

# The impact of technical barriers to trade on China's electronics industry exports

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**Abstract:** Trade in electronic products occupies an important position in China's trade exports, but with the development of global trade in electronic products, the impact effect of technical barriers to trade has been highlighted. Based on the current situation of China's electronic product exports, this paper aims to study the dilemma of technical barriers faced by China's electronics industry product exports and their impact effects, and give strategies to deal with technical trade barriers to help China's electronics industry's foreign trade development.

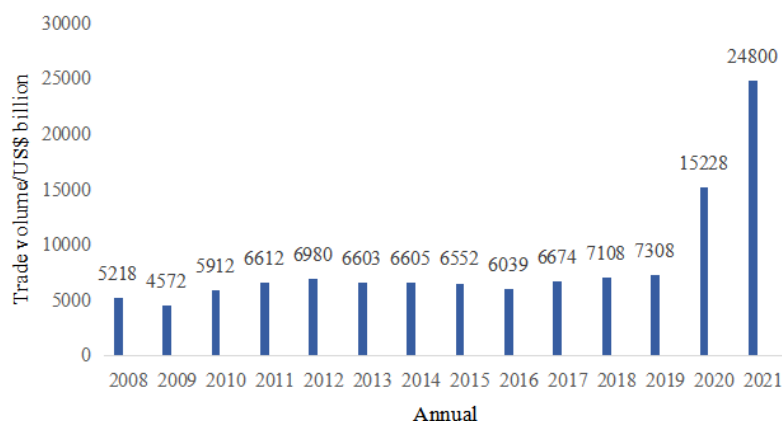
**Keywords:** technical barriers to trade; electronic products; smile curve

## 1. Introduction

With the continuous development of Internet technology, technical barriers to trade play an important role in international trade barriers with its flexible and diverse advantages. In China's export trade, electronic products occupy an important position, and its total export trade shows a rising trend<sup>[1]</sup>. However, with the continuous increase of export trade volume, the trade barriers of various countries to China have gradually increased. Among them, in China's structure affected by various trade barriers every year, the impact of technical trade barriers is as high as 25 % of the total export volume, with a total amount of more than USD 40 billion, which has a profound impact on China's electronic industry export trade for a long time in the future. Therefore, this paper analyzes the impact of technical trade barriers on the industry.

## 2. China's electronics industry export overview

With the deepening of the development of the Internet since the beginning of the 21 st century, the iterative acceleration of core technology systems such as electrical components and electronic equipment has triggered round after round of changes in the electronic information industry<sup>[2]</sup>.



Data source: National Bureau of Statistics

Figure 1: 2008-2021 China's electronics export trade volume

This is shown in Figure 1, throughout China's electronic product export trade in the past 15 years, it has also shown a steady increase, with an average growth rate of more than 20 %. In 2020, China's electronic information industry has gradually become the first pillar industry of the national economy. However, the rising status of China's electronic products export trade has aggravated the trade restrictions

of developed countries on China.

### **3. China's electronics industry exports face the main technical barriers**

The high standards and requirements of consumers on the performance and services of electronic products at the individual level and the trade concerns caused by the huge trade export volume at the national level have aggravated the technical trade barriers of China's electronic products to varying degrees. The stringent requirements of developed countries such as Europe and the United States on environmental protection, energy conservation, safety and compatibility of products have further restricted the entry of related electronic products and services into their trade markets, which has had a serious impact on the foreign trade development of China's electronic industry.

According to the National Bureau of Statistics, the export volume of high-tech products reached USD 979.58 billion, an increase of 26.2 % over the previous year. Among them, communication and electronic devices, home appliance consumer electronic products and computer products are the largest export categories of electronic information industry, so the technical barriers encountered in export trade are more prominent.

#### ***3.1 Computer Products***

With the arrival of the 5G era, the export volume of electronic products has increased rapidly, China's technical barriers to trade have also gradually deepened. Many developed countries gradually achieve the purpose of restricting the export of electronic products by improving the technical standards and regulations of electronic products. The main technical constraints include:

- (1) Use of technical standards to raise the threshold of domestic imports
- (2) Use core patent rights to control export rights of products

#### ***3.2 Home Appliances Consumer Electronics***

According to the National Bureau of Statistics, each year, China's exports of consumer electronics products affected by technical barriers to trade have exceeded 5%, up to \$ 40 to 50 billion. Its technical trade barriers restrictions are mainly reflected in environmental protection and energy saving, mainly including strict international standards, CFC replacement rules for refrigerators, mandatory safety and quality certification, FCC electromagnetic compatibility certification and UL product safety certification, etc.

#### ***3.3 Communication and electronic components***

China's exports of electronic components products are mainly subject to trade barriers reflected in patented technology, intellectual property rights, national defense security and other aspects. In recent years, intellectual property litigation cases have appeared frequently, such as: the European Union implements the CE certification system for electrical products in the form of directives, the European Union implements the WEEE Directive, the United States blocks ZTE and Huawei. These incidents have also further exposed the technical restrictions imposed by developed countries on China's electronic trade.

### **4. The impact of technical barriers to trade on China's electronics industry exports**

#### ***4.1 Short-term effects - inhibit the development of China's electronics industry export trade***

Since 2006, many developed countries have used technical trade barriers to cause huge losses to China's electronic product export trade. As of 2022, the CPSC in the United States has issued 293 recall notifications, of which 157 are consumer products from China, accounting for 53.6 % of the total CPSC recalls in the United States, involving an amount of about \$ 3.59 billion. The United States ' export restrictions on China's electronic products are increasing day by day.

Through in-depth analysis of product recalls, it can be found that China's electronic production enterprises mostly adopt processing methods or engage in the production of large quantities of electronic products. However, the technical barriers to trade in developed countries are not only for the quality of the product itself, but also for the production process, sales and recycling.

According to the supply and demand theorem<sup>[3]</sup>: The equilibrium quantity depends on the supply and demand relationship of the product. In the export trade of products, the change of supply depends on the change of production cost, and the production cost is largely restricted by TBT. The more stringent TBT restrictions, the higher the export cost of the exporting country, which in turn leads to a decrease in product supply opportunities. The smaller the equilibrium quantity, that is, the smaller the export volume, the greater the trade inhibition effect.

According to the analysis of the above supply and demand theory, the export of China's electronics industry is restricted by TBT and presents an increasingly harsh situation. To a certain extent, it weakens the international competitiveness of enterprises in China's electronics industry and aggravates the trade friction between countries brought by export trade.

#### 4.2 Long-term effects - promoting export trade in the electronics industry

According to the American scholar Posner's technology gap theory, the technology gap has a substantial, corresponding to the embodiment of the short-term inhibitory effect of technical trade barriers to China's electronics industry. According to the technology gap theory, with the imitation of the country's technology learning, can gradually master the technology, and then reach the export.

Combined with the learning curve effect analysis, after the latecomer enterprise introduces the production advantages of technologically advanced enterprises, the cost per unit of product will fall with the accumulation of output, and can obtain more benefits than the advanced enterprises. Combining the above two theories, applied in technology trade that is, technological progress can promote the development of trade, and continuous technological innovation will make the trade continue.

Therefore, TBT against developed countries will have a trade inhibitory effect on China in the short term. However, in order to continuously expand the foreign trade market, China will gradually strengthen the innovation of electronic technology, open up the foreign electronic product market, and produce high-quality products that meet international trade standards. This trend has also led to a huge adjustment and improvement in the export structure of China's electronic products.

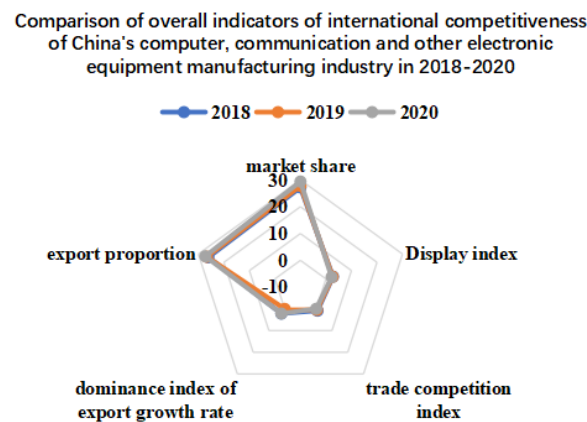


Figure 2: Comparative chart of competitiveness indicators 2018-2020

According to the statistics of the State Administration of Commerce, at the same time, it was analyzed in conjunction with Figure 2, the comprehensive score of foreign trade competitiveness of China's electronic information industry in 2020 is as high as 103.48<sup>[4]</sup>, ranking third among countries and regions in the global trade information system. Although since joining the WTO, foreign technical barriers to China's electronic trade have been deepening, in the long run, electronic products trade still shows a promoting effect and has achieved considerable export trade. At present, driven by a new round of digital infrastructure construction and a variety of factors with increasing endogenous power, China's electronic information industry is constantly innovating, and the development potential of export trade is increasing day by day.

## 5. The domestic electronics industry to deal with technical barriers to trade strategies

### 5.1 Give full play to government functions and improve electronic product standards

The government should actively participate in the meetings of international standard-setting bodies such as OIR, IPPC and CAC, and establish a mechanism to integrate with international standards. At the same time, it should continue to promote the construction of third-party laboratories for electronic export enterprises, strengthen overseas assistance capabilities, and improve the insurance business and law enforcement mechanisms of foreign-related enterprises, so as to escort the development of foreign trade in the domestic electronics industry.

### 5.2 Increase the research and development of electronic products, and constantly optimize the export structure

According to the smile curve theory, high value-added is more reflected in innovative R & D and brand effect. Seizing the R & D of electronic technology and building brand marketing effect is an important opportunity for China to develop foreign trade in the electronic industry. In addition, China should increase the innovation and protection of patents and intellectual property rights of electronic products, avoid technical trade barriers as much as possible<sup>[5]</sup>, and walk out of the road of independent brand export and independent innovation.

Finally, enterprises can also make full use of cross-border mergers and acquisitions, mergers and acquisitions and other means to carry out reasonable technology, talent and capital allocation, create technology and talent advantages, achieve optimal allocation, and maximize economies of scale.

### 5.3 Strengthen environmental awareness, timely control of the new situation of TBT

In order to avoid restrictions on China's foreign trade due to environmental protection and safety in developed countries, China should strictly follow the requirements of ISO14000, from raw material procurement, process manufacturing to production and factory activities, strictly implement standards, strengthen environmental protection, prevent pollution, and establish a modern environmental protection production management system within the enterprise. At the same time, each electronic product export enterprise should improve the technical standards as much as possible, timely understand the new trend of foreign trade barriers, and promote the smooth development of future trade.

## 6. Conclusion

According to the analysis of this paper, the impact of technical trade barriers on China's electronics industry is mainly concentrated in household appliances, electronic components and so on. Through theoretical analysis and practical cases, the short-term inhibition and long-term promotion effects of technical trade barriers on the export trade of the electronics industry are obtained. Finally, based on the current trade development trend and future development trend, this paper puts forward three suggestions for the development of China's electronic product export trade. In the future, we also hope that the electronics industry can continuously improve the technical barriers, strengthen the study of TBT, take the pace of 'going out', and diversify the development of foreign trade through FDI and mergers and acquisitions.

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