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Research on the Development of Supply Chain Finance in the Digital Age

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Abstract: The widespread application of new-generation information technologies has driven the continuous development of supply chain finance in terms of expanding the credit base, precise risk control, and diversifying financing channels. In response to this trend, the government has successively introduced a number of policies aimed at regulating, guiding, and supporting the healthy and orderly operation of supply chain finance. These policies include improving public data open platforms, optimizing the regulatory system, strengthening risk governance, accelerating the construction of exchanges, improving the unified registration and information disclosure system, and introducing relevant supporting policies. To further promote the high-quality development of supply chain finance, it is necessary to continuously improve the risk-control system, ensure the stable operation of the financial market, enhance financial governance capabilities, adapt to dynamic market changes, and improve the information disclosure mechanism to provide institutional support for the construction of the data credit system.

Keywords: Digitalization; Supply chain finance; Development

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1. Introduction

Supply chain finance is an important tool connecting financial capital and the real economy, and it is of great significance for stabilizing the industrial chain and smoothing the economic cycle [1]. Since 2017, the state has successively introduced policies to encourage the establishment of supply-chain-finance service platforms. The 2021 Government Work Report also proposed "innovating the service model of supply chain finance", highlighting its strategic position. Driven by information technology, supply chain finance helps to alleviate corporate financing constraints, strengthen upstream-downstream collaboration, enhance the resilience and operation efficiency of the supply chain, and contribute to the sustainable development of enterprises [2]. In reality, enterprises such as State Grid Yingda, Shandong High-Speed Group, and NIO have achieved positive results in promoting green transformation through supply chain finance. However, some enterprises, such as Chengxing International and

Yijian Shares, carried out financing through false transactions, exposing problems such as weak risk control. In 2024, regulatory authorities issued documents emphasizing that supply chain finance should return to its essence of serving the real economy and cracking down on false transactions. Therefore, it is urgent to deeply study the actual impact of supply chain finance on the sustainable development of enterprises and promote its standardized and healthy development.

2. Overview of the supply chain

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2.1.1. The connotation of supply chain finance

Supply chain finance is an innovative financing model that relies on core enterprises and is carried out for small and medium-sized enterprises upstream and downstream of them. This model helps financial institutions reduce risks and improve capital efficiency by optimizing and controlling the overall cash flow of the supply chain. In practice, it requires core enterprises to establish stable cooperative relationships with small and medium-sized enterprises, strengthen the assessment of the latter's credit and operating conditions, and conduct scientific analysis and value assessment of the entire supply-chain system.

On this basis, financial institutions can set financing limits based on real transactions. The repayment methods are flexible, such as installment repayment and equal-principal-and-interest repayment, to meet the capital needs of different enterprises. In addition, core enterprises should also assume the responsibilities of guidance and support, help small and medium-sized enterprises solve problems in terms of capital, management, and technology, and provide comprehensive and professional services to promote the sustainable development of the industrial chain.

In modern commerce, supply chain finance has become an important part of corporate strategic management, relying on the leading role of core enterprises. These enterprises play a dominant position in the market and maintain frequent business contacts with numerous suppliers and distributors. With the expansion of transaction scales and the increase in the complexity of the supply chain, the accuracy and real-time nature of information flow are particularly crucial. Therefore, it is of great importance to establish an efficient information system. This system can integrate data from all links of the supply chain and use technologies such as cloud computing and big data for intelligent analysis. Relying on these technologies, supply chain finance can provide diversified financial services, such as financing plans, insurance products, and risk-control tools, to meet the capital-flow and risk-management needs of enterprises.

2.1.2. The systematic characteristics of supply chain finance

One of the core characteristics of supply chain finance is its systematic nature. That is, starting from the entire supply chain, it runs through all links from procurement, production, logistics to sales, achieving full-process, closed-loop management. Through system integration and optimization, it not only improves operational efficiency, reduces transaction and financing costs, but also enhances enterprises' market responsiveness and competitiveness.

In addition, supply chain finance creates more opportunities for small and medium-sized enterprises to participate in market competition. Facing difficulties such as capital shortages and insufficient credit, small and medium-sized enterprises can obtain convenient financing relying on the credit and financial support of core enterprises and achieve stable development. It can be seen that supply chain finance is not only an innovation of financial tools but also an important force in promoting industrial collaboration and improving economic

efficiency.

To sum up, the development of supply chain finance integrates technological progress, management updates, and business-model reconstruction. By strengthening the information-sharing and collaboration mechanisms between core enterprises and their upstream and downstream, supply chain finance is gradually becoming a new driving force and innovation engine for promoting the high-quality development of the real economy.

3. New trends in the development of supply chain finance in the digital age

Supply chain finance in China originally originated from trade finance and logistics finance [3]. With the increasingly complex and in-depth development of the supply-chain system, in the process of integrating with the digital economy, supply chain finance has gradually shown significant new trends, such as the expansion of the credit base, precise risk control, and diversified financing channels. In the early stage, supply chain finance was mainly dominated by commercial banks, providing financing support around core enterprises and their upstream and downstream and undertaking corresponding risk-control functions. With the refinement of the division of labor and the application of digital technologies, supply chain finance has gradually expanded from serving bilateral transactions to multi-level suppliers, distributors, and even the entire industrial chain. In this process, core enterprises, with their control over transaction data and good credit qualifications, have become the hubs and credit bases of supply chain finance. The widespread application of new-generation information technologies such as the Internet of Things, big data, and blockchain in the financial field has further expanded the credit base, improved risk-control efficiency, and broadened financing channels, providing technical support for the innovation and efficient operation of supply chain finance [4].

3.1. The expansion of the credit base

In the traditional financial system, the credit base was mainly established on real-estate mortgages. With the development of trade, movable property gradually became an acceptable collateral, especially highly liquid commodities such as bulk energy and grain. Subsequently, equity-based assets such as accounts receivable and letters of credit were also included in the scope of pledges, enriching the means of credit support. At present, digital technologies are promoting the transformation of the credit base from “physical assets” to “data”:

(1) The Internet of Things technology: It enables real-time monitoring of goods, improves the transparency and security of logistics, and allows financial institutions to extend their financing targets to assets that are traditionally difficult to pledge, such as semi-finished products and parts, without relying solely on the realizable value of movable property.

(2) Blockchain technology: It enhances the credibility of transaction data and promotes the extension of accounts-receivable financing to multi-level suppliers.

(3) Big-data technology: It promotes the evolution of credit assessment from “asset-based credit” to “data-based credit”, giving rise to “instant-approval” financing products based on platform data, such as Huabei, Jiebei, and order-based loans, improving the financing availability and efficiency of small and medium-sized enterprises.

3.2. Precise risk-control measures

New-generation information technologies endow supply chain finance with efficient and low-cost risk-control

capabilities, which are reflected in the following three aspects:

(1) More efficient risk identification: The combination of big data and the Internet of Things enables the real-time collection and analysis of transaction and logistics data, effectively distinguishing between real financing needs and speculative financing [5].

(2) Timely risk prevention: Through intelligent monitoring systems, financial institutions can keep abreast of the operating conditions of enterprises in real-time and dynamically adjust credit-granting strategies, which is significantly better than the information-lagged model relying on manual review in the past.

(3) Scientific risk resolution: Cross-verification and dynamic monitoring can accurately identify the causes of defaults. For defaults caused by short-term liquidity shortages, financial institutions can assist enterprises in overcoming difficulties by optimizing the financing structure and broadening the sources of funds, achieving risk mitigation and resource reallocation.

3.3. Diverse capital channels

China's financing system has long been dominated by indirect financing, with the lagging development of direct financing. Information technology is gradually breaking this pattern [6]:

(1) Promoting the development of direct financing: For example, the bill market uses blockchain technology to quickly verify credit information, providing support for building a safe, transparent, and sustainable short-term financing channel.

(2) Breaking market barriers: Traditional financing markets are separated due to differences in risk preferences, sources of funds, and risk-control logics. With the popularization of big data, the risk-control logic is gradually shifting from "collateral-based" to "information-based", promoting market interconnection [7].

(3) Promoting the diversification of financing products: Information technology promotes the convergence of risk-control logics. Enterprises can flexibly select products that match their needs in a wider financing market, achieving the optimization of the financing structure and flexible management [8].

4. Suggestions for further improving supply chain finance policies

Supply chain finance policies revolve around "demand-supply-risk", aiming to standardize and promote its stable development by accelerating the construction of the financing market, improving the information-disclosure mechanism, and perfecting the risk-supervision system. The following are suggestions for further improving supply chain finance policies:

4.1. Improve the risk-control system to ensure the stable operation of the financial market

As the credit base extends from real estate and movable property to data credit, the financial boundaries become increasingly blurred, and the difficulty of risk control rises. To meet these challenges, the following suggestions are put forward:

(1) Diversify risk-control means: For different credit bases (such as real estate, movable property, and data), financial institutions are encouraged to adopt flexible and diverse risk-control mechanisms [9].

(2) Expand the scope of risk control: Shift the focus of risk control from a single market to multiple markets, and strengthen cross-market monitoring and data cross-verification.

(3) Improve the multi-party cooperation mechanism: Promote the construction of a cross-verification mechanism for business flow, logistics, and data flow to form a scientific and effective risk-control model.

4.2. Continuously enhance the governance ability of the financial market to adapt to market evolution

New technologies accelerate the transformation of financial institutions and also bring new changes in organizational models and risks. The government needs to enhance its governance capabilities:

(1) Adapt to the evolution trend of products: The boundaries of the financing market are becoming increasingly blurred, and traditional bank products are gradually moving closer to direct financing. Supervision needs to re-examine the "three-check" system and adjust the framework to adapt to the new business logic [10].

(2) Respond to the risks of new models: Supply-chain-finance platforms have given rise to new products. For example, although multi-level creditor's rights transfer based on blockchain technology improves efficiency, its potential risks emerge with a time lag. Regulatory authorities should pay close attention to the development of new businesses, promptly identify risks, and establish corresponding regulatory mechanisms.

4.3. Improve the information-disclosure mechanism to support the development of data credit

Effective information disclosure is the core support for promoting the development of supply chain finance. Therefore, the following suggestions are made:

(1) Promote the sharing of government data: In accordance with the Document, strengthen the information connection between the government, financial institutions, core enterprises, and third-party institutions, and clarify the scope and standards of information sharing [11].

(2) Improve the quality of information disclosure: Ensure the timely disclosure of information such as bill delinquencies and bond defaults to enhance the market's risk-warning ability [12].

(3) Promote the standardization of the bill market: Improve the interconnection level of platforms and market liquidity, improve the national capital-allocation efficiency, and enhance the risk-sharing ability.

To sum up, improving the risk-control system, strengthening market governance, and improving the information-disclosure mechanism will help supply chain finance achieve compliant innovation and high-quality development in the context of the digital economy [13]. The government should continue to promote policy improvement to support the steady progress of this field.

5. Conclusion

The integration of next-generation information technologies has become a key driver in the evolution of supply chain finance, contributing to the expansion of credit foundations, refinement of risk control mechanisms, and diversification of financing channels [14]. In response, the Chinese government has implemented a series of targeted policies aimed at fostering a regulated and sustainable development environment [15]. These measures—ranging from the establishment of public data platforms and optimization of regulatory frameworks to the enhancement of unified registration and disclosure systems—constitute a comprehensive institutional support system.

Despite these advancements, the pursuit of high-quality development in supply chain finance remains contingent upon addressing several structural challenges. It is imperative to strengthen risk management frameworks, improve financial market resilience, and enhance governance capabilities to better respond to an increasingly complex and dynamic market landscape. Furthermore, the development of a robust and transparent information disclosure mechanism is essential to underpin the construction of a credible data-based credit system.

Ultimately, the synergistic integration of technological innovation and institutional reform will be critical to unlocking the full potential of supply chain finance. Such coordinated efforts are expected to enable the sector to more effectively support the real economy, particularly by improving access to finance for small and medium-sized enterprises.

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