

New Trends and Countermeasures in the Global Supply Chain Evolution of Chinese High-Tech Enterprises in the U.S.-China Game and the Post-Epidemic Era - Take Huawei as an example

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ABSTRACT

In recent years, the economic dominance of the traditional powers centred on the United States has been shaken by the continuous development and rise of China, while the technological competition and economic games between the two countries have been increasing, leading to the United States launching a trade war against China. In addition to political and economic factors, there are also social factors that we cannot predict - the outbreak of epidemics, the global supply chain is forming a new pattern, while the risk of disruption of the global supply chain is also increasing. Against this background, this paper takes Huawei as a typical case, and based on the problems it faces, analyses the measures it has implemented such as "spare tire plan" and "inventory redundancy", provides a response path for China's high-tech enterprises to the new changes in the global supply chain, and finally concludes that it is useful for other high-tech enterprises in China. Finally, it concludes that there are lessons to be learned for other high-tech enterprises in China.

KEYWORDS

Global Supply Chain Risk of disruption; Reverse globalization; Spare tire scheme; Domestic great circulation

1. INTRODUCTION

The United States, as the world's central political and economic body, has held the global discourse for many years, but a red star in the east has risen unknowingly - China. China overtook Japan to become the world's second largest economy in 2010, at which point the United States began to realize the crisis China was posing to itself. Over the years, China has a huge population to bring the dividend, the achievements of the rapid development of manufacturing industry, but also because of the demographic dividend, we have cheap labour, the production of goods at low prices, to the United States and other developed countries to export a large number of good quality and low-cost goods. So, China has maintained a trade surplus with the United States for a long time, and the trade gap between the two countries is gradually increasing, at this time the United States that China's trade surplus has harmed the interests of the United States. This is coupled with a series of frictions in different areas such as technical frictions caused by technical barriers to trade. In January 2018, the United States increased tariffs on some Chinese goods, officially firing the first shot of the trade war between China and the United States.

The trade war involves politics, economy, science and technology and other fields, this article mainly studies the field of science and technology. 2018 Huawei has been ahead of the United States in the research and development of 5G, and the communications industry has always been one of the core

competitiveness of the United States, if Huawei's 5G technology is once entered into the U.S. market, it is bound to pose a threat to the U.S. communications industry. Therefore, in May 2019, the U.S. Department of Commerce put Huawei on the "entity list" on the grounds of threatening national security, and prohibited U.S. companies from selling components and providing related technology to Huawei.

In addition, the outbreak of C.N.C.P. in late 2019 - early 2020 has thrown the world into a viral panic. China, as the "world's factory", carries 28 per cent of global manufacturing output, and many factories in many countries around the world, including China, are shutting down, with the consequence of a large number of factories stopping production and running, creating security issues for the global supply chain.

Due to international trade friction and epidemic outbreaks, the global supply chain has been subjected to tremendous impacts, which, together with the interaction with "anti-globalization" promoted by the United States and other developed countries, will inevitably lead to the adjustment of the global supply chain. It is of great significance for China to enhance its international competitiveness and analyse their impact on the development of Chinese enterprises by keeping up with the new trends in the evolution of global supply chains.

2. MATERIALS AND METHODS

This is a descriptive analytical essay and the methods used are:

2.1. Literature Research Method.

This paper takes Huawei Company as a specific example, and combs and summarizes from multiple perspectives based on CNKI, Google Scholar, journal database resources, Huawei's financial statements and annual statements, etc., and classifies the literature from the reasons for the formation of enterprise supply chain risks, influencing factors, and risk prevention, so as to provide a theoretical basis and guidance for the research of this paper.

2.2. Case Study Method.

This paper chooses Huawei, a typical company, as the subject of analysis, and draws the short-term business strategy and long-term strategic deployment of the enterprise from the annual report of the listed company, press conference, performance briefing, official website statement and other materials, points out the risks in the supply chain, and gives countermeasures and improvement suggestions for the causes and economic consequences.

3. RESULTS AND DISCUSSIONS

3.1. Impact of the US-China Trade War and the New Crown Epidemic Factors on the Global Supply Chain of Chinese High-Tech Firms

3.1.1. Evolutionary trends in GSCs

The financial crisis broke out in 2008, Europe and the United States and a series of developed countries realized that, although one-sided "de-industrialization" can improve the production efficiency of their own countries, but it will endanger the basic supply chain security of their own countries, so developed countries began to actively promote the return of their own manufacturing industries outside, thus setting off a wave of "anti-globalization". Globalization" wave [1]. Due to the perfection of artificial intelligence, automation and other high-tech, replacing part of the ordinary

labour force, to a certain extent, to solve the problem of high labour costs, making the return of manufacturing industries in Europe and the United States possible.

The vulnerability of the current GSCs was also demonstrated to the world when the smooth-running GSCs of 2020 were hit hard by the COVID-19 pandemic, which virtually paralysed transnational industries and hit the world economy hard. Despite the emergence of the vaccine and the normalization of the epidemic, the trend of economic globalization cannot be reversed. From a comprehensive point of view, the trend of "anti-globalization" is strengthening, which will inevitably lead to the adjustment of the global supply chain, and Xiaole Zhu et al. (2021) have analysed that the global supply chain will evolve towards the trend of localization, diversification and regionalization [2]. The inevitable result of these actions is an increased risk of cross-border supply chain disruption for China's high-tech enterprises, which is explained in the following section.

3.1.2. Risks to the global supply chain of China's high-tech enterprises

Most of China's high-tech enterprises are multinational enterprises, which are in the middle and lower reaches of the global high-tech industrial supply chain, and process and sell high-tech parts and related technologies provided by European and American enterprises upstream of the supply chain. Being in this position is actually in a weak position, the evolution of the global supply chain to the new trend and the technology war initiated by the United States, the combination of the two, to China's high-tech enterprises in the global supply chain has brought the risk of non-negligible. Yue Hu et al. (2023) classified the risks faced by the supply chain of multinational enterprises into interruption risk, political risk, co-operation risk and financial risk. This paper focuses on interruption risk, which can be subdivided into endogenous interruption risk and exogenous interruption risk, endogenous interruption risk refers to the interruption risk events caused by internal factors of enterprises; exogenous interruption risk refers to the interruption risk events caused by external factors of enterprises [3]. In practice, exogenous disruption risk for China's high-tech enterprises will eventually lead to endogenous disruption risk.

3.2. Huawei's Global Supply Chain

3.2.1. Impact of US Restrictions on Huawei

The U.S. crackdown on Huawei can be divided into three stages, the first stage January 2018-May 2019, the restrictions began. At this time, American companies are able to transfer or sell their products or technology to Huawei as long as they have permission from the US Department of Commerce. The second phase, May 2019-March 2020, is a full-scale crackdown. On the 15th of that month, the U.S. Department of Commerce placed Huawei on its "Entity List", meaning that Huawei could no longer buy raw materials from U.S. suppliers, including components, chips, semiconductors, operating systems, and related technologies. But the U.S. gave 90 days of "temporary general licence" to postpone the ban on Huawei and its subsidiaries existing products and services in the U.S. transactions, the U.S. is not soft on Huawei, but because the U.S. Huawei implementation of repressive measures not only for Huawei, but also for Huawei's suppliers in the United States of America's business activities have had a serious impact. In 2018, Huawei has 92 core suppliers, and the number of U.S. suppliers is the largest, with 33 suppliers, accounting for 35.87%. (See Table 1.) On the day Huawei was added to the Entity List, the stocks of Qualcomm, SWKS, Qorvo, and Xilinx, Huawei's top five suppliers in the United States, all plummeted by 4-7 per cent each. The "Entity List" was also a blow to many U.S. companies. Phase 3 May 2020-April 2021, Deep Strike. The United States cascaded, carried out a third round of sanctions, completely blocked Huawei, at this time, Huawei has been unable to buy chip products from other countries, overseas purchase channels have been completely interrupted.

Table 1. Geographical distribution of Huawei's core suppliers in 2018

Country/Area	Quantities	Percentage (%)
United States of America	33	35.87
China Mainland	25	27.17
Japanese	11	11.96
Taiwan, China	10	10.87
German	4	4.35
Hong Kong, China	2	2.17
Switzerland	2	2.17
South Korea (Republic of Korea)	2	2.17
the Netherlands	1	1.09
French	1	1.09
Singaporean	1	1.09
The information comes from the website and is compiled by the author.		

The United States chip supply cut-off for Huawei, looking at the whole situation, Huawei as the world's largest communications equipment vendors, overseas share has declined; as the world's second largest smartphone manufacturers, overseas demand plummeted, resulting in a larger decline in shipments [4]. For the internal, Huawei terminal production line supply chain almost interrupted, when the new mobile phone is said to be assembled, the new Matebook laptop delayed launch; its subsidiaries a large number of layoffs, etc., so we can see that the "list of entities" on Huawei's negative impact is huge.

3.2.2. Huawei's response

From the current situation, the U.S. suppression of Chinese high-tech enterprises will not change, in the face of continued U.S. sanctions pressure, Huawei respectively from the short-medium and long-term decision-making, to avoid the risk of disruption of its supply chain [4].

a. Short-term: Stock key components in advance, reduce the pursuit of inventory refinement, have inventory redundancy, and extend inventory turnover to two years and beyond. Huawei imported the last big wave of chips from the Netherlands before the US restrictions on Huawei's chips to ensure that its products could be manufactured smoothly. Kleindorfer et al. (2005) mentioned in the Ten Principles for Managing Supply Chain Disruption Risks that the over-pursuit of streamlining and efficiency can make individual firms, as well as the entire supply chain, more vulnerable, and that an appropriate level of inventory surplus improves the level of disruption risk management. The following are some examples of how to manage disruption risks [11].

b. Medium term: Huawei made a request to TSMC to move some of its chip production to its plant in Nanjing. In addition, it negotiated with Sun Micron and KYEC to move most of their production to factories on the mainland. This is done to minimize the restrictions imposed by the US.

c. Long-term: Improve innovation ability, increase R&D to improve the self-sufficiency rate of chips; make preparations in advance for the "spare tyre plan"; implement the substitution of domestically produced chips, and actively seek domestic high-quality suppliers. Under the great pressure of strict restrictions on chips and systems, Huawei launched a "spare tire plan" - "HarmonyOS" is now available. China's domestic high-tech manufacturers, part of the product technology to reach the world-class level, the local production line has been able to supply large-scale, although there are still domestic technology lags behind the advanced level of foreign fields, but in the current domestic cycle and the main, international and domestic double cycle of the development pattern, the supply chain localization is the best choice.

3.2.3. New layout of Huawei's supply chain

Haixia Zhang et al. (2023) pointed out that Huawei's supply chain still maintains strong resilience to resist the impact of disruptions due to its risk control ability and rapid response capability under the strong suppression of the U.S. government. Huawei actively builds an autonomous and controllable industrial chain in the chip field by integrating resources [7].

To bring the supply chain back to or beyond pre-disruption levels, Huawei has implemented initiatives in two directions:

First, strategic adjustments in technology and market layout. In terms of technology, we will increase investment in research and development, including support in terms of talents and materials, build an independently controllable supply chain in the field of chips, reduce our dependence on United States suppliers, look for domestic alternative manufacturers, and at the same time carry out strategic cooperation with low-risk countries.

Secondly, resource integration is carried out. Yue Hu et al. (2023) have proposed that poor information transfer in the supply chain can bring unpredictable losses to enterprises in the same supply chain, and risks are conductive, and the risks faced by some of them will be transmitted to the upstream or downstream enterprises [3]. Huawei establishes multi-dimensional information and communication channels to obtain external information such as customers and suppliers in a timely manner, and allocates external resources at a lower risk [7].

4. CONCLUSION

4.1. Companies Need to Focus on Research and Development

The core of high-tech enterprises is the chip and related technologies, do not want to be "necked", we have to rely on their own, do not chip design, but not the technology to produce it. Huawei as early as more than ten years ago to start the "spare tire programme", every year to invest a lot of talent and material resources, in order to give the United States when the head a stick, the "spare tire programme" overnight to ensure that the company's security will not face paralysis. Other high-tech enterprises should also have the preparation of "spare tire" awareness, to combat the unpredictability of risk, today's turbulent global situation, change so.

4.2. The Government Should Increase Its Support for the Industry

Enterprises on their own are not sufficient; countries and governments should provide technical and economic support for innovation activities. Governments should focus on incentivizing SMEs to innovate. SMEs are fertile ground for innovation and invention, but many innovative projects cannot be completed due to the limitations of capital and experience. China can learn from the successful experience of the United States in the SBIR programme and the STTR programme, and strengthen the cooperation between industry, academia and research. Focus on the guiding and leveraging role of innovation subsidies to promote enterprises to become the main body of innovation; the subsidy mechanism should be improved, and subsidies should be differentiated for enterprises in different industries to accurately stimulate enterprise innovation, Yüewen Ren (2019) [10].

4.3. Finding Domestic Alternatives

Zheng Zhang (2020) points out that the game between China and the United States is deepening, and in the medium and long term, the decoupling of some Chinese industries is inevitable. China is bound to build a new pattern with a domestic macro-cycle as the main focus and an international and domestic double-cycle [9]. At the same time, the current global supply chain is also developing towards localization. With strong domestic support and the construction of a domestic recycling

system, China's high-tech enterprises are looking for domestic manufacturers, which not only improves the security and stability of the supply chain, but also reduces the extra costs associated with cross-border transport.

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However, I am the only person responsible for errors in the thesis.

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