

Supply Chain Response Optimization Strategy for Chinese Enterprises under COVID-19 Risk

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ABSTRACT

Two years ago, the emergence of the Novel Coronavirus pandemic had a devastating impact on the world economy. At present, the epidemic abroad is still serious and continues to hamper world economic recovery. Sporadic outbreaks in China still require a balance between prevention and control. Although the epidemic is gradually being brought under control and China's "dynamic zero-out" policy is in place, the supply chain still faces risks. This paper analyzes the risks of the current global environment and explains in detail how the supply chain will be affected. PEST macro-environment model is used to analyze from four aspects: policy, economy, social culture, and technology. In terms of policy, many countries carry out border blockade and control policies. Economically, the global economy enters a short depression. In social and cultural aspects, as China is the first place to explode, there is the influence of overseas anti-China sentiment. Technically, the state strongly supports the supply chain innovation technology funding shortage, and the medical technology including vaccine research and development. All these have led to a great increase in the instability of the supply chain. Therefore, in the short term, the supply chain of Chinese enterprises should cooperate with epidemic prevention regulations and strive to improve its competitiveness. In the long run, we should cooperate more with friendly countries to complete the transformation of offline to online cloud platform supply chain construction.

Keywords: Supply chain, COVID-19, Risk strategy, China

1. INTRODUCTION

Now, with the emergence of the omicron virus, the COVID-19 has carried out another round of counter-attacks around the world. To take a simple example, many Chinese people like to eat cherries and dragon fruit, but both of these fruits are imported. Some time ago, positive Coronavirus samples were found on imported fruits. How to control the import supply chain under the epidemic situation is a big problem. In addition to that, the COVID-19 pandemic will challenge China's industrial supply chain's continued competitiveness and put the entire supply chain's overall stability at risk. Firstly, there is a shortage of raw materials at the supply end of the supply chain, resulting in production stagnation. Secondly, enterprises are faced with problems such as human resources shortage, cost increase, and supply chain uncertainty. This will have a specific negative impact on the supply chain of raw materials, procurement management, production resumption, logistics, and market [1]. Given the current epidemic risks, this paper will study how the industrial supply chain should deal with relevant risks and put forward

corresponding optimization strategies for further research. The specific problems are divided into three parts: the risks faced by the supply chain under the epidemic and the corresponding impacts; changes in the supply chain during the pandemic (i.e., complementary optimization strategies); the vision of the future. Among them, the PEST model will be used as the methodology to analyze the risks on the macro level. This paper aims to help address the difficulties and challenges faced by the enterprise supply chains in the context of COVID-19.

2. RISKS AND IMPACTS OF COVID-19 ON THE SUPPLY CHAIN

2.1 Risks

As an effective tool to analyze the macro environment, the PEST model can effectively investigate external factors, namely the risks brought by COVID-19. Next, the author will conduct a detailed analysis from four aspects: P (Political), E (Economic), S (Sociocultural) and, T (Technological).

2.1.1 Political risks

Affected by the epidemic, the buyer's home country has imposed restrictions, causing Chinese foreign trade enterprises to delay or even fail to deliver goods [2]. First of all, many countries will increase quarantine links for ships that dock in China within a certain period of time, and take certain isolation measures. This has increased the difficulty of customs clearance, and resulted in the delay of the delivery of foreign trade enterprises in China [2]. Secondly, many countries have directly closed their borders with China, so goods cannot be delivered smoothly or even returned. Thirdly, many flights and freight between China and other countries are also shut down, which further affects the smooth transportation of goods between different countries and makes the delivery impossible [2]. For example, India has sharply raised the import tariffs and introduced policies to restrict imports. For supply chains, border restrictions or blockades greatly increase the risk of supply chain instability, resulting in an inadequate supply of raw materials that make the entire supply chain unable to operate smoothly.

2.1.2 Economic risks

The rapid spread of COVID-19 has led to a global recession. Although the outbreak has been brought under control with the development and vaccination of vaccines, it remains uncertain from a global perspective. According to the "World Economic Situation and Prospects 2021" released by the United Nations in January 2021, the global economy will shrink by 4.3% in 2020. This is the lowest level of global economic growth since The Second World War and far exceeds the decline during the international financial crisis. As a result, the future of the global economy depends largely on how the COVID-19 pandemic develops [3]. For example, Japan decided to close its doors due to the epidemic. This move has brought great economic impact to Japan. The depression of tourism and the loss of a large number of labor forces have led to a sharp decline in Japan's economy. The strain of global economy brings instability of capital chain to supply chain and the risk of brain drain to many countries including China. The spread of the pandemic has disrupted the already questionable global value chain specialization and may lead to reverse development of global value chain specialization [4]. Seeking enough suppliers in products will be a possible option for some countries [4]. For example, the sudden halt of China's manufacturing industry in the early stages of the pandemic brought multinationals and their home countries the dangers of excessive interdependence [4]. As a result, external shocks may prompt investors and their parent companies to reconsider diversifying manufacturing. In terms of the mode of division of labor, it is more inclined to the division of labor within the enterprise, and the whole production process is controlled

within the enterprise rather than relying on Chinese production [4].

2.1.3 Sociocultural risks

In China, for example, as the first large-scale outbreak of COVID-19 occurred in Wuhan, many people in other countries mistakenly believe that this new Coronavirus originated in China, and even named this Coronavirus as Wuhan Virus. At that time, many countries had developed anti-China trends of varying degrees. As far as foreign importers are concerned, China is the first country to discover the novel coronavirus epidemic. Due to the panic caused by the epidemic, foreign importers will try their best to reduce the possibility of cooperation with Chinese exporters due to domestic pressure and their own protection [2]. From boycotting Chinese products to discriminating against Chinese employees, such cultural and social phenomena make it difficult for Chinese suppliers to smoothly deliver goods to the next stage.

2.1.4 Technological risks

As a result of the epidemic, the country shifted the focus of technical research to the research on medical instruments and vaccines, and has invested a lot of money in it. This slows down the development of the supply chain technology.

2.2 Impacts

The COVID-19 virus affects the overall stability of the supply chain. As for the overall explanation of the supply chain, the value chain can be mentioned here. It was first proposed by Porter as a management concept, which refers to value-creating activities such as research and development, manufacturing and sales. Typical academic problems based on the perspective of the value chain, such as outsourcing and smile curve [5]. The supply chain emphasizes the input-output relationship or upstream and downstream relationship of products or services between enterprises. Management focuses on the study of the supply chain efficiency [5]. The industrial chain in a narrow sense includes the value chain and the supply chain, while the industrial chain in a broad sense includes the relationship between industries besides the narrow sense [5].

2.2.1 Impacts on the logistics stability

Logistics stability refers to the efficient and sustainable process from packaging to transportation and then to consumers. The problem of stability is clearly reflected in the fact that the social logistics situation under epidemic prevention and control in countries around the world is much worse than before because the raw materials produced by a large number of products cannot be transported to the destination in time. On

January 29, 2020, DHL's special report pointed out that the freight along the Yangtze River in Wuhan was seriously interrupted, the materials in the port were overstocked, and the truck transportation and railway transportation services were seriously interrupted [1]. According to the report, COVID-19's influence has led to the interruption of air transportation among China, Singapore, Korea, Thailand, France, Australia, Malaysia, Japan, and Canada. This phenomenon has affected the supply chain operation and material supply, and has had a significant impact, especially in the automotive, technology, and chemical industries [1]. The report also pointed out that the primary industries in Wuhan and its surrounding areas, including automobiles (48.39% of the total economy), technology (25%), engineering (8.06%), and chemical industry (8.06%), also received a severe impact from COVID-19 [1]. The congestion of transportation networks makes the operating efficiency of enterprises decline, and the production volume of the enterprise cannot meet the sales volume in its corresponding cycle which will intensify the contradiction between production and sales.

2.2.2 Impacts on the labor supply and demand

In addition, many enterprise employees have to delay returning to work or implement self-isolation. This has made the labor force in the enterprise's production department and the high-level intellectuals and talents in the research and development department fail to work in time. In order to prevent covid-19 pneumonia, various measures such as delayed reemployment and quarantine were implemented [6]. Measures to "seal the city" were implemented in the high incidence areas [6]. These measures are extremely important for controlling the epidemic situation, but they have also challenged the labor intensive logistics supply [6].

Under the trend of globalization, supply chains are distributed all over the world. The epidemic situation makes the global supply chain system face great uncertainty and adjustment risks. In the global supply chain system, the cross-border logistics service supply chain links the upstream and downstream of the supply chain to ensure the cross-border flow of goods and services. This transport problem will intensify the contradiction between the labor supply and demand to a great extent. The intensification of these two contradictions may cause catastrophic damage to the operation of the enterprise. For example, the decline of benefits will affect the amount of investment received by the company, limiting the enterprise's development in the future. In the two main contradictions, the logistics providers have a "supply failure" such as insufficient capacity supply, lack of function, function failure and cooperative default. These negative effects cause changes in the supply structure of logistics providers. At this time, it tests how the logistics service supply chain should deal

with it to realize the optimization of supply capacity decision-making. But the reality is that there is a shortage of materials, soaring prices and failure of performance. All kinds of emergencies will have a short-term impact on the supply end of the supply chain, and the destruction of the supply end will have a long-term impact on other links in the midstream and even downstream from the upstream of the supply chain.

2.2.3 Impacts on the related industries

From the perspective of world supply chain, COVID-19 has undoubtedly destroyed the stability of supply chain in specific areas. In addition to difficulties in local production and sales of all materials in the hardest hit areas, export goods will also encounter obstacles. Therefore, the shortage of materials in specific areas will lead to the operation and development of related industries. The world supply chain will not collapse completely because of the problems of a specific part. It will continue to adapt to this situation. Then, as this shortage becomes more and more serious, the world supply chain will have an understanding of the resource shortage in this region, and then choose new resource areas or alternative other resources to replace this part. Although the whole world's supply chain will not be greatly hit in the long run, this impact is inevitable in the short term, and the local supply chain will be seriously damaged by the epidemic.

3. CORRESPONDING OPTIMIZATION STRATEGIES FOR CHINESE ENTERPRISE SUPPLY CHAIN UNDER COVID-19

3.1 Short-term strategies

To mitigate the supply-side impact of the short-term supply chain, we should first limit the spread of the epidemic as much as possible. Take measures to prohibit social activities and enforce social isolation, including stopping holding group activities of a particular scale, maintaining social distance, closing shops, suspension of schools, reduction or even suspension of flights, and putting the vaccine into use [7]. After the epidemic is limited, many orders and production can be restored. Although enterprises face many difficulties, they must combine the epidemic prevention requirements with the enterprise operation and enterprise supply chain. Once the epidemic situation is alleviated, the obstacles to the enterprise operation will be significantly reduced, and then the supply chain that has not been destroyed can be quickly stabilized. Many scholars have expressed this concern in different ways [8]. They believe that the ecology of some manufacturing industries in China is fragile, and the shutdown and logistics interruption caused by the epidemic will be difficult to reverse once it poses a severe threat to the global supply chain [8].

However, Chinese enterprises only need to strengthen their competitiveness, maintain the strategic initiative, actively cooperate with large enterprises and firmly grasp their resources to survive in the crisis environment and even get the rapid development in emergencies. They should also make more and more comprehensive strategic layouts in the world and improve the level of internationalization to share risks.

3.2 Long-term strategies

According to the risk analysis, as the instability of the supply chain has greatly increased, we should maintain the stable operation of domestic supply chain at the macro level, carry out deeper cooperation with more friendly countries, expand the scale and level of global supply chain, and improve the resilience and anti-risk capacity of cross-border supply chain [9]. In the long run, when the epidemic is under control, and the vaccines are developed, national funds will no longer be spent a lot on health care. So, China should invest more in research and development, master more core technologies, seize the initiative, and become the unshakeable core of the global industrial chain and supply chain [9]. At the same time, the digitalization process of the supply chain is accelerated [10]. In China, e-commerce is one of the few businesses to flourish during the COVID-19 pandemic, because it provides important supplies and logistics support for residents in the affected areas and other areas [10]. The outbreak of COVID-19 has hindered the offline operation of enterprises, but it has also integrated offline and online businesses [10]. Therefore, the traditional offline supply chain should seize the time to carry out digital economic transformation and establish an online supply chain system by using ERP (Enterprise Resource Planning) and other cloud platforms.

4. OUTLOOK ON FUTURE DEVELOPMENT

COVID-19 is constantly changing, and its existence cannot be entirely restricted. However, enterprises can take advantage of the epidemic's impact to reform their problems. Research and development departments can gradually stimulate more new technologies to move the old supply chain to a new model. Countries can use the changes in the supply chain to accelerate economic development and increase the proportion of the technology industry in all industries. The impact of the epidemic and the reform of enterprises will accelerate the flow of information and promote many overseas supply bases. In addition, the reform of the supply chain will stabilize the market environment. It will also restore and stabilize the prices of goods in the market. Besides, the short-term supply shortage will stimulate consumption and increase domestic demand. A large amount of capital will return to the market after the recovery period. The supply chain system will get development opportunities.

If we can grasp the opportunities, industries such as new-generation information technology and green transportation will gradually integrate into the supply chain. The new infrastructure will also react on the supply chain so that the supply chain can achieve long-term progress and development.

5. CONCLUSION

With the emergence and an increasing variety of COVID-19 in human society, the supply chain of every region and even the whole world is facing significant challenges. This article's main topic is to discuss what risks and impacts will be faced by the supply chain, enterprises and markets under COVID-19. With the spread of the epidemic, social economy, market and logistics have been disrupted to some extent. In this case, the supply chain is volatile, and even some supply chains are excluded, which will lead to the contradiction between supply and demand. The difficulty of enterprise shutdown and employees' return to work have led to the contradiction between production and marketing. The emergence of two contradictions reacts to the supply chain and further destroys the whole system. In addition to these impacts, COVID-19 will generate many potential risks to the supply chain, including political, economic, social, cultural risks and even risks in development opportunities. When the social and economic system is unstable, private investment will be significantly reduced, and the state should shift the focus of development to the medical field. The scarcity of development funds in the supply chain will make the supply chain unable to pass the particular period in time with low loss. At the same time, in the post epidemic era, some industrial chains are depressed, and the demand is suddenly reduced, which breaks the original ecological balance of supply and demand in the logistics service supply chain. It affects the system pricing and profit creation, intensifies the evolution of principal contradictions and conflicts, and the value network system of the logistics service supply chain is facing deconstruction. Each supply chain link must take the initiative to enhance its competitiveness, grasp resources, do not rely too much on other links, and cultivate the cutting-edge awareness of fighting emergencies to rally in the current environment full of obstacles. Although this paper studies the impacts under COVID-19 on the whole supply chain, it lacks the analysis of the specific links. Future research can be detailed to particular problems in different connections.

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