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Analysis of Supply Chain Management under the Impact of Epidemic

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Abstract: Based on this epidemic, the author found that the supply chain is a very important issue for every country. Therefore, this paper aims to analyze the supply chain management of countries and companies under the epidemic. This paper will reflect well on the measures and actions taken by some countries in response to the new outbreak, and its importance is that it is the first relatively effective summary and analysis of supply shortages. The paper focuses on presenting data and comparing measures, ranking and comparing them, and then selecting the best. The results found that government response to this phase of the great wave of supply chain disruption requires the introduction of a series of solution policies. For companies, it is necessary to improve digitalization, enhance supply chain coordination, and consider the layout of warehouses and multiple warehouses on the basis of ensuring survival. For logistics service providers, it is necessary to increase business flexibility, increase transportation options, improve accessibility, and prepare themselves for emergencies and preparedness.

Keywords: epidemic, supply chain, enterprise, import and export, intelligent management

1. Introduction

The importance of the supply chain is that it can facilitate people to get what they need in a short time when they need materials, and the supply chain can comprehensively optimize and improve the overall circulation process of commodities. The supply chain can shorten the circulation path of goods so that goods can take the shortest path and the most effective time to reach the hands of demanders. For goods, the supply chain is much broader and more open-ended. The improvement and development of supply chains can better drive regional economic development. Supply chain management can improve the overall efficiency of the logistics industry. The greater the overall turnover of the supply chain, the greater the cost. Supply chain management is the most critical link of logistics enterprises, and supply chain management is also an important factor in promoting the development of the logistics industry. The development of the supply chain also reflects the economic development of the region in which it is located. In the situation of the epidemic, most supply chains are in a state of tension. Therefore, based on the existing relevant literature, the author intends to analyze the problem of supply chain tension in the context of the epidemic from multiple perspectives. After two years of observation, the author has a clear understanding of this problem. This paper analyzes the impact of the pandemic on the overall supply chain, starting with China, then Asia, and finally the global scale, and how governments and enterprises manage supply chains under the

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ongoing impact of the epidemic. As for the global overall supply chain analysis, the author believes that it can help those small and medium-sized logistics companies and some global procurement companies find out which methods are more suitable for supply chain management after the epidemic, so as to create more value from the overall perspective in a more concrete and intuitive way.

2. Introduction to Epidemic Situation

The outbreak began in 2020 and swept the world in 2022. In 2020, COVID-19 was first detected in Thailand in January, followed by other Asian countries including South Korea and Japan. Due to China's large population, vast territory, and high turnover of people, it has been reported to the World Health Organization(WHO) on a regular basis since COVID-19 was first detected at the end of 2011. In addition, network disinfection and epidemic prevention have been carried out nationwide, and novel coronavirus testing has been started for all. Relevant departments immediately mobilized doctors from all sectors of the country to help the hardest-hit areas, and within two days they built the world's first extra-large isolation module. During the 76-day lockdown of Wuhan, the government imposed a ban on the movement of people, closed major roads and closed all public places, and barred all citizens from leaving their homes. Every other day, special epidemic prevention personnel will come to the door to conduct nucleic acid testing. People in the lockdown area need to ensure that there are no new cases or asymptomatic infections in the area for the last 14 days. The last close contact in the region must be negative for nucleic acid tests more than 14 days after the last exposure. All personnel in the area can complete a round of nucleic acid screening two days before de-containment, and if all of them are negative, the containment can be lifted [1].

After 76 days of quarantine, the number of infected people obviously dropped, and these changes could not have been achieved without the control of the government and the cooperation of the people at that time. The Wuhan government was able to meet the needs of the people under such difficult circumstances and conditions because the government divided the supply of materials into three categories. The first one is in terms of living materials. Direct rural-to-urban transportation of vegetables and meat was ensured for the citizens' food supplies, and the overall food supply was under the direct supervision of the mayor. The second is the supply of medical supplies. This type of supply is very important. Because many people did not have time to stock up on masks or emergency drugs during this tense period, which was very detrimental to those who were sick, the government resumed work and production of medical enterprises at the first opportunity, and the whole country also received the signal from Wuhan to supply medical supplies to Wuhan to ease the current tension of medical supplies. The third is the transportation and distribution aspect. The first is to open up a green channel for the vehicle to establish a mechanism to protect access in order to ensure that the vehicle disinfection is in place, allowing access to transport indoors. The second is to do a good job of preparing the logistics industry staff to return to work. The relevant units also do a good job of articulating transport work to ensure that the staff, through isolation and after health checks, can arrange their work on the job. The last is to let the community staff, network staff, and more than 20,000 community volunteers all work together to solve the problem of the distribution of the last distance.

The static approach has reduced the risk of contagion but has stalled the global economic process somewhat. "According to the World Bank's forecast, global economic output will decline by 4.3% in 2020. Except for China's positive GDP growth, the GDP of other major economies will all decline to different degrees, among which the US and Eurozone are predicted to decline by 4.3% and 8.3% respectively in 2020" [2]. The market demand is severely reduced, and the epidemic is causing serious damage to the economies of all countries in the world. In the current global economic environment, people's overall consumption level has also decreased, which has directly led to the closure of most markets. People's consumption desires are becoming more and more serious, and the overall

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purchasing economy is declining, which also leads to the continuous increase in the costs of upstream processing plants, which leads to serious problems in product supply.

3. Global Supply Chains under the Pandemic

3.1. Overall Supply Chain Situation from the International Perspective

According to Worldometer real-time statistics, as of 6:30 am Beijing time on June 8, 2022, there were 5,36,344,141 confirmed COVID-19 cases and 6,322,904 deaths worldwide. There were 741,113 new confirmed cases and 1,945 deaths worldwide in a single day. The virus has mutated many times, making it highly contagious. In the face of Omicron, many countries around the world are once again on lockdown, especially in Europe, where the epidemic is more severe. [3] "After the Netherlands announced a strict national lockdown on the night of December 18, Germany and Austria followed suit. Berlin designated Britain as a "mutation zone" on Dec. 19 and imposed the strictest travel rules in Germany. Austria will restrict entry of people from Britain, the Netherlands, Norway, and Denmark" [4]. The supply chain problem in Australia and Japan is the most serious because both of them are island countries, which means they are small in land area and can use fewer planting areas and a series of development areas, so most of the things in Australia and Japan need to be imported to meet the needs of the people and various needs. Almost every job in Australia depends on goods shipped in from overseas. Ninety-eight percent of Australia's trade and most of its work is done by sea, but with most of its exporting countries locked down because of the pandemic, Australia and Japan have no way to transport a large portion of their supplies. Moreover, due to the prolonged lockdown and the infection of a large number of workers in the factory, the severe shortage of labor and the rise in costs in the supply chain have all contributed to the chaos in the supply chain. For these reasons, the prices of goods in various countries have risen, and the pressure on the people has become greater and greater. The disruption of the supply chain and the spread of the epidemic have seriously threatened the global supply system. Prices in various countries have risen rapidly due to the impact of the epidemic, and the shortage of materials and human resources has rapidly pushed the spread of global inflation.

3.2. Japan

According to Japan media reports, Honda, Toyota, Mazda, Subaru, and the other four Japanese car companies in the U.S. market have suffered a double-digit year-on-year decline. Japan's car sales and capacity restrictions have a direct impact, because the parts of these cars need the support of countries, but countries are in a state of closure, so the upstream parts supply countries have no way to supply in the first place, resulting in Japan's major car manufacturers were forced to stop work, which also formed a deadlock. Upstream supply chain manufacturers have been closed because the country has not been able to output the parts required by downstream manufacturers. The downstream manufacturers can only stop work waiting for upstream manufacturers, which also led to no way to produce cars. Some of Toyota's plants in Japan have suspended operations in May and June, involving a total of 16 production lines in 10 factories [4]. Toyota suspended some production in Japan in June due to an uncertain outlook due to a global production shutdown and supply chain disruptions leading to a global shortage of semiconductors. As the epidemic has not yet ended, there are many adverse factors affecting the future outlook. However, according to the data launched by Toyota in April this year, it was found that in April this year, global sales of Toyota Motor Corporation in Japan were 859,448,000 units, twice as many as in the same period last year [5]. Toyota hit an all-time high in April, posting eight consecutive months of growth following a decline in sales last year due to a new coronavirus infection. Its production is also recovering, with further momentum evident in the recovery from the outbreak [6].

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Just as many of the auto parts of the Ford Motor Company in the United States come from various countries, Ford is a manufacturer that supplies all over the world. Therefore, the beginning of the epidemic has led to the rupture of the supply chain of various countries, and many parts can not meet the demand of the assembly plants in the United States. Therefore, Ford can not complete the assembly and can not sell. This has also directly led to a sharp decline in the sales volume of the Ford Motor Company in the United States from the second half of 2019 to 2020.

3.3. China

Supply chain is one of the most important procedures in China. As the country first affected by the epidemic, it implemented a shutdown system in order to stop the spread of COVID-19 as soon as possible. All employees work at home, and all students study at home. So many express and logistics are stagnant because logistics and express do not have so many people to work with. Many important express delivery and logistics have been changed to air transport, and air transport can only be transported in batches, not in large quantities. Because the disinfection and epidemic prevention policies are very strict, there is no way to have a prominent advantage in terms of speed, and air transportation also greatly increases the cost of transportation. No matter from the perspective of logistics companies or individuals, it will increase the cost more than road transportation, so many logistics companies have not used air transportation much. Many cities have been completely blocked; all traffic roads are prohibited, and the use of transport vehicles is prohibited. This has also led to the failure of express delivery in many cities that depend on road transportation to achieve smooth transportation. This has also directly led to the pressure of all personal and public express deliveries being handled in the logistics center or logistics transfer station. Many important medical materials, living materials, and urgently needed expresses were all detained and could not be delivered to the residents, causing many unnecessary problems. China is now a big country in goods trade. In 2020, Asia will become the only region where the export volume of goods trade has maintained positive growth, while China will become the world's largest exporter and the second largest importer, accounting for 11.5% and 14.7% of the world's total volume of import and export trade, respectively. WTO predicts that with the accelerated growth of commodity trade in the second half of last year, global trade will recover faster, but by 2022, the total volume of global trade will still be lower than before the epidemic [7]. China has made outstanding achievements in manufacturing, handicrafts, and agriculture, but many international goods cannot be exported, and there is no way to send them to other countries, and imported goods from other countries cannot be transported quickly into China. Therefore, once the work is stopped, there will be great problems for the economy of China's manufacturing industry, leading to the direct decline of China's economy.

4. Response Analysis under Supply Chain Crisis

4.1. The Government

During the epidemic period of COVID-19, the government needs to launch a series of solutions to cope with the wave of supply chain disruption. First of all, we need to re-examine whether the current global supply chain is stable and safe from the perspective of large regions. We need to confirm whether the current global economy is in a stable period. At this stage, it is necessary to find domestic alternative supply chains and increase multiple standby supply chains to ensure a sustainable economy. In the current stage of rapid development of science and technology, the government can make full use of the benefits brought by the big data era or use artificial intelligence to realize automatic transportation management. Artificial intelligence and big data management have been proven to be powerful weapons against such interruptions while improving supply chain efficiency and profitability. In the changing business environment, mathematical optimization, an artificial

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intelligence technology, will continue to be an important tool for supply chain leaders to navigate. With regard to the impact of the epidemic on logistics, China has also specially organized a special epidemic logistics management department to dispatch various places to build preparatory transfer stations to carry out targeted coordination, solution, monitoring, and analysis so as to ensure the normal operation of enterprises that can coordinate the suppliers, personnel, and supplies of enterprises for the first time and "drive the upstream and downstream large, medium, and small supporting enterprises to cooperate to resume work and production." [8] During the epidemic period, the government should play its role, properly adjust the connection between various localities and departments, and take certain measures when the epidemic monopolizes the supply chain.

4.2. Enterprise

Enterprises also need to learn from this epidemic and constantly improve their own supply chain management and operation mechanisms to promote future development. China's Shengqi biological company is the second largest yeast production enterprise in Asia. With the expansion of business scale and the increase in global demand for yeast, many problems have occurred in the company's internal management. The production cycle of products is constantly being shortened, and the number of consumer orders is also increasing year by year. Moreover, production and demand are seriously unequal, resulting in a shortage of supply. The company's internal production and sales data cannot be timely updated and accurately controlled. These problems have caused great problems in the supply of Shengqi company. Therefore, the company started the informatization of big data management and adopted intelligent management. For example, use the Internet and big data to jointly build an internal global supply chain management platform with the company. After the smart management supply chain method was adopted by Shengqi Company, the production cost was reduced by 12%, and the delivery efficiency was increased 10 times. The Shengqi company has developed an online one-stop shopping platform to ensure stable offline sales. Meanwhile, the online sales platform has achieved an excellent performance of 25,000 orders per day [9]. By acquiring the whole process big data of production and procurement, logistics, storage, and sales, the company has established a database of the enterprise, and the management can intelligently acquire the implementation progress and voice decision-making. Even through the network platform, the real-time picture and production information of the entire industrial chain can be clearly seen.

5. Conclusion

On the whole, first of all, the global supply has exposed a lot of problems after the epidemic. Therefore, the supply chain of each country should not only focus on one, but also back up more reliable supply chains and supply companies, so as to ensure that response measures can be taken in special periods or after emergencies. Secondly, during the epidemic period, the supply chain and procurement of the company are a very serious problem. Therefore, after the epidemic, we should make better use of the current scientific and technological development and intelligent management under big data to better complete the management of the supply chain and industrial chain. There are some limitations to this paper. This paper does not conduct specific analysis in terms of data. In the future, it can be analyzed in combination with the actual data of specific companies and the overall statistics. The author's future research will carry out follow-up policy research on the company's supply recovery. Because many companies and countries have learned a lot from the epidemic and have improved their own supply chains and completed most of the changes and optimization.

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