

# *China's Industrial Chain Transfer and Upgrading Experience from Japan and South Korea*

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**Keywords:** Industrial Chain transfer, Industrial Chain upgrading, Global Value Chain

**Abstract:** In the face of an increasingly hostile international environment, China has a more urgent need to shift and upgrading the value chain in the post-pandemic era. This paper will compare the examples of industrial chain upgrading in Japan and South Korea to clarify the necessity, current situation and enlightenment for the Chinese government and enterprises of the current industrial chain upgrading in China.

## 1. Introduction

At present, China International trade presents a gloomy situation. The first reason is that with the impact of the conflict between Russia and Ukraine and the COVID-19 pandemic, the international trade volume has shown a sharp decline. In 2020, the volume of global trade in goods fell 12.2 percent, and trade in services fell even more sharply, by 21.4 percent, compared with the last quarter of 2019. Although the recovery tended to happen, the aggregate trends mask considerable heterogeneity, and further disruptions are likely, owing to the war in Ukraine. The other reason is that China's industrial growth with rising and wages. Taking Electrical and Machinery Equipment Industry as an example, with its rapid growth, the average wage per worker in manufacturing rises even faster than the value-added of production, which can lead China into the middle income trap. International and domestic economic status quo urges China to get into a new point to advocate the development of the economy. This paper will compare with the examples of Japan and South Korea to achieve their growth goals by upgrading their industrial structure and global value chain status, in order to consider the best plan for China's industrial transfer and upgrading.[1]

## 2. Industrial Chain Transfer and Upgrading in China

Although China is also actively seeking methods for industrial transfer and upgrading, due to the late start, imperfect relevant policies, lack of experience and other issues, China's industrial transfer and upgrading road is not smooth sailing.

### 2.1. Background

Unlike Japanese and Korean, China started to form its own industrial chain late. The expansion and adjustment of China's industrial chain can be divided into four stages.

In the first stage, from 1978 to 1989, a temporary surplus of rural labor force appeared due to the new land policies such as the "guaranteed production to each household" in 1978, which solved the problem of grain shortage for the common people. China's township enterprises were the first to absorb this capacity. So the huge rural labor force transformed into industrial workers. China relies locally on agriculture, light industry and the harvesting of basic energy materials.

In the second stage, from 1990 to 1999, due to the failure to join the World Trade Organization and the increase of national consumption demand, China's industrial chain could only be stretched to achieve "self-sufficiency" as far as possible. It also exports a small amount of light industrial products internationally.

In the third stage 2000-2009: China's entry into WTO stimulates and promotes China's industrial chain to gain national competitiveness. During this period, a large number of foreign companies poured into China, and China's industrial chain was intertwined with the world's industrial chain in a real sense. At that time, China was a labor-rich country, at the bottom of the global industrial chain, mainly from the intermediate processing of industrial products, and not strong competitiveness in international trade. However, due to the inflow of middle and high-end technology, China's scientific and technological level has also been developing, laying the foundation for the subsequent technological take-off.

In the fourth stage 2010-present: After the first three decades of development, China has formed a relatively complete industrial chain. In the face of an increasingly complex international environment and rising domestic labor costs, China currently should carry out appropriate transfer and upgrading of its industrial chain. Due to its late entry into the division of labor in international trade, China lacks experience in industrial chain transfer and upgrading compared with Japan and South Korea. In addition, China mainly exports electrical appliances, automobiles and other products, and the Country & Product Complexity Rankings have risen from the 39th place in 2000 to the 17th place in 2020. However, compared with Japan, which ranks the first, and South Korea, which ranks the fourth, it is still necessary for China to diversify its industrial chain.

## **2.2. The Crisis of China's Industrial Transfer and Upgrading**

The blockade of advanced technologies by developed countries seriously hinders China's further industrial upgrading. With the deepening of economic globalization and global economic integration, the division of labor between countries is becoming more and more clear, and the gap between developing and developed countries regarding advanced technology is becoming more and more insurmountable. Although the entry of multinational companies into China in recent years helps China to continuously strengthen its position in the global business, China has also been invisibly incorporated into the bottom of the "food chain" of the international production system of multinational companies, hindering the further industrial upgrading and transfer of Chinese enterprises. In addition, transnational corporations have controlled a certain link of the original domestic industrial cluster which directly prevents Chinese enterprises from transferring and upgrading their industries.

At present, the speed of China's industrial transfer abroad is relatively slow, and the number of countries that have transferred to foreign countries is small, which fails to give full play to the real advantages of the "Belt and Road" initiative. In details, China's high-tech industry companies have failed to make full use of foreign industrial transfers to obtain sufficient financial support and perfect industrial systems.

ASEAN countries, mainly Vietnam, Indonesia and Cambodia, have taken over the transfer of China's footwear industry. ASEAN countries are becoming more competitive in the global footwear export market, with total global footwear production reaching approximately 25 billion pairs in 2019,

and Vietnam ranking third, and entirely for export. Along with the increase in foreign investment and international orders, the momentum of footwear exports from ASEAN countries has maintained strong growth. [2]

Vietnam, Cambodia and Myanmar have taken over the transfer of low-end areas of China's textile and garment industry. China's apparel export market has also been shrinking, Vietnam has become the world's third largest exporter of textile and apparel products after China and Bangladesh, with the market for textile garments spreading to more than 100 countries and regions around the world; exports of textile and apparel products from Cambodia and Myanmar are also rising rapidly.

Foreign-funded enterprises in the field of electronics manufacturing have shifted to ASEAN countries. Affected by the increasing competitiveness of China's own electronic brands and rising labor costs, some foreign-funded enterprises gradually withdrew from China, to the lower labor costs in the ASEAN region to layout production capacity. LG, Intel, Microsoft and Foxconn have also set up factories in Vietnam to take a large number of orders from China.

### **3. Experience from Japan and South Korean**

Japan and South Korea, as the first Asian countries to carry out industrial transfer and upgrading, have a sound international trade industry structure. And it has similar trade characteristics with China. China can learn from the previous experience of Japan and South Korea to develop its own international trade.

#### **3.1. Japan's Structural Transformation and Global Value Chain Reconstruction**

Japan made full use of the advantages of industrial transfer and upgrading to improve its own capital chain, develop cutting-edge technologies, and a number of representative excellent local companies have emerged.

##### **3.1.1. The Three Stages of Japan's Industrial Transfer and Upgrading**

From 1960 to 2000, Japan experienced three industrial transformations. Transformation includes both internal structure upgrading and external capacity transfer. This period of history is an important mirror for China's industrial upgrading. In particular, the transformation of the second and third industries is very close to China's reality, development direction and international environment. [3]

The introduction stage of labor-intensive industries (1960 -1980): labor cost drove the transfer out of labor-intensive industries. After World War II, with the support of the United States, Japan undertook the manufacturing industry from the United States, Britain, Germany, France and other developed countries with sufficient labor resources and superior geographical location. In the 1960s, Japan's economic recovery accelerated, the cost of labor rose, and the profit space of labor-intensive industries was squeezed. At the same time, the Japanese government has also made efforts to reduce the development scale of the traditional textile industry. With the gradual maturity of the production line of the low added value processing industry represented by the textile industry, Japan has started the first industrial transfer, promoting the transfer of labor-intensive industries to countries and regions with sufficient labor resources and low prices such as the four little dragons in Asia.

Upgrading stage of technology-intensive industries (1970-1985): the oil crisis drove the transfer of capital intensive industries. In the 1970s, in order to reduce the economic losses caused by the rise of oil prices, Japan made great efforts to reduce the proportion of traditional heavy and chemical industries in the economy, vigorously adjusted the original manufacturing industry, actively promoted the transformation of the industry to a resource-saving and technology intensive type, and vigorously developed new industries with electrical machinery, information industry and automobile

manufacturing industry as the mainstay through direct policy support and capital investment. This structural transformation has successfully promoted the continued rapid development of the Japanese economy, and Japanese goods have also begun to rapidly seize the global market share.

The transfer stage of technology-intensive industries (1985-2000): the Plaza Agreement forced technology intensive industries to transfer out. In the 1980s, Japan gradually surpassed the United States to become the largest creditor country in the world, which made the trade surplus between Japan and western developed countries more and more large. The developed countries led by the United States began to increase trade sanctions against Japan. In 1985, the United States, Britain, France, Germany and Japan signed the Plaza Agreement. Since then, the Japanese yen has appreciated in an all-round way, and the export competitiveness has been sharply weakened. In addition, the production efficiency and production technology of other Asian countries and regions have improved, and more and more industrial bases and conditions for undertaking high-tech content have been established. Japan has also begun to arrange the third industrial transfer, Transfer some technology intensive industries outward.

### **3.1.2. Impacts of Industrial Transfer and Upgrading on Japan's Economic Development**

During the first industrial restructuring period, heavy chemical industry became the leading industry, leading economic growth and pushing the Japanese stock market to the next bull market. The economy has always maintained an extremely high growth rate of more than 10% per year. With the expansion of heavy chemical industry, Japan's GDP surpassed that of Germany, an industrial power, for the first time in 1968, becoming the second largest economy in the world.

In the process of the second industrial transfer, Japan vigorously implemented the export-oriented economic policy. Japanese goods quickly occupied the international market, the profit growth of manufacturing industry increased rapidly, the economic development continued to improve, and the stock market also entered the upward channel. The 11 year long bull market in the stock market fully illustrates the great success of Japan's industrial structure adjustment and upgrading.

The third industrial transfer was relatively passive. The foam in the stock market burst and the economy fell into a downturn. Japanese enterprises have not made strategic adjustments in response to environmental changes in time, and to a large extent, they are still digesting the profit loss caused by the shrinking export market. In order to pursue rapid wealth appreciation, enterprises or individuals with sufficient funds have turned to invest in the real estate market and the stock market, resulting in a serious financial asset foam.

### **3.1.3. Enterprise Case: Toyota**

Founded in 1937, Toyota is the largest automobile manufacturer in Japan and the third largest automobile manufacturer in the world after general motors and Ford. It has important research value. Toyota has 51 production sites in 26 overseas countries. These countries spread all over the world from developing countries to developed countries. Among them, they are mainly concentrated along the coast of the United States, southern China and Southeast Asia. Some production bases are also scattered in Europe. Since the beginning of "expanding overseas production" in 1995, Toyota Motor Company has built a large number of production bases overseas. In 2011, the global sales volume was 7.097 million units, of which the domestic sales volume was only 1.2 million units, and the overseas sales volume reached 5 times of the domestic sales volume. Toyota Motor Company will also actively promote the strategy of automobile globalization in the future.

#### *A. Basic structure of Toyota supply chain:*

As we all know, Toyota can enter the markets of developed countries such as the United States with its high quality, low cost and low fuel consumption, and has formed a considerable competitive

advantage. It is not mainly because of the production and manufacturing technology it adopts, but because it has adopted a series of advanced production and management concepts, management modes, organizational systems, management technologies and methods in production organization and management, and has implemented a good corporate culture, it is known as "Toyota production system" (TPS), also known as "lean production (LPS), and also known as" just in time production system "(JIT).

TPS is a lean production method, that is, to produce the necessary products at the necessary time. It can be said that TPS has made Toyota today.

This production mode driven by orders and demands is committed to eliminating all forms of waste in the upstream and downstream of the supply chain, including waste in order processing, transportation, negotiation, inventory, and waste caused by unqualified parts or inaccurate delivery date, so as to achieve the ultimate goal of reducing costs.

TPS has established a lean supply chain led and led by core enterprises. The supply chain enterprises cooperate deeply and complement each other's advantages, and form strategic alliances with each other. Its advantages are obvious: on the one hand, it can ensure the height matching between parts and the whole vehicle; On the other hand, it is also convenient for Toyota to control the cost of parts.

The lean supply chain system required by Toyota's lean production mode can realize the accuracy of production quantity and delivery time. This not only makes the efficiency of Toyota's supply chain system higher than that of American companies, but relevant statistics show that before the global financial crisis, Toyota's supply chain cost was about 8% lower than that of American companies. At the same time, accurate quantity and delivery time control also help Toyota achieve "zero inventory". In fact, "zero inventory" is one of the core logistics concepts in TPS.

#### *B. Further deepening of Toyota's modular strategy: new global architecture strategy*

In order to further strengthen the combination of total cost leadership and differentiation strategy of the modular strategy, and enhance the competitive advantage of low cost and differentiation, Toyota further adjusted and improved the modular strategy. In 2012, Toyota first proposed the "Toyota New Global Architecture" (hereinafter referred to as TNGA strategy as the most important new strategic reform in the medium and long term. The TNGA strategy is the foundation of Toyota's future power system and automobile R & D, which has once again made major innovations in Toyota's design, R & D and production systems and processes, including brand-new strategic concepts and corresponding new design, R & D and production systems. The first model under the TNGA strategic mechanism is the new generation Prius, and it is planned to cover more than half of Toyota models by 2020.

TNGA strategic concept consists of three parts: quality enhancement, intelligence sharing and intelligent manufacturing. The realization of the above three concepts depends on the technical fields such as new automobile rigidity, high efficiency and environmental protection engine, as well as the new rational modular design, efficient and reliable modular production system and new supplier system. Meanwhile, the research and development of new technologies and the operation of supplier system also need to be based on modularization. It can be seen that modularization is the backbone of realizing the strategic concept of TNGA. It can also be said that TNGA strategy itself is the readjustment of modularization strategy.

### **3.2 South Korea's Structural Transformation and Global Value Chain Reconstruction**

South Korea is an Asian country following Japan in industrial transfer and upgrading. South Korea developed from a backward agricultural country into an advanced industrial country through industrial transfer and upgrading, and a large multinational company like Samsung was born. Many

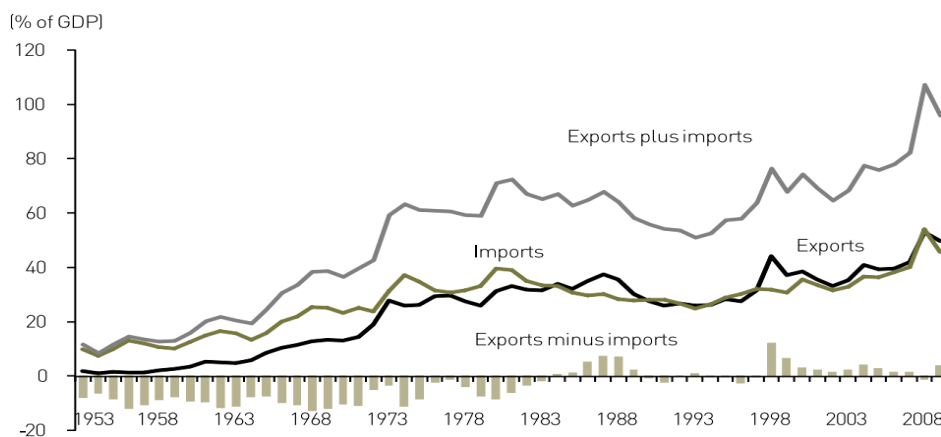
of these experiences are worth learning.

### 3.2.1 The Four Stages of Korea's Industrial Transfer and Upgrading

The initial learning period (1959-1979): import-oriented investment. After the 1950s, with the stability of the political situation, the Korean government had actively undertaken the acquisition of labor-intensive industries transferred from Japan and the United States to obtain the original accumulation of capital and learned the industrial transfer strategies of advanced countries by opening up the market, stabilizing the value of the Korean currency.[4]

Steady development period (1980-1986): natural resource-oriented investment. With the further expansion of the process of industrialization, South Korea's original natural resources could no longer meet the further development of enterprises. Therefore, South Korea actively transferred natural resource-intensive industries abroad, in order to cooperate in developing foreign natural resources. At the same time, the South Korean government has also given support to attract science and technology companies to settle in South Korea to improve the development of domestic science and technology (especially in electronics industry) (See figure 1 for details). In this period of increasing international trade competition, the Korean government has actively formulated corresponding policies. For example, the government provided a large amount of low-interest directional credit to enterprises, and shared the risk of transfer low-end industries abroad with private enterprises. During this period, South Korea's overseas low-end industrial transfer has achieved stable development.

Figure 2-2. Exports and imports (1953-2009)



Source: Bank of Korea (<http://ecos.bok.or.kr>).

Figure 1: Export and imports (1953-2009).

It can be seen from this figure that before the 1980s, South Korea still tended to undertake industrial transfer from developed countries. It can be said that stage I and stage II was a process in which South Korea actively learned high-end technologies from developed countries.

Rapid development period (1986-1996): technology development investment. During this period, South Korea took the lead in Asian countries and took the lead in deploying various low-end industrial processing plants (textiles, electronic components, chemical products, etc.) in the world. At the same time, South Korea has learned a lot from other developed countries for perfecting its own industrialization system, so the government has started to encourage domestic enterprise to set up research institute instead of just blindly becoming the industrial transfer place of advanced countries. So the domestic valuable resources were used to develop core technologies to lead the trend of science and technology innovation in the entire world (See Figure 2 for details).

Figure 2-4. Trend in R&D expenditure

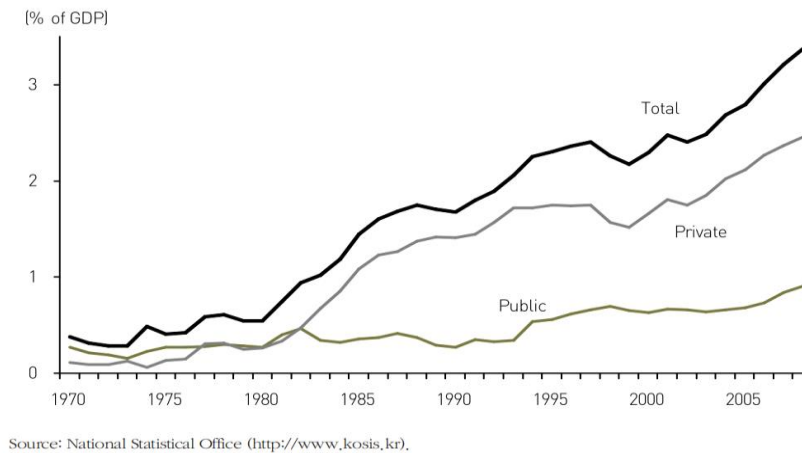


Figure 2: South Korea's trend in R&D expenditure.

As can be seen from the figure, South Korea's investment in domestic technology increased sharply at the end of the 1980s.

Transition period (1997-present): comprehensively promote the liberalization of investment. In 1997, the Asian financial crisis hit South Korea's economy seriously, and the process of South Korean industry's foreign transfer was not smooth. In response to the economic downturn caused by the financial crisis, the South Korean government has issued a series of laws to provide comprehensive support in taxation, insurance, and finance for multinational companies investing overseas, truly realizing the liberalization of South Korea's external industrial transfer and upgrading.

### 3.2.2. South Korea's Investment Features

*A. Periodic changes in investment regions: In different stages of development, South Korean overseas investment invests in different regions.*

- the initial learning period, South Korea mainly undertook surplus industries from the United States and Japan ;
- the period of steady development, South Korea's foreign direct investment was mainly concentrated in North America and the Middle East;
- the period of rapid development, South Korea's foreign direct investment is mainly in Asia, the European Union and North America;
- in the transition period , South Korea's overseas investment was mainly concentrated in North America and the Asia-Pacific region.

*B. Diversification of investment industries*

In the mid-to-late 1980s, under the influence of the international environment, South Korea's overseas investment gradually tilted towards manufacturing; since the 1990s, South Korea has developed from a trade-based country to a technology-based country, and external industrial transfer has gradually moved closer to knowledge- and technology-intensive industries;

*C. Tend to the joint venture mode of operation*

With the expansion of South Korea's external industrial transfer ,South Korean's foreign factories are more inclined to the joint venture mode of operation .

### 3.2.3. Enterprise Case: Samsung Electronics

As the largest business group in South Korea, Samsung Group's sales of electronic products are

very impressive all over the world. Samsung Electronics' foreign industrial transfer is a microcosm of South Korea's foreign industrial transfer. Samsung Group is a company centered on technological innovation, but due to the reality of the scarcity of resources in South Korea, Samsung has built different factories in different periods and in different regions, successfully realizing the transfer of production of labor-intensive goods, and through sufficient Research funding to develop new electronic technologies.

*A. Samsung processing plants in India, Brazil and Indonesia for large consumer market, preferential government tariffs.*

Samsung's Indian processing plant was established in India in the 1990s and is mainly responsible for the production of televisions and mobile phones. Over time, the factory also began to produce refrigerators and electronics; Samsung's processing plant in Brazil was established in 1999, mainly producing smartphones and supplying smartphones throughout Latin America; the Samsung factory in Indonesia was established in 2015, mainly to meet the local demand for electronic products. The products produced in the three countries all have relatively low production technical requirements and high local demand.

*B. Samsung Electronics processing plant in Vietnam for low labor price.*

Samsung Group started to set up factories in Vietnam in 2008, and over time, Samsung's investment in Vietnam factories has also continued to expand. Samsung puts the research and development of low- and mid-level products and assembly work on Samsung. Vietnam is now Samsung's largest production base in the world.

*C. Samsung Electronics Xi'an China NAND chip factory for high technology level.*

The Samsung NAND factory in Xi'an started construction in September 2012 and is Samsung's only memory chip factory outside of South Korea. The NAND chip processing plant in Xi'an mainly produces NAND chips from Samsung Group. According to the data, the total output of Samsung Electronics' chip production in Xi'an factory reached 250,000 pieces per month, making Samsung's dominant position in the market consolidated.

*D. Samsung Electronics' local factories in Korea*

Samsung Electronics' business in South Korea not only includes the development and production of high-end technology, but also involves many fields such as finance, machinery, and chemistry. And the Samsung factory in South Korea focuses on technology research and development, and established Samsung Economic Research Institute (SERI) and Samsung Integrated Technology Research Institute (SAIT)

## **4. China's Feasible Choices in the Post-epidemic Era**

In the post-epidemic era, China should combine the H-O theory, grasp the advantages of various regions, and refer to the experience of Japan and South Korea to further transfer and upgrade the industrial chain

### **4.1. China's Industrial Transfer Methods in the Post-epidemic Era**

In the post-epidemic era, China should make good use of the H-O theory and grasp the advantages of each region to carry out regional economic and trade, so as to promote the transfer of China's industrial structure. The following examples cooperate with regions in Southeast Asia, Central Asia, South Asia, Northeast Asia and Europe to promote the transfer and development of China's industrial structure.



#### **4.1.1. Industrial Transfer to Southeast Asia**

There are many resource-intensive industries in Southeast Asia, such as rubber and palm oil. These natural resources are not available in China. According to the H-O theory, the mode of trade cooperation between my country and Southeast Asia should choose the construction aid mode, that is, to set up cooperation parks in the development zones of these countries, and my country will send relevant management and operation personnel, so that our high-quality funds and advanced experience can be used Combined with the rich local resources. For our country, the industrial structure has thus been optimized and upgrading, which also can make the agreement of RCEP fully functional.[5] However, for those countries that have comparative advantages over China in terms of comprehensive energy and funds, China's capital advantages are not obvious, and cooperation with them is not conducive to my country's industrial restructuring policy. Therefore, in this field, we should cooperate with at the same time, countries with cheap labor and energy advantages cooperate.

#### **4.1.2. Industrial Transfer to Central Asia**

The five Central Asian countries have significant advantages in the field of mineral products and rare metals. Therefore, in this field, my country should set up a joint construction park in the existing Central Asian development zone, and hand it over to the companies of both countries for management, and they will be responsible for the planning of the park. , investment development, investment attraction and operation management.

#### **4.1.3. Industrial Transfer to South Asia**

For labor-intensive industries, according to the H-O theory, South Asian countries have the advantage of cheap labor in light industries such as garment processing, while my country has sufficient funds and a large consumer market. Therefore, we should set up production plants in countries with cheap labor advantages such as Nepal and Pakistan, and select the department responsible for product sales and production in countries with relatively developed international trade and commerce such as China or India.

### **4.2. China's Industrial Upgrading Methods in the Post-epidemic Era**

In the post-epidemic era, China should cooperate with advantageous industries in advanced regions and introduces advanced technologies to promote China's industrial upgrading

#### **4.2.1. Industrial Upgrading with the help of Northeast Asian Countries**

For technology and capital-intensive industries, according to the H-O theory, Japan has significant comparative advantages in digital technology, automobile and other manufacturing R&D industries, and South Korea in high-tech semiconductor industries, and the development trend is positive. Therefore, my country should cooperate with Japan and South Korea in the field of high-tech research and development, set up industrial parks with Japan and South Korea China, and introduce advanced technologies from Japan and South Korea in the field of cutting-edge software, which is very important for my country to further optimize and upgrading its industrial structure significant effect. [6]

#### **4.2.2. Industrial Upgrading with the Help of European Countries**

Germany's R&D industries such as automobiles, machinery and equipment, and electrical and electronic industries, France's aerospace industry, and the UK's financial services industry have

significant comparative advantages and will help China's industrial upgrading. Therefore, my country should cooperate with European countries in their respective advantageous industries and introduce their advanced technologies.

## 5. Conclusions

Promoting industrial transfer needs to take into account two directions: First, focus on the introduction of investment in countries with more optimal industrial structure. Second, invest in countries with advanced technology and management experience. Third, the transfer of part of the industry to less developed countries that lag behind in science and technology but have stable economic growth. Domestic industries should shift to efficiency-driven and innovation-driven: First of all, we should pay attention to the power of science and technology and innovation in industrial development, so that China's industries can achieve leapfrog development. Secondly, in order to promote the development of service industry, we should seize the opportunity of international industrial transfer, push China from the low end of the "smile curve" to the middle and high end, and improve the status of China's industrial value chain. At the industry level, attention should be paid to basic technology and innovation development: Companies should strengthen basic research by strengthening cooperation with global physical chemists and regularly sponsoring global conferences, so as to drive technological innovation and product quality improvement. At the enterprise level, attention should be paid to the international operation and management ability: the enterprise should implement the global layout, actively respond to the challenges of globalization, actively carry out overseas business, such as packaging and selling unprofitable business, and acquiring well-known enterprises to obtain customer resources. At the enterprise level, we should pay attention to product quality: product quality is the lifeline of enterprises. The spirit of professional chemists in Japan, Korea and other countries is stronger than that in China. Chinese enterprises can adopt lean production and other methods to improve product quality.

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