



Analysis of the Influence Mechanism of Host Country's Intellectual Property Protection and China's High-Tech Industry Export

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: From the perspective of intellectual property protection in the host country, combined with the characteristics of China's high-tech industry, this paper explores the influence mechanism of institutional environment, tariff barriers and technological innovation on the export of China's high-tech industry.

Study Design: Using the qualitative research method, this paper first sorts out and comments on the relevant literature on intellectual property protection and high-tech industry exports, and then discusses the impact mechanism of intellectual property protection in the host country, laying a theoretical foundation for the final recommendations to Chinese government and enterprises.

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Methodology: Based on the trade effect of intellectual property protection, this paper discusses the classification of country effect and industry effect, and analyzes the influence channel and influencing factors of intellectual property protection on high-tech industry. Finally, the influence

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mechanism of host country's intellectual property protection on China's high-tech industry export is explored.

Results: The influence mechanism of this paper can be applied to the influence of host country's intellectual property protection on the export of high-tech industry, which contributes valuable policy suggestions to the development of China's high-tech industry.

Conclusion: The host country's intellectual property protection can have an impact on China's high-tech industry exports through the intermediary factors of institutional environment, tariff barriers and technological innovation. Among them, the institutional environment has an impact from the sunk cost effect, theoretical expectation effect and forced mechanism, tariff barriers have an impact from the incentive effect, purification effect and transfer effect, and technological innovation has an impact from various factors such as cost, quality and labor productivity.

Keywords: Host country; intellectual property protection; export trade; high tech industry.

1. INTRODUCTION

China's open economy has always been the focus of world attention. With the rapid development of China's foreign trade, many scholars have conducted in-depth research on it. In recent years, China's export of high-tech products has experienced relatively stable growth. In 2019, the export of high-tech products accounted for more than 29 % of the total export of all products in China, which shows that the promotion effect of high-tech products on China's trade export is becoming more and more obvious. At the same time, with the intensification of industrial change, innovation has become a key factor in promoting the reform of national industrial structure and the development of high-tech industries. Innovation is the first driving force for development, and the protection of intellectual property rights is to protect innovation. China proposes to build an intellectual property power by 2035. It can be seen that as the driving force of scientific and technological innovation, intellectual property protection plays an important role in the development of high-tech industries. From the theoretical point of view, in the era of knowledge economy, the research direction of domestic and foreign scholars mainly focuses on the discussion of economic growth and trade flow. When talking about the object countries, the existing literature focuses on the impact of China's strengthening intellectual property protection on its trade, and lacks analysis of the impact of strengthening intellectual property protection of importing countries on China's trade. In terms of the scope of trade, previous studies pay more attention to the overall trade situation of a country affected by intellectual property protection, and lack of exploration of specific industries. Therefore, this paper takes the export of China's high-tech products and the protection of intellectual property rights in importing countries as the research object. Through the

research and collation of previous literature, the key institutional environment, tariff barriers and technological innovation are introduced as intermediary factors to analyze, to provide suggestions for the long-term development of China's high-tech industry, and supplement and improve the theoretical research in related fields. This article will elaborate on the role of influencing mechanisms from four directions: literature review, mechanism analysis, conclusion summary, and policy recommendations. In the literature review, existing scientific achievements will be provided, and the shortcomings of the research will be pointed out. The innovation of this article will be extended. In the mechanism analysis, the mechanism of mediating factors will be clearly explained using easy to understand language, and then the analysis conclusion of this article will be given, And provide suggestions for the Chinese government's efforts to improve the export level of high-tech industries.

2. LITERATURE REVIEW

2.1 Country Differences of Intellectual Property Trade

The research on the impact of intellectual property protection on trade was first established base on the North-South trade model. Due to the high level of technological development in the northern countries, when the northern countries export products to the southern countries, if the southern countries do not adopt the protection of intellectual property rights of imported products, it will lead to the wanton imitation of imported product technology by enterprises in the southern countries [1].The ' market expansion effect ' and the ' market power effect ' make intellectual property protection have an impact on trade, and these two effects have opposite forces, so the net effect of intellectual property protection on trade is not clear [2]. Smith P J bases on

previous studies, proposed the concept of 'imitation threat, and classified the importing countries according to the degree of imitation threat. The research shows that if the importing country has a strong imitation threat and is affected by the 'market expansion effect', the strengthening of intellectual property protection will promote the export of the exporting country; if the importing country has a weak imitation threat and is affected by the 'market power effect', the strengthening of intellectual property protection will hinder the export of the exporting country [3]. Falvey found that the main factors affecting the trade relationship between intellectual property protections and importing countries are the imitation ability of enterprises and the scale of market demand, and this effect varies from country to country [4]. Yu Changlin pointed out that the trade effect of intellectual property protection will play different roles with the economic development level, market size and imitation ability of importing countries. With the improvement of China's economic level and international status, scholars have gradually shifted their research perspective from developed countries to China [5].

2.2 Industry Differences of Intellectual Property Trade

With the gradual deepening of academic research on the effects of intellectual property trade in terms of country differences, more and more scholars have shifted their research to industry differences. With the progress of science and technology in various countries, high-tech products have increasingly become a new field of foreign trade competition among countries, and have become the focus of academic research. Fink C believes that different products reflect different levels of intellectual property protection [6]. Co C Y believes that US technology-intensive products do not respond significantly to changes in the intensity of intellectual property protection [7]. Shen Guobing believes that the increase in the intensity of China's intellectual property protection will not have a significant impact on the export of high-tech products in exporting countries, but they do not consider potential endogenous problems in the estimation process, so the conclusion is not convincing enough [8].

2.3 The Influencing Factors of High-Tech Industry Export

Seyoum B Based on the analysis of diamond theory, the important factors to promote the

export of high-tech products are technical level and human resources [9]. Guo Youqun found that R & D investment can play a positive role in China's high-tech product exports in both the short and long term [10]. Wang Yujie explores the factors affecting the export of high-tech products from the perspective of technological innovation. The results show that both R & D funds and patent applications have a promoting effect on China's high-tech products, and point out that there is still much space for technological innovation to promote the export of China's high-tech products as a whole [11]. Bao Qun believes that the level of regional financial development can also significantly affect the export of high-tech products [12]. Feng Weiyi believes that strengthening technological development capabilities can enhance the international influence of high-tech industries and adjust the direction of influence on the competitiveness of high-tech industries through the way of an innovation environment [13]. Song Weiliang found that the strengthening of intellectual property protection in importing countries cannot drive the export of China's high-tech products, and this effect has country differences and industry differences. The results show that strengthening technology development capabilities can enhance the international influence of high-tech industries [14].

2.4 Influence Channel of Intellectual Property Protection on the Export of High-Tech Industry

Scholars have also been involved in the research on the impact of intellectual property protection on high-tech products. Liu Juan believes that intellectual property protection mainly affects trade through intensive margin. The import price and quantity of high-tech products have a reverse trend with the level of intellectual property protection in China, while the impact of intellectual property protection intensity on the types of imported products is not significant [15]. Song Weiliang found that the improvement of intellectual property protection in importing countries has a negative impact on China's high-tech products export through intensive margin [14]. Liu Juntong further decomposes the intensive margin. Through research, it is found that the quantitative margin is the main way to influence the intellectual property protection of the importing country. In addition, the intellectual property protection of the importing country will have a positive impact on the extensive margin and price margin of China's high-tech products

export, and have a negative impact on the quantitative margin [16]. Gaulier G shows that China's high-tech industry is an important part of the global value chain, and the added value of some products has reached the world's medium level[17]. Tang Haiyan believes that China's position in the international division of labor has been greatly improved compared with the past, and has reached the phased goal of industrial and technological upgrading in a relatively short period of time[18]. Branstetter L concluded that the prosperity of China's processing trade covered up the actual level of China's high-tech industry[19]. Ferrantino MJ also found through research that compared with developed countries, China's high-tech product trade has a rapid increase in export volume, but it is still dominated by processing trade, and its technical level is far behind that of developed countries [20]. Shi Bingzhan found that China's industry is at the bottom of the international division of labor, especially in technology and capital-intensive products far behind developed countries[21]. Tang Bi believes that with the adjustment of China's industrial structure, China's high-tech industry has been extended and upgraded in the global industrial chain. However, due to the technical blockade and technical trade barriers of developed countries and the constraints of China's high-tech industry development environment, China's high-tech industry is still at the bottom of the global industrial chain[22]. Zhou believes that China's technology-intensive industries are in the downstream position in the international value chain division of labor, and the international division of labor status of China's technology-intensive industries is far lower than that of labor-intensive industries in their own comparison and international comparison [23]. Yin Weihua found that although China's participation in the global value chain has increased, the proportion of high-tech industries is still low, and the industrial structure has yet to be improved. Yin, [24]

3. INFLUENCING MECHANISM ANALYSIS

3.1 Effect of the Host Country's Institutional Environment on the Export of China's High-Tech Industry

3.1.1 Cost effect

The sunk cost usually refers to the cost that has nothing to do with the current decision-making in the past, which has a great impact on the profit

acquisition and future expected return of the enterprise. At present, many scholars believe that enterprises entering the international market will inevitably face sunk costs, and sunk costs are considered as a threshold for enterprises to enter the international market. Multinational companies determine whether to enter the international market by calculating whether the expected future earnings can exceed the sunk cost. Due to the uncertainty of the host country's policy, the expected return of multinational enterprises is difficult to predict, increasing the sunk cost of enterprises in the market, and enterprises that do not enter the host country's market will delay entry. Therefore, the host government uses protective policies to increase the sunk costs of Chinese enterprises and reduce the expected benefits, which is not conducive to the R&D innovation of enterprises. The uncertainty of institutional environment affects the export quantity and quality of China's high-tech industry. From the perspective of export quantity, the unfavorable system has compressed the export scale, caused the sunk cost to rise, and some enterprises have suspended their access to the international market, which is not conducive to the international market share of the industry; from the perspective of export quality, the host country restricts the cooperation between domestic enterprises and Chinese high-tech enterprises, which is not conducive to China's high-tech industry to learn advanced technology, reduce the speed of product update iteration, reduce expected returns, cause sunk costs to rise, and then weaken the export quality of China's high-tech industry. In summary, the host country can easily affect the expected export quantity and quality of China's high-tech industry through policies related to property rights protection.

3.1.2 Theoretical expectation effect

The theoretical expectation effect refers to the expectation and expectation of that the situation will affect the behavior and results. The export of China's high-tech industry is essential to obtain expected returns and seek profits. When the level of intellectual property protection in the host country is stable and the institutional environment changes little, it means that the income expectation is stable and the export scale of enterprises is increased. When the level of intellectual property protection in the host country increases and the institutional environment becomes unpredictable, risk-averse high-tech

enterprises reduce their future income expectations and reduce the scale of exports. Once China's high-tech industry is not optimistic about the expected market environment, on the one hand, the reduction of income has hit the export quality of China's high-tech industry; on the other hand, the delay in the development of the international market has blocked the innovation path of Chinese enterprises. Therefore, the theoretical expectation shows that stable expected income is beneficial to the future export quantity and quality of enterprises, thus improving the level of industrial export; increasing the level of intellectual property protection is likely to cause turmoil in the institutional environment. It is expected that income fluctuations will affect the behavior of investors and enterprises, hit the export enthusiasm of high-tech enterprises, and then hurt the export of the industry.

3.1.3 Forced mechanism

From the above analysis, it can be seen that the host country enhances the level of intellectual property protection and increases the uncertainty of the institutional environment, which can hurt the export of China's high-tech industry through the sunk cost effect and the theoretical expectation effect. However, the high-tech industry is a kind of knowledge and technology-based industry. Only when the products of Chinese enterprises are technologically advanced enough can they occupy a place in the host country market for a long time. The unstable institutional environment drives risk-averse enterprises, but it can encourage enterprises with certain risk tolerance to increase R & D investment, continuously carry out technological innovation, improve the export technical complexity of products, enhance the ability of independent innovation, and get rid of the negative effect of the institutional environment on them. Therefore, in an unstable institutional environment, China's high-tech industry to be able to grab more long-term interests in the host country market, when faced with the layers of intellectual property protection, will inevitably force China's high-tech enterprises to attach importance to technological innovation, research and development of new technologies, training high-level professionals, forming a high-quality development management concept, promoting enterprises to develop diversified innovative products, expanding the variety of export products, has a positive impact on China's exports.

3.2 The Mediating Effect of The Host Country's Tariff Barriers on The Export of China's High-Tech Industry

3.2.1 Excitation effect

In the context of the trade protectionism pandemic, the host country's tariff barrier policy can directly affect the export level of China's high-tech industry. However, raising tariff barriers will also have an indirect incentive effect on China's high-tech industry to break the inherent production management model and accelerate the generation of core competitiveness of products. On the one hand, for leading enterprises in high-tech industries, the host country's tariff increase gives such enterprises an incentive to continue to increase product prices, upgrade product quality optimize business management models, maintain stable profit growth and seek greater market share while maintaining product competitive advantages and avoiding sales losses. On the other hand, for general high-tech enterprises, in the face of harsh tariff barriers, enterprises will tend to carry out the layout of production links along the original trade products and sales markets, give up new products with large R&D investment, and instead expand the export scale of the original products and promote the deepening of the export margin, while the deepening of the export margin will increase the complexity of export technology, thus improving the quality of export products. In summary, tariff barriers can encourage enterprises with a good foundation to increase product prices, upgrade product quality, and optimize business management models; encourage enterprises with a general base to promote the deepening of export margins, increase the technical complexity of export products, and ultimately increase market share in the international market and obtain excess profits.

3.2.2 Purification effect

Tariff barrier restrictions will make general enterprises face the risk of exiting the host country's market. The exit of low-quality enterprises from the market has triggered a purification effect, that is, when enterprises are faced with negative shocks such as rising costs and declining demand, enterprises and products with lower efficiency and quality will withdraw from the market, leaving more powerful enterprises. The host country sets trade barriers in the final product, which helps the Chinese

industry to break the traditional processing mode, re-examine the industrial chain, and accelerate the independent research and development of intermediate products, rather than simply committing to the final processing and assembly links. The development of China's high-tech industry has broken the dependence on the advantage of low labor costs. With the increasing level of international intellectual property protection, it is more and more difficult for Chinese industries to obtain high-quality intermediate products, which has increased the internal demand for high-quality intermediate products to a certain extent. At the same time, under the stimulation of the external pressure of tariff barriers, enterprises are warned to re-examine the industrial chain and production mode, which breaks through the constraints faced by the export of high-tech products to a certain extent. The purification effect of industry is the only way for the development of China's high-tech enterprises, and it also has the inevitability of the times. It accelerates the process from quantitative change to qualitative change in production technology, which is conducive to the continuous improvement of product quality.

3.2.3 Transfer effect

In today's international division of labor system, the form of international trade has changed from a single final product transaction to more and more cross-border production. To maximize profits, enterprises choose to carry out production layout on a global scale, and obtain the greatest division of labor benefits through the study of resource endowments in different countries. When a country raises the level of intellectual property protection and increases tariff barriers, it will stimulate enterprises to re-examine the production layout and transfer production and operation locations worldwide. When China's high-tech industry is exporting, due to the restrictions of the host country's tariff barriers, the problem of rising trade costs is caused. Chinese enterprises transfer their technology R & D links to countries with lower levels of intellectual property protection to ensure low-cost production of intermediate products or technologies and ensure the sales of final products. Therefore, according to the transfer effect of high-tech industries, it can help Chinese enterprises to seek a more efficient R & D environment, save the cost of low value-added and low-tech production activities, and generally save costs.

3.3 Technological Innovation Factors on the Impact of China's High-Tech Industry Exports

3.3.1 Reduce the production cost

Low price competition is a traditional means of competition. Technological innovation to reduce product costs can be reflected in the following three aspects: First, technological innovation can make more production processes become mechanized and reduce labor costs; secondly, technological innovation enables resources to be used more effectively and reduces the cost of resource use; finally, technological innovation has derived an efficient management system to reduce the cost of enterprise management. This makes China's high-tech products have a certain export strength in price.

3.3.2 Improve product quality

Technological innovation can also provide higher-quality products at the same price to improve the quality of industrial exports. Improving the level of technological innovation can not only directly improve the performance of products, but also be reflected in the use of materials. For example, many products have changed from simple chemical materials to polymer materials production, which has improved the service life of products. By improving the quality of products, the export level of China's high-tech industry can be improved.

3.3.3 Improve labor productivity

Technological innovation promotes the research and development of mechanized production equipment, which helps to improve the overall layout of mechanized equipment on the production line and improve labor productivity as a whole. The more mechanized processes of products, the higher the degree of standardization of products, which improves the labor productivity of enterprises and changes the level of international competition.

3.3.4 Ability to respond to market risks

The technological innovation of the high-tech industry is a long process, from product research and development, to the transformation of achievements, formally to the international market each link must go through the test of the market. Every technological innovation process

of an enterprise is a decision made through a detailed business strategy, which is inseparable from the management innovation of the enterprise to promote the overall progress of industrial export and enhance the ability to resist market risks.

4. CONCLUSION

Today's protection of intellectual property rights has long gone beyond the meaning of pure legal provisions. This paper focuses on the following three perspectives to explore the intermediary impact of the host country's intellectual property protection on China's high-tech industry export. First, the host country's awareness of intellectual property protection will directly change the institutional environment of the host country. The uncertainty of the policy will make it difficult for enterprises entering the host country to bear high sunk costs and increase the export costs of enterprises. It will also lead to the failure of enterprises to achieve the expected returns and crack down on export enthusiasm. However, it will also force some enterprises with core competitive advantages to have full intention to make technological breakthroughs, improve the complexity of export technology, give full play to the engine effect of enterprises, and drive the export level of the whole industry. Second, due to the host country's urgent need for intellectual property protection, trade will contribute to the formation of tariff barriers. This barrier will first cause an incentive effect, forcing high-tech enterprises to carry out technology research and development, and increase the deepening of the export margin of enterprises. Secondly, it will have a purification effect, promote the survival of the fittest in high-tech industries, and improve the export quality of the industry as a whole; finally, through the transfer effect, the formation of tariff barriers will prompt enterprises to carry out production layout again, and ultimately reduce export costs. Third, the protection of intellectual property rights in the host country will directly change the way of technological innovation of China's high-tech export enterprises. This paper concludes that the improvement of independent R&D levels can affect the export of China's high-tech industry from two dimensions: export cost and export quality. Among them, the export cost is affected by production cost, labor productivity and scale effect; export quality is affected by the product quality and anti-market risk ability, which will ultimately affect the export of the industry.

5. SUMMARY

Judging from previous studies, the academic community has had very rich research results in theoretical exploration. For the national differences and industry differences in intellectual property trade, the international division of labor status of China's high-tech industry and the important factors affecting the export of high-tech products have been systematically and elaborated. However, there are still some shortcomings in the current research results. For example, in the study of the impact of intellectual property rights on foreign trade, many scholars have analyzed the impact of intellectual property protection on China's high-tech product trade, but the existing literature mainly takes China's high-tech product import trade and China's intellectual property protection level as the entry point. With the rapid improvement of China's scientific and technological level and the increasingly perfect international intellectual property protection system, it is also of far-reaching significance to explore the impact of intellectual property protection in importing countries on China's high-tech products export.

6. POLICY PROPOSAL

First, deep participation in the international protection of intellectual property rights. Close and efficient cooperation between countries in the world can effectively promote the development of the world economy, and the intellectual property system is the key to protecting international cooperation. China should deeply participate in international intellectual property governance, promote the improvement of international intellectual property-related rules, strengthen cooperation and exchanges with intellectual property institutions in various countries, and build a good trade environment. Second, actively improve the intellectual property protection system. The meticulous and thorough intellectual property protection system can escort the development of China's intellectual property rights. The government departments should follow the national conditions and the provisions of international conventions, and formulate corresponding laws and regulations, so that China's intellectual property legal system can also be fully protected in the international community to create a more equitable environment. Third, actively respond to intellectual property barriers. China's product model will lead to intellectual property trade

barriers. Therefore, government departments should speed up the construction of the public service system of intellectual property rights. At the same time, enterprises should also set up a special intellectual property department within the enterprise, pay attention to the cultivation of intellectual property talents, and actively establish government-enterprise communication channels and early warning mechanisms.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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