Research on New Supply Chain Finance Models in the Context of Digital Economy

--Taking IP Enterprises as an Example

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Abstract. Traditional financing methods, characterized by information asymmetry, stringent credit evaluation criteria, and operational inefficiencies, have proven inadequate in addressing the financing needs of small and medium-sized enterprises (SMEs). It has led to the emergence of supply chain finance (SCF) as an innovative financing solution. This study systematically examines the evolutionary trajectory and fundamental concepts of SCF, while conducting a comparative analysis of conventional and emerging SCF models. For intellectual property (IP) enterprises, while SCF presents an effective financing approach, this study suggests that incorporating government credit enhancement mechanisms is essential to expand the applicability of SCF within this specific sector.

Keywords: Supply chain finance, Government credit enhancement, IP enterprises, Innovative financing models.

1 Introduction

As cultural construction gains increasing emphasis in today's society and has become a core task for promoting national development, IP-based enterprises—whose primary outputs are intellectual property rights—stand out due to their unique creative appeal and strong brand influence. These enterprises have become key targets of support in economic development and have attracted significant attention. However, these enterprises commonly face financing challenges during their development. This is especially true for IP-based companies in consumer sectors, such as mobile game developers and trendy toy manufacturers, whose products' intangible value is difficult to accurately assess, making them ineligible for traditional financing. Supply chain finance (SCF), as an innovative financial service model, effectively addresses the limitations of traditional financing—such as information asymmetry among supply chain participants, stringent financing requirements, and operational inefficiencies—by deeply integrating financial resources with supply chain operations. This approach has created new financ-

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ing channels for numerous enterprises. Theoretically, SCF can offer IP-intensive enterprises more customized and efficient financing solutions to alleviate their capital constraints.

Currently, there is a relative lack of academic research on the application of supply chain finance in IP Enterprises. Existing research has predominantly focused on financing for technology-driven IP enterprises, while largely neglecting the financing challenges specific to consumer-oriented IP enterprises. Accordingly, this study specifically investigates supply chain finance (SCF) for consumer-sector IP enterprises, systematically analyzing their distinctive business characteristics and financing constraints. Explore the innovative application model of government credit enhancement supply chain finance in this field.

2 Definition of Supply Chain Finance

2.1 Development Trajectory

The genesis of supply chain finance (SCF) can be traced to the standardized operations of warehouse receipt pledging in the early 20th century. The formation of its modern paradigm, however, has been fundamentally shaped by two concurrent developments: the theoretical advancement of supply chain management and structural transformations in global industrial specialization.

After the 1980s, multinational corporations (MNCs) promoted the rise of the supply chain management mode with the help of global business outsourcing, which made the integration of logistics and information flow in the supply chain gradually mature. However, due to the lag in capital flow management, the problem of rising transaction costs has become increasingly prominent. Enterprises have gradually realized that it is difficult to break through the bottleneck of capital constraints by relying solely on cooperation within the supply chain. Third-party financial institutions must be introduced to provide systematic solutions, which has given birth to a new financing model of supply chain finance [1].

The core reason lies in the fact that, in the context of globalization, enterprises need to maintain their competitiveness by optimizing the capital efficiency of their supply chains. However, traditional financing models often fail to meet the financing needs of small and medium-sized enterprises due to issues such as information asymmetry. Therefore, a financing model that deeply integrates financial resources with supply chains has emerged [2]. Particularly since the 21st century, economic globalization has entered an accelerated phase, with international division of labor deepening and interdependence among major economies increasing. It has indirectly intensified global competition and increased the frequency of sudden events (such as financial crises and the COVID-19 pandemic), while amplifying their contagion effects and impact scope. Consequently, access to sustained and stable cash flows—especially for small and medium-sized enterprises (SMEs)—has become a critical determinant of long-term corporate resilience and sustainability. Against this backdrop, supply chain finance (SCF), as an innovative financial model that effectively facilitates SME financing within supply chains, has seen its strategic importance increasingly recognized [3].

2.2 Core Concepts

Supply chain finance is a systematic solution based on supply chain operations. Its essence lies in integrating financial resources and industrial ecosystems to provide customized financial management services for enterprises in the chain. In 2004, Allen N. Berger and Gregory F. Udell pioneered the conceptual framework of supply chain finance (SCF) through their seminal research on SME financing. Subsequently, Hofmann E. (2005) and other scholars advanced the theoretical foundations, formally defining SCF as 'a collaborative approach among two or more organizations within a supply chain—including external service providers—to jointly create value through the planned execution and control of financial resource flows across organizational boundaries.' The essence of SCF lies in its cross-organizational coordination mechanism for optimal capital allocation [4].

From a broad perspective, supply chain finance focuses on the coordinated optimization of capital flow, logistics, and information flow within the supply chain. Its participants include financial institutions, core enterprises, upstream and downstream suppliers, logistics providers, and other parties, which leverage credit transfer and risk-sharing mechanisms to reduce financing costs. In a narrow sense, supply chain finance refers specifically to comprehensive financial services designed by financial institutions around genuine trade relationships within the supply chain, with core enterprises as the entry point. Its core feature lies in breaking away from the traditional financing model's over-reliance on the creditworthiness of individual enterprises, instead focusing on assessing the overall stability of the supply chain and the self-liquidating nature of trade. Through dynamic risk control measures, it achieves efficient allocation of funds [1].

3 Comparison between Traditional and Innovative Modes of Supply Chain Finance

3.1 Traditional Modes

Traditional supply chain finance is primarily applied in the manufacturing industry. Manufacturing companies typically have well-established supply chains, making them one of the most suitable industries for supply chain finance operations. Traditional supply chain finance models are divided into three types: pre-payment financing, inventory financing, and accounts receivable financing, corresponding respectively to the procurement stage, production stage, and sales stage of a company's production process [5,6].

While current academic research has demonstrated that traditional supply chain finance (SCF) models provide significant assistance in addressing financing difficulties for small and medium-sized enterprises (SMEs), some scholars argue that these conventional approaches exhibit notable limitations. Gong et al. (2022) identify three primary shortcomings in traditional SCF models [7].

First, the collaboration-dependency paradox. In supply chains, core enterprises typically occupy a dominant position, controlling the flow of various resources and playing

a pivotal role in transaction success. This power asymmetry not only creates long-term dependency of SMEs on core enterprises but also forces them to prioritize core enterprise demands over their own development needs, ultimately eroding their competitive advantage.

Second, financing inefficiency. In traditional supply chain finance models, the inherent conflict between core enterprises' cross-regional operations and banks' strong regional focus creates significant difficulties in conducting inter-bank and cross-regional financing activities. Furthermore, the multi-tiered intermediary institutions involved throughout the supply chain contribute to both high financing costs and low operational efficiency.

Third, inadequate risk management and trust issues. Traditional supply chain finance suffers from information asymmetry, which makes data susceptible to tampering, leading to fraudulent trade financing and duplicate financing. In addition, centralized platforms are prone to information abuse and unverifiable transactions, which greatly undermine mutual trust among stakeholders and undermine the stability of the supply chain.

3.2 Innovative Modes

With the continuous advancement and innovation of digital technologies such as artificial intelligence, the Internet, blockchain, and big data, emerging industries leveraging these technologies have demonstrated an increasing trend of integrated development with traditional industries. This convergence has given rise to new business models in the digital economy, among which digital supply chain finance (DSCF) represents a prominent example. Compared with traditional supply chain finance models, DSCF demonstrates the following key improvements and advantages [8,9].

First, promote product innovation and cost optimization. The integration of digital technologies with supply chain finance has promoted the diversified innovation of financial products, effectively addressing the heterogeneous financing needs of small and medium-sized enterprises (SMEs). Concurrently, full process automation and digital operations have substantially reduced manual intervention and paper documents, thereby decreasing both operational and temporal costs. These further promote the popularization and development of supply chain finance.

Second, more efficient credit transfer and resource integration. Digital supply chain finance enables multi-level credit penetration and networked transmission, allowing the credit of core enterprises to radiate to enterprises at all levels within the supply chain network. Moreover, digital supply chain finance (DSCF) enables more effective integration of multi-party resources within the supply chain ecosystem. Through data sharing and operational synergy, it facilitates deeper integration of industry and enhances overall supply chain efficiency.

Third, Full chain transparency and traceability assurance. Digital supply chain finance (DSCF), particularly blockchain-powered SCF, allows all transaction data to be stored on the blockchain, ensuring tamper-proof and real-time verifiability. This technological infrastructure effectively mitigates information asymmetry and transparency issues inherent in traditional systems. Concurrently, through real-time monitoring of

cargo status and transaction flows, it significantly enhances both security protocols and regulatory compliance in supply chain financing.

Fourth, more precise supervision, management, and risk control. Digital supply chain finance uses various digital intelligence technologies to achieve real-time monitoring and intelligent analysis of the entire supply chain process. It not only enables financial services to accurately match the capital needs of enterprises and significantly improve operational efficiency, but also shifts risk control from "post-event management" to "pre-event prevention + in-process monitoring" through real-time data analysis and anomaly monitoring, thereby significantly reducing the probability of default and the due diligence costs of financial institutions.

4 Supply Chain Finance of Intellectual Property Enterprises

4.1 Concept and Characteristics of Intellectual Property Enterprises

Intellectual Property (IP)-intensive enterprises refer to businesses that treat IP as their core asset, achieving value maximization and sustainable development through the creation, utilization, protection, and management of intellectual property. Such enterprises typically exhibit the following characteristics: competitiveness heavily reliant on IP assets; asset-light operations with predominantly intangible outputs; brand-consumer connections established through cultural symbols; and dual legal-commercial attributes [10].

With the ongoing technological revolution, accelerating digital transformation of economies, and increasingly intensified global competition, the focus of international rivalry has progressively shifted from material assets to knowledge-based assets. This paradigm shift has elevated intellectual property (IP) and IP enterprises to strategic priorities for both government support and capital investment.

4.2 Government Credit Enhancement Supply Chain Finance Model for IP Enterprises

Currently, IP-based companies can be broadly divided into two categories: one category focuses on the technology sector, dedicated to technological research and development, innovation-driven growth, such as XINYAOHUI, which specializes in semiconductor IP research and development, and JIRUI Technology, which focuses on developing AI-powered e-commerce intelligent marketing technologies. The other category comprises enterprises focused on the mass consumer sector, specializing in trend culture operations and delivering emotional value to consumers, exemplified by prominent blind box producer POP MART, as well as mobile gaming companies Tencent and NetEase.

Currently, there have been studies exploring how intellectual property-based enterprises in the technology sector can leverage their intellectual property rights to obtain collateralized financing based on supply chain finance principles: small and medium-sized technology enterprises in the supply chain develop new technologies and sign intellectual property usage contracts with core enterprises, which then provide credit guarantees, thereby enabling banks to be willing to provide loans [11]. However, this

financing model is not suitable for consumer-oriented IP companies. The intellectual property value of consumer-oriented IP companies is relatively intangible and varies from person to person. Take the popular IP "LABUBU" from POP MART as an example. Despite being priced at 99 yuan, some consumers are willing to pay exorbitant prices as high as 10,000 yuan for scalped products even during stock shortages, while others consider them useless even if given for free, as they take up space. In such cases, conventional value assessment is impractical, and such companies struggle to secure financing from financial institutions. Therefore, introducing government-backed financing mechanisms is both necessary and beneficial.

Government credit enhancement financing refers to a financial support mechanism whereby the government improves the creditworthiness of small and medium-sized enterprises (SMEs) or specific projects through credit support, risk compensation, policy guidance, and other means. This approach aims to reduce financing costs and difficulties, thereby facilitating access to bank loans or other forms of financing. Common forms include the following.

First, credit guarantees. The government establishes or supports guarantee institutions to provide credit endorsements for SMEs, thereby enhancing their access to bank loans. Second, risk compensation. The government allocates funds to establish risk compensation pools, subsidizing banks for potential losses incurred from SME lending, thereby mitigating banks' risk aversion [12]. Third, policy incentives. Through preferential policies, fiscal subsidies, tax incentives, and other measures, the government encourages banks and financial institutions to increase financing support for SMEs [13].

4.3 Feasibility of Applying Government Credit-Enhancement Financing Models to Trendy Play Enterprises

In summary, existing research predominantly focuses on IP-driven enterprises in the technology sector, while studies on IP-based firms in the consumer domain—such as mobile gaming companies and trendy play enterprises—remain notably scarce. Against this backdrop, this study examines the feasibility of applying government credit enhancement to supply chain finance development, using mobile gaming firms and trendy play enterprises as representative case studies.

Compared with technology-based IP enterprises, consumer-oriented IP firms predominantly rely on virtual assets as their core value, rendering conventional physical collateral financing models inapplicable. Instead, they are better suited for intellectual property pledge financing mechanisms. Secondly, most consumer IP enterprises fall into the SME category due to their relatively small scale and limited social credit standing. Notably, although these enterprises center around virtual products, they maintain comprehensive supply chains that align well with supply chain finance models. A case in point is trendy play enterprises, whose operational ecosystems encompass the full spectrum of creative development, planning, design, manufacturing, marketing, sales, and derivative activity development. These interconnected yet functionally distinct phases, often handled by specialized entities or departments, collectively form an integrated supply chain architecture.

Therefore, for consumer-oriented IP enterprises that face difficulties in obtaining financing through physical asset pledges, government credit-enhanced intellectual property pledge financing emerges as a viable alternative. In practical implementation, governments can provide support through the following approaches:

First, building upon the national policy foundation that strongly supports the development of cultural and creative industries, relevant laws and regulations should be established and refined to strengthen intellectual property protection and foster the growth of trendy manufacturing sectors. Concurrently, financial incentives should be provided to institutions willing to invest in trendy manufacturing enterprises, thereby channelling greater financial resources toward these businesses.

Secondly, relying on the government's creditworthiness to vouch for these enterprises, improve their social credit, reduce the risk of default, and thereby encourage banks to provide financing.

Finally, establish a shared platform to improve the supply chain structure of small and medium-sized trend-driven manufacturing enterprises. The government can introduce large institutions and financial institutions to jointly establish a joint platform. The government provides preferential policies and incentives to large institutions and financial institutions, such as common tax incentives. Large institutions and financial institutions provide incubation assistance to studio enterprises, forming complementary advantages and a virtuous cycle of "creativity-incubation-funding". This not only reduces the burden on the original studio enterprises but also compensates for the lack of core enterprises in the original supply chain.

5 Conclusions

In the context of deep integration between the digital economy and intellectual property (IP) economy, IP-focused enterprises face challenges in securing financing through conventional channels due to their asset-light nature and high-risk characteristics. Particularly in the fashion consumption sector, compared with technology-driven IP companies, these enterprises exhibit more variable output values that lack standardized benchmarks. This makes it difficult for them to obtain funding through intellectual property valuation and collateralization processes. Under these circumstances, the introduction of government credit enhancement becomes imperative. As a vital supplementary mechanism to supply chain finance, government credit enhancement offers distinct advantages, including lower financing thresholds, official credit endorsement, complete supply chain information transparency, and support for emerging industry development. This approach effectively utilizes policy instruments to address market failures. The proposed approach not only directly addresses the financing difficulties and high costs faced by consumer-oriented IP enterprises through the establishment of incubation platforms involving large institutions and financial entities but also fosters the development of the trendy manufacturing industry by enacting relevant laws and regulations. By strategically guiding the allocation of financial resources, this model promotes sustainable development across the entire industry. For consumer IP firms grappling with financing challenges, it is a suitable and efficient solution.

The limitation of this study lies in that although this study sorted out the policy logic and practical framework of government credit enhancement in supply chain finance to support the financing of consumer IP enterprises from a macro perspective, it did not conduct classified discussion on the heterogeneous characteristics of different consumer IP enterprises, resulting in limited pertinacity and practical guidance of the research conclusions. Future research should select representative enterprises across diverse scales, lifecycle stages, and subsectors, discuss how to adjust the coverage and compensation ratio of government credit enhancement, and how financial institutions should set loan interest rates, to more accurately serve the personalized financing needs of consumer IP enterprises.

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