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Exploring supply chain finance from the perspective of third-party logistics providers

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ABSTRACT

This study explores the emerging role of third-party logistics (3PL) providers in supply chain finance (SCF) and develops a 3PL-dominated SCF model to enhance supply chain performance. Using a multiple case study approach with Chinese 3PL providers, the research gathers qualitative insights through interviews. Findings reveal that 3PL-led SCF effectively integrates financial, material, and information flows, improving coordination across supply chains. A conceptual framework is proposed to guide 3PLs in implementing SCF strategies. The study provides novel insights into how 3PL providers, leveraging their financial capacity, can deliver innovative financial solutions to supply chain stakeholders—particularly SMEs. This research advances understanding of SCF by highlighting 3PLs' strategic potential beyond traditional logistics roles.

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Supply chain finance; investments; third-party logistics; China

1. Introduction

Traditional management studies generally assume that firms have an unlimited budget for their operations (Wang, Yang, et al. 2019). Organisations are keen to manage the cash flow needs of supply chains to maintain their operations at the threshold level of performance. For instance, the theory proposed by Modigliani and Miller in 1958 is based on the assumption of a perfect capital market to explain the irrelevance of the company's capital structure and market value; therefore, a firm can always raise funding and avoid bankruptcy. However, this assumption deviates from reality, especially in the firm's start-up phase. Stemming from information asymmetry between lenders and borrowers, firms' financing solutions have always been a tricky problem in both practical and academic fields (Song, Yang, and Yu 2020). Given the relatively high default risks, commercial banks are likely reluctant to finance small- and medium-sized enterprises (SMEs). According to the data of the People's Bank of China, from 2009 Quarter 1 to 2020 Quarter 4, the overall demand for enterprise loans is much higher than the demand for bank loan approval, among which the demand for loans from SMEs is much larger than the demand for large enterprises. In 2020 Quarter 4, the loan demand indices for large, medium, and small micro-enterprises are 59.3%, 62.9%, and 74.7%, respectively, while the bank loan approval index is only 53.6%. The gap between loan supply and demand is widening, which is a main concern in initiating new finance offers to stakeholders. To make matters worse, COVID-19 has undoubtedly worsened the operation of SMEs. How to help SMEs overcome the financial crisis has become a critical issue to the business stakeholders.

There is an increasing interest in exploring the financial flow in operations and supply chain research (Jia et al. 2020). Traditional supply chain management (SCM) focuses on information and material flow as the sources of competitiveness, while the financial flow is largely under-explored (Caniato, Henke, and Zsidisin 2019). Supply chain finance (SCF) has been put forward as an effective way of managing the financial flow. There are two major SCF perspectives in the current business environment: 1) the finance-oriented aspects focus on the financial products in supply chains, and 2) the supply chain-oriented SCF aims at the optimisation of financial flows in supply chains (e.g. working capital management) (Caniato et al. 2016). This research focuses on the supply chain-oriented SCF. Gelsomino et al. (2016) specifically defined SCF as optimising supply chain financial flows through solutions implemented by financial institutes or technology providers, and the ultimate objective is to align

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financial flow with information and material flow within the supply chain.

In recent years, traditional third-party logistics (3PL) firms began to gradually assume multiple supply chain roles. They started to provide value-added services for entities, for instance, procurement, to increase their competitive strength and strengthen customer loyalty (Huang et al., 2019). 3PLs are increasingly involved in SCF to develop their supply chain innovativeness. The connectivity and communication requirements of leading supply chains have created the emergence of a more advanced role for 3PLs. They evolved from providing logistics capabilities to becoming orchestrators of supply chains that create and sustain a competitive advantage (Zacharia, Sanders, and Nix 2011). Chen and Cai (2011) mention that large international logistics firms, such as UPS and MSK, have provided financing services for years. In China, under the trend of encouraging innovation and development of SMEs, financing services offered by a 3PL firm become a new financing mode favoured by many SMEs in capital-constrained supply chains.

Traditional SCF service providers include commercial banks and fintech, while 3PLs rapidly grow their capacity in the SCF markets. Compared with conventional financing channel-trade credit financing and bank financing modes, the SCF service provided by 3PL has unique advantages. Given 3PLs' intermediary supply chain position, they are more likely to develop strategic relationships with the upstream and downstream firms and have a clear vision of supply chain operations. SCF is a new model of supply chain innovation for 3PLs, adding value to customers by using their established supply chain relationships, operations, and infrastructure. 3PL firms in China, such as Cainiao Smart Logistics Network Limited and JD Logistics, provide financial services to their upstream and downstream customers, demonstrating that 3PL providers have transformed from traditional contractual logistics service providers to fully integrated providers.

Nonetheless, 3PL-dominated SCF is still under-explored. Little is known about how 3PLs can develop innovative SCF practices compared to traditional service providers. Also, 3PLs that dedicate resources to SCF may be concerned with the opportunity costs of not using scarce resources on core business activities (e.g. logistics services). Hence, exploring the antecedents to 3PL-dominated SCF and its consequent changes in supply chain operations is essential.

Recent studies also mention why 3PLs need to provide financial services for customers and what they can do. Did a comprehensive literature review of SCF and highlighted two key financing factors: asset-based financing (ABF) and inventory financing (IF). Moreover, Chakuu, Masi, and Godsell (2020) use IF as an example to explain how 3PLs work with suppliers in developing financing services. However, these studies do not include concerned customers, other financial service providers (FSP), or relevant banks. As a result, it is a challenge for firms to obtain a big picture of 3PL-dominated SCF. Elliot et al. (2020) discuss how 3PLs decide to provide financial services by assessing relevant barriers. Nevertheless, they need to discuss how 3PLs' internal and external factors impact financial service delivery decisions. Propose a framework for Asset-based lending services. However, the research only focuses on SCF providers, and they do not explain how the relevant 3PLs and service users may respond to the SCF providers' services. Existing research highlights 3PL-based SCF's significance in managing current supply chain processes. Notwithstanding, it is merely to see how 3PLs dominate SCF in different situations to optimise relevant supply chain processes. Therefore, this research outlines the connection between the antecedents of providing financial services, 3PL-dominated financial services, and the impacts on the supply chain process. To achieve the goal, we need to answer the following questions:

1. What are the key antecedents influencing the supply chain finance service offered by 3PL providers?
2. How can 3PL providers establish a dominant position to offer supply chain financial services to enhance supply chain management?

The remainder of the paper is organised as follows: Section 2 presents a systematic literature review on SCF to map out the theoretical foundation of this study. Section 3 describes the research methodology, which includes a detailed case selection procedure. The companies' specific descriptions and their different SCF application strategies are systematically described in Section 4. The cross-case analysis is provided in Section 5. 3PL-dominated SCF framework is then described in Section 6 with the conceptual model proposed. Finally, Section 7 discusses the contributions and conclusion by highlighting the critical findings, clarifying theoretical and practical significance, and outlining directions for future research.

2. Literature review

2.1. Supply chain finance

Trigged by constant changes in consumption patterns and customer demands, social and economic processes wherein service exchanged for service have accounted for a large proportion (Wang, Jia, et al. 2019). Service-dominant logic (S-D logic) provides a view of markets that are more integrated and compliant with economic development than the traditional goods-centric perspective. The servitisation trend gradually makes supply chains a complex value network, where value is produced and embedded in goods during firm-controlled manufacturing processes and then distributed through the market to consumers (Brodie, LöBLER, and Fehrer 2019, Fehrer, Woratschek, and Brodie 2018).

Within this context, SCF, as an effective method to lower financing costs and improve financing efficiency and effectiveness (Xu et al. 2018), has been determined into a vital part of service supply chain management. The factors from a system-oriented focus, where banks increased the interest rate, to the lack of service supply chain management concepts in core enterprises and reduced capital risks and operating costs, have become the key reasons that aggravate the

financial pressures of SMEs (Lu, Liu, and Song 2020, Qian and Zhou 2014, Song, Yu, and Lu 2018). Regarding the S-D logic, the dynamic closed-loop e-commerce platform, based on the mutual promotion of capital, assets, and data-driven logistics activities, makes 3PL-dominated SCF possible. Thus, it plays a key role in resource planning and enhances functional capability improvement.

A systematic approach was used to review the SCF literature to provide the theoretical foundation for this study. Three steps were followed. First, academic articles were collected using multiple library databases such as *Web of Science, Science Direct, Scopus, Emerald, Engineering Village,* and *Springer Link*. Second, the articles from Clarivate Analytics Web of Science Core Collection were processed by HistCite software to lock important literature and academic experts in this research direction quickly and reveal the development context of the SCF research field. Histcite is a typical citation analysis software. It means finding groundbreaking papers without specified keywords is another benefit of this process (Yu and Shi 2015, Tho et al. 2017). Third, as a supplementary analysis, the articles searched from databases such as *Science Direct, Scopus, Emerald, Engineering Village,* and Springer Link complement other important articles missing in the second step.

Gelsomino et al. (2016) examines publications between 2000 and 2014 in a comprehensive review. Hence, this study focuses on the SCF literature in the year 2014–2020 (65% of selected articles listed in Table 1 are from this period), which explores the recent development of SCF. The fifty most relevant papers were identified as reported in Table 1, where the author, year-wise distribution, and focused area are presented. Table 1 lists key publications in this domain. It is visible that the formal definition of SCF did not appear until the 2000s (Xu et al. 2018). Some researchers suggest that the purpose of SCF can be further classified into two perspectives: supply chain-oriented and finance-oriented (Gelsomino et al. 2016). In supply chain orientation, SCF is an approach for multiple organisations in a supply chain to jointly create value through means of planning, steering, and controlling the flow of financial resources on an inter-organisational level (Hofmann 2005). Gelsomino expanded 'finance orientation' to the 'financial orientation' concept (Caniato et al. 2016). This perspective treats SCF as a set of products and services that financial institutions use to facilitate the management of the supply chain financial problem. Confirms that SCF enables buying firms to use reverse factoring with their entire supplier base, providing flexibility and transparency in the payment process. The logistics-financing-oriented studies mainly treat 3PL data as a basis for credit; no study has considered 3PL as 'the lead party'. The financial impact is also a heated topic in logistics financing. A positive cash flow is essential in providing a sound foundation for future activities, especially for SMEs. Theoretically, a company, especially an SME, struggling to maintain its cash position can obtain a loan from logistics financing based on well-conditional information on their operations and sales, which are accumulated by 3PL firms through a long-term product delivery service. Unfortunately, a few relevant papers previously considered its feasibility and superiority in depth.

Regarding the SCF business model, inventory financing and trade credit financing research are more than the prepaid receivable financing and credit financing publications (Lou et al. 2024; Xiao, Sethi, and Li 2024). Another significant takeaway from Table 1 in this category is the supplier and customer perspective financing – one crucial aspect of SCF.

Researchers explore the SCF domain with a diverse range of mathematical tools, which include balanced scorecard (Kleijnen and Smits 2003), Stackelberg model (Yan and Sun 2013), Data Envelopment Analysis (Chang 2019), Fuzzy TOPSIS (Zhou and Wang 2015), multiple criteria decision-making method (Xiang and Ieee, 2009), DEMATEL method (Dey et al. 2012), Big Data, TBL method (Tseng et al. 2018), and blockchain (Ahluwalia, Mahto, and Guerrero 2020). Some articles have dealt explicitly with supply chain finance instruments. Early studies tend to focus on inventory financing and trade credit financing. Incorporate asset-based financing into production decisions. Reverse factoring is a way to solve supplier financing problems. Use partial credit guarantee contracts to achieve profit maximisation and super-coordination effects. Examine the moral hazard problems in supply chain financing with procurement contracts (or purchase orders). The supplier-oriented study is always the popular research direction for the SCF actors. However, few studies focus on SCF from the perspective of 3PL providers.

2.2. 3PL-based SCF

Logistics finance is not a brand-new business model supported by the revolution in 3PL services (Wang et al. 2008). It temporarily revitalises the capital occupation of idle raw materials and finished products and optimises corporate resources, crucial to extending a broader supply chain view. Addressed that 3PL providers can offer value-added services and explore the opportunities to expand their activities to the area of inventory financing. Furthermore, put forward a flexible logistics finance model to vouch for other firms on the logistics chain to get the loan and help the bank evaluate, supervise, and dispose of the asset. In this way, logistics started to free from the single material transportation role.

There are mainly two types of SCF services offered by 3PL providers. First, some large 3PL providers can exploit their relatively low cost of capital to operate as an independent SCF service that provides financing services based on fixed assets and inventory. These large 3PL providers use their expertise, knowledge, and information in supply chain operations to adequately evaluate risks and provide tailored SCF services. Second, many 3PL providers extend consulting services to collaborate with traditional financial services providers in SCF. For instance, banks may have an inherent flaw in coming into contact with the operational zone (e.g. vendor-managed inventory), resulting in a poor understanding and weak power to exercise control to decrease the financial risks substantively. 3PL providers can provide banks with an assessment of the operational performance of the financing firms. They can monitor the material flows for better quality

Table 1. Key SCF publications.

No.	Authors (Years)	Supply chain management	Logistics management	Inventory management	Financial management	Supplier management	Consumer management	Trade credit financing
1		✓						
2	Kleijnen and Smits (2003)		✓					
3				✓				
4					✓			
5	Xiang and IEEE (2009)	✓						
6					✓			
7				✓				
8						✓		
9						✓	✓	✓
10						✓		✓
11	Dey et al. (2012)					✓		✓
12								✓
13						✓		
14						✓		
15		✓						✓
16						✓		
17	Zhou and Wang (2015)					✓		✓
18	Agrawal, Singh, and Murtaza (2015)							
19							✓	
20	Gelsomino et al. (2016)	✓						
21	Lekkakos and Serrano (2016)						✓	
22	Caniato et al. (2016)	✓						
23								
24		✓						
25		✓			✓			
26						✓		✓
27	Song, Yu, and Lu (2018)	✓						
28						✓		
29			✓					
30				✓			✓	
31	Tseng et al. (2018)						✓	
32								✓
33					✓			
34					✓			
35							✓	
36	Chakuu, Masi, and Godsell (2019)	✓						
37								
38	Ahluwalia, Mahto, and Guerrero (2020)							✓
39		✓						
40								✓

control. Certain credit lines can be granted to a 3PL provider to directly manage the operations and risks of financing firms by a bank (Wen et al. 2019). Thus, a 3PL provider is more likely to provide flexible and efficient SCF services.

2.3. SCF, 3PL, and SMEs

Researchers have widely studied SCF in the context of SMEs. SMEs are deemed asymmetrical in acquiring capital from a financial institution by their character. The logistics finance (LF) business model is a viable option for combining logistics and finance services. Short operational lives, incomplete financial statements, small asset size, and high uncertainty always make it SMEs difficult in obtaining capital funding. Due to higher default risks, commercial banks have imposed strict policies on collaterals or guarantees for SMEs, increasing SMEs' financial costs and difficulty in obtaining working capital supplements (Song & Wang, 2013). SMEs increasingly depend on SCF to solve financing problems (Lekkakos and Serrano 2016). Financial and non-financial indicators enable supply chain configuration and project environments in the long term (Sabri, Micheli, and Cagno 2020; Solakivi, Töyli, and Ojala 2013).

The following superiority gives 3PLs a promising prospect in providing flexible and efficient SCF services. Theoretically, 3PLs can effectively assess the risks by their well-developed knowledge and information on supply chain operations and, hence, create innovative and customised SCF terms. The high level of supply chain visibility enables 3PLs to evaluate and monitor the inventory in transit, in motion, and storage and effectively reduce SCF risks. A common challenge to buyers' anchored SCF programs is effectively onboard suppliers. SMEs largely rely on 3PLs in supply chain operations (Chen, Cai, et al. 2019). Such dependence makes 3PLs flexibly develop effective SCF solutions for SMEs in line with the buyers' anchored SCF programs.

Table 2 outlines existing studies that integrate 3PL, SMEs, and SCF. It is easy to see that most studies mentioned that logistics service providers (LSPs) could obtain SCF services for clients. LSPs can take specific SCF services to help suppliers optimise performance (Franco 2016) and control financing processes in specific scenarios (Chen and Cai 2011). 3PL can choose to develop their SCF services (DE Goeij, Gelsomino, and Steeman 2019; Huang et al., 2019) or collaborate with banks (Chakuu, Masi, and Godsell 2020; Shi et al. 2020) or other professional financial service providers (FSP) (Chen, Cai, et al. 2019; Elliot et al. 2020) to serve clients. Hua et al. (2021) and Dang et al. (2021) highlight that 3PLs and other providers (bank and FSP) are not mutually exclusive in delivering SCF services to clients. On the other hand, 3PLs can lead and coordinate the SCF services process to optimise the whole supply chain performance (Liu and Zhou 2016). In selecting LSPs and relevant SCF services, clients need to consider the strategic alignment between SCF and organisational business strategy to enhance the supply chain's competitive advantages and capability (Li and Chen 2019; Wen et al. 2019). Beyond studying the development and delivery of SCF services, Gelsomino, DE Boer, and Steeman (2017) and DE Goeij, Gelsomino, and Steeman (2019) also discuss the necessity and influencing factors that LSPs and their clients need to consider before adopting SCF services.

The table also shows the limitations of existing research about 3PLs' SCF services. First of all, Marak and Pillai (2018) recommend that it is critical to identify the key enabling and hindrance factors for organisations adopting SCF services. However, most existing research discusses how 3PLs develop and deliver SCF services without considering the relevant enablers and barriers. Second, as Jia et al. highlighted in 2020, it is vital to have more studies on how 3PLs impact SMEs' adoption of SCF. The root cause is that we already have too many studies about how manufacturers and banks impact the application and development of SCF. However, 3PL is a critical puzzle in global supply chain development. Therefore, the impact of 3PLs on SMEs' adoption of SCF and relevant performance deserves more research focus. Third, Caniato, Henke, and Zsidisin (2019) mentioned that existing SCF studies focus on the dyadic relationship between SCF providers and users. However, a supply chain is far more complicated. Studying how SCF impacts more actors across different tiers in a supply chain process is significant. Therefore, it is meaningful to study 3PL-dominated SCF as a 3PL process usually includes three actors (a 3PL, a seller, and a buyer) at least. Finally, concerning significant impacts from more and more unexpected interruptions and risks (e.g. COVID and wars), Parida et al. (2022) highlights the value of investigating how SCF can contribute to managing supply chain risks and developing supply chain resilience for mitigating supply chain interruptions.

In summary, it is valuable for this research to investigate how LSPs adopt SCF services under the impacts of enablers and barriers to help clients develop resilience in managing risks and secure overall supply chain performances.

3. Methodology

Given the exploratory nature of different factors, diversified 3PL services and SCF aspects, and non-identical supply chain management requirements, the present study adopts a qualitative case-study method to explore the integration between these areas in the context of China as the evidence of such integration is not well explained in existing studies.

Theoretically, case research has consistently been one of the most powerful methods in operations management, particularly in developing a new framework (Voss, Tsikriktsis, and Frohlich 2002). The case study deals with complex structures that are affected by numerous factors and existing explanations for observed outcomes (Eisenhardt and Graebner 2007; Stuart et al. 2002). Analysing multiple case studies reinforces the generalisability of the results and allows a cross-case analysis of the significant variables, strengthens representativeness and external validity, and avoids biases (Stuart et al. 2002). Therefore, in this research, multiple case studies can better understand the cause-effect connections between factors, financial services, and supply chain management requirements. In detail, information about different SCF adoptions in three companies was

Table 2. Existing studies combining 3PL, SMEs, and SCF.

Authors (Years)	Focus	Financial service providers	3PL financing	SCF adoption factors (barriers and drivers)	Outcome
Chen and Cai (2011)	3PL firms and budget-constrained retailers	Bank and 3PL	Yes	No	3PL can control the financing process in specific scenarios.
Franco (2016)	3PL's financial service	3PL and FSP	Yes	No	LSP takes SCF to help suppliers optimise the whole supply chain performance
Liu and Zhou (2016)	3PL's role in SCF	3PL and Bank	Yes	No	Conceptualizes the orchestrator role of 3PLs in SCF.
Gelsomino, DE Boer, and Steeman (2017)	3PL's decision making on SCF	Bank and 3PL	Yes	Yes	3PL can develop SCF service solely or collaborate with bank financing to serve customers.
Chen, Cai, et al. (2019)	3PL's impacts on SCF and supply chain process	Bank and FSP	Yes	No	3PL leading cash flow creates more benefits for capital-constrained SMEs.
Li and Chen (2019)	3PL and SCF	Bank and 3PL	Yes	No	Strategic alignment between SCF and organisational strategy can enhance 3PL's performance and competitive advantage.
DE Goeij, Gelsomino, and Steeman (2019)	3PL' SCF service	3PL	Yes	Yes	How to enable 3PL providers to develop and manage SCF services for their customers.
Huang et al. (2019)	3PL, capital constrained SMEs, and SCF	3PL	Yes	No	3PL offering SCF services for capital-constrained SMEs can enhance overall performance.
Wen et al. (2019)	SMEs' selection of 3PL	Bank and FSP	No	No	SMEs want to align their SCF requirements with selected 3PL providers' logistics service capability.
Chakuu, Masi, and Godsell (2020)	Supplier relationship, 3PL, and SCF	Bank and 3PL	Yes	No	3PL providers can compete or collaborate with banks in offering SCF services.
Shi et al. (2020)	3PL and SCF management	Bank	No	No	3PL can coordinate and facilitate SCF service for buyers.
Elliot et al. (2020)	3PL and FSP	FSP and 3PL providers	Yes	No	3PL providers must collaborate with FSP to overcome barriers to developing and offering SCF services.
Hua et al. (2021)	3PL financing and Bank financing	Bank and 3PL	Yes	No	3PL financing and bank financing are not mutually exclusive; SMEs need to choose SCF services from different providers per different situations.
Dang et al. (2021)	3PL financing and Bank financing	Bank and 3PL	Yes	No	SME retailers must choose SCF services from different providers per different situations.

collected through field interviews. Also, a cross-case analysis was used to capture the similarities and differences between other firms' SCF solutions.

3.1. Case selection

Following and, a two-step approach was used in case selection. First, in order to reach a homogeneous target 3PL for size (only large firms), business activities (focus on supply chain management), and origin (China), the following characteristics were required to create a reliable sample:

- Large companies (i.e. registered capital higher than RMB 5million);
- Same region (to avoid differences caused by national conditions and culture);
- SCF service has already been in operation for at least five years;
- Mature companies with intensive assets and independent logistics facilities

Three 3PL firms were selected as representatives of diverse SCF adoption following the above selection criteria. An overview and analytical method of case firms are given in Table 3. We conducted several semi-structured interviews with senior executives from three large 3PL firms in China. The respondents were selected based on their seniority and extensive experience in supply chain and financial operations, with each having between 5–10 years of executive-level decision-making experience. The sample selected ensures the respondents have a deep understanding of the firm's SCF practices and provides more strategic-level business insights. Six in-depth interviews were conducted per firm case (18 interviews in total). Each interview was conducted for around one hour. It helps the researchers to capture all different perspectives to ensure triangulation across cases. In addition, we reviewed relevant materials, including annual reports, financial service records, to complement and validate the data.

3.2. Reliability and validity

The three organisations were selected from different logistics industries. Furthermore, they have different capital sizes. Therefore, the diversity of industrial business backgrounds and financial resources can help to obtain sufficient variation in securing the research reliability. The study followed ideas provided by Stuart et al. (2002) to obtain sufficient reliability and validity of data and findings. First, concerning the requirements of data triangulation, researchers compared and contrasted interview data with relevant organisational records, formal financial services documents, and supply chain strategies and processes to confirm the consistency of collected information. Second, researchers drafted all transcriptions of each interview data and sent them to relevant interviewees for feedback in 24 hours. It can ensure that researchers do not misunderstand and miss out on any key ideas and opinions from every interviewee. Finally, considering that traditional supply chain management and finance are two majors, interviewees from three organisations may have different perceptions of supply chain finance. Therefore, researchers invite three chief financial offers (having years of experience in different supply chain and logistics organisations) to enhance the data transcription and interpretation. Overall, the above steps help us to secure sufficient research validity and reliability for this exploratory study.

3.3. Data analysis

We followed an integrated approach in our interview analysis, where interviewing and analysis occurred simultaneously. During the 1st-order analysis, we embraced the emergence of numerous informant terms, codes, and categories akin to open coding. We refrained from consolidating categories initially, resulting in a potentially overwhelming number. Despite feeling 'lost' at times, we recognised the importance of exploring the data comprehensively. As the research progressed, we transitioned into 2nd-order analysis, seeking similarities and differences among categories similar to axial coding. This process led us to reduce and label the germane categories. At this stage, we engaged in a 'gestalt analysis' to discern deeper structures and develop tentative theoretical insights. Subsequent interviews allowed us to refine concepts through theoretical sampling. In the 2nd-order analysis, we focused on developing themes and concepts to describe and explain phenomena, often exploring new or relevant concepts from existing literature. Once a set of workable themes and concepts emerged, we pursued theoretical saturation, and in the final stages, we explored the possibility of further distilling emergent 2nd-order themes into 2nd-order 'aggregate dimensions'. The method employed for data analysis in our research draws inspiration from the framework proposed by Gioia, Corley, and Hamilton (2012). The following is a sample for coding. The process began with first-order coding, where key informant terms and categories were grasped inductively from the interviews.

Table 3. The overview of case companies.

	Company A	Company B	Company C
Country	China	China	China
Year established	1992	2012	2013
Registered capital	10 million CNY	100 million CNY	10 billion CNY
Staff size	7400	69400	247000
company type	Limited liability company	Limited liability company	Limited liability company
Industry Classification	Transportation	Air Cargo and Logistics	Air Cargo and Logistics
Core competitiveness	Comprehensive supply chain management services.	Global smart supply chain infrastructure network	Smart logistics supply chain solutions

These were then consolidated during second-order analysis into broader themes such as financial service innovation, operational integration, and risk control mechanisms. Finally, aggregate dimensions were used to discuss the underlying structures of 3PL-dominated SCF practices, supply chain resilience, etc. To make the process transparent, we developed a coding structure tree that illustrates the progression from first-order codes to aggregate dimensions (see Figure 1).

4. Case description and SCF adoption

4.1. Company A

Company A, founded in 1992, is a class A international freight agency approved by MOFTEC ('Ministry of Foreign Trade and Economic Cooperation', new name MOC, 'Ministry of Commerce') and CAAC (Civil Aviation Administration of China). It is listed as one of the state-supported logistics companies and provides outstanding domestic transportation services, international freight forwarding, warehousing, and contract logistics services. In December 2019, Company A owned total assets of approximately 1.5 billion RMB with around 7400 employees. Company A's vision is to become China's best-integrated logistics provider, with supply chain management as the core.

They provided two types of services. One is a financing service, and the other is a purchasing service. The financing service is mainly for manufacturers. Take supplier A as an example: when supplier A produces products and needs one month to sell them to 4S dealers. Now, we will purchase its products once they are made. Dealer A can receive the money immediately. Company A is responsible for inventory management but could increase the purchasing price to cover the current inventory costs. As for dealers, they could purchase orders from Company A lower than the market price. The selling price to dealers would be slightly higher than their purchase price because the price gap would need to cover financing, inventory, administration, and human resource costs. Offering purchase service helps 3PL providers improve customer loyalty and release 3PL users' financial pressure through providing loans. This service requires Company A with sufficient financial ability to implement this service.

Figure 1. Coding tree.

4.2. Company B

The B Group is China's leading technology-driven e-commerce company and retail infrastructure service provider. The Group was listed in 2014 with 2.937 billion ordinary shares issued. By March 2020, the group had total revenue of 146.205 billion with a 15.41 per cent gross profit margin. B Group started self-built logistics in 2007, registered a logistics company in 2012, and officially established B Logistics Co., Ltd., which is a sole subsidiary specialising in the logistics business. Throughout 2019, B Group has achieved total revenue of 66.2 billion yuan, up 44.1% year on year. The income from B company reached 23.5 billion yuan, an increase to 35.5% in the group income. In the first three quarters of 2020, B company's revenue reached 49.5 billion yuan, a year-on-year increase of 43.2%. This indirectly reflects that B company is evolved as a 'booster' for the steady growth of the group's revenue.

Company B's SCF includes accounts receivable factoring, financial leasing, and inventory financing. Take inventory financing as an example. Company B first automatically evaluated the value of commodities through internal data and models, thus making the pledge feasible. Regarding risk management, taking logistics companies advantage of the data availability and adopting a 'full traceability' strategy, Company B avoids credit and fraud risks. Based on the process and data, the quantitative risk control technology and statistical model are used to manage the whole life cycle of customer credit. With its steady cash flow as support, Company B provides strong capital support for upstream core manufacturers, dealers, and carriers, reduces input costs and risks, and optimises corporate cash flow.

4.3. Company C

The C Group is a Chinese conglomerate founded in 1999. The Group operates various businesses and has been involved in multiple industries that can support operating the business ecosystem from related company businesses and services. C Group was officially listed in 2014, creating the largest IPO record in history. By March 2019, C Group reported an annual revenue of 376.8 billion RMB, a profit of

57.08 billion RMB, and total assets of 965.1 billion RMB. The Group has vowed to establish a 'social network' development pattern that includes merchants, brands, and other companies that were subsequently integrated to meet customer expectations. This ensured improving its efficiency with the latest technology infrastructure and diverse marketing platforms. Company C is the principal operating company under C Group with the linkage sof business and logistics flow. The initial vision is to overcome the bottleneck of logistics efficiency by integrating other logistics companies. This vision of C company means it is not a logistics company in the traditional sense but an ecology focused on building a comprehensive logistics network.

Company C is an innovative enterprise based on Internet thinking and technology, opting to create e-commerce industry ecosystems. After integrating the resources of logistics enterprises, Company C now focuses on opening up the logistics backbone network and capillaries, establishing a digital infrastructure for the entire logistics industry, constructing a future-oriented innovative logistics supply chain solution, and creating a global logistics network. Company C aims to improve logistics efficiency, reduce social logistics costs, improve consumers' logistics experience, and generate higher profit margins for the manufacturing industry.

As to Company C's SCF solution, its core model is bonded warehouse financing in prepayment financing. The traditional bonded warehouse financing means that under the buyer's premises, paying a specified deposit, the bank lends the number of goods for the buyer to purchase from the seller (the core enterprise), and the seller issues the amount bill of lading as the credit guarantee. The model of Company C is based on its own big data platform as an endorsement. The financing amount is calculated based on the merchant's past transaction data and the overall operating situation. The loan can be released after the merchant and the upstream manufacturer reach a purchase agreement promptly. C company's strong available capital and highly transparent data supported this new type of bonded warehouse financing. In this way, there is no need for a commercial bank or core enterprises to get involved, and with a dominant power in SC, Company C can also play the monitor role to find more needs and margin opportunities.

5. Cross-case analysis

This section presents the analysis from the multi-case study and illustrates the resulting model and its underlying logic. First, similarities and differences in SCF services among the three companies are discussed, thus answering RQ1. Subsequently, a conceptual model of 3PL-dominated SCF is developed, thus answering RQ2.

5.1. A Summary of 3PL providers' adoption of SCF service

In Figure 1, all three case firms are involved in SCF but at a different level. They offer various types of SCF services. Besides traditional logistics services, Company A mainly offers two tailor services: SCF and 3PP. The ultimate goal of these two services is to increase customer dependence; instead of becoming a trading company, one top manager noted, 'We are not ready for transformation, and SCF is not our future development direction. Our strategic goal is to establish the development direction of supply chain management as the core, provide customised services according to customer needs, and become an international first-class logistics enterprise.'

However, although they offer these logistics-oriented financial and purchasing services, the ultimate purpose is to maintain a close relationship with the supply chain partners and to improve the quality of logistics service, which shows a conservative risk appetite. Since Company A only provides these two value-added services, it has accumulated relatively limited historical transaction data, somewhat restricting its information analysis and forecasting ability. Some other parties still limit the external environment's dominant position in the supply chain due to its firm size.

Company B was developed from the self-established logistics department of its parent company. Due to the existence of many SMEs in the parent company's e-commerce platform, SCF services were provided to meet the capital needs of these companies. Its capital strength and capacity to analyse the platform data reduce the cost across the supply chains efficiently. The core risk control method is the standardised evaluation of Company B's massive trade data gained from the supply chain information flow. It can identify fraudulent transactions and predict the trade situation within the supply chain, which exerts comprehensive and accurate control and influence on the whole supply chain. As of September 2018, B's Supply Chain Finance has accumulated nearly 500 billion yuan in loans.

Therefore, Company B treats SCF as one of the value-added services with a more dominant position in the entire supply chain process than Company A. Using big data and algorithms, Company B creates an intelligent supply chain management system for customers. Different business scenarios and needs provide intelligent and rational inventory management decisions, optimise operational indicators, and effectively diagnose full-chain operations through the full-link data platform. Company B treats these financial services as one of their value-added businesses to improve their financial performance, revitalise the supply chain's capital flow, and monitor for measurement of supply chain robustness.

Compared with Company B's self-established logistics, Company C's core strategy is to construct a platform for free access to social resources such as materials, warehousing, and trunk transportation. According to Table 3, the scale of Company C is much larger than Company B, which makes it achieve a more dominant degree in supply chain operations. In Company C's scenario, bonded warehouse financing can no longer involve banks or core companies. Company C plays the role of a bank and works as a monitor, which also helps the company measure supply chain robustness. More importantly, with the advantage of 'network' operation, Company C can create a superior resilient supply chain.

Table 4. The summary of cross-analysis.

	Internal factors		External factors	
Company	Information analysis and prediction level	Culture degree of caution and innovation	The degree of 3PL dominance in supply chain operations	Environment dynamics
A	Low	Conservative	Relatively low	Uncertain
B	Relatively high	Neutral	Relatively high	Uncertain
C	High	Open up	High	Uncertain

Company C used business flow and supply chain characteristics to integrate channel advantages into financing needs. The concept of 'Financialisation from the warehouse to everything' makes it possible to open up the full chain of 'logistics + retail + finance + data'. Hence, it simplifies the risk control dimension and introduces the seller's commitment, which directly solves the problem of the realisation of the pledged goods and further reduces the risk. In this mode, buyers and sellers are deeply bound by Company C spontaneously, which makes Company C deepen the dependence of enterprises on itself in the supply chain based on maintaining a healthy customer base. The cross-analysis of the three cases is summarised in Table 4.

5.2. The impact of SCF service on the position of 3PLs

Company A has weaker control over all parties in the supply chain within all three companies. Their strategic position and available resources make it less possible to rule the game. By comparing the operational model, B Company has established its advantages in supply chain service through self-established logistics. As the largest of the three enterprises, C Company owns a more dominant power in the supply chain system through technological innovation and efficient collaboration. In line with social trends and technological development, 3PL is no longer the past contract role but a trading agent with a significant impact on in-chain entities.

According to China's Enterprise Procurement Industry Research Report, China's total social logistics expenditure was 13.3 trillion RMB in 2018, with a year-on-year growth of 9.8 percent, accounting for 14.6 percent of GDP. As an important part of the total social cost, the high cost of socialised logistics is a difficult problem for enterprises in their development. Adopting advanced technology helps 3PL providers make significant progress in solving issues like information sharing and transmission. Information can be widely used as a basis for adjusting and decision-making. Under this atmosphere, the value of new entities is no longer the number of resources they own but the degree of resource sharing and opening (Guan et al. 2020). Many firms share their resources with supply chain partners to enhance transparency and digitisation, enabling 3PL-dominated SCF to be feasible.

On the other hand, although most SMEs are engaged in the same chain, they are still independent individuals. Most enterprises treat their resources and relevant data, such as logistics, material flow, and capital flow, as commercial secrets (Li 2017). The loose environment of supply chain management and the closed information between each enterprise makes it harder for bank and core enterprises to evaluate SMEs' actual business status, especially lower-tier

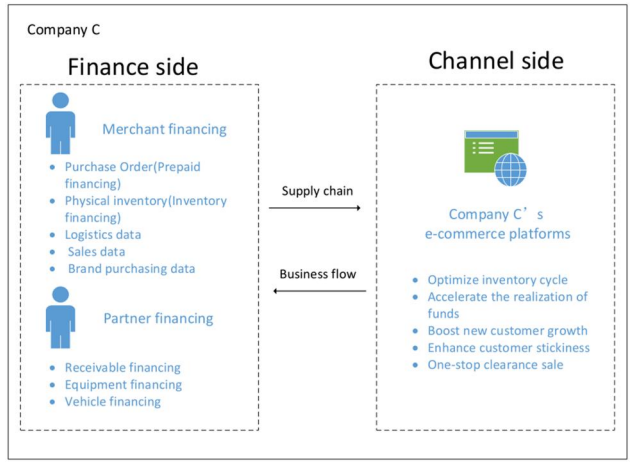

Figure 2. Different SCF solution of three companies.

suppliers and distributors, resulting in slow market response and difficulty in business operations, which greatly affects the financing capacity across the supply chains (Huang, Yang, and Tu 2020). 3PL providers have accumulated a lot of information in daily activities such as storage, distribution, loading, and unloading. They will get more accurate and timely primary data in the open-source environment. As of September 2018, B Company has served 200,000 SMEs.

The comparative model in Figure 2 illustrates the difference between 3PL-dominated SCF processes from the traditional model. As discussed earlier, there are some differences between the 3PLs' positions regarding the SCF implementation. Traditional SCF illustrates that SCF used to be a financial service based on the core enterprises in the supply chain, aiming at the upstream and downstream enterprises. Our analyses suggest two main reasons why 3PL providers do not play a trading agent in traditional SCF. First, the concept of a 3PL provider was developed from the demand for outsourcing. Particularly in China, the logistics industry started relatively late, and the relevant supporting technologies and theoretical knowledge were not yet mature. The consciousness of 3PL enterprise managers is relatively conservative and limited. For instance, Company A's strategic approach always revolves around providing better logistics services rather than looking for other ways to add value and improve the SC's robustness and resilience. The above factors have made it impossible for 3PL providers to dominate SC in the past. The supply chain power favours 3PLs, given its supply chain position and core competence. Also, 3PLs have a relatively high access to capital and information acquisition capabilities. Managers should develop a commitment to 3PL-dominated SCF practices as an innovation initiative.

The risk control measures of highly coordinated core enterprises in traditional SCF are particularly prominent. For example, core enterprises provide promised repurchases and adjusted sales. There is increasing attention and application to 3PL's risk control measures. The information management system can update relevant data timely. The intelligent analysis provides risk prediction. The Internet of Things technology tools improves the transparency and credibility of the data. Under the background of the Covid-19 pandemic, with the continuous rise of online shopping penetration in China, from the end of 2019 to November 2020, the penetration rate of online shopping in the domestic market increased from 20% to 25%, and the penetration rate increased by 25%. Driven by huge market possibilities, the value of supply chain robustness and resilience will become increasingly essential. For large 3PLs, taking the dominant position in SCF service will be a feasible and promising way to rule the game. Banks and financial institutes are traditionally reluctant to provide inventory financing because of risk aversion, especially if the inventory ownership needs to be transferred. 3PL can effectively assess the risks through their well-developed knowledge and information on supply chain operations and by creating innovative and customised SCF solutions. The high level of supply chain visibility enables 3PLs to evaluate and monitor the inventory in transit, motion, and storage to capture more SCF opportunities. For example, in prepaid receivable financing, combining bank lending and core enterprise supervision simplifies the risk control dimension, directly solves the collateral problems and reduces the risk. 3PLs are closely bound in operations with customers in the 3PL-dominated SCF model. It is more likely to explore the SCF limitations and threats by using such a model.

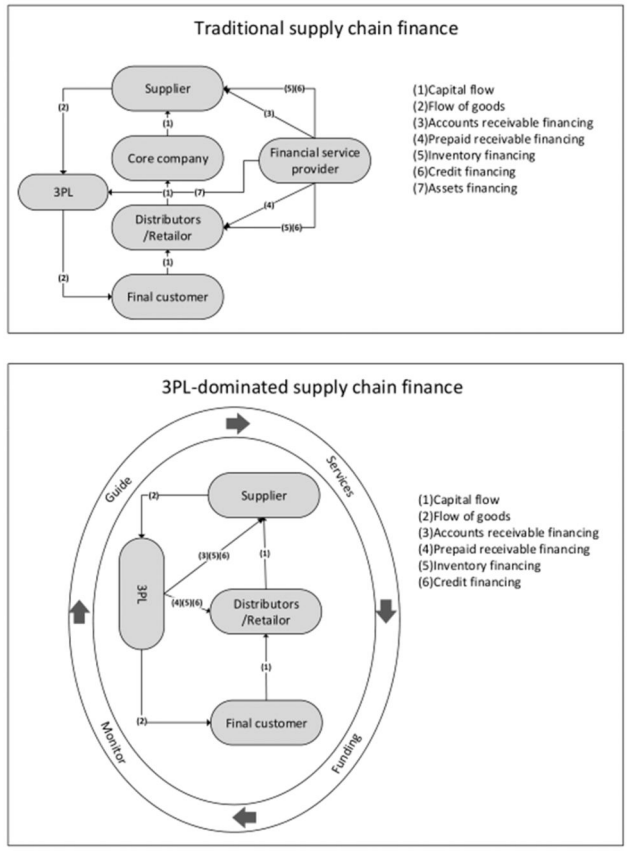

Figure 3. The competitive model of traditional SCF and 3PL-dominated SCF.

6. The conceptual framework of 3PL-dominated SCF

While all three case companies are involved in SCF services, the cross-case analysis shows that 3PL-dominated SCF has not been widely used as an innovative approach. Some challenges hamper managers' commitment to explore SCF fully. In this section, the antecedents and consequences in 3PL-dominated SCF are analysed. A conceptual framework is developed, providing 3PLs with business strategies for adopting SCF, as illustrated in Figure 3.

6.1. Antecedents

3PLs should strategically evaluate two major internal factors in developing SCF capacity. The first is information analysis and prediction level, and the other is the cultural degree of caution and innovation. In the current business context, a mature supply chain can involve dozens of countries and hundreds of companies, from raw materials, components, and semi-finished products to finished products. In such a structure, one partial interruption will quickly ferment and affect the whole body in one stroke. This 'ripple effect'[1] (Ivanov and Dolgui 2019) may lead subsequent enterprises to experience significant losses. There is also clear evidence that involved parties have a profit motive, a key enabler for opportunistic behaviour in this outsourcing activity (Mackerron et al. 2015). Firms that possess a higher level of information analysis and prediction tend to fit the needs of customers and markets. It, in turn, naturally guarantees the continuity of operation in the face of external disaster with the best preparation, allowing quick recovery from disaster disruptions. Taking COVID-19 as an example, it has disrupted the global supply chain system at a rapid rate. The daily operations of global SMEs have been hit hard. Protecting the enterprise cash flow from breaking is still the top priority, and organisations are fighting to innovate to remain afloat in the industry. The delay in business resumption causes most companies to bear higher internal costs, such as inventory, plant, and raw material occupation costs, without revenue. Firms with a high level of capacity in information analysis are more likely to have cost efficiency and robust cash flow and thus develop effective SCF practices.

Different tiers indicate different commercial distances in the manufacturer and supplier relationship. With a shorter commercial distance to the focal company, the supply chain player can have a bigger chance to gain funding. On the contrary, it is almost impossible for n-tier supply chain players, especially SMEs, to obtain financing opportunities in the traditional SCF system. SMEs do not have any self-protection ability against a global catastrophe like COVID-19 and can easily be destroyed by the ripple effect. 3PL providers, with a diversified risk control procedure and capital capacity, can protect SMEs from bankruptcy.

SCF service has become more and more profitable. Many banks with a certain amount of disposable money are willing to provide such a service. However, with limited information available and technology restrictions, it is difficult for banks to assess credit risk properly. Especially for smaller banks, this service greatly increases the risk of default. Enter into the 3PL-dominant system and cooperating with 3PL is the best option for small banks. Under a formal financing sharing agreement, 3PL can remove more funds from other businesses to decrease the risk by diversification. Small banks can also profit in a lower-risk environment.

The second antecedent is that 3PLs should strengthen their commitment to innovativeness and, thus, use SCF as an innovative approach in developing competitiveness. The cross-case analysis shows that 3PLs are concerned with using scarce resources on non-core business activities. Thus, SCF functions are likely to be peripheral services. The importance of aligning financial flow to information and material flow has been increasingly explored. The present marginal use of SCF by 3PLs found in this study weakens the nature of SCF as a source of innovation. 3PLs should develop a high degree of innovation culture before the adoption of SCF while cautiously evaluating the business risks using the information analysis capacity.

3PLs should also analyse two external factors: their degree of dominance in supply chain operations and environmental dynamics. 3PLs need to provide existence legitimacy as an intermediary echelon in a supply chain. A high degree of dominance indicates that 3PLs are involved in a broad scope and scale of supply chain operations, providing legitimacy in developing SCF practices. Also, the dominance in supply chain operations shows a high supply chain power favouring 3PLs. Power is an essential enabler of SCF (Caniato et al. 2016). A 3PL with a high degree of dominance is likely to onboard firms on their SCF initiatives in place of a bank or a buyer's anchored SCF program.

3PLs need to examine environmental dynamics continuously. A high level of market unpredictability and instability will likely stimulate the demand for 3PLs' SCF service. However, 3PLs should be cautious with the sudden cash crunch raised by these external threats. Long-term and strategic operational risks should be carefully evaluated before using the 3PL-dominated SCF model.

6.2. Consequences

The 3PL-dominated SCF model may create two consequences. First, supply chain power may be balanced, reducing SMEs' financial dependence' on large firms. Large firms commonly have a high level of supply chain power due to their resource positions. The unfavourable position in negotiation forces SMEs to continuously provide, for example, trade credits/fast payment to maintain their sales/purchasing volume. In turn, it increases the financial asset-specificity of SMEs to these large firms and 'locks' SMEs in such transactions with a high switch cost. As discussed earlier, the 3PL-dominated SCF increases SMEs' capital flexibility. It reduces the financial dependence of SMEs on these large firms. Also, the low capital costs support SMEs' business innovation and growth, improving their bargaining position in transactions with large firms. Moreover, 3PLs may increase their supply chain power through SCF. The contributions to financial resources in supply chain operations strengthen their dominance in supply chain operations and, thus, bargaining power.

Second, 3PL-dominated SCF can improve supply chain resilience. The increasing number and severity of disruptive events (e.g. the COVID-19 pandemic) require supply chains to develop strength. In addition to slack financial resources (e.g. working capital), the effectiveness of operational resilience (e.g. alternative sourcing route and inventory slack) has been widely explored. While financial institutions primarily focus on providing slack financial resources through SCF, 3PLs-dominated SCF is more likely to support a rapid and efficient increase of operational resilience. With well-developed supply chain knowledge and information, 3PLs can help supply chain companies speedily identify and finance alternative suppliers/buyers and increase inventory. Operational resilience is more effective than financial slack in dealing with disruptions. Hence, 3PL-dominated SCF effectively improves resilience against disruptive supply chain events (such as COVID-19).

Industry effect and firm size are two control factors that 3PLs should evaluate when developing SCF practices. 3PLs should tailor industry characteristics and establish effective SCF practices. For example, the production cycle in the computer chip industry is long, and the automotive industry has a high level of supply chain complexity (Jia et al. 2020). The length of the cash-to-cash cycle (including inventory turnover) is industry-specific. Industry characteristics have a significant effect on SCF development. 3PLs should develop an appropriate scale and scope of SCF services for different industries. Firm size is an essential factor. The high demand of SMEs for financial resources provides 3PLs with business opportunities. However, SMEs' financial and operational data are less transparent and reliable. 3PLs develop the analytical skills and techniques to assess risks in providing SCF to SMEs. They need to collaborate with large firms in SCF proactively. Large firms also have financial constraints because of their limited ability to borrow. 3PLs should seek SCF business opportunities with these large firms. The 3PLs can utilise the large firms as a channel to access the supply chain partners and extend the SCF scope.

6.3. Summary of the framework

As shown in Figure 4, to enhance supply chain robustness and resilience via SCF, 3PL managers need to consider four aspects. First, 3PLs must have sufficient service capabilities and financial resources. Otherwise, 3PLs cannot provide effective SCF services as per customers' requirements. Second, 3PL managers communicate with customers to clarify why they need SCF services. Customer requirements for convenience and smooth cash flow will target different SCF instruments in the supply chain processes. Third, as explained previously (in Figure 3), managers also need to see how their internal and external factors impact the preparation and delivery of SCF instruments. Finally, after

integrating all information from 3PLs' capabilities, customers' requirements, and all impacting factors, 3PLs and customers can negotiate about three types of SCF instruments as services (Figure 5).

Fundamental SCF instruments, such as typical and reverse factoring services, are widely applied in most industries. These services provide customers convenience as 3PLs can better understand customers' logistics requirements than banks and other financial institutions. Second, supply chain-oriented services show more concern about how 3PLs can help customers release the pressure of cash flow. For example, customers will lose good business opportunities if their cash is tied to high inventory. Furthermore, supply chain-oriented financial services also provide customers with more convenience as most 3PLs' primary supply chain services are connected with customers' inventory and logistics requirements. Finally, fiancé oriented services are mainly for securing customers' cash flow. For instance, customers can use particular assets as deposits to have short-term loans from 3PLs when they run out of cash. Overall, all three types of SCF services are not mutually exclusive. 3PLs can use one or all of these services per unique customer requirements. In turn, because of the support of financial resources from 3PLs and alignment between physical material flow and financial flow, customers can obtain more robustness and resilience against unexpected supply chain disruptions and risks.

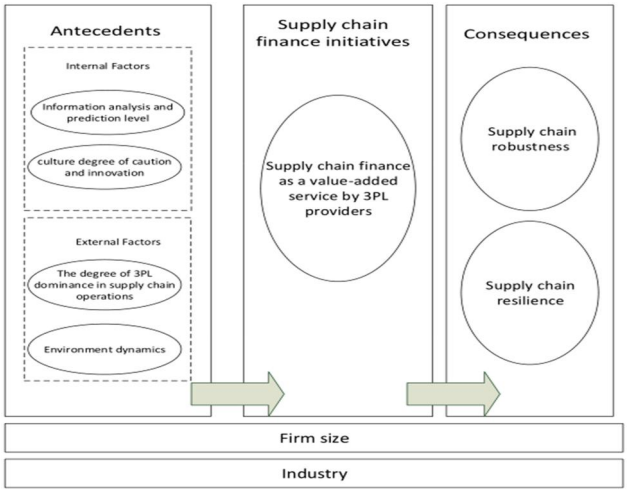

Figure 4. The conceptual framework of 3PL-dominated SCF services.

7. Managerial implications

Our research offers key managerial implications. First, the study would help to transform 3PL's traditional SCF perspectives into contemporary settings. Exploring 3PL service providers' dominance facilitates understanding emerging platform business models in the context of the extended services offered by 3PL firms (Fehrer, Woratschek, and Brodie 2018). Second, the study provides deliberations around information asymmetries between finance providers and beneficiaries in financing activities can result in uncertainty about how goods have been produced and traded, resulting in credit rating difficulties (Hannibal and Kauppi 2019). Third, the service-dominant logic (S-D logic) provides insights into new operating philosophies that emphasise the service needs of 3PL. At present, not many financial products provided by traditional financial institutions truly benefit SMEs. Financing channels for SMEs are generally limited. For instance, compared with first-tier suppliers, lower-level suppliers are harder to find financing (Wilhelm et al. 2016). Amidst this background, the study deliberations may convince 3PLs to design and offer new services based on their core strengths within their resources and financial ability. Fourth, because of information asymmetry, traditional financial institutions cannot achieve the mutual integration of capital, material, and information flow in the supply chain, and the cost of risk identification and management is relatively high. The supply of traditional financial services products has been

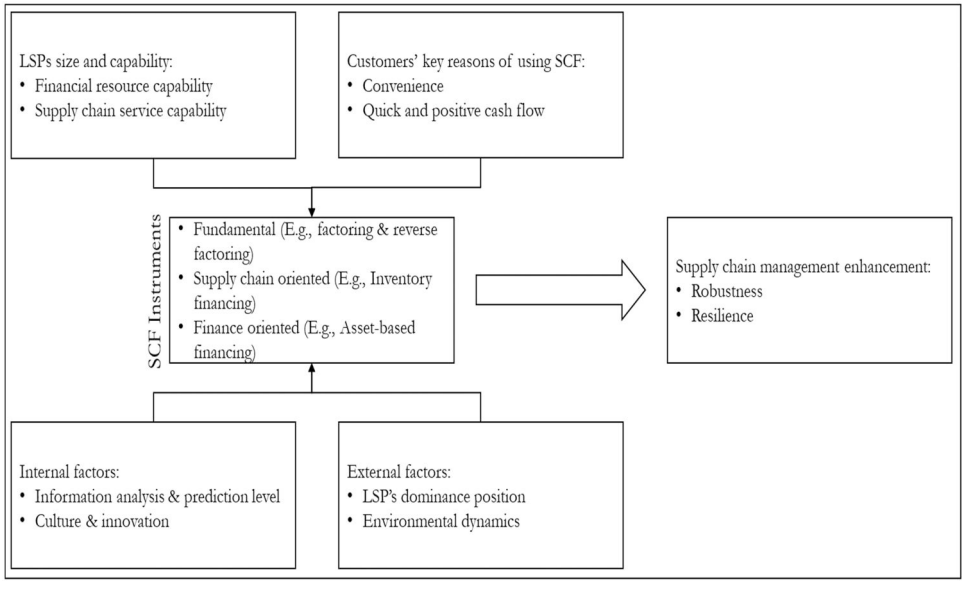

Figure 5. Integration of factors, LSP-dominated SCFs, customer requirements, and supply chain management enhancement.

challenging and complex to keep up with the development of the real economy. With specific industry understanding and relevant transaction data accumulation, the study extends the function of 3PL to monitor and lead the market, further to play a significant environmental normative influence on industrial development. This major implication brings the service extension proposal under the institutional pressure radar. Also, larger 3PL companies can accurately identify lower-tier suppliers and offer SCF services, thus providing opportunities to broaden their business operations.

8. Conclusion

This paper used a multiple-case approach to identify practical applications to address the feasibility and superiority of 3PL-dominated SCF. The research highlights that large 3PLs have advantages in information acquisition and funding capacity to dominate the entire SCF process. A conceptual model was given in this study, where the antecedents to and consequences of 3PL-dominated SCF are analysed.

We make the following theoretical contributions to the SCF literature. First, this study explores from a 3PL perspective the development of SCF and a new model of supply chain innovation. Financial institutions (e.g. banks and fintech) play a significant capital provider's role in SCF, which constrains the scope of SCF due to their operational nature. 3PLs are likely to have well-established supply chain capacity and infrastructure. The advanced SCF practices that improve operational performance in supply chains (e.g. inventory-related financing) are more likely to be developed by 3PLs. Especially, 3PL-dominated SCF can be a practical approach in developing supply chain robustness against environmental uncertainty (e.g. the Covid-19 pandemic). Besides, the fierce industry competition forces 3PLs to adopt an innovative business model based on but beyond traditional transportation and warehousing activities. Similar to the creative path of 3PLs in third-party purchasing. SCF can be a new model for creating value-added services and developing supply chain innovation. Second, this study provides a conceptual framework to underpin the development of 3PL-dominated SCF. The findings in the cross-case analysis of this study show that 3PLs' involvement in SCF is still marginal at present. The lack of contextual exploration for 3PLs hinders managers' commitment to 3PL-dominated SCF. This paper highlights the importance of ripple effects through two different models provided by the 3PL-dominant SCF system. The conceptual framework in this study offers guidance for 3PLs to develop SCF, where the proposed internal and external factors, consequences, and control factors provide a systematic map of business strategies in SCF. Third, this pioneering study delineates the trading agent's role as 3PL service providers in SCF.

Two limitations of this research include: 1) we only focus on the qualitative perspective to examine the possibility of offering SCF by 3PL providers, and 2) the empirical cases are primarily retrieved in China. There are some avenues of future research to complement this study. Future studies can focus on this area from a quantitative perspective in different regions. Further, the development of financial technology, represented by big data, cloud computing, and artificial intelligence, has changed traditional finance's means and methods of information collection, customer touch, and risk control.

For large 3PL providers to stay competitive, they strengthen their ability on a digital basis. Future studies can study how new infrastructure systems built by computing technology can exponentially play a positive role in 3PL-dominated SCF. For instance, the blockchain's unique chain structure and distributed storage technology make the transaction of data non-tamper ability, and each data can be traced clearly (Anjum, Sporny, and Sill 2017). Highly authentic and reliable transaction information can masterly solve the credit problem in SCF. Moreover, the COVID-19 epidemic, which has caused severe damage to the global economy, has enhanced higher requirements for supply chain resilience. 3PL, as the dominant trading agent, needs to deploy a more flexible, reliable, and pressure-proof supply chain network for better SCF practice.

Note

1. Supply chain disruptions can cause ripple effect, which escalates disruption risks, rather than remaining localized or being contained to one supply chain part, cascades downstream and impacts the performance of the supply chain.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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