

Impacts and Responses of Global Industrial Chain Restructuring: Changing Roles of Developed and Developing Countries

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Abstract. The global industrial chain is undergoing profound changes, and the evolution of the global economic landscape is to the point where it is driven by multiple factors. This change not only involves the geographical transfer of supply chains but also promotes the upgrading and restructuring of the industrial structure, with far-reaching impacts on the economic development of both developed and developing countries. The industrial chain restructuring has brought about important changes such as industrial upgrading, changes in production patterns, foreign capital flows and technology transfers, while the geopolitical situation has exacerbated the instability of supply chains, prompting governments and enterprises to pay more attention to the security and reliability of supply chains. This study aims to analyze the background, driving forces and future trends of global industrial chain restructuring, explore the changing roles of different countries in global supply chains, and propose key factors for maintaining the sustainability of industrial chains.

Keywords: Industrial chain, developed country, developing country.

1. Introduction

The industrial chain refers to the entire production process from the supply of raw materials to the delivery of final products to consumers, covering design, production, distribution and service. The global industrial chain is the extension and integration of this process on a global scale, involving the division of labor in many countries and regions. The importance of the global industrial chain lies in its profound impact on the global economic pattern, trade flows and technology diffusion, and it is a key driving force for the economic growth and competitiveness of countries.

With the evolution of the global economic pattern, scientific and technological progress, trade policy adjustments and rising geopolitical risks, the structure of the global industrial chain is undergoing a profound transformation. This process not only involves the geographical transfer of supply chains, but also promotes the upgrading and restructuring of the industrial structure, with far-reaching impacts on the economic development of both developed and developing countries. The restructuring of the industrial chain has not only affected the economic patterns of both developed and developing countries, but also brought about a series of important changes in industrial upgrading, changes in production patterns, the flow of foreign capital, technology transfer and so on.

In addition, the global geopolitical situation has further aggravated the instability of supply chains, making governments and enterprises pay more attention to the security and reliability of supply chains. Therefore, the background, driving force and future trend of global industry chain restructuring, analyzing the changing roles of different countries in the global supply chain, and proposing key factors to maintain the sustainability of the industry chain. The research results can provide reference for governments to formulate relevant policies, such as how to enhance the competitiveness of their countries in GSCs by attracting foreign investment, promoting technological innovation and cultivating talents. In addition, the study will explore how to reduce the potential risks of supply chain restructuring through international cooperation, so as to gain a more comprehensive understanding of the interaction between globalization and localization and its impact on the global economic order.

2. Drivers of Global Industry Chain Restructuring

2.1. Technological Innovation

Technological innovation is the core driving force behind the reconfiguration of the global industrial chain, and its impact is mainly reflected in three aspects: production efficiency, supply chain management and industrial upgrading. First, the widespread application of emerging technologies such as artificial intelligence, robotics, the Internet of Things and big data analysis has significantly optimized production processes, improved product quality and reduced production costs. For example, intelligent manufacturing reduces human error and improves production efficiency and product consistency through automated production lines and intelligent equipment; IoT technology realizes real-time monitoring and dynamic adjustment of the production process through equipment interconnection and data collection, further enhancing production flexibility and responsiveness.

Second, digital transformation driven by technological innovation has greatly enhanced the transparency and flexibility of the supply chain. Enterprises are able to monitor the operation status of each link in the supply chain in real time, optimize inventory management, and accurately forecast market demand through cloud computing and big data technology. This data-driven supply chain management model not only reduces inventory costs and operational risks, but also improves enterprises' adaptability to market changes, enabling them to respond faster to changes in consumer demand. For example, the retail industry has significantly improved its market competitiveness through the use of big data analytics to achieve precision marketing and personalized recommendations.

Finally, technological innovation provided developing countries with opportunities for industrial upgrading, but also posed challenges. Although the digital economy has created conditions for developing countries to integrate into the global industrial chain, many countries still face a digital divide due to a weak technological foundation and imperfect data infrastructure [1]. If they cannot effectively enhance their digitalization capabilities, these countries may remain at the low end of the global industrial chain for a long time, making it difficult to break through the technological blockade and achieve high-quality development. Therefore, developing countries need to strengthen technology research and development, improve digital infrastructure and cultivate high-end talents in order to occupy a more favorable position in the reconstruction of the global industrial chain and realize the leap from "low-end manufacturing" to "high-end manufacturing".

2.2. Geopolitical Changes

In recent years, the uncertainty of the international geopolitical environment has increased significantly, and Governments and enterprises have begun to reshape their supply chains in order to reduce their dependence on a single market and enhance the security and stability of the supply chain.

In order to enhance the competitiveness of the local manufacturing industry, developed countries, such as the United States, have implemented a series of policies to promote the return of high-end manufacturing industries and adjust the layout of foreign investment. After the epidemic, U.S. investment in South Africa, Latin America, Europe and Japan has grown significantly, for example, to Peru by 817.1%, to Germany by 365.9%, to Japan by 152.9%. At the same time, for geopolitical security considerations, developed countries such as the United States in the field of high-tech industries, focusing on support for domestic manufacturing, and for textile and clothing, raw material processing and other reconstruction cost of higher industries, through the industry chain alliance and differential tariff policy adjustment, to promote the "Asian Alternative Industry Chain" (Altasia). Secondly, developing countries have been affected by China-US trade.

Secondly, developing countries affected by the U.S.-China trade war, some enterprises in order to avoid tariffs and trade barriers, choose to transfer production lines to Southeast Asian countries (such as Vietnam, Thailand, Indonesia), to promote these countries to become a new manufacturing center. For example, the United States has vigorously promoted Mexico as a manufacturing base in recent years to reduce its dependence on China's supply chain. According to the research of, the U.S.

government actively encourages enterprises to set up factories in Mexico to take advantage of its geographic advantages, lower labor costs, and tariff preferences brought about by the U.S.-Mexico-Canada Agreement (USMCA), in order to build a more secure and controllable supply chain system [2]. This strategy not only involves the adjustment of the supply chain layout, but is also an important policy choice in the toolbox of its game against China, which is intended to reconstruct the global industrial chain pattern. The adjustment of the global industrial chain promotes the transfer of labor-intensive industries to Vietnam, India, Indonesia and other countries, which attract foreign investment through tax incentives and policy support to promote the process of industrialization.

Finally, with the enhancement of global environmental protection awareness, green supply chain has become an important direction of global industrial chain restructuring. Governments and enterprises have been promoting a low-carbon economy and emphasizing sustainable development goals (such as carbon neutrality and clean energy transition), prompting the manufacturing industry to develop in the direction of being more environmentally friendly and energy-efficient. Developed countries have strengthened environmental regulations, pushed companies to adopt green production technologies, and encouraged local manufacturing to reduce their carbon footprint. Developing countries, on the other hand, face the challenge of balancing economic growth and environmental protection while attracting manufacturing relocation, and need to strengthen environmental policies and industrial upgrading to avoid becoming relocation sites for highly polluting industries.

3. Changing Roles

3.1. Developed Countries

As the mode of production outsourcing brought about by globalization has gradually been challenged, developed countries have begun to promote the return of manufacturing, especially in the areas of high-tech and high value-added industries. The United States and European countries have gradually strengthened the protection of key technologies and manufacturing industries, driven by the trade war between China and the United States and the issue of technological security. For example, the “re-industrialization” strategy implemented by the United States is aimed at restoring the domestic manufacturing industry and enhancing the technological innovation capacity, while the European Union promotes the return of industry and independent production through economic security strategies [3-4]. These initiatives not only focus on low-cost production, but are also committed to the development of intelligent manufacturing, precision manufacturing and other technology-intensive industries to further consolidate its dominant position in the global industrial chain. However, this has also brought the pressure of foreign capital outflow and industrial transfer to some developing countries.

At the same time, technological innovation has become the core driving force for the reconstruction of the global industrial chain. Developed countries, especially the United States and Europe, still occupy the center of global technological innovation. The Silicon Valley of the United States and Germany's “Industry 4.0” represent the frontiers of scientific and technological innovation and the digitalization and intelligent transformation of the traditional manufacturing industry respectively [5]. The popularity of emerging technologies has lowered the threshold for entering the high-end manufacturing industry, enabling some developing countries, such as India and Vietnam, to optimize production processes through digital technology, attracting investment from multinational corporations, thus accelerating their integration into the global industrial chain. This technology-driven change has not only altered the center of gravity of the global industrial chain, but also provided developing countries with opportunities for leapfrogging development.

In addition, supply chain security and localization strategies have become the focus of attention for developed countries. In recent years, geopolitical crises and global epidemics have exposed the vulnerability of the global supply chain, prompting developed countries to promote supply chain diversification and localization in order to reduce dependence on low-cost countries and guarantee the security of key technologies and production chains. At the same time, developed countries have

gradually shifted from low value-added manufacturing to high value-added industries such as finance, technology, design, and R&D [6]. This service-oriented trend makes developed countries play more knowledge-intensive and technology-intensive roles, while the manufacturing link is gradually shifted to labor-intensive countries. This change has not only reshaped the pattern of division of labor in the global industrial chain, but also pushed emerging economies to accelerate their upgrading to high value-added areas through policy support and market demand.

3.2. Developing Countries

Developing countries, especially China, India, Vietnam and other countries, has gradually become an important receiving place for global manufacturing. With its large labor market and relatively low production costs, China has long been transformed from the “world's factory” to the “global manufacturing center” [7]. However, with the rise in labor costs and the tightening of environmental protection policies, part of the production line gradually transferred to Southeast Asia and South Asia and other regions, these countries have gradually become a new manufacturing center [8]. Nevertheless, the division of labor of developing countries in the global industrial chain is still mainly concentrated in the areas of resource extraction, assembly and processing, and labor-intensive production, which makes them downstream in the value distribution, facing the pressure of industrial upgrading and technological transformation.

The inflow of international capital has brought technology transfer, knowledge and management experience to many developing countries. Countries such as Vietnam and India have gradually upgraded their technological level and production capacity by attracting multinational corporations to set up manufacturing bases [9]. However, it is still a major challenge for many developing countries to move from “low-end manufacturing” to “high-end manufacturing”, which requires the strengthening of national technological innovation, talent training and the overall upgrading of the industrial chain. Although technology transfer provides developing countries with development opportunities, how to realize independent innovation and industrial upgrading is still the key to their long-term development.

The rise of emerging markets is changing the pattern of the global industrial chain. China and other emerging economies have successfully integrated into the global industrial chain and become global manufacturing centers by virtue of low-cost labor, infrastructure development and global market demand [10]. By deeply embedding themselves in the global supply chain, developing countries have not only accelerated the process of industrialization, but also enhanced the added value of manufacturing [11]. For example, since 2000, the average annual growth rate of manufacturing exports of Southeast Asian countries has exceeded 7%, showing the trend of global industrial chain expansion to developing countries. This change not only promotes the rise of emerging economies, but also injects new impetus into the reconstruction of the global industrial chain.

4. Policy Recommendations

4.1. Enhance the Status of Global Industrial Chain

Promote industrial upgrading and the high-end of the industrial chain. Global value chains not only promote economic growth, but also provide developing countries with opportunities for technology diffusion and industrial upgrading [12]. Developed countries need to further promote industrial upgrading to higher value-added and technology-intensive fields, and support enterprises to realize the upgrading of the industrial chain through technological innovation and equipment renewal. At the same time, governments should introduce policies such as tax incentives and financial subsidies to encourage enterprises to invest in technology and independent innovation.

Although developing countries have gained development opportunities in the reconstruction of the global industrial chain, they still face challenges such as technological dependence and locking in the low-end of the industrial chain. Therefore, strengthening industrial upgrading with independent innovation, optimizing the business environment, and deeply integrating into the global industrial

chain and upgrading it are the keys to achieving long-term competitiveness for late-developing economies [13]. Studies have shown that late-developing economies can take advantage of the opportunity of global industrial chain restructuring to occupy a favorable position in international competition through policy support and industrial upgrading.

Promote green economy and sustainable industrial chain development, sustainable development is the inevitable trend of the future development of the global industrial chain. Green Supply Chain Management (GSCM) is influencing the global industrial chain reshaping [14]. The study points out that with the advancement of the global carbon neutral goal, multinational corporations pay more attention to the sustainability of the supply chain and incorporate carbon emission and environmental protection standards into global procurement decisions. This trend has prompted developed-country firms to pay more attention to environmental compliance and social responsibility in global supply chain management, and has pushed developing countries to upgrade their manufacturing standards to meet international environmental requirements. For example, the European Union has implemented the Carbon Border Adjustment Mechanism (CBAM), which requires imported goods to meet carbon emission standards, which has prompted developing countries to adopt more environmentally friendly production methods in their manufacturing processes [14]. By strengthening the enforcement of environmental regulations, green production is encouraged to reduce resource consumption and carbon emissions, and improve the competitiveness of enterprises in the international market. In addition, the promotion of circular economy and green supply chain will help to enhance the sustainability and stability of the global industrial chain.

4.2. Reduce Risks

First, promote multilateral cooperation and international coordination. Developed countries should strengthen multilateral cooperation and promote the formulation and coordination of international trade rules and standards to ensure the stable operation of the global supply chain. By strengthening cooperation with major economies (e.g. the EU, China, India, etc.), they can avoid supply chain disruptions caused by unilateralist policies or trade protectionism. Developing countries can enhance their national voice in the global economy by joining global economic organizations and participating in free trade agreements.

Secondly, domestic infrastructure development and supply chain resilience should be strengthened. Developed countries should increase investment in infrastructure, especially in key areas such as transportation, logistics and energy, and developing countries should enhance supply chain security management to ensure stable supply for key industries. Developing countries enhance the efficiency and resilience of supply chains and reduce risks. At the same time, they should strengthen the management of data and information flow and promote the construction of digital infrastructure to provide strong support for the safe operation of the global industrial chain.

Finally, optimizing foreign investment policies and promoting global market access, attracting foreign investment and optimizing foreign investment policies are important means to enhance the status of the global industrial chain and reduce supply chain risks. Developed countries can attract foreign investment into their markets, especially in high-end manufacturing and science and technology fields, through policies such as tax incentives, simplifying the approval process and providing innovation support. In addition, by joining GSCs and expanding market access, they can help countries better participate in global competition, reduce dependence on a single market and mitigate the impact of geopolitics and trade frictions. Developing countries can attract more foreign investment by optimizing their foreign investment policies, thereby enhancing their domestic industrial chain position and international market access.

5. Conclusion

The restructuring of the global industrial chain is the result of a combination of factors, which brings opportunities and challenges to both developed and developing countries. And it has led to significant changes in the roles of developed and developing countries in the global economy. Governments should actively respond to the restructuring of the industrial chain, promote scientific and technological innovation, enhance the competitiveness of local industries through policy guidance, and strengthen international cooperation in order to realize sustainable economic growth.

Developed countries are gradually withdrawing from low-end manufacturing and transforming into high-tech and high value-added industries, while strengthening the localization of the industrial chain and technological innovation. Developing countries, on the other hand, have gradually become an important link in the global industrial chain by taking over the global manufacturing industry, and have upgraded their position in the global economy through technology transfer and industrial upgrading. In the future, the reconfiguration of the global industrial chain will further promote changes in the global economic landscape, and how countries respond to challenges and seize opportunities in this process will determine their long-term competitiveness in the global industrial chain.

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