Advances in Economics, Business and Management Research, volume 203
Proceedings of the 2021 3rd International Conference on Economic Management and Cultural Industry (ICEMCI 2021)

Research on the Development of Supply-Chain Finance in the Context of Digital Transformation

Yufan Wei[1,*]

[1]*School of management,Xiamen University Tan Kah Kee College,Zhangzhou, 363105,China*
[*]*Corresponding author's Email: 591914763@qq.com*

ABSTRACT
Digital transformation has become a must for the vast majority of companies around the world. The development of information technology also means that enterprises avoid atomistic competition and become active participants in the supply-chain network containing multiple businesses and relationships. In the current supply-chain practice, there are many small and medium-sized enterprises upstream and downstream of the core enterprises are lack of capital flow. This problem can be solved by supply-chain finance, which can also help the core enterprises to manage the quality of upstream and downstream supplier relationship more closely. Therefore, this thesis will explore the current development of supply-chain finance against the backdrop of digital transformation, analyze the mechanism that enables the successful operation of Jingdong Group, a Chinese e-commerce giant, as well as the shortcomings in its operation and make suggestions for its improvement.

Keywords: *digital transformation; supply-chain finance; supply-chain management*

1. INTRODUCTION

An increasing number of enterprises have begun to focus on the internal process management of supply-chain and the relationship management of external suppliers due to the Covid-19. In addition, banks have started to tighten the loan issuance to SMEs or increase the interest rate to reduce the bad debt, resulting in the continuous shortage of cash flow and the poorer risk resistance of SMEs. The combination of these two trends has led to a high demand for supply-chain finance and a study on this area has become especially important when China endeavors to promote the growth of the real economy by encouraging enterprises to "move from the virtual to the real". However, according to the results of the supply-chain finance practice of most Chinese enterprises, most of the supply-chain finance only remains on the surface. It is more of loans to enterprises than supply-chain finance. Core enterprises, taking advantage of their powerful positions, keep exploiting their suppliers by extending billing periods, monopolizing data, granting loans with high interest rates, and etc. The research and practice of supply-chain finance in China are therefore greatly hindered. This thesis will be of certain theoretical and practical significance since it takes supply chain and finance as the background of the theoretical research analyze them with cases.

2. THE DEFINITION OF SUPPLY-CHAIN FINANCE

As the economy becomes more global and digital, the difference of comparative advantage between enterprises and countries has emerged, so that small and medium-sized enterprises in less developed areas and lack of capital have become "cost pits", which has become the biggest bottleneck in the supply chain, affecting the stability and financial cost of the supply chain. In this context, the center of supply chain research and exploration has gradually shifted to the level of supply chain finance to improve the efficiency of capital flow. The current representative definition and understanding of supply chain finance is shown in Table 1.

Table 1. Definition of supply-chain finance

Author	Definition	Financial Institution	Reverse Factoring	Inventory Optimization	Fixed Asset Financing
Hofman (2005) [1]	Supply-chain finance is a process in which two or more organizations in the supply chain, including external service providers, effectively plan, monitor and control inter-organizational financial resources in order to jointly create value.				Yes
Shenzhen Development Bank Co.,Ltd. (2006) [2]	By treating the related enterprises in the supply chain as a whole, setting up financing schemes according to the chain relationship and industry characteristics constituted in the transaction, effectively injecting capital into small and medium-sized enterprises which are in a relatively disadvantaged position, and providing capital management services for large enterprises, we can solve the imbalance of capital allocation in the supply chain and enhance the competitiveness of enterprise groups in the whole supply chain.	Yes		Yes	
Camerinelli (2009) [3]	Supply-chain finance is a series of products and services provided by financial institutions to promote the exchange supply-chain materials and information.	Yes			
Pfohl,Gomm (2009) [4]	Supply chain finance is the act of optimizing and integrating inter-organizational finance with customers, suppliers and service providers in order to realize the value of all participating members of the supply chain.			Yes	Yes

Lamoureux,Eavns (2011) [5]	Supply-chain finance, an integration of technology and financial services, has brought closer global supply-chain enterprises, suppliers, financial institutions and especially technology providers, improving the efficiency of fin-tech supply chain by stopping damaging cost shifting and improving the visualization, availability, delivery and cost of capital for global supply chain participants.	Yes			
More,Basu (2018) [6]	Supply-chain finance can be defined as the management, planning and control of all transaction activities and capital-related processes among all supply-chain stakeholders to improve the capital operations of all parties.	Yes			
The People's Bank Of China (2020) [7]	Supply-chain finance means, based on real transactions, building an integrated financial supply system and risk assessment system between the dominant core enterprises in the supply chain and upstream and downstream enterprises and providing systematic financial solutions by using fin-tech means to incorporate information on logistics, capital flow and information flow, thus responding quickly to supply-chain enterprises' comprehensive needs on the settlement, financing and financial management, reducing enterprise costs and enhancing the value of all parties in the chain.	Yes			Yes

This thesis adopts the definition of the People's Bank of China, which defines supply-chain finance as the purpose of promoting the upstream and downstream of the supply chain to achieve cost reduction and efficiency improvement as well as value co-generation by providing financial solutions from the overall perspective of the industry under the background of technological means and real transactions. With the rapid development of information technology, supply chain activities have become increasingly complex. Therefore, how to ensure the stability of the supply chain process against the backdrop of the fast growth of digitalization has become a major challenge. Capital flow and how enterprises can solve the problems of capital structure, cost and flow in the context of digital transformation remain the biggest bottleneck in the supply chain. Therefore, this thesis will explore how to maintain the ability of efficient utilization of resources, risk control and value co-creation of supply chain in supply-chain finance based on the background of digital transformation.

3.RESEARCH ON SUPPLY-CHAIN FINANCE MODEL

There emerged three traditional forms of supply-chain finance in terms of the way of controlling risks during its decades of development.

The first is accounts receivable financing with factoring, reverse factoring, factoring pool and note pool credit as the major financing methods, which is the most common form at present and generally exists between core enterprises and upstream enterprises [8]. The second is inventory financing, which generally covers static pledge credit, dynamic pledge credit and warehouse receipt pledge credit. This is mostly found in the automobile manufacturing industry. The third is prepayment financing including order financing, channel dealer financing and confirming warehouse financing, which is mostly used by enterprises in its procurement stage. This requires high participation of third-party logistics or warehousing enterprises since credit guarantee from third-party logistics enterprises is needed, which makes this form the most complicated and cumbersome one in terms of procedures and operation process.

In addition to the three traditional forms, domestic scholar Song Hua [9] proposed a new one: strategic relationship financing, which, based on long-term partnership, is oriented to enhance the value creation capability of supply chain from a strategic perspective and to guarantee the long-term stable development of supply chain and the future core competitiveness of enterprises. This thesis also summarizes the above-mentioned four forms, as shown in Figure 1.

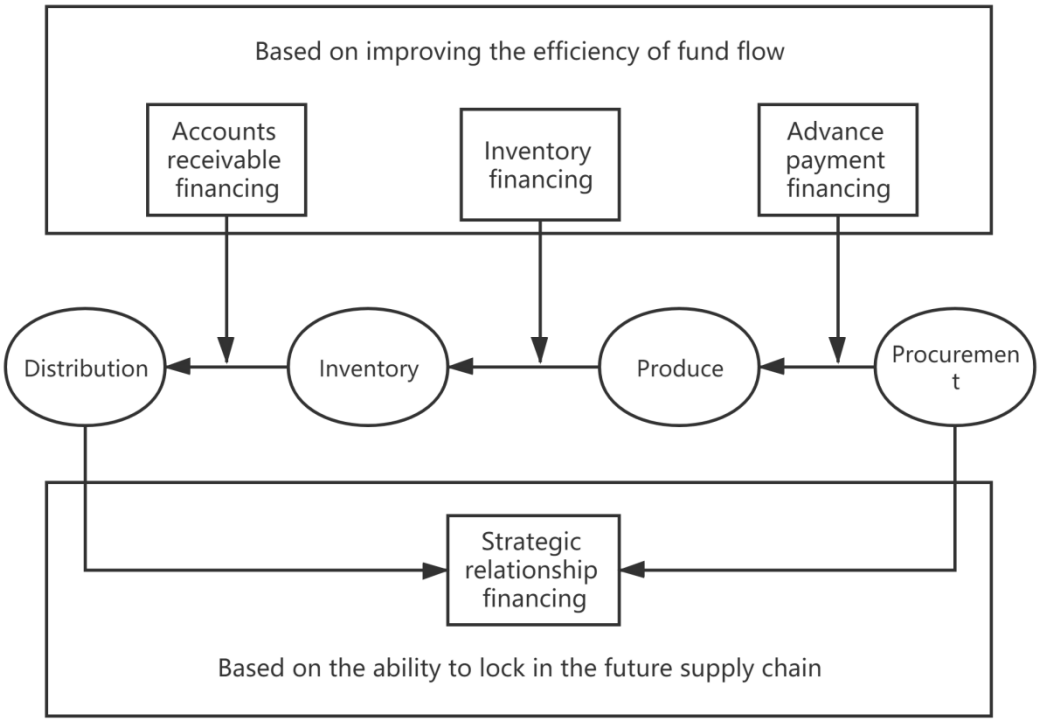

Figure1. Summary of supply-chain finance form

However, the four forms all have the following problems: the supply chain involves the core competitiveness of enterprises, resulting in low transparency of the overall supply chain information and it is difficult for financial institutions to obtain complete and true information; in addition, because of the inadequate information, the credit granted by financial institutions for supply chain finance only covers core enterprises or reputable first-tier suppliers; the problems of small and micro suppliers and distributors still face the shortage of fund and the bargaining power of core enterprises is too high, which makes it difficult to realize the real value co-creation. There lies a huge problem: the number of bills, orders and contracts involved in supply chain finance is too large, resulting in a large input of labor forces from financial institutions to verify their authenticity and data entry and a high operational risk.

There is where block-chain technology comes in. It is decentralized, traceable and tamper-resistant, which makes it in line with the digital, integrated, transparent and highly secure supply chain demanded by enterprises in the digital era. The application of block-chain technology in supply chain finance can ensure the

authenticity of information in supply chain finance, reduce the supervision difficulty of banks, expand the scope of credit and the openness and authenticity of transactions, thus reducing operational risks and labor costs [10]. Moreover, supply chain finance in the form of block-chain conforms to the digital, ecological and platform-based development of supply chain finance [11]. In the future, all parties in the supply chain can, based on block-chain technology, jointly build an alliance chain to form a value co-creation ecosystem so as to share information and capabilities and enhance the competitiveness of the whole industry chain [12].

4. RESEARCH ON SUPPLY CHAIN FINANCE CASES

China has entered an era of "digital everything" as its digital technology grows rapidly, which in turn brings more technologies to the traditional financial industry. The combination of these technologies and finance has formed a customer-centered and interconnected ecosystem. At the same time, in the supply chain, there are more emphases on the concept of shared information platform, interaction and coordination. In the future supply chain activities, enterprises will no longer compete with each other individually, but form a symbiotic relationship of cooperation and competition in which the former outruns the latter. The two new trends form a new form of supply chain finance, which is the Internet supply chain finance based on industrial ecology. Therefore, Jingdong, a Chinese e-commerce giant with strong supply chain strength in this field, is selected as the case to be studied in this chapter to explore the model and status quo of Jingdong's supply chain finance.

4.1. Overview of the Case

Jingdong's supply-chain financial services were first launched in November 2012, when Jingdong Mall signed a strategic cooperation agreement with Bank of China Beijing Branch to provide financial services to Jingdong's cooperative suppliers. The year of 2013 witnessed the independent operation of Jingdong Finance and the gradual introduction of "Jingbao Bei" and "Jing Small Loan ", two standard products of supply chain finance. Relying on Jingdong's resources, they began to build their own ecological platforms.

Depending on its strong e-commerce sales platform, Jingdong has accumulated a large amount of e-commerce business data, covering merchant and user data, thus expanding and developing its supply chain finance business with the help of these business transactions to better control the upstream and downstream capital flows and realize the closed loop of capital flows. Jingdong Finance has also gone through 3 development stages: digital finance stage from 2013 to 2015 in which Jingdong make more efforts to layout C-terminal business. With its self-owned financial licensed business at the center, it has launched Jingdong Pay, Jingdong White Strip, Jingdong Small Vault and other most competitive products, covering payment, financing and wealth management, to lay a foundation for C-terminal financial users and financial business; financial technology stage from 2016 to 2017 in which Jingdong Finance emphasized on empowering B-terminal financial institutions. It initiated the concept of "financial technology positioning" at the end of 2015. Later, it set up a financial technology division and successively launched financial technology products like "ABS cloud platform" to provide technology services for financial institutions. After 2018, Jingdong Finance renamed itself to Jingdong Digital Technology and entered the digital technology era, emphasizing the comprehensive development of the digital finance field. Oriented to the B- and C-terminals in supply chain finance, it began to use technology to empower the whole industry chain.

4.2.TOB-terminal Chattel Financing Model

"Jingbaoibei" a factoring financing based on bills and accounts receivable, is launched to meet the demand of suppliers for fast fund recovery as the first Internet financial product based on big data of Jingdong Finance. It mainly serves large suppliers of Jingdong Mall since banks require high-quality collateral and a certain amount of loan. While "Beijing Small Loan" solves small and medium-sized suppliers' problems by providing them with financing services on the basis of the merchant information and historical transactions of Jingdong Mall's third-party sellers and short-term and medium-term credit without collateral.

In September 2015, China Postal Express & Logistics, together with Jingdong Finance, jointly launched "Cloud Warehouse Beijing Finance", the first movable property financing product for e-commerce enterprises in the field of Internet finance in which goods on sale would be taken as the pledge(something traditional financial companies dare not do), and the full range of supply chain information from branding companies to retailers be integrated with professional warehousing services at the center so as to provide credit for the pledge in turnover. Through chattel financing, the financing amount for e-commerce enterprises can be increased from about 2 million yuan for credit loans to a maximum of 10 million yuan, and the financing cost is expected to be further reduced. This chattel financing product uses a data-based and modeling approach to manage risks, measures the amount and interest rate more accurately, and provide financing services to customers through an online system.

"The "Cloud Warehouse" has made up for the shortcomings of "Beijing Small Loans" and "Jingbaobei" and become the third product line of Jingdong Supply Chain Finance. In 2016, "Jingbaoibei" and "Beijing

Small Loans" will be upgraded to 2.0 version, which will be completely out of Jingdong's ecosystem and export Jingdong's supply chain finance capability to the outside world.

In fact, the core of Jingdong's chattel financing is the large amount of data generated by the e-commerce platform and the model that automatically evaluates the value of commodities. These have effectively controlled the risks of Jingdong's chattel financing. While in the field of e-commerce where falsified data and order transaction information are frequent, Jingdong has digitized the layout of multiple links in the supply chain and effectively avoided credit risk and fraud risk through cross-verification of data in multiple links. Besides, Jingdong Chattel Financing is most characterized by its ability of dynamic replacement of pledged goods. For e-commerce merchants with huge and unpredictable sales volume, Jingdong's financial system can realize intelligent adjustment of pledged SKUs so that goods on sale can also be pledged and the system will automatically prompt merchants to make a new round of replenishment and pledge when the goods are about to be sold out, which revitalizes the pledged stagnant goods to a great degree. The dynamic replacement of pledged goods can efficiently release fast-flowing goods and meet the normal business needs of enterprises.

4.3. Problems behind Jingdong Supply Chain Finance

1）Transfers risks through highly leveraged lending. The listing of Ant Financial Services was previously called off by the Chinese government and a series of monitoring efforts were launched. The over-leveraged credit business of Ant, Jingdong and other Internet fin-tech platforms has raised concerns about Chinese government’s regulation. Splitting up Ant and it can be found that most of company transferred the credit assets in the form of ABS, trust plans, joint loans, etc., thus avoiding the risk of default, and transferring the risk of bad debts to the funded financial institutions. Despite the support from the technology and data, the occurrence of extreme events and failure of risk control models in such a large credit stock will cause inestimable social hidden costs.

2）More efforts are needed in data rights and privacy protection. Data assets have become the cornerstone of technology companies' product development, accurate marketing, and business expansion. Some technology companies, however, take advantage of the market to excessively collect and use corporate and personal data and even steal data for sell, which are not fully authorized by users and seriously infringe on corporate interests and personal privacy. Therefore, it is urgent to improve relevant laws and regulations on personal information protection and build an effective data collection, use and trading mechanism.

3) Abuse of dominant market position and monopolization of the market. Monopolies, which can be found in both traditional and emerging industries, will form faster, more extensively with stronger user stickiness in the new economy supported by mobile Internet technology and large-scale capital. Possibilities of external negative impacts brought about by platform monopolies, such as endangering consumer rights and interests, extracting residual value and squeezing the living space of small businesses, may be even greater. Infringement of consumers' rights and interests like inducing excessive consumption, extra charge on membership, using big-data analysis to price products to the disadvantage of the existing customers and bundled sales is quite common. As the Chinese government has now carried out severe supervision on industry and data monopolies, Jingdong, one of the Internet giants, needs to conduct its business more cautiously.

5. CONCLUSION

Having accumulated a large amount of user data and transaction data based on its e-commerce platform, Jingdong has achieved "instant response" to enterprises through supply chain finance, which has greatly compensated for the lack of funds of upstream and downstream suppliers and enhanced the competitiveness of the entire Jingdong supply chain. However, there is also a certain degree of risk, so this thesis concludes with three suggestions.

First, strengthen internal financing management. Jingdong has utilized emerging technologies to ensure a smooth development of its supply chain finance, but because its C-terminal-oriented consumer finance business involves financing methods such as ABS, China has now started to strictly regulate such forms of financing. Therefore, Jingdong needs to avoid the potential irrational organizational risks to prevent large-scale financial risks.

Second, strengthen the management of enterprise data assets. The data accumulated by Jingdong in its development has become its important data assets. From the perspective of enterprises, the lack of data criteria and irregular data entry will lead to data redundancy and inability to share, resulting in “data island” and increased information costs. Moreover, in terms of social responsibility, the lack of data security awareness and protection of enterprises will also lead to data leakage, endangering the interests of users. Therefore, Jingdong needs to continue to strengthen the protection of its cloud service center to ensure that supply chain finance can realize a certain degree of information sharing and prevent the risk of information leakage.

Third, improve information regulation. The government needs to better play a regulatory role and introduce financial technology to provide financing information service and supporting risk control operation

system and issue timely warning of potential risks of enterprises. Meanwhile, enterprises need to further improve the credit evaluation system of suppliers, introduce the supply chain finance business to more end suppliers and ensure a good financial operation mechanism, thus preventing core enterprises from monopolizing the upstream and downstream of the supply chain and the risk of undesirable supply chain finance.

REFERENCES

[1] HOFMANNE, 2005. Supply chain finance: some conceptual insights. Beitrage zu beschaffung und logistik: 203-214.

[2] Zhang Fangli. Supply chain finance -- financial innovation worth attention. Financial Review,2007(20):30-32.

[3] CAMERINELLI E, 2009. Supply chain finance. Journal of payments strategy & systems. Management science, 50 (9): 1274-1292.

[4] PFOHL H C, GOMM M, 2009. Supply chain finance: optimizing financial flows in supply chains. Logistics research, 1 (3/4): 149-161.

[5] LAMOUREUX J F, EVANS T, 2011. Supply chain finance: Anew means to support the competitiveness and resilience of global value chains. https: // ssrn. com/abstract=2179944 or http: // dx. doi org/10. 2139/ssrn. 2179944.

[6] MORE D, BASU P, 2013. Challenges of supply chain finance: a detailed study and a hierarchical model based on the experiences of an Indian firm. Business process management journal, 19 (4) : 624-647.

[7] People's Bank of China Hengshui city central sub-branch research group. Explore the new development trend of supply chain finance under the background of big data. North China Finance, 2019, (3) : 40-45, 52.

[8] Tian Junfeng, SI Yanhong, WANG Li, Tang Meixian. Literature review and prospect of supply chain finance: Boundaries, trends, methods and themes. Supply chain management,2020,1(06):60-76.

[9] Song hua, 2015. Supply Chain Finance. Beijing: China Renmin University Press.

[10] Gu Chengjia, Wu Zhiyue. The reform of supply chain finance in the era of big data. China Business Theory,2018(18):30-31.

[11] Song Hua, 2019. Smart Supply Chain. Beijing: China Renmin University Press.

[12] Song Hua,Innovation trend of supply chain finance based on industrial ecology. China circulation economy,2016,30(12):85-91.