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An Analysis of the Historical Evolution of U.S.-China Science and Technology Relations (1949-2025)

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Abstract:

This paper focuses on the evolution of Sino-US S&T relations from 1949 to 2025. From the early period of the founding of the country to the establishment of diplomatic relations between China and the United States in 1979, the United States' S&T policy towards China was mainly based on containment.After the establishment of diplomatic relations between China and the United States in 1979, the two sides signed the Sino-US Agreement on S&T Cooperation and set up the Sino-US Joint Committee on S&T Cooperation, which formally started the official government-to-government cooperation.During the period of about 40 years from 1979 to 2017, Sino-US S&T relations have become increasingly close and complex, with the cooperation extending from the traditional fields to the frontiers of Science and technology, although accompanied by competition and defense, but the overall cooperation is mainly. 2017 Trump administration, the United States will be in the field of science and technology as the forefront of strategic competition with China, the implementation of the "full decoupling" type of containment strategy, the United States and China to enter a period of comprehensive confrontation of science and technology. After Biden took office, he continued the tone of confrontation, adopting the strategy of "small yard and high wall", implementing precise blockade in core technology areas such as

semiconductors and artificial intelligence, and building technical barriers jointly with allies to escalate the game of science and technology between China and the United States into a systematic confrontation. This evolution not only reflects the changes in the international pattern and the power contrast between the two countries in different periods, but also highlights the strategic core position of science and technology in the competition among great powers.

Keywords: China-US relations, technological competition, technological strength

I. Period of total blockade and thaw (1949-1978)

The founding of the new China in 1949 marked a major shift in the world's political landscape. At that time, the world was in a tense situation of Cold War confrontation between the United States and the Soviet Union, and the United States, for reasons of ideological rivalry and geopolitical strategy, regarded the newborn People's Republic of China as one of the main targets of Cold War confrontation, and comprehensively implemented a policy of political isolation and scientific and technological containment against China. In terms of political isolation, the U.S. utilized its influence in the international political arena to manipulate the United Nations to obstruct China's restoration of its legal seat for a long time. During the 21 years from 1950 to 1971, the U.S. repeatedly led the United Nations General Assembly to adopt the so-called "deferred discussion" of China's representation, in a vain attempt to isolate the new China from the international community, cut off the normal channels of exchanges between China and other countries of the world in the fields of politics, economy, culture, etc., and make it difficult for China to obtain international resources and technical support, thus seriously hindering the new China's access to international resources and technical support. This has made it difficult for China to obtain international resources and technical support, and seriously hindered the development process of the new China. In terms of scientific and technological containment, the U.S. led the establishment of the "Paris Coordinating Committee" (PCC), which set up a strict export control mechanism. The "Paris Coordinating Committee" has drawn up an embargo list covering military equipment, high-performance computers, precision instruments, aerospace technology and almost all other strategic goods and key technologies. For example, in the field of semiconductor technology, it strictly restricts the export of integrated circuits, transistors and other advanced semiconductor

manufacturing technology, and prohibits the flow of any semiconductor production-related equipment and materials into China; in the field of aerospace technology, it strictly prohibits the export of aircraft engines, satellite communications and other core technologies to China, in an attempt to stifle China's potential for development in the field of emerging science and technology on all fronts, and to keep its scientific and technological level in a state of backwardness.

This situation of absolute blockade lasted until the early 1970s, when the international situation underwent significant changes. The United States was mired in the quagmire of the Vietnam War and its national strength was greatly depleted. Meanwhile, the military rise of the Soviet Union posed a serious threat to the United States, which urgently needed to adjust its foreign strategy. China, on the other hand, was gaining influence in the international arena and becoming a force to be reckoned with in the international political landscape. Against this background, in April 1971, the U.S. Table Tennis Team was invited by the Chinese Table Tennis Association to visit China, and this "Ping Pong Diplomacy" event, which was a shock to the world, knocked open the door of the long-term closed Sino-U.S. contacts and became an important opportunity for the thawing of the U.S.-China relations. It became an important opportunity for the thawing of Sino-American relations.

In 1972, U.S. President Richard Nixon was invited to visit China, which was a landmark event in the history of U.S.-China relations. The two sides jointly issued the Shanghai Communiqué, a clear commitment to facilitate exchanges between the two sides in the fields of science, technology and culture, marking the shift of the U.S. policy of containment of China from an "absolute blockade" to a "limited contact", with exchanges and cooperation in the field of science and technology formally incorporated into the strategic vision of the two governments. The two governments' strategic vision. As a matter of fact, science and technology is one of the earliest areas in which China-US relations have thawed, which deeply reflects that science and technology occupies an important position in China-US political interactions, and that the progress of scientific and technological cooperation is often closely linked to the direction of the political relations between the two countries.

After Nixon's visit to China, under the personal promotion of Chairman Mao and Premier Zhou, Sino-US scientific and technological exchanges gradually began. Two professors from Yale University and the Massachusetts Institute of Technology (MIT) were the first to visit China after their trip to Vietnam. Subsequently, on the recommendation of these two professors and with the approval of Premier Zhou, a delegation of the Federation of American

Scientists (FAS) visited China. During its visit to China, the delegation repeatedly invited the Chinese side to send a delegation of scholars back to the United States, but due to the sensitive Sino-U.S. relations at that time, China did not immediately send scholars to visit the United States. As the international situation eased further and both China and the U.S. realized the importance of strengthening exchanges to improve relations, Chinese leaders finally decided to send a delegation of Chinese scientists to the U.S. for an academic visit. The delegation was hosted by the U.S.-China Academic Exchange Council during its visit to the U.S., and the trip received a grand welcome from the U.S. side. In the seven years from 1972 to 1979, when China and the United States formally established diplomatic relations, China and the United States sent academic delegations to each other more than 80 times, with exchanges in a wide range of fields of specialization covering not only the natural sciences and the humanities, but also industrial and agricultural production and other practical applications, and achieved certain exchange results in the areas of agricultural technology improvement, medical research and so on.

However, during the period between the ice-breaking of Sino-U.S. relations and the formal establishment of diplomatic relations, there are still obvious limitations in Sino-U.S. scientific and technological exchanges. Exchanges are limited to mutual academic delegations and lack formal cooperation mechanisms between governments. The two governments have not paid enough attention to scientific and technological cooperation, and have not established a stable cooperation framework and long-term communication mechanism, making scientific and technological exchanges lack of systematic and sustainable. 1974 outbreak of the "Watergate Incident" led to the resignation of President Nixon, the United States of America's domestic political turmoil, which inevitably affects the relationship between China and the United States, and the relationship between the two sides appeared to be a certain trough. The relationship between China and the U.S. was at a certain low ebb. The political instability further hindered the deepening of scientific and technological exchanges, making it difficult for such semi-official exchanges to develop into comprehensive and in-depth scientific and technological cooperation, and the Sino-US scientific and technological relationship is still moving forward slowly in the process of exploration.

II. Period of formal cooperation (1979-2000)

Compared to the Nixon and Ford administrations, the Carter administration has seen substantial development in the exchange of scientific and technological cooperation between

China and the U.S. After Carter's inauguration in 1977, the normalization of U.S.-China relations was not a priority issue in U.S. foreign policy. Although Presidential Research Memorandum No. 24 (PRM-24) made the normalization of U.S.-China relations the main goal of U.S. policy toward China, the U.S. paid more attention to the issue of détente toward the Soviet Union under the framework of the Cold War in the early years of the Carter administration. [1]In August of the same year, in order to promote the process of normalization of Sino-US relations, President Carter sent his Secretary of State Vance to visit China. However, the visit did not achieve any breakthrough results as the U.S. side did not make substantial concessions on the Taiwan issue, which was the most important issue for China. It was not until 1978 that the United States abandoned its strategy of détente with the Soviet Union and chose instead to unite with China to fight the Soviet Union when it recognized that the Soviet Union's expansionist actions in the Third World posed a serious threat to its national interests. In July of the same year, then U.S. Presidential Science Advisor Press led a U.S. science and technology delegation to China. During the visit, Press told Vice Premier Fang Yi that the development of government-to-government scientific and technological cooperation between the two countries was a key step in expanding scientific and technological cooperation between the two countries, and that China and the U.S. could establish government-to-government scientific and technological cooperation by signing a cooperation agreement. Although Fang Yi held off on responding to the proposal, citing the fact that China and the United States have not yet established diplomatic relations, this does not mean that Prez's visit was a failure. The Prez delegation's visit to China is a milestone in that it formally opens the door to U.S.-China government-to-government cooperation in science and technology and injects critical momentum into the breakthrough in political relations between the two countries.

The results of Press's visit to China illustrate that the Chinese side, while attaching great importance to the development of science and technology, explicitly made the establishment of formal diplomatic relations a prerequisite for expanding cooperation. However, the U.S. did not give up on advancing U.S.-China S&T relations because of China's principled position; instead, the U.S. took a more active stance in advancing the implementation of its policy on S&T cooperation with China.In October 1978, on the basis of the results of his visit to China and further research, Press, on behalf of the U.S. Policy Review Commission, provided Carter

1 Xiong Chenxi. The Formation of the U.S. Government's Policy on Scientific and Technological Cooperation with China in the Late 1970s[J]. Party History Research and Teaching, 2021(01):76-86.

with a memorandum that systematically described the future U.S. S&T policy toward China The memorandum systematically described the specifics of future U.S. science and technology policy toward China. In the memorandum, Press argued that extensive S&T cooperation between China and the United States would not only be able to contribute positively to the formal establishment of diplomatic relations between China and the United States, but might even have a holding effect on Soviet foreign policy. Although the report also mentions that strengthening S&T cooperation between the U.S. and China could create some political risks, such as triggering resentment from the Soviet Union and its allies, it would not fundamentally affect U.S. relations with the Soviet Union and its allies. In terms of specific S&T cooperation programs, Press said that the U.S. should engage China in a number of areas, including agriculture, energy, health care, and natural resource exploration. The memorandum was approved by President Carter and was adopted as the official guiding document for U.S. scientific and technological cooperation with China.

While the U.S. was advancing its policy on S&T cooperation with China, the Carter administration and Deng Xiaoping reached a key consensus on the issue of arms sales to Taiwan, removing the final obstacle to the normalization of U.S.-China relations.On December 16, 1978, the two sides issued a Joint Communiqué on the Establishment of Diplomatic Relations between the United States and China, announcing that diplomatic relations would be established on January 1, 1979.This political breakthrough completely cleared the institutional barriers to official S&T cooperation between the two countries. This political breakthrough completely cleared the institutional barriers to official scientific and technological cooperation between the two countries, and in January 1979, during Comrade Deng Xiaoping's visit to the U.S., China and the U.S. formally signed the China-U.S. Agreement on Scientific and Technological Cooperation, and simultaneously set up the "China-U.S. Joint Committee on Scientific and Technological Cooperation" as the executive body. This institutionalized design marks the formalization of the two countries' scientific and technological cooperation into a government-led stage. On the one hand, the two sides signed nearly 50 sub-agreements under the framework of the General Agreement, covering a wide range of fields, including environment, energy, agriculture, mapping, metrology, etc. On the other hand, the U.S. government generally liberalized the cooperation between the two countries. On the other hand, the U.S. government has generally relaxed its technology export controls to China, allowing the export of dual-use related products and technologies to China. The breadth and depth of U.S.-China interaction in science and technology has increased by

leaps and bounds.

There are complex motivations behind the establishment of diplomatic relations between China and the United States in the late 1970s and the establishment of an institutionalized framework for scientific and technological cooperation between the two countries. There are many factors that need to be taken into account in the decision-making process of a country, especially a big country like the United States and China, and in terms of the basic factors, safeguarding national interests is the most fundamental objective and starting point.

In the late 1960s, in response to the Soviet Union's frequent forceful provocations along the Sino-Soviet border, the Chinese decided to strike back.In March 1969, China and the Soviet Union engaged in a violent clash on Jumbo Island, a fortuitous conflict that had a strategic impact on U.S.-China relations and one that inspired China's leaders to consider China's international strategy. Similarly, the Jumbo Island conflict had a significant impact on U.S. leaders. As Kissinger, then U.S. assistant for national security affairs, put it, "At the time of the outbreak of the conflict between the Soviet and Chinese armies ..... All haziness disappeared, and we had no hesitation in moving toward a major change in world diplomacy."[2]

In addition to the geostrategic consideration of jointly checking the Soviet Union, the complementary resources of China and the United States are also an important motivation to promote scientific and technological cooperation and exchanges between the two countries. in the late 1970s, China was in the early stage of reform and opening up, the demand for advanced technology for modernization was extremely urgent, learning and introducing the world's advanced science and technology has become an important way for China to achieve modernization. [3]Deng Xiaoping pointed out that absorbing advanced technology from other countries to promote the development of productive forces was a necessary way for China to realize modernization. The United States, as the top country in the world in terms of science and technology and education level at that time, possessed advanced technologies in the fields of aerospace, electronic information, modern agriculture, etc., which were urgently needed by China, so it naturally became the first choice for China's scientific and technological exchanges and cooperation. As early as 1972 in the Shanghai Communiqué, China and the United States clearly put forward to promote the two peoples in science and technology, culture, sports and journalism and other areas of contact and exchange. However, due to the

2 Xiong Zhiyong. Sixty Years of U.S.-China Relations [M]. Beijing: People's Publishing House, 2009.
3Zhang Jing. Deng Xiaoping and the development of Sino-US scientific and technological cooperation (1977-1979)[J]. Research on Contemporary Chinese History,2014,21(03):14-23+125.

stalemate of the Cold War, the wavering U.S. policy toward China and the reconstruction of China's domestic order, it has not been possible to reach substantive cooperation, etc. After U.S. President Jimmy Carter took office in 1977, he made the normalization of U.S.-China relations the key goal of his foreign policy. China's accelerated "four modernizations" strategy (industry, agriculture, defense, science and technology) aroused the U.S. government's great concern. The Carter administration believed that scientific and technological cooperation with China could, on the one hand, expand China's market share through technology transfer in exchange for market access and, on the other hand, build a stronger strategic alliance with the Soviet Union by fostering China's economic strength. 1978, with the signing of the Sino-Japanese Peace and Friendship Treaty with Japan and the signing of a trade agreement with Europe, the United States feared that its economic interests in China would be seized by its allies and began to step up its efforts to promote the layout of science and technology policy toward China. layout of its science and technology policy toward China. In July of that year, when Price visited China, the U.S. side had clearly prioritized agricultural technology transfer, satellite data sharing, and cooperation in high-energy physics, in an attempt to lock down the Chinese market with a "technological dividend". China's market for technology, the U.S. technology for strategic synergy, the two sides in this "asymmetric complementary" relationship to find a point of convergence of interests. This strategic choice based on resource differences has become a key driving force for China-U.S. science and technology cooperation to break through ideological barriers.

III. Period of engagement and competition (2001-2016)

China's accession to the WTO in 2001 brought broad space and new opportunities for U.S.-China scientific and technological cooperation, and the areas of cooperation have been greatly expanded. After China's accession to the WTO, it has integrated into the global economic system and further opened up its market, attracting a large number of U.S. companies to invest and transfer technology. In the field of information and communications, U.S. technology giants such as Intel and Microsoft have increased their business layout in China and carried out cooperation projects with Chinese enterprises, which have promoted the technological upgrading and industrial development of China's computer industry and the rapid popularization of information technology applications in China. In the automobile manufacturing industry, GM, Ford and other U.S. car companies and Chinese local enterprises to build joint ventures, bring advanced automobile manufacturing technology and

management experience, help China's auto industry to improve production processes, optimize enterprise management mode, and promote China's auto industry to a new level. In terms of agricultural science and technology, U.S. agricultural technology and seed cultivation technology has entered China, and through cooperative projects, it has improved the efficiency of China's agricultural production and the quality of agricultural products. In addition, academic exchanges and scientific research cooperation have become more frequent, with Chinese and U.S. universities and research institutions sending visiting scholars to each other, conducting joint scientific research projects, and sharing results and exploring together in basic science research, such as physics and chemistry, to promote the flow of knowledge and the collision of innovative thinking.

The occurrence of the 9/11 incident has profoundly changed the global strategic layout of the United States, and to a certain extent, it has also indirectly affected the Sino-US scientific and technological relations. The U.S. shifted its strategic center of gravity to the Middle East due to the war on terrorism, which eased the strategic pressure on China for a period of time, providing a relatively relaxed external environment for Sino-U.S. cooperation in science and technology. During this period, China-U.S. cooperation in the field of civil science and technology was able to continue to advance, with the two sides carrying out cooperative projects in energy development technology, environmental protection technology, and other areas. For example, in the field of clean energy, the two sides jointly researched and developed technologies for the efficient utilization of solar and wind energy, and cooperated in the establishment of relevant demonstration projects, which promoted the development and application of clean energy technologies. However, over time, the competitive factors in the U.S.-China science and technology relationship have gradually come to the fore and escalated. With the rapid development of China's economy, science and technology strength is increasing, in some areas of the United States to form a challenge, the two sides of the structural contradictions began to appear. In the field of communications technology, China's Huawei and other enterprises in 3G, 4G technology research and development and application of the promotion of significant progress, threatening the U.S. communications companies in the global market share, the United States began to set obstacles to China's communications technology exports, the so-called "national security" reasons, to restrict China's communications equipment to enter the U.S. market, and the Chinese enterprises in overseas business expansion obstruction. The U.S. has begun to impose barriers to China's communications technology exports, restricting the entry of Chinese communications

equipment into the U.S. market on the grounds of so-called "national security" and obstructing Chinese enterprises from expanding their business overseas. [4]In the semiconductor industry, China has increased its investment in chip R&D and manufacturing, gradually narrowing the technology gap with the U.S. The U.S. has tried to curb the development of China's semiconductor industry by means of technological blockades and restrictions on the export of key equipment and technologies. In the field of intellectual property rights, the U.S. frequently accuses China of infringement of intellectual property rights, and launches "301 investigations" and other initiatives to promote the formulation of international intellectual property rules that are unfavorable to China, and impede the technological innovation of Chinese enterprises and the expansion of overseas markets.

In this period of Sino-US scientific and technological relations, cooperation and competition are intertwined. Cooperation has promoted the scientific and technological progress and economic development of both sides, and China has accelerated industrial upgrading and scientific and technological catch-up with the help of U.S. technology and capital; U.S. enterprises have also gained abundant profits from China's huge market and expanded their development space. [5]However, the escalation of competition also reflects that with the rise of China, China and the United States in the field of science and technology, the conflict of interests intensified, the United States tried to maintain its scientific and technological hegemony through various means, while China is trying to break through the bottlenecks in technology, to achieve independent innovation in science and technology, the coexistence of this competition and cooperation situation has profoundly affected the direction of the U.S.-China relationship in science and technology, as well as the global scientific and technological pattern of evolution.

IV. Period of full confrontation (2017 - 2025)

After Trump came to power in 2017, he began to clearly define China as a competitor and a threat, officially opening the curtain of strategic competition with China. The technology blockade led by the "New Cold War" thinking has become the norm, and the United States has implemented a comprehensive technology blockade against Chinese high-tech enterprises under the pretext of "national security", such as including Huawei in the "entity list" and

4 Li Yang, Ding Guangchao, Huang Ning. An Analysis of the Evolution of U.S. S&T Policy toward China and Its Influencing Factors[J]. Science and Technology China,2022(07):1-4.
5 Wu Xinbo. Competition-oriented U.S. policy toward China and the transformation of U.S.-China relations[J]. Research on International Issues,2019(03):7-20+138.

restricting its access to core technologies such as U.S. chips, in an attempt to cut off China at the source. Huawei on the "entity list", restricting its access to core technologies such as U.S. chips, in an attempt to cut off the path of development of China's science and technology industry from the source. [6]The Biden government has also gathered allies to build the "Chip Quadrilateral Alliance" and other mechanisms in an attempt to isolate China's science and technology industry on a global scale and exclude China from the formulation of international scientific and technological rules, so as to consolidate its dominant position.

Trump's first term U.S. science and technology policy toward China has a multifaceted motivation. From the cultural level, the U.S. hegemony to protect the genetic culture, the United States has long been in the position of scientific and technological hegemony of the U.S., it is difficult to accept the reality of China's rapid development of science and technology, trying to maintain the advantage through the policy of suppression. [7]China's rise has triggered U.S. anxiety, and China's remarkable achievements in areas such as 5G and artificial intelligence threaten the global monopoly of U.S. science and technology companies, prompting the U.S. to adopt a radical policy. U.S. domestic forces are also driving this policy direction, military, high-tech and other interest groups to maintain their own technology monopoly profits, lobbying the government to introduce restrictive policies, and different political factions gradually reached a consensus on the containment of China's science and technology. The content of its policy mainly includes core technology blockade and export control, and the imposition of an embargo on key technologies such as chips on Chinese enterprises; the promotion of the policy of "regulation lock" on China's intellectual property rights, groundless accusations of China's infringement, and the promotion of intellectual property rights rule-making unfavorable to China in the international arena; and the implementation of restrictions on the exchange of talents with China, restricting Chinese foreign students and scientific researchers from and researchers from China to study and exchange with the U.S., impeding the flow of knowledge and talent. [8]These policies are aggressive, breaking with the relatively mild model of science and technology competition in the past; adopting a "whole-of-government" approach to sanctions against China, with all government departments cooperating in all aspects, from legislation and administration to law

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6 Huang Qixuan. Great Power Strategic Competition and U.S. Technology Policy Changes toward China[J]. Diplomatic Review (Journal of Foreign Affairs College),2021(03):94-120+7.

7 Gu Xuming and Liu Yiming. U.S. technological competition with China and China's response under the perspective of technological power[J]. International Trade,2022(10):3-10+26.

8 SONG Guoyou, ZHANG Jiteng. Strategic Competition, Export Controls and U.S.-China Trade in High-Technology Products[J]. World Economy and Politics,2023(03):2-31+156.

enforcement; and employing a multifaceted and complex array of tactics, ranging from economic sanctions to diplomatic pressure, and from legal regulation to public opinion smear campaigns.

After taking office, the Biden administration has continued and upgraded its policy of scientific and technological containment of China. Its policy motivation mainly stems from the increasing domestic conflicts in the U.S. Unbalanced economic development and the widening gap between the rich and the poor have made the government try to shift the focus of domestic conflicts through external competition. [9]The gap between the strength of China and the United States continues to narrow, especially in the field of science and technology, China's catching up faster, so that the United States is deeply disturbed. Science and technology is the focus of Biden's competitive policy toward China, trying to maintain U.S. global leadership through scientific and technological advantages. In terms of policy content, the implementation of "small yards and high walls" strategy of precision technology blockade, no longer pursuing a comprehensive blockade, but for semiconductors, quantum computing and other key areas of the implementation of precision strikes, to limit China's access to specific high-end technology. Carrying out alliance reorganization and collective blockade, further drawing in allies, consolidating and expanding technological alliances, and implementing collective blockade against China, such as pushing EU countries to exclude Chinese equipment in 5G construction. At the same time focus on maintaining the competitiveness of U.S. science and technology, increase domestic investment in science and technology research and development, and introduce relevant industrial support policies. But the Biden government's implementation of science and technology policy towards China faces many difficulties. There are contradictions in the collaboration of allies, some allies in Europe and Asia for their own economic interests, some of the U.S. policy does not fully cooperate, such as German automotive companies and China in the new energy automotive technology cooperation, not willing to follow the U.S. restrictive measures. There is also political and economic resistance within the United States, some companies have lost the huge Chinese market due to the technology embargo on China, profit decline, resistance to the implementation of the policy. China has taken a series of countermeasures, increased its investment in independent research and development, made progress in areas such as chips, and reduced its dependence on U.S. technology, while exposing U.S. hegemonic practices in international public opinion, which has tarnished the image of the U.S. in international

9 Li Zheng. The Biden Administration's Science and Technology Policy Adjustment toward China and Its Impact[J]. Cyberspace Strategy Forum,2021(12):85-88.

scientific and technological cooperation.

The fierce evolution of Sino-U.S. S&T competition is the result of the accumulation of historical policies and the current game of interests. Although the two administrations of Trump and Biden have their own strategic focuses, they both take the containment of China's scientific and technological development as their core objective, a trend that has seriously impacted Sino-US relations and the global scientific and technological ecology. [10]From the perspective of policy continuity, the U.S. bipartisan consensus on science and technology competition with China has been strengthened, and "decoupling" of science and technology is regarded as a key means of maintaining hegemony, and policy inertia has led to a continuous escalation of Sino-U.S. science and technology confrontation. For China, although these policies have brought challenges such as technology supply cut-off and market obstruction, they have also forced China to accelerate independent innovation, improve the domestic science and technology industry ecology, and realize breakthroughs in some areas. The U.S. itself is caught in the predicament of "hurting the enemy a thousand times to its own detriment", enterprises have lost the Chinese market and opportunities for cooperation, and the vigor of technological innovation is limited by the embargo. The U.S.-China science and technology competition has transcended the purely technical field, and has become a key battlefield of the great power game. In the future, China needs to adhere to the independent innovation at the same time, and actively promote international scientific and technological cooperation, to break the U.S. technology blockade; and the United States should also recognize that win-win cooperation is the long-term way of scientific and technological development, and sustained confrontation will only exacerbate the fragmentation of the global scientific and technological order.

Summarize：From 1949 to 2025, China-U.S. science and technology relations have undergone a profound evolution from comprehensive blockade, formal cooperation, contact and competition to full-scale confrontation, which is not only a microcosm of the two countries' strengths and strategic games, but also a reflection of the inherent logic of the restructuring of the global scientific and technological landscape. From the ideological confrontation during the Cold War, to the complementary cooperation in the era of globalization, and then to the systematic competition in the post epidemic era, science and technology has always been the core variable affecting the direction of Sino-US relations. Looking back at history, the ups and

10 Hou Guanhua. Interpretation of U.S. Think Tanks' Views on U.S.-China Science and Technology Competition and Suggestions for Countermeasures[J]. Journal of Intelligence,2021,40(04):33-41.

downs of China-U.S. science and technology relations have always been closely linked to changes in the international landscape and the strategic needs of both countries. In the early days, the United States implemented blockade and containment by virtue of its technological advantages, while China insisted on independent innovation in adversity; in the cooperation stage after the establishment of diplomatic relations, the two sides realized win-win development through resource complementarity; but with the rapid rise of China's scientific and technological strength, the U.S. strategic cognition of China has undergone a fundamental shift, and scientific and technological competition is regarded as a key means to maintain hegemony. The Trump administration's "comprehensive decoupling" and the Biden government's "small yard high wall" policy are essentially the U.S. response to China's rise of strategic anxiety, and this kind of confrontational policy not only seriously undermines the foundation of mutual trust between the two countries, but also causes a huge impact on the stability of the global science and technology industry chain and the innovation ecosystem. Innovation ecology has caused a huge impact.

China-U.S. science and technology relations are standing at a new historical crossroads. Despite the current confrontation, the globalized nature of scientific and technological development and the common technological challenges faced by mankind have determined that cooperation is still the general trend. China needs to continue to adhere to the strategy of independent innovation, improve the mechanism of key core technologies, and at the same time actively participate in global scientific and technological governance and promote the construction of an open and inclusive international scientific and technological cooperation system. The U.S. should abandon zero-sum thinking, recognizing that containing China's development can not fundamentally solve its own problems, the only way to achieve common progress is through healthy competition and pragmatic cooperation. The future direction of China-U.S. science and technology relations not only concerns the interests of the two countries, but will also have a profound impact on the process of global scientific and technological development and the progress of human civilization.

References

[1] Xiong Chenxi.The Formation of the U.S. Government's Policy on Scientific and Technological Cooperation with China in the Late 1970s[J]. Party History Research and Teaching,2021(01):76-86.

[2] Xiong Zhiyong. Sixty Years of U.S.-China Relations [M]. Beijing: People's Publishing House, 2009.

[3] Zhang Jing. Deng Xiaoping and the development of Sino-US scientific and technological cooperation (1977-1979)[J]. Research on Contemporary Chinese History,2014,21(03):14-23+125.

[4] Li Yang, Ding Guangchao, Huang Ning. An Analysis of the Evolution of U.S. S&T Policy toward China and Its Influencing Factors[J]. Science and Technology China,2022(07):1-4.

[5] Wu Xinbo. Competition-oriented U.S. policy toward China and the transformation of U.S.-China relations[J]. Research on International Issues,2019(03):7-20+138.

[6] Huang Qixuan. Great Power Strategic Competition and U.S. Technology Policy Changes toward China[J]. Diplomatic Review (Journal of Foreign Affairs College),2021(03):94-120+7.

[7] Gu Xuming and Liu Yiming. U.S. technological competition with China and China's response under the perspective of technological power[J]. International Trade,2022(10):3-10+26.

[8] SONG Guoyou,ZHANG Jiteng. Strategic Competition, Export Controls and U.S.-China Trade in High-Technology Products[J]. World Economy and Politics,2023(03):2-31+156.

[9] Li Zheng. The Biden Administration's Science and Technology Policy Adjustment toward China and Its Impact[J]. Cyberspace Strategy Forum,2021(12):85-88.

[10] Hou Guanhua. Interpretation of U.S. Think Tanks' Views on U.S.-China Science and Technology Competition and Suggestions for Countermeasures[J]. Journal of Intelligence,2021,40(04):33-41.