# Study on the Risks and Countermeasures of the "Logistics + E-commerce" Supply Chain Finance Model

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## Abstract

With the rapid development of economy and the increasing pressure of market competition, the traditional financing model is no longer suitable for the current financial market. The supply chain finance model of "logistics + e-commerce" is becoming one of the mainstream models of international industrial organizations. This model has the characteristics of reasonable interest rate, precise lending, flexible approval, etc. However, due to information asymmetry, imperfect credit security evaluation system and high level of financing risk, this model also has major problems such as idling risk, credit risk and operational risk. This is bound to directly affect the financing strategy decisions of enterprises, and ultimately affect the long-term healthy development of enterprises in the entire supply chain system. In view of this, it is necessary to formulate corresponding solutions to these problems. Specifically, we should continue to make efforts from the three-dimensional strategy of "establishing third-party logistics incentive mechanism", "building a perfect credit supervision system" and "strengthening the introduction of high-quality talents" to prevent the adverse transformation of related risks in the "logistics + e-commerce" supply chain finance model.

**Keywords:** Logistics + e-commerce" supply chain finance; Risk management

The "logistics + e-commerce" supply chain finance model is based on the supply chain to unify the relevant logistics, commodity flow, information flow and capital flow, activate the current assets such as prepaid accounts, inventories and receivables, and then set up personalized financing plans according to the industry characteristics of supply chain enterprises, so as to effectively inject funds into the supply chain enterprises. Under the supply chain financial service model, commercial banks will provide personalized comprehensive financial services for upstream and downstream enterprises in the entire supply chain based on industrial characteristics and around the core enterprises in the supply chain. [1]According to the data of the National Bureau of Statistics, from 2011 to 2019, the average annual growth rate of the supply chain finance business of international banks basically exceeded 30%, and the supply chain finance business developed rapidly. As an innovative way of financing, the "logistics + e-commerce" supply chain finance model can make up for the company's traditional working capital loan limit compressed by the bank, and also expand the business field of financial institutions, enhance and strengthen customer relations through this cooperation. But this model also has credit risk, market risk, operational risk and other hidden worries. Therefore, this paper conducts innovative application research on the supply chain finance model of "logistics + e-commerce", to discuss the theoretical basis of this model, analyze the main risks existing in this model, and put forward corresponding countermeasures against these risks, so as to respond to the current supply-side reform policy of the country and promote the promotion and application of this model.

## I. "Logistics + e-commerce" supply chain finance model and its advantages

"Logistics + e-commerce" supply chain finance is a combination of e-commerce logistics and finance, and a supply chain service that includes financial functions. This service model no longer unilaterally emphasizes the financial status and industry status of the company in the e-commerce logistics system of loans, and no longer simply makes credit decisions based on its isolated evaluation, but focuses on the combination of real transactions to make evaluations. The biggest feature of "logistics + e-commerce" supply chain finance business is to find out the core company in the entire supply chain, and take it as a starting point to provide financial support for the entire e-commerce logistics supply chain. In this innovative model, logistics enterprises directly bear the credit risk, and financial institutions will evaluate the credit of logistics enterprises and provide credit lines before lending. Logistics enterprises set logistics operation, information inquiry, financing services and other functions in one, to provide credit loans for financing enterprises, undertake all logistics business, and conduct real-time evaluation based on information base. Therefore, while the cost of enterprise default increases, the occurrence of default behavior is also reduced. The comparative analysis results of the "logistics + e-commerce" supply chain finance innovation model and the traditional supply chain finance model are shown in Table 1.

Table 1：A comparative analysis of "logistics + e-commerce" supply chain finance innovation model and traditional supply chain finance model

| No. | Financial model | Traditional supply chain finance | “Logistics + e-commerce" supply chain finance |
|---|---|---|---|
| 1 | Accredited object | All supply chain enterprises | Part of the supply chain enterprises that have been trusted by the platform |
| 2 | Credit evaluation | Rely on the core enterprise's past credit | Use specific trading behavior as the basis for evaluation |
| 3 | Credit granting method | Additional collateral as the subject matter of security | Accounts receivable or goods rights as the subject matter of security |
| 4 | Risk management | Offline management | Online management |

The "logistics + e-commerce" supply chain finance business model is a financial service model that can achieve a win-win situation, which can not only realize the profits of banks, but also facilitate the financing of e-commerce logistics companies. E-commerce logistics companies themselves should implement investment and financing plans according to requirements to break the financing dilemma. In the supply chain finance business of "logistics + e-commerce", all the supply, procurement, production, sales, warehousing and distribution, inventory and related information flow activities in business activities are regarded as a dynamic ecosystem. Through advanced supply chain management methods, to provide hardware and software support for the company, thereby reducing the supply and marketing links of commodities. "Logistics + e-commerce" supply chain finance has great advantages. In the "logistics + e-commerce" supply chain finance ecology, small and medium-sized enterprises are the most important subjects. The most important financing demand of these enterprises is the working capital demand generated in the turnover, which is often characterized by small amount, high frequency and urgent use. The financial services in the "logistics + e-commerce" supply chain have the advantages of low interest rates, precise loan quotas, and flexible approval, which can fully meet the financing needs of small and medium-sized enterprises. Specifically, the three major advantages are mainly reflected in: First, the interest of "logistics + e-commerce" supply chain finance is reasonable. Due to the low level of risk, the interest rate of supply chain finance products is generally about 10%, which is much lower than the interest rate of microfinance. At the same time, the duration of "logistics + e-commerce" supply chain financial products can also fully match the financing needs of enterprises, so that SMEs in the supply chain ecosystem can minimize the actual expenditure of interest; Advantage 2, "logistics + e-commerce" supply chain finance can achieve accurate lending amount. The loan amount of "logistics + e-commerce" supply chain financial products is subject to the capital demand generated by the actual transaction, which can accurately match the actual demand of enterprises; Advantage 3, the loan approval procedures of "logistics + e-commerce" supply chain finance are flexible and efficient. The review of "logistics + e-commerce" supply chain finance enterprises focuses on transaction information, rather than the past credit rating of the borrower, so the approval conditions are relatively flexible.

## II. Risk management theory of "logistics + e-commerce" supply chain finance model

1. Risk control theory

The axis principle of risk society is the control of risk, and the control logic of risk rules the logic of wealth production. Risk can be divided into individual risk and group risk according to the degree of publicity. There are differences in regulation methods between individual risk and group risk. When the risk is an individual risk, the subject relationship is single, the loss is relatively fixed, and the risk creation behavior is closely related to the loss. However, when the risk is the whole risk, then the subject relationship is not singular, the created risk has the characteristics of spreading and expanding, and the loss is also in the process of expanding change. In this case, the relationship between the behavior of creating risk and loss is far away.[2]

Under the path of risk control, the "logistics + e-commerce" supply chain finance model mainly regulates the special risks of financial transactions in the model system by adjusting the inter-subject rights and obligations framework. In the "logistics + e-commerce" supply chain financial activities, the two sides of the transaction activity have a wide gap in the transaction ability centered on the information acquisition ability, resulting in the loan side bearing more risks than ordinary transactions in the transaction activity. Risk and return are directly proportional, generally speaking, any business pays attention to high risk and high profit, and seeks stable growth and low profit. From the overall environment, as long as two or more possibilities are derived from the progress of a certain business, it will be judged that there is the possibility of the occurrence of uncertain risks in this business. Supply chain logistics companies will encounter several uncertain factors in the process of preliminary approval and later operation, and the probability of occurrence of these factors and their accompanying degree of later impact cannot be predicted in advance. These various uncertain factors that are objective and affect the logistics company to achieve the expected goal, are the risks.

Risk control is an important operation link that cannot be ignored in supply chain finance business, which includes the following contents: Firstly, it should identify all kinds of hidden risks effectively. Secondly, for the clarity of risk understanding, ratings are given according to the complexity and maturity of the borrower's business background involved in the "logistics + e-commerce" supply chain finance system, simulation analysis and systematic record are carried out on the expected business operation process and forecast results, and then appropriate hierarchical risk control is implemented according to the risk level given by the rating standard. The last is the risk control stage, that is, under the premise of ensuring the smooth operation of the business, the risk is reduced to a minimum. There are many uncertain factors in the process of supply chain logistics company providing business, so it is necessary to adopt specific countermeasures according to the level of risk.

2. Incentive theory

In the existing research on supply chain finance, the discussion on moral hazard and incentive mechanism mostly focuses on the determination of optimal incentive and effort coefficient. Cao Yugui found the influencing factors of optimal incentive model selection and optimal incentive contract[3]. Xu Peng et al. combined the research on third-party logistics incentive with supply chain finance and found that the co-existing method of reward and punishment can better improve the effort level of third-party logistics[4]. Jiang et al. believed that the cost sharing of the third-party logistics is also a reasonable incentive mechanism, because only using linear incentive method is often one-sided and slow, while the incentive method of cost sharing can achieve mutual benefit and win-win results[5]. Guo Junsheng et al. proposed that only when the incentives for logistics companies exceed their operating costs, logistics companies will make efforts, and the degree of bank incentives for logistics companies will decrease with the increase of financing enterprises' loan amount or interest rate[6].

In the context of digital economy, e-commerce enterprises have gained greater freedom of operation. In order to further reduce market transaction costs and improve economic benefits, under the e-commerce technology support service format, various types of affiliated enterprises have gradually formed a "logistics + e-commerce" supply chain financial service model based on information sharing and its core. This supply chain finance model is based on resource dependence, market demand, product interaction frequency, external competition and other comprehensive factors. In order to integrate resources effectively and realize efficient financing, member enterprises in the supply chain ecology need to establish long-term cooperative and trust relationship through the construction of incentive mechanism. In the process of designing the supply chain of e-commerce, member enterprises should fully consider the differences in corporate culture, operation efficiency, information sharing and other aspects, gradually form a community of interests, enhance mutual trust, effectively optimize the function of the incentive mechanism of the supply chain, and on this basis, construct a risk response strategy of "logistics + e-commerce" supply chain finance.

3. Information asymmetry theory

Information asymmetry is studied under the background of principal-agent problem, which is the main cause of information asymmetry. The theory of information asymmetry refers to that in the market economy, different subjects have different grasp of relevant information, and those with superior information often have more information, while those with poor information are in a disadvantageous position. Therefore, in the contract theory, the information superior party has more decision-making power and dominant power than the information inferior party. This asymmetry causes the imbalance of rights in the transaction, which is a market failure, such as adverse selection, moral hazard.

On the one hand, information asymmetry is the cause of financing difficulties for financing enterprises in the "logistics + e-commerce" supply chain financial system. It is difficult for financial institutions to understand the financing intention, development prospects and operation of financing enterprises, so it is easy to produce adverse selection, resulting in the exclusion of financial institutions from granting credit to the main body of "logistics + e-commerce" supply chain finance. On the other hand, information asymmetry is the cause of "logistics + e-commerce" supply chain financial credit risk, market risk, moral risk and so on. The rapid development of supply chain finance business is based on real trade information. Due to the large number and complex information of small, medium and micro enterprises in the "logistics + e-commerce" supply chain, it is difficult for financial institutions to obtain relatively comprehensive trade data in a timely manner. In addition, there is a lack of normative standards on the disclosure and publicity of information related to micro, small and medium-sized enterprises in the market, and the degree of information standardization and credibility are relatively low, and there is obvious information asymmetry between banks and enterprises. Therefore, it is difficult for banks to grant credit to financing enterprises. The problem of information asymmetry has become particularly prominent in supply chain finance. The problem of information asymmetry is the basic cause of various risks in "logistics + e-commerce" supply chain finance.[7]

**III. Risks of "logistics + e-commerce" supply chain finance**

The "logistics + e-commerce" supply chain financial ecosystem is a comprehensive credit granting business carried out by financial institutions from the perspective of the entire supply chain, thereby transforming the risk management of specific market players into the risk management of the entire ecological industry chain. In this model, logistics is a changing dynamic system. Because the carriers on the cooperation chain affect each other and interact with each other, the failure of any chain may affect the normal operation of the entire supply chain, so the source of supply chain financial risks is everywhere. Supply chain financial risk refers to the possibility of damaging the normal function of the capital chain by adversely affecting several supply chain carriers in a stable capital chain operation. Supply chain finance risks include all the factors that play a role in the safe operation of the supply chain, which ultimately lead to the failure to complete the established plan objectives, resulting in the increase of related costs of financing business, the reduction of operational indicators, and even the breakdown of business cooperation. Specifically, the "logistics + e-commerce" supply chain finance model mainly has idling risk, credit risk, operational risk and so on.

First, idling risk. The "logistics + e-commerce" supply chain finance model takes the precipitation information in the supply chain as the core means of risk control, and the real transaction behavior as the basis, uses the self-liquidated transactions in the system to build a closed loop of capital flow, and finally provides precise financial support for a single financing demand in the supply chain. However, in the financial operation of the "logistics + e-commerce" supply chain, there is a risk of financial "idling arbitrage" that harms the health of the national economy. That is, the manufacturer and the supplier do not have actual business, but forge fake electronic contracts, fabricate the illusion of legal relationship between the two, and thus defraud financing of financial institutions, and the financing is not used for the actual production business operation in the supply chain. E-commerce logistics platforms are actually difficult to detect such idling transactions. However, this kind of idling arbitrage risk is more harmful than moral hazard. Enterprises in the "logistics + e-commerce" supply chain may no longer focus on their main business, but want to obtain more bank funds through this way. Over time, the technical means of the entire industry will stagnate. Moreover, "idling arbitrage" has a strong "infectivity", in order to expand the amount of financing after suppliers and main manufacturers have obtained certain benefits, they often absorb more subjects into the "idling" system, such as by co-opting the e-commerce platform to package themselves to increase the amount of loans applied to the bank. The risk of "idling arbitrage" has become a major risk in the supply chain finance of "logistics + e-commerce". Once this risk is difficult to supervise, it is likely to cause the occurrence of systemic financial risks.

Second, credit risk. The emergence of credit risk is based on the information asymmetry theory and moral hazard theory elaborated in the second part. When the e-commerce platform enterprises, logistics enterprises and lending institutions in the "logistics + e-commerce" supply chain finance ecosystem carry out supply chain finance business, they will face the credit risks of both upstream and downstream customers in the supply chain. With the continuous development of supply chain finance business, it is more and more difficult to identify the credit risk of loan customers. E-commerce logistics enterprises should not only integrate logistics, information flow, capital flow and other information on the supply chain, but also analyze different customer data collected to determine different credit levels. At present, the identification and control of credit risk in e-commerce logistics mainly focus on the five parts of loan enterprises' "transaction data", "industrial and commercial registration information", "financial statements", "logistics information" and "account period information since cooperation", and the main credit risk identification comes from "transaction data". However, e-commerce logistics cannot fully identify the credit risk level of enterprises through transaction data, and the operating data of an enterprise is the result of multiple factors, the most important of which is its own operating conditions, and will also be affected by partners, upstream and downstream enterprises in the supply chain and national policies. For example, in 2019, the net operating cash flow of Suning E-commerce was 17.865 billion Yuan, the lowest value in history, of which the net cash outflow generated by financial services business was 7.691 billion Yuan, accounting for 43.05%, and a large amount of funds flowed to upstream and downstream enterprises in the form of loans.[8] If the upstream and downstream enterprises of Suning E-commerce default, they will face great capital risks, and the normal and healthy operation of their supply chain finance business will be greatly impacted. Therefore, the financial risks of such enterprises are difficult to control. Once a certain subject in the supply chain system has a capital turnover problem, it may face compensation for breach of contract, which also causes certain economic losses to e-commerce logistics enterprises. Therefore, it is very important for e-commerce logistics enterprises to conduct pre-loan analysis and post-loan supervision in order to minimize credit risk.

Third, operational risk. Many links inside the supply chain finance model need a lot of manual operation. A complete set of financing process includes "credit, verification, valuation, transportation, storage, delivery" and other links, each link requires a lot of manpower to operate. Once a human error occurs in a certain link, the entire business cannot continue to carry out. Once the operator base is too large, there may be a risk that the practitioner does not have the professional operation ability, thus damaging the interests of the enterprise. Common operational risks include: improper valuation of collateral resulting in significantly excessive amounts of financing provided, improper management by warehouse managers resulting in damage to inventory, incorrect verification of accounts by acceptance personnel resulting in discrepancies between delivered assets and written records, etc. This series of operational risks will affect the interests of enterprises and damage the corporate image. Moreover, in the era of digital economy, the occurrence of risks presents a new feature of "too fast and beyond saving", that is, the digital transmission speed greatly increases the efficiency of the operation, and a wrong operation may take effect instantly and be difficult to save. Therefore, operational risk is a big hidden danger in "logistics + e-commerce" supply chain finance.

## IV. Strategies to deal with the financial risks of "logistics + e-commerce" supply chain

The previous part mainly discussed the main risk points existing in the supply chain finance model of "logistics + e-commerce". These risk points are mainly caused by the defects of the current system, information asymmetry, negligence of operators and other reasons. In order to deal with the above-mentioned possible risks, the following strategies should be mainly adopted to deal with them.

First, establish the third-party logistics incentive mechanism. In order to solve the problem of "idling arbitrage", an independent third-party logistics is introduced into the "logistics + e-commerce" supply chain financial to transport the goods between the supplier and the main manufacturer, and at the same time to screen and supervise whether there is actual trade between them. As the manager of the capital pool, the e-commerce platform can motivate the third-party logistics company to provide more authentic, accurate and timely information, so as to prevent the so-called moral hazard caused by the bribery of the third-party logistics by both sides of the supply chain. The information sharing incentive method under the background of supply chain finance can promote the symmetry of supply chain finance information.[9] In supply chain finance, the supervisory mechanism can improve the degree of information sharing, but the effect is often not good. Therefore, there is a need to explore new ways of breaking arbitrage. And the information sharing incentive method under the background of supply chain finance can promote the symmetry of supply chain finance information. On the one hand, although the third-party logistics is weak in the initial stage of contact business and can only rely on the e-commerce platform to survive, under the strong incentive of e-commerce platform, the number of third-party logistics contacts increases, and the understanding of various potential idling arbitrage means is gradually deepened, and the ability to find idling arbitrage is strengthened. The whole supply chain system can realize the benign cooperative relationship between the third-party logistics and the e-commerce platform. In the transaction process of supply chain enterprises, logistics enterprises can rely on the trading platform to realize real-time monitoring and supervision of financing enterprises, so as to judge whether the transaction activities can be carried out smoothly, ensure that financing enterprises can repay loans in time in the later period, and reduce the occurrence of defaults. On the other hand, with the improvement of the output capacity of the third-party logistics, the relationship between the third-party logistics and the e-commerce platform has gradually changed from the previous dependence relationship to the "collusion" relationship. With the further improvement of the output capacity of the third-party logistics, the third-party logistics began to be able to game with the e-commerce platform, and its social responsibility began to be highlighted. At the same time, in order to reduce its own financial risks, the e-commerce platform also needs the third-party logistics to play its supervisory role. Therefore, in the rapid rise period after the trough, the third-party logistics and e-commerce platforms reflect a win-win, mutual supervision and incentive benign cooperative relationship.

Second, establish a sound credit supervision system. In order to prevent credit risk effectively, it is necessary to construct a perfect credit supervision mechanism to reduce moral hazard and adverse selection. Specifically, first, monitor customer credit. When lenders provide supply chain finance business to SMEs in the "logistics + e-commerce" supply chain finance, need to fully collect their credit information, conduct a comprehensive and systematic analysis of the information, and form an accurate portrait to control their detailed dynamic data and form a credible credit evaluation result. More assessment methods should be added to the enterprises that use the service for the first time, and the supervision of their ability to repay the loan should be strengthened. Secondly, establish the enterprise credit database. The riskiest stage of supply chain finance business is the stage when SMEs repay loans after loans. If SMEs fail to repay loans on time, financial institutions in the supply chain finance platform will face the risk of capital chain breakage. Therefore, the e-commerce platform in the supply chain can use its main logistics business to collect business conditions, repayment ability and other information, build a corporate credit database, so as to fully grasp the credit status of small and medium-sized enterprises in the supply chain, and share relevant information with lending institutions in order to reduce the risk of default. After the loan, financial institutions should always supervise the loan enterprises, pay attention to the flow of funds, clarify the use of funds, pay attention to the dynamic changes of credit status of loan enterprises, and timely update the enterprise credit database; Finally, establish a sound pre-loan risk warning mechanism and post-loan management system. Supply chain finance is a loan service provided based on the entire supply chain, and any problem in one link of the service may affect the whole link. Therefore, it is necessary to build a pre-loan risk warning mechanism to identify credit risks in advance and prevent unnecessary losses. After the loan, when the improper use of enterprise funds and the rupture of capital flow led to the difficult recovery of loans, the post-loan management system can quickly identify risks and timely reduce the degree of harm. These two systems fully cover the two links of supply chain finance before and after lending, and comprehensively monitoring the financing process can effectively reduce the credit risk of enterprises.

Third, strengthen the introduction of high-quality talents. Operational risk is more reflected in the problem of personnel management, so the problem of operational risk should be optimized from the management of talent organization mechanism. First of all, in terms of personnel recruitment, we should cultivate high-quality logistics talents with professional competence. Nowadays, logistics enterprises are not only simple as traditional transportation and warehousing, but the application of blockchain, big data and other technologies increasingly requires the participation of Internet technicians, which involves multiple disciplines such as encryption technology and artificial intelligence. Therefore, all kinds of business entities in the "logistics + e-commerce" supply chain finance model not only make requirements in terms of academic qualifications when recruiting employees, but also pay more attention to the professional skills of employees, and should consider the comprehensive quality of employees in many aspects. After hiring employees, targeted and systematic training should be carried out to make them familiar with their own business processes and improve their business capabilities. Secondly, the corresponding reward and punishment mechanism should be established. Employees with outstanding work performance, excellent business ability and compliance with the company's regulations will be rewarded accordingly, while employees who are not dedicated, have poor work attitude and make mistakes in business operations will be punished to a certain extent. Through these effective reward and punishment measures, it can not only attract professional talents, but also mobilize the enthusiasm of employees, and ensure the stability and order of the overall operation process of supply chain finance business; Finally, the continuing education of employees cannot be ignored. Logistics technology is constantly updated and iterated, and the knowledge reserve of personnel also needs to keep pace with the Times. Only through on-the-job education can the new technologies in the future be better applied to supply chain finance. In addition, while training talents, a strict approval and operation process must be designed to ensure that employees can strictly implement this set of operating rules.

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