

미·중 무역분쟁이 중국의 5G 산업에 미치는 영향 화웨이 사례 중심으로

황기식¹ · 장재^{2*}

The Impact of the US-China disputes on China's 5G Industry focus on Huawei case

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요 약

미·중 무역 분쟁이 시작된 이래로 전 세계의 관심은 물론이고 각국의 무역에도 영향을 미치게 되었다. 하지만 미·중 무역전쟁은 전통산업의 경쟁에만 국한되지 않았으며 5G 산업의 경쟁도 갈수록 치열해지고 있다.

본 연구는 문헌연구를 중심으로 미국이 중국의 화웨이 회사에게 제재를 가하게 된 심층적인 원인을 분석하였다. 또한 이에 대한 문제점을 파악하고 해결방안을 제시하고자 한다. 미·중 무역 전쟁이 끊임없이 확대되고 빠르게 성장하고 있는 중국 산업은 미국의 산업에 영향을 줄 수 있으며 미국의 제재는 더 강화될 수 있다.

미국의 제재에도 불구하고 중국 5G의 빠른 속도와 효율적인 비용은 중국의 경쟁력을 더욱 높여 주고 있다. 하지만 앞으로 미국의 경제제재 하에서 중국의 5G 산업은 어떻게 생존하고 더욱 발전할 것인가에 대한 심도 있는 연구가 이루어져야 한다.

ABSTRACT

The U.S-China disputes have attracted worldwide attention since it took place. However, the disputes between China and the US are no longer limited to the competition in traditional industries, and the competition in 5G industries is becoming more intense.

This paper analyzes the reasons for US sanctions on Huawei and puts forward some Suggestions for its countermeasures. With the continuous trade exchanges between China and the United States and the acceleration of China's rise, the related industries in the United States will inevitably be impacted by the related industries in China.

Despite U.S. sanctions, the fast speed and effective cost of 5G in China is further improving China's competitiveness. However, under the economic sanctions of the United States, how to survive and further develop China's 5G industry needs in-depth research.

키워드 : 중국, 미국, 5G 기술, 무역전쟁, 화웨이

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I . Introduction

1.1. Introduction

The US-China trade relations have been in friction and twists and turns since the two countries established trade relations. The annual most-favourable treatment review, related to trade or independent human rights issues, the true reflection of the characteristics of china-US trade relations before China attend the WTO. With the development of economic and trade relations between the two countries, the frequency of trade friction has increased, and the United States has the second highest number of antidumping cases against China.[1]

The trade war between China and the United States is not limited to traditional industries, but also increasingly extends to high-tech industries. In order to develop its own 5G industry, China has not only invested in capital but also given a lot of policy support. Chinese companies, such as Huawei, are focusing on Europe as the main market for overseas 5G development. so American started the trade war not simply for economic reasons, but for other reasons as well.

The main area of competition between China and the United States in 5G is in Europe. At first, European countries refused to cooperate with Huawei because of the United States, but over time, European countries began to cooperate with Huawei, including Germany, France, Italy and other countries have signed 5G contracts with Huawei. US attempts to block Huawei are not just motivated by protectionist principles, but also reflect US concerns that China's rise will challenge its Technological monopoly and also The United States fears that the Chinese government will spy on American citizens if they use Huawei equipment.

This article focuses on an in-depth analysis of why European countries' attitudes towards Huawei have changed, and why the US is trying to block the Chinese company globally.

1.2. Background of US and China trade war

On July 6th, 2018 America formally slapped a 25%

tariff on the first \$34 billion of Chinese goods on its list. And the United States China "301 Investigation" [2] under the formal implementation of the tax measures in the world trade organization (WTO) started addition lawsuits. At this point, the US-China trade friction officially escalated into a trade war. On July 10th America unveiled a detailed list of tariffs of 10% on \$200 billion of Chinese imports. On August 3rd America said it would raise tariffs on \$200 billion of imports to 25%. In response, China imposed tariffs at four different rates on US \$60 billion worth of imports from the US.[3]The industries in which China and America impose tariffs on each other are identical to the Table.1. At this point, the trade war between China and the United States is becoming more and more intense. The United States is no longer confined to the economic blockade of China in traditional industries, but pays more attention to the blockade of China in the high-tech field. The U.S. government has even publicly asked its Allies to ban the use of Huawei's 5G products, which have seriously violated the rules of free trade. In the future, fast-growing Chinese companies will surely continue to be curtailed by the US in strategic technology fields such as big data analysis, artificial intelligence, hypersonic technology and biotechnology. US attempts to block Huawei concerns that China's rise will challenge its technological monopoly.[4]

Table. 1 Tariffs on certain goods originating in the United States

U.S raises taxes on China	China ends tax cuts on U.S	China raises taxes on U.S
High-speed rail Equipment	Fruits	Agricultural Products
Biological Medicine	Dried Fruits	Cars
Agricultural Machinery Equipment	Wine	Aquatic Products
Industrial Robot	Denatured Ethyl Alcohol	Chemicals
IT	American ginseng	Medical Equipment
NEV	No plastic steel tube	Energy Product

U.S raises taxes on China	China ends tax cuts on U.S	China raises taxes on U.S
Aeronautical Facility	Pork	
Medical Equipment	Aluminium Scrap	

Source : China's Ministry of Commerce

II. The development status of China's 5G industry

2.1. China's policy on developing the 5G industry

In 2015, China put forward the “Made in China 2025” [5] strategy, through which China will build an ultra-high-speed network, promote the development of 5G technology and accelerate research and development. In 2016, China's state council proposed 13.5 “national strategic emerging industries development plan” to guide the development of emerging technologies such as 5G technology.

In 2016, the ministry of industry and information released the “industrial planning for the new generation of information technology (2016-2020)”, [6] which indicates that the development and testing of 5G technology should be completed by 2018, the infrastructure construction of 5G network should be completed by 2019, and the commercialization of 5G technology should be realized by 2020, and relevant technical standards should be formulated.

In December 2018, the China's Ministry of Industry and Information Technology will allow China's three major telecommunications companies to pilot 5G frequency and expand support to ensure the frequency required for 5G system testing. The meeting to decide economic policy in 2019, held in December 2018, also stressed that China will continue to invest in the commercialization of 5G. [7] The scale of China's future investment in 5G industry can be referred to Fig. 1.

Chinese mobile communication enterprises and communication equipment enterprises also keep up with the pace of government policies. China Mobile, China Telecom and China Unicom, the three major communication

companies in China, have announced plans for large-scale investment in order to achieve large-scale commercialization of 5G, and have also selected demonstration cities.

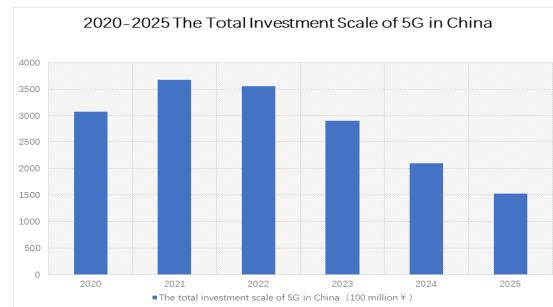


Fig. 1 2020-2025 The Total Investment Scale of 5G in China
Source: CVINFO “China's 5G industry development and investment report”

2.2. The development of Chinese enterprises represented by Huawei in Europe

Huawei, the largest communication equipment supplier in the field of 5G communication equipment, occupies the dominant position in the 5G market through its strong price advantage and huge investment in research and development. In 2018, Huawei increased its investment in research and development (R&D) from \$15 billion to \$20 billion, devoting 15% of its annual sales to research and development. [8] About 25,000 5G base stations were built in 2018, and the proportion of patents related to 5G technology accounted for 17% in the world, ranking first in the world. [9] The global share of Huawei's patents is shown in Fig. 2.

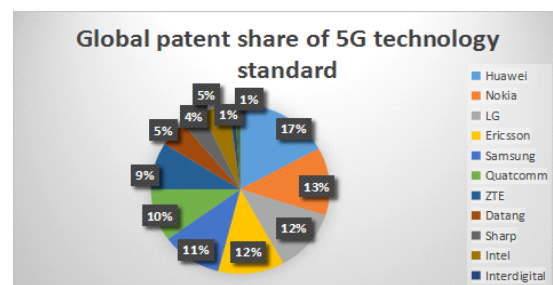


Fig. 2 Global Patent Share of 5G Technology
Source: Intellectual property center of China communications academy (2018)

Huawei's 5G industry did not develop smoothly in Europe and was initially resisted by European countries. But over time, Huawei has struck 5G deals with a number of European countries, even as the U.S. pushed for European countries to ban its equipment. According to the Chinese foreign ministry's press conference on December 10, 2018, China's foreign ministry said that more than 20 countries have signed 5G cooperation agreements with Huawei. The European countries include Spain, Ukraine, Austria, Germany, Italy, France, Switzerland, Britain, Turkey, Russia, Malta, Monaco, Latvia and Portugal.[10]

III. The attitude of EU countries towards Huawei

In the face of American pressure, European countries have not heeded American demands. First of all, from the perspective of the mobile phone market, Huawei has won a certain market share in Europe through its operation in the past few years, and the consumer response is also good, and even thinks that some functions are more advanced than iPhone. Compare the capabilities of the two companies' flagship phones in 2019, Huawei MATE30 and Apple 11, In terms of processor, the iPhone 11 series is equipped with the new A13 Bionic processor. Whether it is CPU, GPU or neural network engine, it has achieved more than 20% improvement compared with the A12. [11] Huawei Mate30 series 4G version is equipped with the Kirin 990 processor developed by Huawei and adopts the second generation 7nm process. The CPU USES 2 large cores (developed based on Cortex-A76), 2 medium cores (developed based on Cortex-A76) and 4 small cores (designed based on Cortex-A55), and is matched with a 16-Core Mali-G76 GPU. The overall performance of the Kirin 990 is greatly improved compared with that of the Kirin 980.[12] The two processors have similar performance, But in 5G chips, the Kirin 990 5G has an advantage over the A13.

Huawei's main competitors in Europe are only Nokia and Ericsson. Nowadays Huawei has 28% of the European market, Ericsson 27% and Nokia 23%.[13] The 5G network equipment market share can be referred to in Fig. 3. Furthermore, Europe has no network equipment or server companies. Ericsson and Nokia are only equipment suppliers. In the past, the supply of network equipment and servers was provided by the United States, and the Europeans did not want their servers to be provided by the Americans all the time. If Huawei can enter the European market, China will also allow more European companies to enter the Chinese market and can replace the market share of American companies after their departure, which is what European countries hope to see.

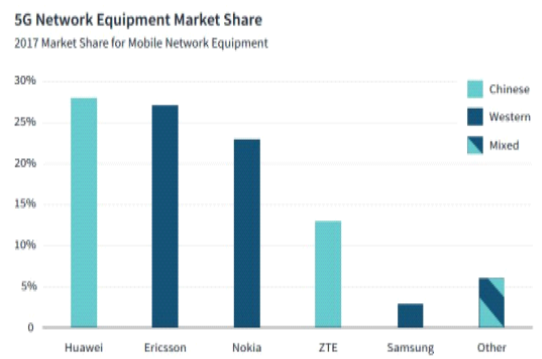


Fig. 3 5G Network Equipment Market Share

Source: CSIS (2018)5G Equipment Market Share

In addition, Huawei equipment has a high cost performance. In recent years, European economy has been sluggish, and the construction of communication network infrastructure requires a large amount of money, and Huawei's appearance just meets the needs of European countries. Europe does not want to continue to use American equipment and wants to choose other manufacturers. Huawei's products are good and can replace American equipment at a reasonable price, so Europe starts to use Huawei equipment on a large scale. Huawei also has a wide range of businesses, other than base stations, that do not compete with European technology firms. More than 90 percent of Huawei's net

revenue growth in 2017 came from outside the carrier business, which means that Huawei's reliance on carrier business has been significantly reduced. So the conflict between Huawei and European companies is not that serious.

Take Germany as an example. As early as 2007, Huawei won the order from Germany and established more than 8,000 base stations in Germany. In 2017, Germany exported \$98,804 million to China and Germany imported \$81,767 million from China.[14] In the Sino-German trade relationship, Germany has a trade surplus, that is, the Germans actually make a lot of money from their trade with China. Germany's trade surplus continued to increase by \$26 billion to \$297 billion in 2016, the highest level since World War II, and surpassed China to become the world's largest trade surplus country again.[15] As the world's largest trade surplus country, Germany is in favor of free trade and will never engage in trade protectionism with the United States.

In contrast to Germany's active engagement with Huawei, the UK initially sided with the US in rejecting Huawei products. In December OF 2018 a massive network failure has taken place at Britain's O2 network. That caused the 4G network to crash, leaving millions of users without cellular service. The fault was caused by a software problem based on Ericsson's base station, causing huge losses. In fact, the O2 network was down for about 40 minutes in September 2018.[16] It is clear that Huawei's network equipment is more reliable and cheaper than those of the Nordic telecoms equipment makers, and has gained global acceptance among operators. In the development of 5G technology, Huawei is the standard setter of Polar code. Using its standard can avoid the expensive patent fee of Qualcomm and help operators save a large amount of cost. Its 5G equipment is also more affordable, which is very suitable for the current development situation of European operators.

In the end, the British government began to cooperate with Huawei in spite of the pressure from the United

States. O2, the UK operator that previously announced it might stop using Huawei's 5G equipment, said it would continue to use Huawei's 5G equipment and expects to test it in January 2019, according to the latest Financial Times report. The Chinese government also began to allow British telecommunications companies to enter the Chinese market in order to gain more trust from the UK. On Jan. 25, BT (British Telecom, referred to as "BT") website published stories, announced that the company has to obtain a license in China is the first China national license issued by the ministry of industry and international telecommunications company, has the power to provide Chinese IP VPN license and China national Internet service provider (ISP) licenses, and charge in RMB.[17]

In short, the reason why European countries eventually resisted the US pressure to cooperate with Huawei is that the European countries do not want to be allowed to listen to the United States again, and the quality of Huawei's products is also credible, and the choice of cooperation with China must be more than harm to Europe.

IV. The reason that US try to block Huawei

4.1. Trade protectionism consciousness of the United States

The United States had already blocked ZTE, another Chinese company, before blocking Huawei. On April 16, 2018, the U.S. department of commerce announced a total ban on U.S. companies selling parts, goods, software and technology to ZTE for the next seven years.[18]

First of all, it is determined by the trade protectionism consciousness of the United States. The United States government believes that if China takes the lead in promoting 5G technology, Chinese enterprises will gain a first-mover advantage and develop the next generation of high-tech products and services. [19] This is less of a concern in smaller countries, where companies do not have enough markets to test and refine their ideas. But

China's vast population of 1.4 billion makes it an ideal place for companies to do large-scale business before exporting to other countries. For example, WeChat is not only an instant messaging service, but also provides mobile payment, network banking, automobile service and other products. After the success of THE WeChat model in China, it began to promote this model overseas, and the western countries have tried for years to emulate Tencent's success. Huawei is now the world's leading provider of infrastructure equipment, but they also grew up serving China's domestic market. Gaining a lead in 5G could give China's tech industry another advantage.

4.2. Reasons for racism in United States

There are also reasons for racism in America. Some American politicians are afraid of what Huawei has achieved and accuse it of double standards, which is nothing but xenophobia and racism.[20] Huawei has become a target for some U.S. politicians because it is seen as a major threat to American technology monopoly. (The table below details U.S. sanctions against Huawei since the trade war began) Associate the fear with Huawei so that U.S. and allied companies can continue to have a technological edge. The specific sanctions can be referred to in Table.2. America's big technology companies also often work with the government and the military, and you can guess what services they provide, as Edward Snowden's disclosure of American intelligence documents powerfully revealed. So, in terms of product trust, just because the west and China are different, this is pure xenophobia, and can be considered as racism.

Table. 2 US government sanctions against Huawei in 201

Date	Specific Sanctions
5.17	The official website of the US department of commerce announced the decision to include Huawei in the so-called "entity list". But it will give Huawei and its partners a 90-day interim license.
5.20	Alphabet, Google's parent company, announced it was suspending the transfer of hardware, software and technology services to Huawei. This has directly affected the development of Huawei phones in overseas markets, especially the lack of access to services such as Google email and YouTube.

Date	Specific Sanctions
5.20	Chipmakers including Intel, Qualcomm, Xilinx and Broadcom have also told employees they will not supply Huawei until further notice, Bloomberg reported.
5.21	Lumentum Holdings Inc. (LITE.O), a maker of cellphone components, became the first U.S. company to formally halt supplies to Huawei .
5.22	The Verge reports that Microsoft's online store has been unable to find any Huawei-related hardware products, but some Microsoft stores are still selling The existing MateBook X Pro
5.23	Qorvo said it would follow orders from the US government to stop shipments to Huawei.
5.23	An ARM spokesman said in a statement: "ARM is complying with the latest restrictions proposed by the US government and is in ongoing dialogue with relevant authorities to ensure our compliance.

Source: Zhongguancun online "After the United States sanctions Huawei: all the responses are summarized"

4.3. U.S. military and intelligence concerns

In Concerns about China's leading role in 5G also seeped into national security. The U.S. government has made unsubstantiated allegations that Huawei's products are untrustworthy and that its equipment is likely to be used for spying. Huawei's products are used by operators around the world, but the U.S. government has long worried that Huawei could help the Chinese government spy on U.S. citizens, businesses and politicians. Huawei has almost been blocked by the U.S. But if U.S. and allied telecom-equipment companies pull out of the market, American operator may have no choice but to buy Huawei products. U.S. buyers will certainly continue to shun Huawei equipment in favor of American companies like Cisco and Juniper or European companies like Ericsson and Nokia. But that won't pose much of a challenge to Huawei's global standing, and even if the U.S. wins the 5G war, it won't be able to stop China.

Some politicians in the United States are stuck in the past, treating China as an enemy and starting a new cold war. Their ideas are blocking the world from benefiting from collaboration, and closing off access to advanced products. In the process, they inculcate in their citizens that Chinese companies are less reliable than their own.

And there are American politicians who fear Huawei and other Chinese technology companies for what they have achieved. They want to block them, and maybe even keep them out of the market. This desire has not been accepted by developing countries in south-east Asia, Africa and elsewhere. These countries have embraced Huawei and other Chinese innovators.

V. Conclusion

The U.S. government's attempt to block Huawei from the EU can be summarized as follows:

1. The rapid development of China's 5G technology has made remarkable achievements not only in China, but also in the international market.
2. Huawei, a technology firm that represents China, has struggled to make inroads in Europe. One reason is that European countries no longer want to be limited by the United States and want more possibilities. Secondly, Huawei's equipment is good in quality and cheap in price.
3. The reason why the U.S. wants to block Huawei globally. The first is that the United States does not want its technology monopoly to be challenged because of trade protectionism. Secondly, the United States also has some racist reasons. Under the principle of "American First", the United States government has adopted double standards against Chinese enterprises. Third, the U.S. government is most concerned about military and intelligence security issues. The U.S. is concerned that the Chinese government could use Huawei's equipment to spy on U.S. citizens. From the perspective of the strategic competition and game between the great powers in history, the essence of today's Sino-US trade war is the global strategic competition between the United States, as the old established empire, and the rapidly developing socialist China. From a longer perspective, it is the competition between the Chinese model and the American model, focusing on the

dominance of the world economy and the right to formulate the rules of economic globalization.

For China's leading players in the 5G industry, the time between 2018 and 2019 brings them more exposure than ever before, and they have been placed in the spotlight countless times. It also marks a gradual acceleration of the pace of 5G. In China, base station, terminal and application go hand in hand. And abroad, even in the face of the crackdown, we still believe that China's 5G network can obtain due commercial respect, and will affect the world with China's "harmony and expensive" standards.

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