

# *Research on the Development Strategy of New Energy Vehicle Industry Driven by Blockchain Technology and Supply Chain Finance—Taking BYD Supply Chain Finance as an Example*

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**Abstract:** With the emphasis on environmentally friendly and sustainable development in economic development, there has been an increasing demand for new energy; especially as new energy vehicle products continue to replace traditional automotive industry development. Against the backdrop of the rapid development of blockchain technology, this article elaborates on the current situation and problems of China's new energy vehicle development, as well as the current situation of BYD Motors' financial development in the new energy vehicle supply chain, and proposes general issues for the development of the new energy vehicle industry. It is hoped that targeted policy recommendations will be proposed in future research.

## 1. The Current Development Status of New Energy Vehicles and Supply Chain Finance in China

### 1.1 Current Development Status of New Energy Vehicles in China

Table 1: Annual Sales of New Energy Vehicles in China from 2017 to 2022

Time	Sales volume (10000 units)
2017	77.7
2018	125.6
2019	120.6
2020	136.7
2021	352.1
2022	688.7

Data source: Wind database

2021 is known as the "first year" of electric vehicle development by the new energy vehicle industry. Prior to this, the development of new energy vehicles in China mainly relied on national

subsidies and support for new energy vehicles. However, since 2021, although subsidies from national and local governments have gradually declined, the demand for independent consumption in the new energy vehicle market has further been released. Table 1 shows the sales of new energy vehicles in China from 2017 to 2022. It can be seen that the sales of new energy vehicles in China for the entire year of 2022 were 6.887 million units, a nearly double year-on-year increase.

## 1.2 Current Development Status of China's Supply Chain Finance

From the current practical application of supply chain finance, it can be seen that the scope of use of supply chain finance is continuously expanding. Table 2 shows the number of listed companies participating in supply chain finance business. From 25 companies in 2014 to 910 companies in 2019, these companies are actively investing in this field and constantly growing and expanding. With the continuous progress of technology, China's supply chain finance scale has exceeded 52 trillion yuan, making significant progress and becoming the world's most dynamic economy.

Table 2: Number of Listed Companies Participating in Supply Chain Finance Business

Time	Number of listed companies
2014	25
2015	356
2016	298
2017	468
2018	729
2019	910

Data source: Insight Research Report

## 2. The concept of Blockchain Technology

The application of blockchain technology is becoming more and more widespread. The core problem solved by Olnes et al. is whether blockchain technology will lead to innovation and transformation of government processes. Based on a rigorous evaluation, although he provided guidance for further research on the potential advantages of BC applications in e-government and the role of BC architecture and application governance in meeting social needs and public interests, the research process lacks data [1]. Möser et al. evaluated two weaknesses in Monero's mixin sampling strategy based on experience. First, approximately 62% of transaction inputs with one or more mixins are susceptible to "chain reaction" analysis, that is, the actual input can be inferred by elimination. Secondly, the sampling method of Monero mixed coins can easily distinguish them from real coins by age distribution. Although there are still a large number of potentially privacy-sensitive transactions affected by these weaknesses after removing the mining pool activities in his research, the research process is too complicated [2].

Blockchain is a chain composed of blocks one after another. Each block stores a certain amount of information, which is connected into a chain in the chronological order of their respective generation. This chain is stored in all servers, and as long as one server in the entire system is operational, the entire blockchain is secure. These servers are referred to as nodes in the blockchain system, providing storage space and computing power support for the entire blockchain system. If you want to modify information in the blockchain, you must obtain the consent of more than half of the nodes and modify the information in all nodes, which are usually in the hands of different entities. Therefore, tampering with information in the blockchain is extremely difficult. Compared to traditional networks, blockchain has two core characteristics: first, data is difficult to tamper with,

and second, decentralization. Based on these two characteristics, the information recorded by blockchain is more authentic and reliable, which can help solve the problem of people's mutual distrust [3-4].

### **3. Problems in New Energy Supply Chain Finance**

At present, the implementation of supply chain finance services in China is in its early stages, and the relevant laws and systems are not yet perfect. Banks are not very proactive in carrying out supply chain finance in order to control credit risks. The introduction of financial leasing companies into the new energy supply chain has solved the problem of lacking high-quality core enterprises in the finance of the new energy supply chain, providing feasible conditions for carrying out supply chain financial services. However, there are still problems of information asymmetry in the supply chain, and members of the supply chain transmit false information for personal gain; The construction of new energy power stations relies on credit obtained by financing leasing companies from banks. With the implementation of the "Management Measures for Joint Credit Granting of Banking and Financial Institutions", the credit limit of financing leasing companies in banks and other financial institutions will be restricted [5].

#### **3.1 Information Asymmetry**

Financial leasing companies in the new energy supply chain are unable to grasp all transaction information of small and medium-sized enterprises in the supply chain, and the authenticity of the information cannot be guaranteed, resulting in low enthusiasm for providing credit endorsements. Although supply chain finance has been integrated with the internet, the business flow, information flow, and logistics in the supply chain are controlled by different information entities. Although it is technically and operationally feasible for banks and other funding providers to eliminate information asymmetry, the cost is too high compared to loan quotas [6].

#### **3.2 Information Opacity**

The lack of timely disclosure of the transaction process in the supply chain results in banks obtaining transaction information only afterwards, failing to timely understand the entire transaction process, incomplete transparency of business and information flow, and untimely updates of credit balances. Small and medium-sized enterprises may participate in the new energy ecosystem led by multiple core enterprises, resulting in duplicate pledges. In addition, there are some behaviors of enterprises reselling roads, as well as potential government rent seeking issues [7].

#### **3.3 Credit Risk**

At present, China's credit reporting system is not yet perfect. Most small and medium-sized enterprises in the new energy supply chain have loan demand, which faces significant uncertainty in their development, low default costs, poor performance, and significant credit risks. There may be a risk that companies that are not involved in the new energy supply chain may use the country's preferential policies for financing and taxation in the new energy industry to engage in false transactions with core supply chain enterprises, forge bills and transaction information to deceive bank loans or evade taxes [8].

### 3.4 Limited Credit

Limited credit includes limited credit scope and limited credit limit. Supply chain finance revolves around core enterprises, and financial institutions such as banks can only provide credit support to small and medium-sized enterprises that directly trade with core enterprises. Core enterprise credit cannot radiate the entire supply chain. With the deepening of deleveraging, it will become difficult for financial leasing companies to obtain bank credit, and the overall financing capacity of the new energy supply chain will be limited. The liquidity of small and medium-sized enterprises that already lack funds in the supply chain will become even more tense.

## 4. BYD Company Applies Blockchain Technology to Improve Supply Chain Finance Analysis

### 4.1 Analysis of the Effect of "Di Chain" on Improving BYD's Operating Capacity

Table 3 shows the accounts receivable turnover, inventory turnover, current asset turnover, and operating cycle of BYD from 2020 to 2022. BYD's turnover rate and revenue cycle of accounts receivable, inventory, and current assets have all decreased, especially in March 2022, which is nearly half of the turnover rate compared to March 2020. This indicates that BYD's economic benefits are constantly improving, and its development prospects are becoming increasingly optimistic. Despite some changes in inventory turnover, overall, it is steadily increasing. BYD's current asset turnover rate generally shows an upward trend, rising from the initial 1.19 to 1.56. The turnover rate of accounts receivable has significantly increased, from 2.57 to 5.58. Compared to before the launch of the "Di Chain" platform, the downstream dealers of BYD have a significant problem of occupying BYD's funds. The increase in BYD's accounts receivable rate indicates that the "Di Chain" supply chain finance has enabled BYD's funds to be withdrawn more quickly, and also indicates that the "Di Chain" has promoted more efficient flow of funds in BYD's supply chain [9-10].

Table 3: BYD's Operations from 2020 to 2022

Time	Business cycle (days)	Inventory turnover rate	Accounts receivable turnover rate	Current asset turnover
2020-03	369.95	0.50	0.47	0.19
2020-06	252.16	1.48	1.38	0.56
2020-09	220.69	2.36	2.54	0.98
2020-12	196.68	3.64	3.68	1.43
2021-03	184.39	0.91	1.05	0.33
2021-06	172.54	1.91	2.30	0.75
2021-09	164.62	2.94	3.70	1.13
2021-12	149.34	4.24	5.58	1.56
2022-03	136.05	1.02	1.88	0.39
2022-06	124.45	2.23	4.10	0.86
2022-09	119.13	3.28	7.31	1.40

Data source: Wind database

### 4.2 Accounts Receivable Turnover Rate of BYD's Core Suppliers

Table 4 shows the accounts receivable turnover rate of BYD's core suppliers from 2017 to 2022. This article selects five listed companies among BYD's core suppliers, namely Fuyao Glass

Industry Group Co., Ltd., Shenyin Baoshan New Technology Co., Ltd., Huizhou Desai Xiwei Automotive Electronics Co., Ltd., Landai Technology Group Co., Ltd., and iFlytek Technology Co., Ltd. From Table 4, it can be seen that the accounts receivable turnover rate of BYD suppliers has significantly increased and shows an upward trend from 2018 to 2020. Therefore, it can be concluded that the implementation of the "DiChain" supply chain finance platform has enabled BYD's suppliers to obtain more loans, thereby improving their operational efficiency [11-13].

Table 4: Accounts receivable turnover rate of BYD's main suppliers from 2017 to 2022

Company Name	2017	2018	2019	2020	2021	2022
Fuyao Glass	5.09	5.53	5.99	5.54	5.87	5.87
Yinbaoshan New	3.99	3.71	4.23	5.56	4.46	3.47
Desai Xiwei	5.06	4.42	3.84	3.98	4.24	3.3
Lande Technology	2.93	2.44	2.88	4.36	4.29	2.6
IFLYTEK	2.5	2.66	2.38	2.47	2.83	1.51

Data source: Wind database

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