

Construction of Live Streaming E-commerce Supply Chain-based on Supply Chain Matching Theory

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Abstract: With the rise and gradual development of live streaming e-commerce, contradictions and problems between supply and demand have become increasingly prominent, and the construction of the supply chain of live streaming e-commerce has gradually become an important issue of concern from all walks of life. Based on the supply chain matching theory, live streaming e-commerce product are divided into stable supply and demand, unstable supply and stable demand, stable supply and unstable demand, unstable supply and demand. According to the supply and demand uncertainty of live streaming e-commerce product, we constructed different supply chain strategies, which are efficient supply chains, risk-hedging supply chains, responsive supply chains and agile supply chains. The results provide live streaming e-commerce with implementation for construction in different supply and demand environments.

Keywords: Live streaming e-commerce; Supply chain constitution; Supply chain matching theory

1. Introduction

In 2016, live streaming e-commerce began to gradually rise with its strong interactivity and price advantages. After 2019, it began to officially enter the outbreak period, and the live broadcasting industry ecosystem was gradually improved. In 2020, the number of live streaming e-commerce service enterprises and employees increased rapidly, starting to achieve new increment through refined operation and supply chain penetration. Affected by the COVID-19 epidemic, the economic development of various industries is blocked, but the live streaming e-commerce development is still in full swing, and is expected to continue to maintain a high growth trend in the future. The challenges and opportunities brought by live streaming e-commerce mainly focus on improving efficiency and reducing costs for the live broadcasting industry chain and bringing new opportunities for the development of various industries. In the process, the level of supply chain capacity will become one of the important factors to measure and determine the future development of live streaming e-commerce. In addition, the epidemic has also had an important impact on the development of live streaming e-commerce and its needs, which will usher in a new round of development opportunities. Therefore, it is urgent to build a live streaming e-commerce supply chain suitable for the current development trend.

In the process of building the traditional supply chain, it often presents the disadvantages of many links, less communication and imbalance, and most of them are

spot transactions, resulting in large loss of the supply chain, uneven product quality and violent price fluctuation, poor stability of the upstream and downstream supply relations, and finally resulting in losses to suppliers and end consumers in all links. Therefore, traditional supply chain has been unable to meet the needs of live streaming e-commerce for supply chain. Many e-commerce platforms and suppliers of each link began to build supply chain. Although the supply chain which is formed spontaneously can maintain good efficiency and effect for most of the time, its construction process lacks theoretical guidance and demonstration. At the same time, they also present a fragile characteristic, especially to encounter some important promotions or festivals. The major changes in supply and demand can easily lead to the interruption and inefficiency of supply chain. This contradiction between supply and demand is particularly obvious in some weak links of live streaming e-commerce supply chain. The root cause of these problems is the failure of live streaming e-commerce to overcome its weak links during the construction of supply chain. Without recognizing its complexity and variability characteristics, it directly applied the traditional supply chain mode, and did not select the supply chain strategy suitable for its development according to its industry characteristics and supply chain needs, or build a live streaming e-commerce supply chain that reflects its internal regularity.

Driven by a variety of factors, live streaming e-commerce supply chain's innovative development has attracted much attention. In addition, the current external

environment and internal environment is constantly changing the supply and demand characteristics of live streaming e-commerce, which objectively urges live streaming e-commerce supply chain to consider multiple factors in the construction process, especially the impact of the contradiction between supply and demand. First of all, with the improvement of quality of life, consumers pay more attention to health, product quality and safety and environmental protection, which promotes live streaming e-commerce to meet the differentiation of consumer needs in the process of supply chain construction, and the coordination and internal integration of various supply chain links will become an important trend. Secondly, live streaming e-commerce development is constantly encouraged by government policies and the intervention of external investors, as well as recognized by a large number of consumers, thus improving the live streaming e-commerce supply chain efficiency requirements. In the construction process, it needs to focus on changing the traditional live streaming e-commerce supply chain structure and constantly improve its efficiency. Finally, technology change is also constantly affecting the development of supply chain, such as cold chain logistics, product quality traceability, and so on, which puts forward higher requirements for live streaming e-commerce supply chain construction.

2. Research Status of Live Streaming E-commerce Supply Chain

At present, China's live streaming e-commerce is in a period of rapid development. More and more merchants and platforms introduce the sales mode of live broadcast with goods, and consumers are gradually used to buying goods in the broadcast room. However, supply chain serving live streaming e-commerce is still in the bud, and the relevant logistics links are not perfect. If live streaming e-commerce wants to develop for a long time, it needs to establish a perfect supply chain system (Xi, 2020) [11] to optimize the management and construction of supply chain in a timely manner. Wang (2020) [10], after analyzing the phenomenon of live streaming e-commerce in Yixing, Jiangsu Province, he put out that live streaming e-commerce is not only the ability of anchors, but also mainly product, production, processing, packaging, distribution, after-sales and other services. Guo and Qu (2020) [2] pointed out that the live broadcast problem also involves product production, grading, packaging and logistics. It is a systematic project. More importantly, they pay attention to the construction of product supply chain and the cultivation of regional e-commerce ecosystem to create a good development environment for live streaming e-commerce. The "unstable and unplanned" characteristics of live streaming e-commerce make the logistics serving it uncontrollable. Therefore, only the supply services of their own goods

can no longer adapt to the needs of customers. Only by combining logistics services with live streaming e-commerce can we achieve the ultimate goal of improving user satisfaction (Wang, 2020) [9].

In terms of management, there are also many problems in the sales, supply, consumer and product end of the e-commerce live broadcast mode, especially the product quality problems and high return rate existing in the current e-commerce live broadcast sales mode. The underlying cause of these problems is the unclear responsibility of all supply chain parties in product quality (Sun, 2020) [7]. Therefore, relevant departments should formulate relevant regulations and standards for the e-commerce live broadcast mode, clarify the responsibilities of supply chain parties in product quality, so that the rights and interests of consumers can be safeguarded, so that all parties in supply chain can consciously check the product quality (Sun, 2020) [7].

In terms of technology, with the emergence of emerging technologies such as "big data" and "cloud computing", e-commerce enterprises can comprehensively coordinate and coordinate procurement, production, sales and other aspects, find breakthroughs into the upstream production end, and gradually reach the supply chain mode of stores, merchants and anchors (Tang, 2020) [8]. Hua (2020) [3] pointed out in the supply chain research on agricultural products live broadcast can use big data to predict future needs, realize supply chain flexibility, and build a good ecosystem of professional division of labor and cooperation, to achieve supply chain flattening. Lin (2020) [5] believes that live streaming e-commerce supply chain, can be built through digital empowerment to use big data analysis and tap user needs, strengthen the in-depth cooperation and information sharing of various supply chain nodes, to ensure the reasonable supply of goods.

The literature combing of live streaming e-commerce supply chain found that most studies stay on the discovery of problems, propose no specific solutions and supply chain construction solutions, and do less research on supply chain construction strategies based on product supply and demand problems. Therefore, this paper will build the live streaming e-commerce supply chain on this basis.

3. Live Streaming E-commerce Supply Chain Construction Method Analysis

The construction of live streaming e-commerce supply chain should be based on the product supply capacity of e-commerce platforms and merchants and the product demand of consumers, and build a matching supply chain based on judging whether the supply and demand end are balanced. Given the variability of live streaming e-commerce and traditional industries, its supply chain construction strategy should continue to be optimized and improved on supply chain matching theory.

Fisher (1997) [1] was one of the first scholars to propose the division of different types of supply chain. Fisher (1997) [1] divides products into two categories according to their stability, predictability, life cycle length and slow change. One demand is stable and predictable practical products, and the other demand is innovative products with opposite characteristics. Corresponding to two different types can respectively match the lowest cost, efficient supply chain and the most responsive supply chain. Lee (2002) [4] continues to extend the classification method based on Fisher's (1997) [1] supply chain matching theory, increasing the characteristics of whether supply has certainty, dividing it into four different types of products using the matrix classification method according to the characteristics of supply and demand uncertainty, and proposes a supply chain construction strategy matching it.

Live streaming e-commerce supply chain is unique compared to other traditional supply chain. First of all, each link of supply chain has the characteristics of combining online and offline. Compared with almost all traditional supply chain transactions completed offline, live streaming e-commerce supply chain needs close online and offline cooperation, especially in production, order transaction, transportation and distribution and after-sales service. Second, live streaming e-commerce involves a wide variety of products, covering almost every aspect of consumer purchase demand. Therefore, it is very necessary to timely classify scientifically reasonable products and build matching supply chain. Finally, the supply and demand state in the live streaming e-commerce environment is often volatile, especially in some important promotion festivals, or when inviting appealing and influential opinion leaders to act as anchors. The contradiction between supply and demand is more significant, and it will be very important to build a supply chain to adapt to its changes in supply and demand. Based on the matching theory of Fisher (1997) [1] and Lee (2002) [4], we will divide it into four product types based on the uncertainty of live streaming e-commerce supply and demand, stable supply and demand, unstable supply and stable demand, stable supply and unstable demand, unstable supply and demand. The matching supply chain is respectively efficient supply chains, risk-hedging supply chains, responsive supply chains and agile supply chains.

4. Live Streaming E-commerce Supply Chain Construction Strategy in China

This paper constructs four supply chain strategies for four types of live streaming e-commerce products based on the stability of the product supply end and the demand end, as shown in Fig. 1:

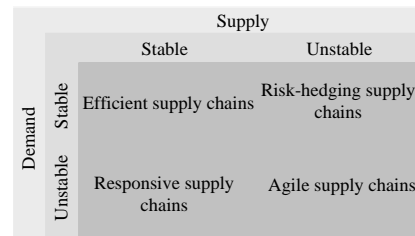


Figure 1. The live streaming e-commerce supply chain matching strategy

4.1. Efficient supply chains

In the live streaming e-commerce supply chain construction, products with stable supply and demand match the efficient supply chains strategy. Such products mainly include functional products and daily necessities, and show the characteristics of long cycle, small differentiation, small substitutability, large scale of supply and demand. Functional products stability of both the supply and demand side is relatively high. However, the separation between production and consumption links is not conducive to the accurate transmission and acquisition of product information. There is poor information in all supply chain links, and even information distortion. Therefore, the key in building supply chain is to reduce bovine whip effect, reduce cost and improve efficiency. Implementing the efficient supply chains strategy takes place from two levels. At the national level, establish scientific and reasonable laws, regulations and policy guidelines, and effectively guide live streaming e-commerce to reasonable pricing, benign competition. At the supply chain level, participants in each link should work together by using the "collaborative planning, forecasting and replenishment (CPFR)" as well as the "Vendor Managed Inventory (VMI)" technology. A view to minimizing inventory costs is to improve efficiency (Zhang et al., 2013) [12]. At the same time, it can also combine the intelligent storage function to meet the changeable live streaming e-commerce logistics needs and adapt to the live streaming e-commerce logistics business in various situations. Although in the short term, the cost of intelligent equipment is higher, each regional logistics service function is in the state of sustainable development. Compared with the traditional manpower, intelligent logistics services can more conform to the regional logistics service development, meet the substantial growth of express package efficient processing and delivery demand, and improve the demand of customer experience. Therefore, in the long run, the cost of intelligent logistics is far lower than the labor cost of continuous expenditure, and it is more efficient, which helps more to the construction of efficient supply chains.

4.2. Responsive supply chains

In live streaming e-commerce supply chain construction, products with unstable stable demand match the responsive supply chains strategy. Such products mainly include the fashion type of FMCG products, electronic products and so on. The common feature of these products is that the market prospect is unknown. Demand is difficult to predict, with short life cycle and sales period. These uncertainties often lead to large fluctuations on the demand side, but its supply is relatively stable, so the inventory often occurs. Choosing supply chain strategies that are rapidly responsive can to the maximum extent respond to fluctuations in demand. First of all, live streaming e-commerce shipment is characterized by centralized fragmented orders. Through the delay strategy, differentiated products can try to form at the time and place near consumption, such as the production and packaging of products, as delayed or completed on site as far as possible to form an efficient warehouse distribution integration mode. Secondly, by shortening the supply chain link, the intermediary and information difference can be reduced, and the information obtained by the front-end live broadcast sales link can be quickly feedback to the back-end production link. Finally, live streaming e-commerce should pay attention to establishing long-term cooperation with service providers in all links of supply chain, ensure timely response to new products, ship on demand, and reduce the cost of inventory backlog (Zhao and Chen, 2020) [13]. In view of the particularity of live broadcast with goods, logistics services should timely update customized logistics and express services close to the needs of live broadcast business. Through big data analysis and prediction, it should provide more value-added services and personalized logistics service solutions for each live streaming e-commerce, assist live streaming e-commerce in logistics services to improve logistics experience and reduce customer dissatisfaction. For example, Jingdong's new digital supply chain service mode of "Live plus Help Agricultural plus E-commerce" also reflects the rapid response efficiency of the current new logistics supply chain, and can timely feedback various emergencies to customers on the consumer end.

4.3. Risk-hedging supply chains

In live streaming e-commerce supply chain construction, supply unstable demand stable demand match the risk-hedging supply chains strategy. Such products mainly refer to products with various supply risks that lead to unstable supply risks, such as high production technical requirements, regional, perishable, seasonal factors and uncontrollable natural disasters and human factors, especially some high-quality organic fresh fruits, fruits and vegetables, dairy products and so on. The production quantity of these products is often difficult to guarantee, and the transportation and storage environment require-

ments are high, but the consumption demand is still maintaining a stable or rising state. To solve the problems of unstable production and supply and interrupted supply requires a risk hedging strategy. First of all, products with high requirements for transportation and storage environment can use cold chain logistics technology to ensure product quality and meet customer needs. It also uses modern information technology to establish shared inventory mechanisms in multiple live broadcasting bases to hedge against uncertain supply risks. When the production and supply is unstable, cross-regional goods transfer can be realized to form multiple supply chain supply complexes. In addition, contracts can choose to determine the price or purchase amount in advance to deal with price fluctuations caused by human factors (Zhang et al., 2013) [12]. Finally, the risks caused by supply chain outsourcing can be handled by building supply chain base. That is to establish offline supply bases, recruit, incubate anchors and establish rapid shipment and realization of broadcast rooms.

4.4. Agile supply chains

In the live streaming e-commerce supply chain construction, products with unstable supply and demand match the agile supply chains strategy. Such products mainly include some of the latest developed and promoted new products. These products often have no similar products in the market, and their future development direction is difficult to clearly predict. Therefore, the supply and demand state of such products presents an extremely unstable characteristic. The matching agile supply chains strategy has the advantage of combining hedging with responsive supply chains. In the face of constantly changing, diverse and unpredictable customer needs and the risk of supply-side disruptions, agile supply chains can minimize the impact of supply and demand instability of this type of product. This product with highly differentiated demand and highly unstable supply most requires close collaboration upstream and downstream of supply chain. On the one hand, in the upstream link to improve the technology and capacity of non-standardized production and flexible production, decompose and refine the production process, to meet the small-batch multi-frequency shipments. On the other hand, in the downstream link, the online mode of live streaming e-commerce makes the data collection more rapid and accurate, which can provide sales predictions and suggestions through the analysis and integration of consumer behavior data, and provide timely demand feedback to the design and production link. In the agile supply strategy, live streaming e-commerce and suppliers are no longer the traditional supply mode, but both sides are committed to build partnerships, with information technology and system, building dynamic supply network, sharing demand, production and inventory information,

efficiently coordinating production planning and logistics, so as to obtain rapid response ability in the uncertain market demand environment, hedge the risk of the supply and demand instability (Lu et al., 2019) [6].

5. Conclusion

The core of the live streaming e-commerce competition is its supply chain capability. To improve their core competitiveness, enterprises must actively participate in the construction and improvement of live streaming e-commerce supply chain. At the same time, the complexity of live streaming e-commerce and its supply chain makes how to build a matching supply chain an important research topic. Based on this, we mainly completed the following work. First, the current live streaming e-commerce supply chain problems and the research status of academia are analyzed. Secondly, supply chain matching theory based on Fisher (1997) [1] and Lee (2002) [4] proposes the type division of live streaming e-commerce supply chain, refines the uncertainty of the supply end and the demand end, divides into four different types, and summarizes the types and characteristics of their respective live broadcast products. Finally, the matching supply chain strategies and the implementation methods of live streaming e-commerce supply chain construction under various strategies are given for four different supply and demand types of products. In short, as the live streaming e-commerce model deepens, the challenges facing live streaming e-commerce supply chain are constantly increasing. Supply chain enterprises need to further promote the digital and intelligent upgrading of supply chain, integrate online and offline resources, and build a more intelligent, efficient and comprehensive supply chain, to meet future challenges, improve operational efficiency, reduce costs, and bring better service experience to customers.

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