

# Impact of the Implementation of TRIPS Agreement on International Trade Law and Intellectual Property Protection

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**Abstract:** With the acceleration of economic globalization, the role of intellectual property rights in international trade has been increasingly concerned and recognized by the international community. The Agreement on Trade-related Intellectual Property Rights is an important legal document to regulate the protection of intellectual property rights in international trade. It has a far-reaching impact on the innovation and development of all countries. Based on qualitative research, this paper uses quantitative research methods to comprehensively evaluate the impact of TRIPS. In order to achieve this goal, this study is divided into the following four steps: first, this paper reviews the relevant literature and finds that the influence of TRIPS has not been systematically studied in the literature. Secondly, this paper analyzes the provisions of TRIPS agreement and its dispute settlement mechanism by using the method of legal text analysis. In addition, the influence mechanism of different interest groups on the negotiation and signing of TRIPS agreement was obtained by expert interviews. Finally, after obtaining the data, this paper analyzes the impact of TRIPS agreement on intellectual property protection, innovation and foreign direct investment by using econometric model. The results show that the implementation of the Agreement on Trade-related Aspects of Intellectual Property Rights has significantly reduced the number of intellectual property infringement cases, increased the number of intellectual property registrations, and promoted the growth of foreign direct investment. Before the implementation of the Agreement on Trade-related Aspects of Intellectual Property Rights in the United States, there were 39,105 cases of infringement, while in the period after the implementation of the Agreement, there were 25,586 cases of infringement. These changes show that TRIPS Agreement

has played an active role in protecting intellectual property rights, promoting innovation and attracting foreign investment.

**Keywords:** TRIPS Protocol; International Trade Law; Intellectual Property Protection; Number of Infringement Cases

## 1. Introduction

As an international institutional arrangement, TRIPS has a far-reaching impact on international intellectual property protection standards, international trade laws and intellectual property laws of member countries. This paper studies the influence of TRIPS agreement on the legal environment of international trade and its improvement on the patent law system of member countries. This document can not only analyze the comparison of matching data before and after the adoption of the Agreement on Trade-related Aspects of Intellectual Property Rights, but also discuss the long-term impact of international trade law and intellectual property rights from an empirical perspective. This paper selects developing countries with comparable data, and estimates the impact of TRIPS agreement on reducing intellectual property infringement, promoting intellectual property registration and attracting foreign direct investment. It is concluded that TRIPS has a series of positive effects on the innovation process. In particular, this paper uses a new method to discuss the three aspects of TRIPS. Over the years, academic circles have written a large number of documents to discuss the impact of TRIPS on the development of national innovation capability. However, at present, there is a lack of a comprehensive analysis framework for evaluating the impact of TRIPS Agreement on countries from multiple dimensions, so this study provides a new perspective for evaluating the impact of TRIPS Agreement on developing countries.

The introduction part of this paper introduces the

research background, motivation and main contribution; the second part is related work, explaining the legal framework of TRIPS agreement and its influence on international trade law; the third part is methodology, which introduces the research design, data sources and analysis tools in detail. The fourth part is the result and discussion, which introduces the comparative analysis before and after the implementation of the agreement on trade-related intellectual property rights, and discusses the influence of the agreement on trade-related intellectual property rights on international trade law and intellectual property protection; the fifth part is the conclusion, which summarizes the findings of this study and provides policy enlightenment and direction for future research.

## 2. Related Work

With the implementation of the Agreement on Trade Related Aspects of Intellectual Property Rights, the status of intellectual property law in international trade law has become increasingly prominent, which has had a profound impact on the innovation and development of economies in various countries. Based on the existing intellectual property laws, there is a protection gap in protecting enterprise data, and enterprise data often cannot perfectly fit traditional intellectual property categories. He Rong analyzed the structural similarities and differences between intellectual property rights and potential data rights, and proposed a method for classifying enterprise data [1]. On the basis of theoretical analysis of the impact of big data development on the intrinsic mechanism of green technology innovation in enterprises and the regulatory role of intellectual property protection, Ren Yinghua used the exogenous policy impact of the "National Big Data Comprehensive Experimental Zone" to study A-share listed companies in Shanghai and Shenzhen. He used a double difference model to evaluate the impact of big data development on green technology innovation in enterprises and the moderating effect of intellectual property protection between the two [2]. To accelerate the localization and transformation of the international intellectual property protection legal system, Xia Junli believed that it is necessary to establish an integrated intellectual property protection system that is compatible with the construction of a Chinese style free

trade port with global influence. He drew on the advanced experience of intellectual property protection legal systems in typical free trade ports around the world, combined with the legislative advantages, working mechanism advantages, and platform advantages of Hainan Free Trade Port, to build a high standard intellectual property protection legal system in Hainan Free Trade Port [3]. Ma Haiqun introduced the basic elements of the Soft System Methodology with the Client Actor Diagram policy analysis method. He established an evaluation and analysis framework for intellectual property protection policies from four dimensions: policy makers, policy content, policy participants, and policy value. Based on this, he constructed an evaluation index system for intellectual property protection policies. He used the Entropy Weight Technique for Order Preference by Similarity to Ideal Solution method to evaluate 9 intellectual property protection policies [4]. Xing Nana used the Hausmann method to calculate the export technology complexity of 52 countries based on the Harmonized System-2 quantile product level export data from 2005 to 2021. He combined the Intellectual Property Protection Index released by the World Economic Forum to measure the intensity of intellectual property protection in various countries, and established a regression model to empirically analyze the impact of intellectual property protection on the complexity of export technology in countries. He also used the Two Stage Least Squares method to estimate the model [5].

In addition, McGIVERN L analyzed the provisions on compulsory licensing in patent legislation of 195 countries (193 United Nations member states and 2 observers) and 3 tariff zones [6]. Xaydarov B paid special attention to how small and medium-sized enterprises can enhance their commercialization and entrepreneurial performance through intellectual property protection, and explores how open innovation model limitations and information and communication technology can enhance corporate performance. The final research findings emphasize the significant impact of intellectual property management on open innovation, commercialization performance, and entrepreneurial performance [7]. Zhang J proposes a new model watermarking framework to protect deep networks trained for low-level computer vision or image processing tasks,

based on the serious risk of intellectual property infringement faced by deep neural networks. Specifically, a special task independent barrier is added after the target model, which embeds a unified and invisible watermark in its output [8]. Chen W used independently developed indicators to measure the development of China's provincial-level digital economy and explored the impact of intellectual property protection on the digital economy. The research results found a U-shaped relationship between intellectual property protection and the digital economy [9]. Kharchenko O adopted a variety of general scientific methods, including observation methods, comparison methods, experimental methods, convergence methods from abstract to concrete, formal methods, axiomatic methods, analytical methods and historical methods, to analyze the current situation and challenges of Internet intellectual property protection [10]. Although the research of these scholars provides profound insights into the interaction between intellectual property protection and international trade law, there is still a blank space in analyzing the impact of the implementation of the TRIPS agreement on international trade law and intellectual property protection. The purpose of this study is to fill the gap in existing literature and analyze the impact of the implementation of the TRIPS agreement on international trade law and intellectual property protection.

### 3. Method

#### 3.1 Research Design

When the impact of the implementation of the TRIPS agreement on international trade law and intellectual property protection is analyzed, the tendency of comprehensive evaluation is adopted again through the combination of qualitative and quantitative analysis methods, so as to appreciate the impact of the agreement on international trade law and intellectual property protection [11-12]. Qualitative analysis is used to understand the legal principles and provisions of the TRIPS agreement and its impact on the international legal environment. Literature review, legal text analysis and expert interview methods are used to discuss the TRIPS agreement, and the international standards and trade rules for intellectual property protection have been formed. The impact of the domestic legislation of the member states can be evaluated

by qualitative analysis. Through the case law of the legal reform of the domestic legislation of the member states, the degree of legal reform can be reflected by the following equilibrium equation:

$$L = \frac{L_{post} - L_{pre}}{L_{pre}} \times 100\% \quad (1)$$

$L_{pre}$  is the legislative level before the implementation of the TRIPS agreement,  $L_{post}$  is the legislative level after implementation, and  $L$  is the percentage change in legal reform.

Quantitative analysis uses statistical data to measure the specific effects of the implementation of the TRIPS agreement, including the number of intellectual property dispute cases, changes in international trade flows, and statistical data on intellectual property registration and enforcement. The changes in intellectual property dispute cases can be measured using the following time series analysis model:

$$D_t = a + b \cdot TRIPS_t + \varepsilon_t \quad (2)$$

$D_t$  refers to the number of dispute cases in time  $t$ , while  $TRIPS_t$  is a dummy variable indicating whether the TRIPS protocol is implemented in time  $t$ .  $a$  is the intercept term,  $b$  is the effect coefficient of the TRIPS protocol implementation, and  $\varepsilon_t$  is the error term.

This study also applies case study methods to deeply analyze the intellectual property practices of specific countries or regions under the TRIPS protocol framework, and selects representative cases to evaluate the implementation of the TRIPS protocol in different legal systems and cultural backgrounds [13-14]. The case study can focus on the impact of the TRIPS agreement on the domestic legislation of member states, the challenges faced by member states in complying with the TRIPS agreement, and the impact of the TRIPS agreement on international trade and investment flows. Case studies are constructed by collecting and analyzing publicly available legal documents, policy reports, economic data, and academic articles, while considering the perspectives of stakeholders, such as government officials, business representatives, intellectual property lawyers, and consumer groups, to obtain a comprehensive analytical

perspective.

### 3.2 TRIPS Protocol and Data Sources

The TRIPS agreement, as the only multilateral trading agreement within the framework of the World Trade Organization, has an important impact on international trade law and intellectual property protection [15-16]. From an international trade and investment perspective, the TRIPS agreement has many advantages and positive effects. First, the TRIPS agreement makes global intellectual property protection standards uniform, so that multinational corporations and investors can obtain the same level of intellectual property protection when investing in different countries. Second, the TRIPS agreement strengthens the enforcement of intellectual property rights, including civil, criminal, and border measures, so as to fight infringement and protect the legitimate interests of innovators. Third, the TRIPS agreement can create an environment that facilitates the flow of

innovation, because TRIPS helps to strengthen the protection of intellectual property rights and has generally increased the confidence of foreign investors and innovators in investing in developing countries [17-18]. Fourth, the special advantages brought by the TRIPS agreement in international trade are closely related to it acting as a strong incentive for technology development and transfer. With the increasing protection of intellectual property rights, multinational companies must improve their productivity and change their traditional production organization and management methods. Therefore, the resolution of the intellectual property rights system is attributed to the establishment of new production lines, which leads to modern industries and technologies. It is also a great motivation for investment products. As shown in Table 1, the international trade data for each country in 2020 are as follows:

**Table 1. International Trade Data of Various Countries**

Country/Region	Year	Exports (Billions USD)	Imports (Billions USD)	Average Tariff Rate (%)	Intellectual Property Applications (Pieces)	Intellectual Property Protection Index (1-10)
United States	2020	2.1	2.8	3.5	600,000	8.5
Germany	2020	1.3	1.1	2.3	450,000	8.0
China	2020	2.5	1.9	7.5	1,200,000	6.5
Brazil	2020	0.2	0.18	14.0	50,000	5.0
India	2020	0.31	0.45	13.5	200,000	5.5
Japan	2020	0.69	0.75	2.4	350,000	7.8
South Korea	2020	0.55	0.50	5.9	250,000	7.2
France	2020	0.50	0.60	4.7	300,000	7.9
United Kingdom	2020	0.30	0.50	5.2	225,000	8.2
Canada	2020	0.45	0.40	4.9	150,000	7.7
Australia	2020	0.25	0.20	4.6	100,000	7.5
Russia	2020	0.40	0.30	8.0	80,000	5.8
South Africa	2020	0.12	0.15	9.1	30,000	4.9

Table 1 compares the main economic indicators of the United States, Germany, China and Brazil in international trade law and intellectual property protection. These indicators have important reference value for the government to understand the development trend of world trade and economic indicators. For policy makers, these indicators can be used to guide and improve trade policies, intellectual property protection laws and regulations and international cooperation strategies. For enterprises, it helps to judge the potential market, competitive environment and business risks of entering new markets. The international intellectual property

index is measured by the number of patent applications, the number of copyright infringement cases and the income and payment of intellectual property royalties. Economic indicators such as patents and intellectual property information provided by the World Bank database may be the most comprehensive and original intellectual property information. China National Intellectual Property Administration's statistical data can also become an important source of information to understand a country's intellectual property protection. According to the above data sources and data sets, this paper makes an empirical

evaluation of the impact of TRIPS agreement on international trade legal rules, intellectual property protection standards, technology transfer, foreign direct investment and other economic indicators.

### 3.3 Analysis Tools

A number of analytical tools are used in this paper to ensure that the research has a certain comprehensive and depth. As the most basic means of quantitative research, the statistical approach is conducive to dig out the law and trend through digital data, which is used to analyze the impact of the TRIPS agreement on changes in trade flows, changes in the number of intellectual property infringement cases and other related issues. The comparative legal method primarily involves comparison of different countries or regions in terms of legal systems and legal practices, which is also an effective way of analyzing how the TRIPS agreement has affected member states in different legal traditions and in various stages of development and economic backgrounds. The policy analysis method is mainly used to evaluate and explain the process of formulating policy decisions on international trade law and intellectual property protection, focusing on the formulation and negotiation process of the relevant convention, implementation of the member countries, and on how international trade policy and international intellectual property law reform have played a role in the driving [19-20]. By combing these analytical tools, the paper attempts to explore the impact of the TRIPS agreement from the perspective of international trade law rules, intellectual property protection practice in different countries and the influence of the global economy and legal order, and provide groundwork for the next round of policy making and international cooperation.

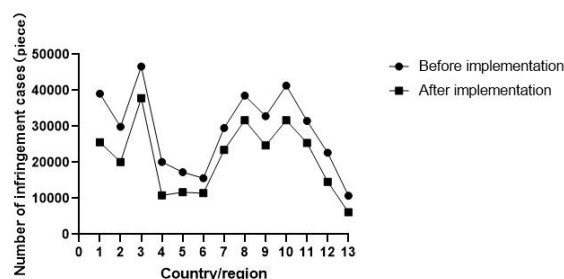
## 4. Results and Discussion

The implementation of TRIPS Agreement has had a far-reaching impact on the legal system, economic structure and international trade law of member countries. In order to comprehensively evaluate the impact of TRIPS Agreement, this study designed a series of comparative experiments, aiming at quantitatively analyzing the changes in the number of intellectual property infringement cases, the number of intellectual property

registrations and foreign direct investment in 13 countries or regions such as the United States, Germany, China, Brazil, India, Japan, South Korea, France, Britain, Canada, Australia, Russia and South Africa before and after the implementation of TRIPS Agreement. During the experiment, the serial numbers 1-13 were used to represent these 13 countries and regions respectively.

### 4.1 Number of Intellectual Property Infringement Cases

The number of intellectual property infringement cases is an important indicator for measuring the effectiveness of intellectual property protection in a country or region. The specific comparative data is shown in Figure 1:

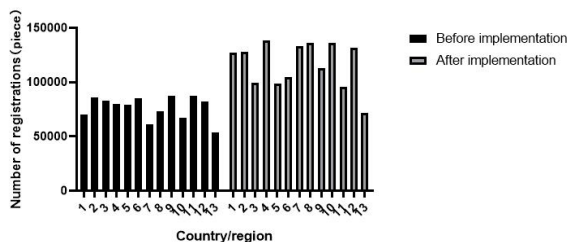


**Figure 1. Comparison of the Number of Intellectual Property Infringement Cases**

As shown in Figure 1, among these 13 countries and regions, the number of intellectual property infringement cases after the implementation of the TRIPS agreement in all countries has decreased unevenly compared to before implementation. The amount of infringement lawsuits in the U.S. before the TRIPS agreement coming into effect was 39105, which dropped to 25586 following the enforcement of the TRIPS agreement. Other countries besides the United States have also experienced significant declines. According to the global infringement lawsuit data in 2010, it is possible to see that the rules of intellectual property protection based on the TRIPS agreement has improved with international intellectual property protection awareness growing. The number of intellectual property infringement lawsuits in all of these countries has decreased after the implementation of the TRIPS agreement.

### 4.2 Number of Intellectual Property Registrations

The comparison results of the number of registered intellectual property rights in various countries are shown in Figure 2:

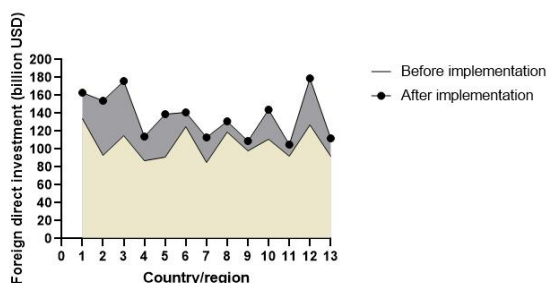


**Figure 2. Comparison of the Number of Intellectual Property Registrations**

As Figure 2 shows, the number of intellectual property registrations after the agreement was signed has increased greatly compared with the number before. Before the agreement was signed, the number of intellectual property registrations in the UK was the highest, reaching 87439. After the agreement was signed, the number of intellectual property registrations increased to 112764, an increase of 25325. This upward trend represents not only the fact that after the enactment of the TRIPS agreement, the protection of intellectual property rights has become stronger, but also that intellectual property rights are widely recognized and valued worldwide. As a country with a long history and mature system in intellectual property protection, the growth in the number of registrations in the UK reflects the active innovation activities in China. This may also attract more foreign direct investment and technological cooperation, which can help drive economic growth and technological innovation.

**4.3 Foreign Direct Investment**

In order to deeply analyze the impact of the TRIPS agreement on foreign direct investment, this comparative experiment aims to quantitatively evaluate the changes in foreign direct investment before and after the implementation of the agreement, as shown in Figure 3:



**Figure 3. Comparison of Foreign Direct Investment**

As can be seen from the data in Figure 3, the implementation of TRIPS Agreement has a good role in attracting foreign direct investment. In

Germany, the foreign direct investment before the agreement was only \$93 billion, and it was \$154 billion after the agreement, with an obvious growth rate, and the growth in other 12 countries was also remarkable. Therefore, the growing trend shows that the Agreement on Trade-related Aspects of Intellectual Property Rights has greatly improved the ability of Germany and other countries to attract foreign direct investment.

**5. Conclusions**

Several significant findings have been drawn according to the analyses and studies above. Firstly, the number of intellectual property infringements across all member states has declined considerably since the implementation of the TRIPS agreement. This indicates that the TRIPS agreement serves to increase the awareness of intellectual property protection and the efficiency of intellectual property enforcement mechanisms. Secondly, the increasing number of intellectual property registration demonstrates greater confidence from enterprises and innovators in the intellectual property protection framework, and is beneficial to encouraging innovation and conducting technology transfers. Thirdly, the increasing amount of foreign direct investment is direct evidence of the ability of the TRIPS agreement to attract foreign investment and facilitate international trade. In conclusion, the TRIPS agreement has played a vital role in promoting global harmonization in terms of the intellectual property protection regime and the stimulation of international trade. Research in the future may need to examine in detail how to make the TRIPS agreement more efficient in meeting the development needs of different countries and regions, and to ensure the intellectual property protection regime can be the support for sustainable economic and socio-economic development. In the process of creating and amending the intellectual property protection framework, policymakers should carefully consider how the TRIPS agreement can work and strive to strike a balance between protecting innovation, promoting trade, and protecting public interests.

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