

Research on the Development of Supply Chain Finance Driving the Development of New Energy Industry Chain—Taking BYD Supply Chain Finance as an Example

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Abstract: The article starts with introducing the relevant concepts of supply chain finance, elaborates on the development stages of supply chain finance, and combines the development issues of BYD's supply chain finance to propose the rational use of supply chain finance and prevent related risks; adjust the supply chain finance model, strengthen the establishment of online platforms, and improve the financial technology information management system and system.

1. Introduction

Supply chain finance focuses on the nodes of the supply chain, namely, the core enterprises and upstream and downstream companies, where funds flow with the aim of improving the competitiveness and intrinsic value of the supply chain through cooperation between the core enterprises and upstream and downstream enterprises. At the same time, supply chain finance integrates logistics, business flow, capital flow, and information flow, among which logistics is the foundation; information flow is a bridge; capital flow is the purpose; business flow is a carrier that effectively integrates these four flows into supply chain management, providing various financial services to enterprises at all stages of the entire supply chain and capital financing [1].

The characteristic of supply chain finance is to look at the entire industry chain from the core enterprise, transfer funds to weaker links upstream and downstream of the supply chain, and help small and medium-sized enterprises overcome difficulties in supply chain development. Furthermore, the credit services of financial institutions serve the trading behavior of upstream and downstream enterprises in their supply chain, strengthen trade credit, improve bargaining power, and make the internal communication among participants in the supply chain more fair, basically forming long-term strategic synergies. It establishes the relationship between each other, which further enhances the strength of the supply chain and plays a positive role in the long-term stability of the supply chain. Supply chain finance provides a new perspective for credit risk assessment of small and medium-sized enterprises. Based on the concept of supply chain financing, these financial institutions give equal attention to the entire supply chain and its operation, as well as the credit risk

assessment of small and medium-sized enterprises. At the same time, more small and medium-sized enterprises have gained financial flow [2].

This study takes accounts receivable financing model as an example to further explain. The accounts receivable financing model refers to the way in which enterprises obtain financing by pledging their account receivable bills. This approach can effectively avoid asset loss, making it easier for enterprises to better manage and control their own assets. Accounts receivable refer to the uncollected amount formed by a company after selling goods or providing services to its customers. These payments usually need to be collected within a certain accounting period. However, enterprises often face pressure on capital turnover while waiting for customers to make payments, especially for upstream suppliers. Account receivable financing can help enterprises solve the problem of liquidity shortage. Specifically, enterprises can mortgage their outstanding account receivable bills to financial institutions, which will provide financial support. This way, enterprises can quickly obtain the necessary funds without losing the accounts receivable, thereby solving the pressure of capital turnover. As shown in Figure 1.

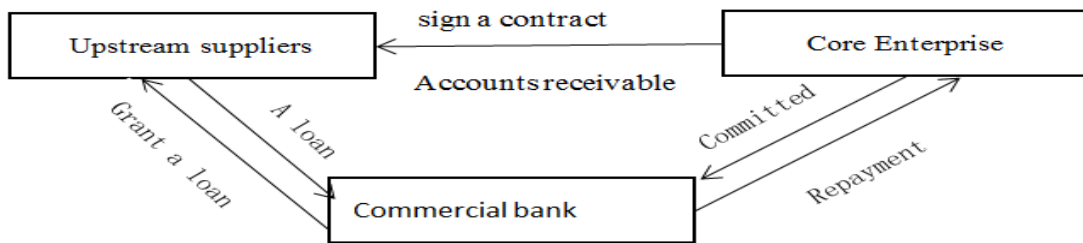


Figure 1: Account receivable financing model

2. Development Stages of Supply Chain Finance

The first stage is the supply chain finance stage led by financial institutions. At this stage, commercial banks or traditional financial institutions provide supply chain-based financial products and are responsible for developing, providing, and managing supply chain financial products that finance core enterprises. At this stage, financial institutions do not directly participate in the supply chain operation process and can only be considered participants. They cannot truly grasp the details of transactions and logistics, and their risk control is mainly based on financial statements and pledged assets [3].

The second stage is the supply chain finance stage led by core industrial enterprises. This study establishes its own supply chain system, and cooperates with financial institutions, upstream and downstream operators, and third-party operators to provide capital procurement services for your upstream and downstream operators. Its limitations lie in: on the one hand, only with a relatively complete supply chain system can supply chain financial services be promoted, and most enterprises, especially small and medium-sized enterprises, do not have this ability. On the other hand, financial services often only target primary suppliers and customers of large companies, which makes it difficult to promote financial services in multilevel supply chains [4].

The third stage is the supply chain stage based on the network platform. The structure formed at this stage is no longer a chain-like a supply chain, but a virtual industrial cluster based on a key platform, especially the Internet, that is, direct industrial ecology and cooperation between ecosystems, including vertical cooperation of "up" and "down" as well as oblique cooperation between regions and departments. This stage poses enormous challenges to management, and without good information and communication technology, the network platforms that fund these supply chains are unsustainable [5].

The fourth stage is supply chain finance driven by financial technology. At this stage, fintech refers to technological innovation in the financial field. Financial technology utilizes artificial intelligence, blockchain, cloud computing, and big data to develop financial services in the supply chain, enabling companies to provide financial services more effectively, transparently, and securely. At this stage, not only will the business network structure and strong business relationships, but the gradual integration of digital information will also develop supply chain finance and risk control.

Table 1: Development History of Supply Chain Finance

Supply chain finance model	Characteristics	Main participants in financial services	Main sources of funds	Technical support
Supply chain finance 2.0 model	diversified financing model	commercial banks, core enterprises	commercial banks	Internet+
Supply Chain Finance 3.0 model	supply chain informatization	third-party e-commerce service platforms, commercial banks core enterprises,	commercial banks	cloud platforms, data risk control
Supply Chain Finance 4.0 model	intelligent risk control	large-scale third-party e-commerce service platforms, commercial banks, core enterprises,	Commercial banks, e-commerce platforms	Internet of Things, artificial intelligence, big data
Supply Chain Finance 5.0 model blockchain platform,	core enterprises	upstream and downstream enterprises on the supply chain	core enterprises	electronic digital vouchers, blockchain technology

3. Analysis of Financing Issues in BYD's New Energy Industry

3.1. Emphasis on Debt Financing, Unreasonable Financing Structure

Table 2: BYD's 2017-2021 Financial Report (Data Source: Company Annual Report)

Source of funds(%) time	2017	2018	2019	2020	2021
Short term loans	20.09	19.42	20.62	8.16	3.45
Notes payable and accounts payable	22.61	23.79	18.49	25.82	27.21
Long term loans	3.58	3.52	6.11	7.34	2.96
Bonds payable	2.52	3.64	5.1	4.42	0.69
Paid-in capital (or share capital)	1.53	1.4	1.39	1.36	0.98
Other equity instruments	2.19	2	2.25	0.54	0
Perpetual bonds - owner's equity	2.19	2	2.25	0.54	0
Capital reserve	13.74	12.6	12.54	12.29	20.56
Other comprehensive income	0.71	-0.15	-0.02	-0.28	-0.04
Surplus reserves	1.91	1.97	2.1	2.21	1.69
Undistributed profits	10.8	10.54	10.76	12.17	8.94

Through research on BYD Co., Ltd., we can find that its asset liability ratio is very high across the entire industry. Moreover, from Table 1, it can be seen that BYD's asset liability ratios in the past five years have been 66.33%, 68.81%, 68%, 67.94%, and 64.76%, respectively. This indicates that the company relies too heavily on debt financing, and its financing structure is unreasonable when the company is in a high debt state. From the data in Table 2, it can be seen that the proportion of debt financing has reached nearly 70%, indicating that debt financing has become an important component of the company's external funds. This also reflects the issue of imbalanced debt to

financing ratios in BYD. Excessive debt financing will increase the company's payment risk, increase its operating costs, affect its cash flow, and reduce its refinancing ability, potentially endangering its survival. If it is at the same time, it is difficult for enterprises to quickly obtain large amounts of funds through other financing channels, which will have a significant impact on the financial risk of the enterprise. Moreover, if there is a relatively high asset liability ratio, it will cause a series of problems to the capital structure and operation of the enterprise.

3.2. Single Financing Model

The current development situation of BYD Company is that long-term loans and repayable loans alternate, which reflects the problem of excessive borrowing pressure and the phenomenon of insolvency. The bonds issued by BYD Company are only for obtaining more working capital in the future to reduce the loan pressure of the enterprise. Meanwhile, compared with BYD's short-term debt ratio and long-term debt ratio, it is evident that the proportion of short-term debt is higher [6]. This indicates that in order to quickly obtain financing, short-term loans can only be obtained through green credit to meet the development needs of new energy vehicles. From Figure 2, it can be seen that a large portion of BYD's debt is composed of short-term debt, which makes the cash flow issue more prominent [7]. Overall, it has had a significant impact on BYD's capital structure and operations. Because its debt has strong liquidity, its debt structure has high risk, so its interest rates and repayment pressure are increasing. This has forced BYD to struggle for support between the new and old types of debt, with the new debts repaying the old debts. This has led to an increasing overall debt pressure, ultimately forming a strange circle of "tearing down the east to make up for the west". BYD has a significant share in the new energy field, so it is also necessary to develop secondary batteries. The development of new energy vehicles requires companies to continuously improve their technology, and technological innovation often takes a long time, and the return on investment is also high [8]. To maintain good operations, capital support must be provided for a long period of time, which poses great risks. Due to BYD's large amount of short-term debt during its external fund raising process, the company faces significant risks. In order to avoid this situation, the company's senior management must take new preventive measures. However, this short-term debt has not effectively promoted the company's innovation and is difficult to improve the company's technological level. Therefore, excessive short-term debt will seriously affect the company's development in the new energy field, it will also affect the long-term development of the company.

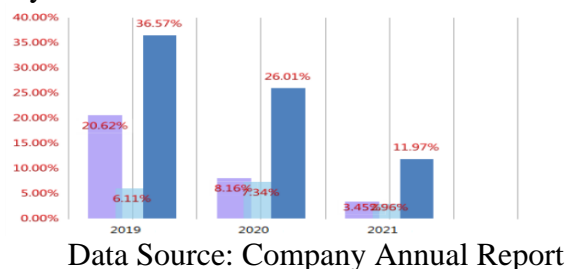


Figure 2: Ratio of Long Term Debt and Short Term Debt of BYD Company from 2019 to 2021

3.3. Over Reliance on Government Subsidies

According to reports, from 2011 to 2020, BYD saw an overall surge in the amount of government subsidies it received. Compared to the industry, average, BYD receives much higher annual subsidies. In BYD's first year, in 2012, its subsidy growth rate was as high as 82.72%, which can be described as a rapid progress. From 2013 to 2014, although the amount of subsidies received

continued to increase, its growth rate gradually slowed down and showed a stable trend. In 2015, even with negative economic growth, the amount of subsidies received was still considerable. During the 2016-2018 period, the subsidy amount surged and reached a new high of 1.558 billion RMB in 2018.

4. Measures to Improve Financing Issues through Supply Chain Finance

4.1. Reasonable Use of Supply Chain Financing to Prevent Related Risks

BYD needs to accelerate the approval of industry compliance to avoid a bunch of illegal and non-compliant enterprises entering and disrupting market rules. At the same time, enterprises should reexamine their own expansion direction to avoid malicious competition and unnecessary resource waste. Various service platforms actively connect to form a common information network database for supply chain financial entities such as sales channels, financial companies, and commercial banks, providing users with a better experience. At the same time, the market risk is actually uncertain, so it is necessary to establish a timely emergency mechanism to ensure the ability of upstream and downstream enterprises in the supply chain to survive under various uncertain risks [9].

BYD can effectively control the risks in the supply chain by utilizing technologies such as big data and cloud computing to timely understand the current situation of enterprises in the supply chain. It can also utilize the characteristics of blockchain decentralization and information traceability to timely identify risks and prevent information leakage. At the same time, the digitization, visualization, and intelligence of supply chain finance are achieved through financial technology methods, breaking the problem of information silos, improving risk management efficiency, and reducing risk management costs [10].

4.2. Adjusting the Supply Chain Finance Model and Strengthening the Establishment of Online Platforms

BYD should establish and improve a business ecosystem centered around the Internet, building a business ecosystem that integrates platforms, customers, and resources [11]. By utilizing the Internet, BYD should create an open e-commerce platform, lower market entry barriers, and attract more resources. By connecting suppliers, distributors, channel customers, and technical partners through a close network, a stable interest link is formed, and the connection between core enterprises and other external enterprises is strengthened. By obtaining funding at a lower cost through the supply chain, production activities are ensured to improve the competitiveness of the enterprise.

BYD should establish a more open online platform that not only connects offline economic activities in a virtual space, but also facilitates data analysis and collection, as well as timely compliance with regulatory regulations. At the same time, using an online platform can help supply chain financial services break the barriers of time and space, display supply chain financial services on the platform, and obtain effective advice. Building a diversified supply chain financial service platform can not only strengthen the communication and exchange between enterprises in the supply chain, but also enable faster and better data exchange [12].

4.3. Improving the Financial Technology Information Management System and System

BYD needs to increase the investment in information security technology, protect information security with the standard system of cloud computing and big data, and recognize that financial

technology can effectively support information systems in the long term. At the same time, establish an information security risk assessment system for fintech, analyze potential vulnerabilities in the security system and assess the possible consequences of information security incidents using risk management methods, and promptly propose corresponding measures and countermeasures. In the data transmission process, it is necessary to improve risk prevention capabilities and ensure information security during data transmission [13].

In response, the risk awareness and management level of BYD's management personnel should be correspondingly improved, and the internal control management system should be improved. Real time monitoring of transaction information using big data technology and timely prevention and control to prevent regulatory loopholes in financial technology. This study integrates emerging technologies into the fintech information security management system, timely updates and upgrades related software and hardware, and enhances the security defense capability of information systems. Integrating technology and supply chain better not only ensures the security of the supply chain system, but also provides more accurate data information.

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