

Analysis on the Current Situation of Export Competitiveness of China's Mechanical and Electrical Products

Changfei Li*, Xiaohua Yang

Shandong Xiandai University, Jinan, Shandong, China

**corresponding author*

Keywords: electromechanical products, export competitiveness, present situation

Abstract: In recent years, with the continuous development of international trade, the trade of mechanical and electrical products has become an indispensable part of international trade. The development of mechanical and electrical industry to a certain extent determines the comprehensive strength of a country and its position in international trade. Since 1995, mechanical and electrical products have been the largest trade volume in China. In particular, in order to promote the upgrading of the manufacturing industry, "made in China 2025" was proposed in 2015. Manufacturing fields such as high-tech major equipment are key development areas. Therefore, it is very important to analyze the competitiveness of export trade of mechanical and electrical products. Based on the analysis of the current situation of export competitiveness of mechanical and electrical products, this paper focuses on the advantages and disadvantages of China's export trade of mechanical and electrical products, so as to provide a practical basis for the government to formulate better export trade policies of mechanical and electrical products.

1. Introduction

The trade of mechanical and electrical products is very important in Global trade and trade. The strength of a country's comprehensive strength is often weighed by the amount of its total export. At the same time, "made in China 2025" was proposed, and it was pointed out that the manufacturing industry plays a particularly important and positive role in the promotion of the comprehensive strength of the country [1]. In order to promote the manufacturing industry from large to strong, on the basis of developing the general consumer goods field, we should pay special attention to the innovation and development in the manufacturing field such as large machinery and equipment. Therefore, in order to promote the upgrading of the manufacturing industry, the "made in China 2025" strategy has been put forward "It is imperative to analyze the export competitiveness of mechanical and electrical products in this context [2].

By analyzing the current situation of export trade competitiveness of mechanical and electrical products in recent years, this paper analyzes its influencing factors, so as to enrich the theory of enhancing export trade competitiveness and reveal the trade theory suitable for guiding China's export of mechanical and electrical products. In addition, based on the current situation that the

overall trade competitiveness of China's mechanical and electrical products is not strong and the export product structure is not reasonable, this study aims to calculate the export competitiveness index, analyze the changes of China's export competitiveness of mechanical and electrical products in recent years, predict its development trend, and make corresponding countermeasures and suggestions to optimize the import and export structure and enhance the export trade of mechanical and electrical products competitive power [3,4].

2. Related Concepts

(1) Overview of mechanical and electrical products:

Mechanical and electrical products (from Baidu Encyclopedia) are all kinds of production equipment and living utensils produced by using electrical equipment, including electronic and transportation equipment, instrumentation, mechanical equipment, metal products and their parts.

Furthermore, according to the analysis of the export volume of mechanical and electrical products, the total import and export value of such products in 2018 was US \$2.42 trillion, including US \$1.46 trillion, an increase of 10.6% year-on-year, accounting for 58.7% of the total export value of all products. In 2017, the export value of such products accounted for 58.4% of the total exports of all commodities, which was basically the same in these two years. In 2019, the total import and export value of China was 4575.3 billion US dollars, including the export of mechanical and electrical products 1459.02 billion U.S. dollars, accounting for 58% of China's total exports of all products, down 0.1% year-on-year [5].

In terms of trade mode, China's mechanical and electrical products export mainly adopts processing trade, which is characterized by more labor resources input and low value-added rate. As the largest developing country in the world, China has made full use of various production resources to give full play to the diversified industrial manufacturing capacity, thus occupying an important position in the world trade of mechanical and electrical products. Despite the impact of trade friction between China and the United States, the overall value of export trade of mechanical and electrical products fluctuates little, still occupying the first place in China's export commodities, and is an important supporting industry for China's trade development [6].

Furthermore, Trade competitiveness index (TC) is commonly used to measure the competitiveness of export trade. $TC \text{ index} = \frac{\text{the balance of a commodity's exports minus imports}}{\text{the total value of a commodity's import and export}}$. It represents the percentage of a country's trade balance of a certain kind of product in the total value of import and export trade.

TC index is usually used to indicate whether a country or a region imports or exports a certain kind of goods in international trade, so as to measure a country's comparative competitive advantage of a certain commodity. No matter what the absolute amount of imports and exports of a certain type of products is, the index fluctuates between - 1 and 1. When the index is - 1, it means that the country only imports a certain kind of goods, and the closer it is to - 1, the less competitive advantage there is; the closer the value is to 0, the production efficiency of this kind of product is equivalent to the international level; when the index is 1, it means that the country only exports a certain kind of goods, and the closer it is to 1, the stronger the competitive advantage [7,8].

3. Analysis on the Export Competitiveness of China's Mechanical and Electrical Products

(1) Export trade structure

At present, the export structure of China's mechanical and electrical products is mainly labor-intensive products, and the mechanical and electrical goods with rapid export growth are radio broadcasting, portable automatic processing equipment, etc. The export of labor-intensive mechanical and electrical products can promote the development of all walks of life and help to

reduce the number of unemployed people to a certain extent, but the value created is low and the internal core technology is insufficient. Although the added value of capital intensive mechanical and electrical products is high, it only occupies a small part of the whole export, so the export trade structure of mechanical and electrical products is not very reasonable [9].

With the continuous improvement of China's technology research and development level and the continuous expansion of capital investment in high-quality mechanical and electrical products, the export of capital intensive mechanical and electrical products began to increase, and the trade structure gradually tended to mechanical and electrical products with high technology content. According to statistics, among China's export products in 2017, mechanical and electrical products with high value accounted for 58.43% of China's total export value, while traditional labor-intensive products accounted for 20.12%. In the trade of mechanical and electrical products, the export growth rate of labor-intensive products was 6.9%, while that of automobiles, computers, mobile phones and other products was 27.23%, 16.61% and 11.32%, respectively. In 2019, despite the impact of Sino US trade frictions, China's mechanical and electrical products output still increased, accounting for 58.43% of the total exports. In particular, the exports of high-quality, high-tech and high-value-added products such as automobiles and wireless earphones increased by 25.32% and 8.2% respectively. Among them, the export of integrated circuit products broke through 700 billion yuan, and the export of wireless headphones exceeded 70 billion yuan, both of which increased year on year. In particular, the number of wireless earphones increased by more than 80%. With the development of trade in mechanical and electrical products, the commodity structure is also constantly optimized and improved [10].

(2) Ways to participate in trade division

China's mechanical and electrical products trade is mainly divided into mechanical and electrical products processing trade and general trade. Processing trade is mainly divided into processing with supplied materials and processing with imported materials. General trade refers to unilateral import and export trade conducted by enterprises with import and export operation rights. With the increase of China's export of mechanical and electrical products, the proportion of processing trade volume will decrease. For example, in 2005, the proportion of imports and exports by processing trade accounted for 65.2%, but by 2016, the proportion dropped by about 20%.

Since the transformation and development of China's manufacturing industry has gradually achieved success, the proportion of processing trade in China's import and export trade has dropped by about 30% by 2017; at the same time, the proportion of high-value industries in China's export trade continues to rise, and the general trade mode of mechanical and electrical products is also gradually rising. The proportion of general trade volume of mechanical and electrical products has increased from 24.5% in 2005 to 42.5% in 2016, and In 2018, the general trade volume of mechanical and electrical products accounted for 43.81% of the total export value, roughly equal to the processing trade, and increased at an average annual rate of 1.3%, and the growth rate continued to be higher than the overall level.

Although the general trade volume of mechanical and electrical products is increasing year by year, the proportion of export by processing trade still occupies a certain relative position, that is, the extensive development mode has not been completely changed. At the same time, China's mechanical and electrical products have a low ownership rate of independent intellectual property rights and lack of key technologies. Compared with developed countries which mainly export capital intensive mechanical and electrical products, there is a big gap in product structure. Therefore, China still needs to pay attention to the innovative development of the mechanical and electrical industry, build a Chinese brand, and pay attention to improving the level of import and export technology of processing trade, as Zhang Jing (2014) [1]. Research and analysis show that the development of processing trade not only makes use of the rich domestic labor resources, but

also brings advanced production methods and innovative products that can be learned by reference for the development of China's mechanical and electrical products through the technology spillover effect, thus enhancing the international competitiveness of mechanical and electrical products.

(3) Analysis of export market share and structure

Export market share refers to the percentage of a country's total export value in the global output value. In the international market, it can be expressed by the proportion of a country's export value of a certain kind of product in the global total export value of this product. In 2018, the global total output of goods was 19.6 trillion US dollars, and China's total output was 2487.4 billion US dollars, with a market share of 12.82%, with a year-on-year increase of 1.1%. Among them, the total output of mechanical and electrical products was 1460.72 billion US dollars, with a year-on-year increase of 10.5%. China's mechanical and electrical trade market is widely distributed, with the main trading objects in Europe and the United States. Among them, the United States is the country with the largest export volume of China's mechanical and electrical products. Despite the trade friction between China and the United States, the total number of mechanical and electrical products imported from China by the United States in 2019 was 217.39 billion US dollars, accounting for 48.1% of the total imports of the United States from China. Among them, the import of motor and electrical products is 125.4 billion US dollars, and the import of mechanical equipment is 91.99 billion US dollars.

Table 1: changes in the proportion of mechanical and electrical products imported from China by countries from 2015 to 2019

	USA	Japan	UK	Malaysia	Poland	Malaysia
2015	20.79%	6.32%	2.10%	1.42%	0.68%	0.62%
2016	20.26%	6.37%	1.78%	1.44%	0.73%	0.55%
2017	20.49%	6.00%	1.45%	1.51%	0.74%	0.56%
2018	19.89%	5.84%	1.47%	1.59%	0.79%	0.59%
2019	15.43%	5.54%	2.06%	1.47%	0.82%	0.55%

Source: Ministry of commerce country report

China's ten largest one importing one belt, one road, one in 2015, the other is China, Hongkong, Japan, Holland, Mexico, Korea, Germany, Singapore, India and the United Kingdom. This paper selects three typical countries to analyze the proportion of imports of mechanical and electrical products in the past five years, and Malaysia, Poland and South Africa are the representatives of the countries along the "one belt and one road". Table 1 shows the percentage of the total value of mechanical and electrical products imported from China to the total value of mechanical and electrical products exported by China. It can be seen from this table that China is gradually expanding the export scale of mechanical and electrical products to emerging markets, but the countries with large export volume of mechanical and electrical products are still in the traditional market, and the United States is still the country that imports the most mechanical and electrical products from China. However, due to the impact of trade friction, its share has shown a downward trend in the past two years. According to the overall analysis in Table 1, the share of China's mechanical and electrical products exports in the traditional market shows a decreasing trend, while in the emerging markets, although the proportion is small, the market share shows an increasing trend.

Based on the analysis of the annual average growth rate of China's export of mechanical and electrical products to various countries from 2006 to 2015, the average annual growth rate of traditional markets represented by the United States, Japan and other countries was about 7%; the

average annual growth rate of emerging markets represented by India, Brazil and other countries was about 14%^[3]. It can be seen that China's export growth rate to emerging markets is obviously higher than that of traditional markets. China's export share of mechanical and electrical products to the traditional market is large and relatively stable, and it is difficult to see a substantial increase in the export volume of mechanical and electrical products. However, in emerging markets, the industrial restructuring and upgrading speed is fast, and the domestic market of emerging economies has great development potential, which will inevitably generate a large demand for China's mechanical and electrical products. So, the space for the substantial increase of export volume of these countries and therefore, it is necessary to expand the development space of emerging markets and increase the export strength to them.

(4) Analysis of competitive advantage

This paper uses trade competitiveness index to analyze the export competitiveness of mechanical and electrical products. When $TC = 0$, it means that the production efficiency of a country's mechanical and electrical products is close to the global average production efficiency of this kind of goods; when $0 < TC < 1$, it shows that a country's net export of mechanical and electrical products has strong export competitiveness and strong competitive advantage; when $-1 < TC < 0$, it reflects that a country's net import of mechanical and electrical products has weak export competitiveness and no competitive advantage.

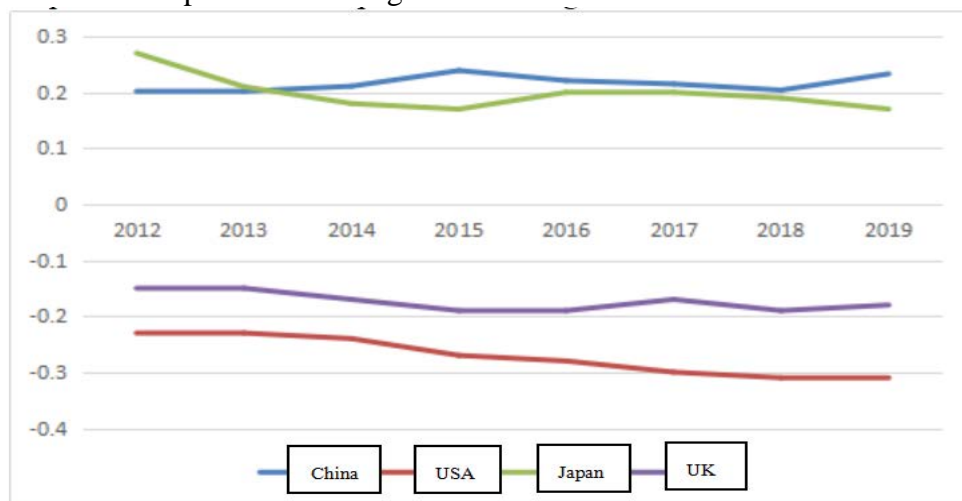


Figure 1: TC index of each country in 2012-2019

Source: National Bureau of statistics

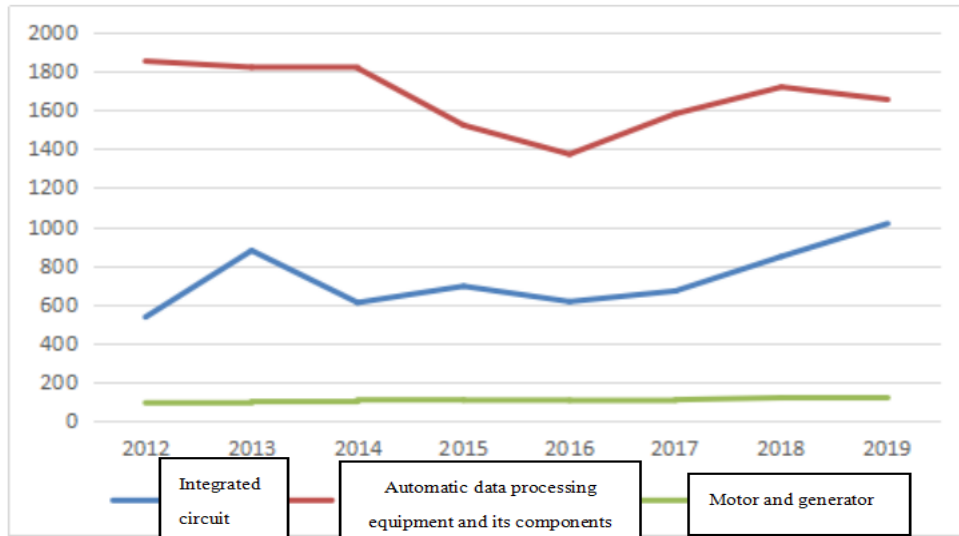


Figure 2: Export trend of China's major mechanical and electrical products
Source: annual report of the General Administration of customs

The integrated circuit, motor and generator, automatic data processing equipment and its components which are at the top of export in mechanical and electrical products are selected for comparison. It can be seen from Figure 2 that the total export value of automatic data processing equipment and its components is leading, and far ahead of the motor and generator, but the overall trend is decreasing, while the export value of integrated circuit is in the middle, showing an increasing trend year by year. Circuit has considerable export competitiveness.

4. Countermeasures to Enhance Export Competitiveness of Mechanical and Electrical Products

(1) Expand economic scale and improve production efficiency and quality

Economic scale affects the development level of a country. To expand the economic scale, we should first improve the production efficiency, extend the industrial chain, increase the added value of mechanical and electrical goods, increase the export volume, enhance the competitiveness of export trade and promote the growth of GDP; secondly, expand the scale of market demand for mechanical and electrical products, and promote the development of mechanical and electrical industry from the demand side, so as to give full play to the market demand for trade. At the same time, it can improve the consumption ability of residents and increase consumption to promote GDP growth.

In addition, when exporting mechanical and electrical products to foreign countries, Chinese enterprises should have a certain understanding of the quality standards of the importing country, pay attention to testing the production quality of China's mechanical and electrical products, so as to make them strictly conform to the quality standards of the other party, so as to facilitate export. To improve the quality of production, one is to get rid of the inherent understanding of the low quality of "made in China" in other countries; the other is to improve the attractiveness of mechanical and electrical products and expand the market to increase the total export value of mechanical and electrical products. High quality products with their own advantages attract foreign investors to ensure sales volume, to a certain extent, can improve the competitiveness of products in export trade, and make products more deeply into the global value chain. Therefore, enterprises should strengthen the basic ability of processing materials to ensure the stability of product quality. At the

same time, enterprises should attach great importance to product quality and strictly check in order to expel the products with inconsistent quality in time to improve the quality monitoring system.

(2) Enhance innovation ability and increase investment in technology research and development

The high and new technology of mechanical and electrical products is the premise and guarantee to occupy market share and strive for competitive advantage. Therefore, in view of the current situation of mechanical and electrical products trade, China should increase the investment in technology research and development of mechanical and electrical industry, and make all the investment funds truly used in the technical innovation of products, create independent brands, and accelerate the speed of using new technologies to produce high-quality mechanical and electrical products. Publicity and promotion methods of products such as recognition.

At the enterprise level, increasing technology investment and improving product technology level is the first choice and the only way. Large scale enterprises should actively adjust the product structure, increase R & D investment and research and development of new products. At the same time, they should pay attention to avoid technical barriers to trade, make products meet international technical standards, and can use technology spillover effect to improve the core technology level of enterprises at any time; and small and medium-sized enterprises should learn to use financial preferential policies to share technology R&D investment. The secondary development will digest and absorb foreign advanced technology for its own use, thus improving the level of enterprise technology and product research and development. At the government level, the government actively uses financial and financial policies to encourage large-scale mechanical and electrical groups to establish technology research centers. At the same time, it increases capital investment in small and medium-sized enterprises, strengthens the training of innovative talents and core technical personnel, creates a "production university research" technological innovation team, continuously improves the R & D ability of enterprises, and forms independent intellectual property rights to guide enterprises from low-level mode. At the same time, we should encourage the development of intellectual property intermediary agencies, promote the flow of goods, technology and experts, protect intellectual property rights, and increase the crackdown on intellectual property rights infringement, and gradually improve the laws and regulations of property rights protection.

Acknowledgments

The phased achievements of "Industry university research cooperation and collaborative education" project of the Higher Education Department of the Ministry of Education "Research on the coupling between the promotion strategy of College Students' entrepreneurship education and marketing" in 2021(202101282011).

References

- [1] Zhang Jing: *the role of processing trade in promoting the upgrading of China's industrial structure, statistics and decision making*, 2004, issue 4.
- [2] Guo Penghui: *analysis of export competitiveness and constraints of China's mechanical and electrical products, economic research guide*, 2012, issue 33.
- [3] Zhang Xiaoxue, Wu Dan, Zhang Xiaoshuang: *analysis of export competitiveness of China's mechanical and electrical products, foreign trade and economic cooperation*, 2012, issue 5.
- [4] Yao Jinhua: *Research on export competitiveness of China's mechanical and electrical products and its influencing factors, master's thesis, Lanzhou University of Finance and economics*, 2015.
- [5] Zhang Liying: *analysis of export competitiveness of China's mechanical and electrical products based on panel data, Journal of Panzhihua University*, 2016, issue
- [6] Yu Guoxiang, Hu maixiu: *comparative analysis on export competitiveness and structure of mechanical and electrical products between China and ASEAN -- Based on the background of "21st century Maritime Silk Road"*, *Shanghai management science*, issue 6, 2017.

- [7] Hou Junyan, Zou Zongsen: *Empirical Study on export competitiveness and influencing factors of China's mechanical and electrical products, foreign trade and economic cooperation*, 2017, issue 2.
- [8] Li keying: *Research on export competitiveness of China's mechanical and electrical products, master's thesis, Shandong University*, 2017.
- [9] Zhao Meijuan: *Research on the influencing factors of China's mechanical and electrical products export, master's thesis, Northeast University of Finance and economics*, 2017.
- [10] Ceng Xiaoqiang: *"one belt, one road" strategy for China's export potential of mechanical and electrical products, master's thesis, Dongbei University of Finance and Economics* 2017.