



The Impact of Resilient Supply Chain on Enterprise Supply Chain Management—Based on the Analysis of E-commerce Enterprises Under the COVID-19

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Abstract. Since the global public health security incidents broke out, the occurrence of diseases had brought about a serious impact on the global supply chain. Natural disasters and other emergencies expose the vulnerability of the supply chain. Through analyzing some e-commerce enterprises' successful solution measures for avoiding risks, the paper will explore the impact of a resilient supply chain on supply chain management. On the basis of the existing literature, this paper is dominated by qualitative analysis, accompanied by less quantitative analysis. Based on the theory of resilient supply chain and supply chain risk, this paper analyzes how the supply chains of Alibaba, JD and other enterprises deal with the uncertainty brought by the epidemic situation to innovate the supply chain, and provide relevant suggestions for enterprises to build resilient supply chain. From the enterprise level under the background of supply chain management, the study summarizes the measures to effectively improve the resilient supply chain and anti-risk ability.

Keywords: Supply chain management · Supply chain · Risks · Case analysis

1 Introduction

The impact of the epidemic caused a serious temporary shortage of materials and logistics obstacles. The global economy and trade are greatly affected, and at the same time, many small and medium-sized enterprises cannot survive the risks [1]. The impact of the sudden external influence on social demand is incalculable, and this temporary change has brought challenges to manufacturers' production, storage and sales [1]. The problem of supply chain interruption alerts supply chain-related enterprises to pay more attention to the development of supply chain risk and resilient supply chain, and to deal with supply chain interruption by setting up resilient supply chain [12].

Moreover, with the continuous innovation of new products, globalization and the emergence of new rules and regulations, even new security risk management mechanisms, consumer end users put forward more new standards for the supply chain [12].

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Y. Jiang et al. (Eds.): ICFIED 2023, AEBMR 237, pp. 59–67, 2023.

https://doi.org/10.2991/978-94-6463-142-5_7

This requires the supply chain to constantly develop and innovate according to the market demand and eliminate the problems in the supply chain. Risks bring difficulties as well as opportunities. Enterprises need to be good at finding opportunities in risks, and turning risks into profits, so that they can stand firm in the increasingly competitive market [8].

Analyze resilient supply chain, get feasible measures, and build resilient supply chain to improve the ability to resist risks [11]. It is commonly believed that resilient supply chain management method can improve the operation ability of supply chain, promote the supply chain operation mode dominated by market supply and demand relationship and customer bias, and strengthen the cooperation among node enterprises and eliminate the uncertainty of business environment as far as possible, which can not only turn the corner in the risk, but also promote enterprises' demand for quantity and diversification with the greatest accuracy [8].

To cope with the frequent changes in the external environment, such as international situation and economic market, and to quickly respond to consumer demand, enterprises need to attach importance to improving their ability to deal with risks and respond quickly to information. This paper analyzes the resilient supply chain formed by Alibaba, JD and other enterprises in response to emergencies, and explores the measures for enterprises to deal with risks and how to innovate to improve the resilience of supply chain. In this paper, the theory of supply chain resilience is used to analyze the actual cases, and the theoretical concept and framework are interpreted. According to the current situation of supply chain management industry, the development direction of supply chain elasticity is studied from the strategic perspective of enterprises, which provides theoretical enlightenment and management enlightenment for enterprises to build resilient supply chain to deal with risks.

2 Development Status of Resilient Supply Chain

The development of the supply chain has the following three stages [13]. At present, China's supply chain enterprises have gone from the trade mode of earning price difference (1.0) and the supply chain mode of earning platform service fee (2.0) to the 3.0 stage of the whole supply chain [13] (Table 1):

2.1 Development Status of Domestic Supply Chain

Judging from the performance in 2018, when the domestic economic situation is unstable, the decline in net profit and growth rate of supply chain management industry is the most obvious [13]. The data shows that China's supply chain management is still in the development stage, the industry growth is greatly affected by the macro environment, and the level of supply chain risk resistance is low [13] (Figs. 1 and 2).

Liu Ning [6] believes that the demand for economic development, times development, and enterprise development are the reasons for establishing and developing the supply chain. Optimizing and integrating the supply chain and strengthening its management through modern information technology is the development trend of supply chain

Table 1. Three stages of supply chain development

Three stages of supply chain development			
Stage	Model	Profit model	Characteristics
1.0	Trade pattern	Rely on the high growth of demand and earn market price difference	Large market capacity, small product difference and low industry concentration
2.0	Supply chain mode	Gradually get rid of the proprietary trading business that earns price difference and turn to the supply chain mode that mainly collects service fees	With the increase of concentration, the profit stability of leading enterprises began to improve
3.0	Whole supply chain mode	Deeply involve in value-added businesses such as warehousing, processing and supply chain finance to extend the business chain and obtain better income	The business is concentrated in large enterprises with strong financial strength, complete supporting logistics system and strong integrated service capacity, and the market share of leading enterprises will be rapidly increased.

management. Because information sharing is the basic point of supply chain management, accelerating the application of modern information technology is the foundation to promote the rapid development of supply chain.

2.2 Introduction of e-commerce Supply Chain

JD chose self-operated logistics to improve the logistics circulation efficiency in JD's supply chain. However, self-operated logistics has the disadvantage of large upfront investment. Jingdong Logistics has established six highly coordinated networks, such as a warehousing network, comprehensive transportation network, last mile distribution network, bulky goods network, cold chain logistics network and cross-border logistics network.

Merchants on Alibaba's e-commerce platform choose to transport goods through third-party logistics, and their cooperative enterprises include Shentong, Zhongtong, Yunda and other large logistics companies [1]. At the same time, with the development of Alibaba's e-commerce platform, many third-party logistics enterprises have developed. Alibaba doesn't completely rely on third-party logistics, because the efficient logistics circulation level can support the development of the enterprise. Ali invested in express delivery company, and through the warehousing and express delivery system set up by Ali, the logistics circulation of the whole Ali platform is as efficient as self-operated logistics.

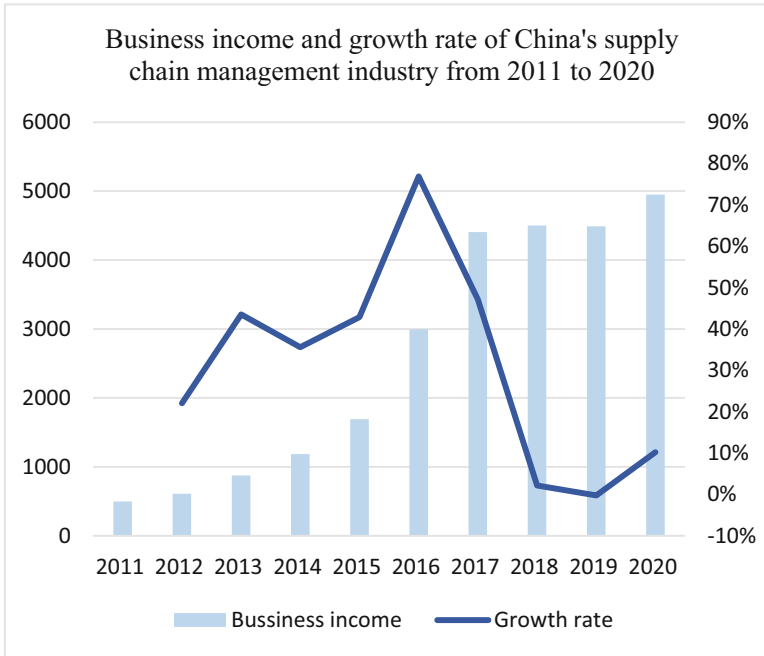


Fig. 1. Business income and growth rate of China’s supply chain management industry from 2011 to 2020

3 Case Analysis

The supply chain is a functional network chain formed by the connection of manufacturers, suppliers, distributors and end users in the process that a commodity starts from the purchase of raw materials required for its production, and the final product is sent to consumers after a series of processing. Alibaba’s e-commerce platform, headed by Taobao, provides sales channels and commodity flows for Alibaba’s supply chain system. Around this backbone, Alibaba Group has established Ant Financial Service, Rookie Logistics and Alibaba Cloud, taking all the capital flow, logistics and information flow into its own hands and supporting an advanced and efficient supply chain system.

By building a financial supply risk prevention and control system [4], JD integrates business flow, logistics, capital flow and information flow. In this way, many parties in the industry cooperate efficiently, realizing the characteristics of efficient system integration, closed-loop business, and visible data of the whole chain.

4 Supply Chain Overview

Supply chain system is divided into two parts: upstream and downstream [3]. The upstream involves the business decision-making level, including commodities, prices, marketing activities, marketing strategies, supply chain planning and other modules. The

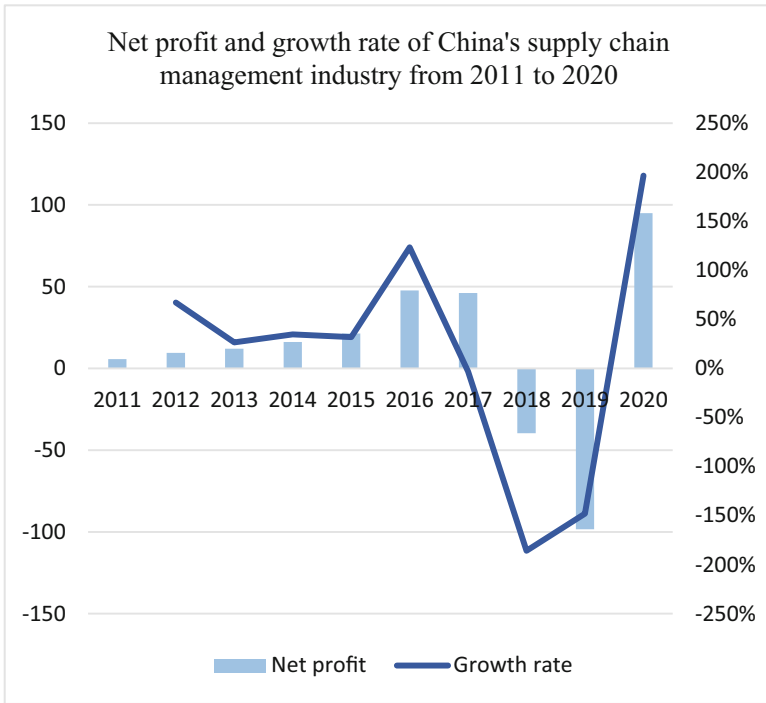


Fig. 2. Net profit and growth rate of China's supply chain management industry from 2011 to 2020

upstream will transmit the results to the downstream modules of the supply chain, including the order situation, inventory management, replenishment and allocation actions, etc., and then the upstream and downstream cooperate to form the architecture system of the whole system.

4.1 Resilient Supply Chain

4.1.1 Demand Forecast

Demand forecasting is the starting point of the whole business. First of all, enterprises need to collect and sort out data first. Take the Double Eleven Shopping Festival as an example, the required data types will cover many aspects [16]. On the consumer side, enterprises need to collect consumers' past consumption data and analyze their consumption preferences. In terms of commodities, enterprises need to integrate commodity data and promotion strategies involved in promotion [12].

Secondly, enterprises need to establish corresponding data models to forecast and analyze the collected data. On the basis of the forecast, the business can be carried out, and then the whole supply chain will start running. Demand forecasting can also divide the supply chain into different flows. If a certain supply flow is affected at the beginning of the business, the enterprise still has an alternative supply chain to continue working as a backup [8].

4.1.2 Stock Replenishment

Replenishment is also one of the most important links in the inventory field. In this part, the main activities such as dynamic inventory layout, transshipment/cross-warehouse strategy [16].

First of all, the inventory management of the warehouse needs to be dynamic. Inventory management is complicated, and enterprises place the goods with fast turnover near the export to improve the inventory turnover rate. Through the business model of pre-sale, enterprises also send goods to the turnover warehouse close to consumers in advance. Consumers can receive the goods in a very short time after placing an order. At the shopping festival in 2020, the first item was signed for the customer at eleven past zero.

4.1.3 Warehouse Performance

Warehouse fulfillment involves booking delivery, active order cutting, order generation and control, intelligent warehouse operation, transportation and distribution planning and other actions [9].

The purpose of pre-sale is to divert a large number of commodities in time, reduce the transportation time of commodities, and greatly ease the logistics traffic pressure during the shopping festival. Enterprises control the warehouse capacity by controlling the order generation speed and marketing mode, thus reducing the inventory pressure [16].

Enterprises actively develop intelligent logistics. By using intelligent equipment such as AGV robots and intelligent warehouses, the time is greatly shortened and the accuracy of operation is improved. The construction of intelligent logistics also helps enterprises to build a supply chain management system and manage inventory more scientifically [16].

4.2 Innovation of Supply Chain

4.2.1 Innovation “3 + N3” Integration Mode

JD’s supply chain financial technology adopts a “3 + N3” integration model, in which the first three represent the financial institutions, enterprises and governments served by the platform, and the last three in the “3 + N3” is cubic [14]. In JD’s supply chain fintech platform, the multiplier effect is used more [14].

From the enterprise’s point of view, this model can help enterprises build a platform for business circulation between upstream and downstream SMEs in the industrial chain [14]. From the perspective of financial institutions, this model enables enterprises to cooperate with financial institutions such as banks and trust companies. Capital financial institutions penetrate into the original industrial chain, and then help service entities through scientific and technological capabilities [14]. From the government’s point of view, this model can help the government build the trading platform and product platform of supply chain finance [5].

4.3 The Supply Chain's Ability to Resist Risks

By integrating six management capabilities (demand management, procurement bidding, supplier management, self-service shopping center, performance coordination and financial settlement), JD can comprehensively solve the problems of “purchasing” and “management” in procurement management [15]. Therefore, JD launched “Jingcaiyun”, a digital purchasing mall, and built a resilient supply chain for enterprises. This alleviates the problems of information asymmetry caused by supply chain interruption, helps enterprises to understand supplier information, thus matching different suppliers and making supplier management intelligent [15].

5 Relevant Suggestions

5.1 Establish and Improve the Supply Chain Risk Early Warning System and Strengthen Risk Management

The purpose of establishing a risk early warning system is to predict and evaluate unknown risks in various fields of enterprises in advance, and to prepare countermeasures in advance. The vulnerability of the supply chain is considered as the source and driving factor of risk, and enterprises need to analyze the vulnerability factors in the supply chain to improve the risk handling mechanism [11]. In the operation of supply chain, attention should be paid to the following four aspects: transaction, logistics, capital flow and information [1]. The early warning of supply chain not only pays attention to the directly related upstream suppliers and downstream customers, but also enterprises should manage the risks of all nodes in the supply chain [1].

5.2 Build and Improve the Digital Management System

Digital management is a very effective way of management. This means that information sharing and data analysis can effectively reduce errors caused by information asymmetry [10]. By mastering the real-time data, enterprises can also ensure the smooth progress of business, and high information transparency can also reduce the risks of upstream and downstream enterprises in the supply chain due to information asymmetry. The application of regional chain technology increases the transparency of information and can alleviate the trust crisis of upstream and downstream enterprises in the supply chain [12]. Enterprises should play their big data analysis ability in supply chain collaboration, which is conducive to improving the performance of supply chain [2]. Therefore, the formation of digitalization is conducive to the construction of information sharing mechanism in the supply chain, thus improving the flexibility of the supply chain.

5.3 Increase the Elasticity of the Supply Chain

Affected by the epidemic, enterprises realized the fragility of supply chain, and exposed the most serious factors affecting the fragility of supply chain [11]. If the weak links are not maintained, the whole supply chain will be threatened. Enterprises can promote the construction of diversified supply chains [1], broaden supplier channels and back up

multiple supply chains, thus avoiding the risk of supply chain interruption. Enterprises should build intelligent logistics platform, improve supply chain management system and improve the flexibility of supply chain.

6 Conclusion

Based on the theory of supply chain elasticity and supply chain risk, this paper analyzes the development status and innovation measures of Alibaba's and JD's supply chain after responding to the epidemic situation. From the enterprise level, under the background of supply chain management, it proves that the innovation of supply chain is positively related to the performance of enterprise supply chain [10]. At the same time, enterprises should improve the flexibility of supply chain to improve the resilience to risks. Further expand the information visualization of upstream and downstream enterprises in the supply chain, improve information transparency to flexibly respond to market demand and policy changes, and make the supply chain have strong flexibility and toughness at the same time [7].

The research method of this paper is still insufficient, so we can use data analysis to analyze the correlation analysis. This conclusion is more credible. There are few samples of e-commerce companies studied in this paper, so more companies can be selected for analysis.

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