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STI, Foreign Policy and the long march to China's Modernization

RESUMEN

El desarrollo de la ciencia, la tecnología y la innovación (CTI) ha jugado un rol crucial en la gran transformación que ha convertido a China en la segunda economía del planeta y en una gran potencia mundial. Este artículo busca explicar la evolución histórica del desarrollo de China en el campo de la CTI, detallando cómo la seguridad y la modernidad del país están vinculadas a dicho avance. Asimismo, se analizará cómo el desarrollo basado en la CTI le ha dado al país instrumentos de política exterior para desarrollar su diplomacia científica, fortalecer sus industrias crítica, impulsar la Iniciativa de la Franja y la Ruta e incrementar el impacto de su respuesta a la pandemia del Covid-19, a escala global.

Palabras clave: ciencia, tecnología e innovación, política exterior China, diplomacia científica, iniciativa de la franja y la ruta.

ABSTRACT

The development of Science, Technology and Innovation (STI) have played a crucial role in China's massive transformation which has turned it into the world's second largest economy and a major world power. This paper seeks to illustrate the historical evolution of China's STI development and the extent to which the country's security and modernity is connected to it. Furthermore, It intends to explain how China's STI-based development has provided the country with greater foreign policy instruments to develop its Scientific Diplomacy, strengthen its critical industries, boost the Belt and Road Initiative and heighten the impact of its response to the Covid-19 pandemic, at a global level.

Key words: science technology and innovation, Chinese foreign policy, scientific diplomacy, delt and road initiative

1. Introduction

Since Deng Xiaoping launched the Reform and Opening Up policy in 1978, China has gone through a deep economic and social transformation which has made it the world's second economy in nominal terms.(Woetzel et al.,2018). From 1978 to 2018, China's GDP has grown 34-fold while its foreign trade volume has increased 234-fold, making it the world's second largest economy.(Yu,2018) Furthermore, the development of Science, Technology and Innovation (STI) has been and will continue to be instrumental for accelerating China's rise, strengthening its power projection capabilities, its capacity to provide global public goods and international cooperation.

In this paper, firstly I intend to illustrate China's historical transition from the traumatic century of humiliation to its current status as an STI powerhouse. I will explain how scientific development has been regarded as a line of defense against foreign aggression and as a pillar of the country's national development. Secondly, I will explain how China has implemented reforms, strategies and scientific diplomacy to boost the competitiveness of its STI sector while strengthening international cooperation. In the third place, given the prominence of the Belt and Road Initiative in China's domestic development and foreign policy strategy, I will shed light on how this

signature initiative has impacted China´s International projection agenda in the field of STI. In the fourth place, I will demonstrate how in the face of the COVID-19 pandemic, China's STI development enabled the country to strengthen its foreign relations by deploying medical and scientific teams, developing vaccines and establishing manufacturing facilities to produce them beyond its shores.

I intend to demonstrate the development of STI has been closely linked to the project of modernization, by strengthening national capacity and the defense of national sovereignty. Moreover, I will argue that the development of STI capabilities have not merely boosted China's economic growth and development, but also enlarged the scope of foreign policy instruments at its disposal and its capacity to provide global goods and STI-based solutions.

2. Scientific backwardness and the Century of Humiliation

In 1978, on the occasion of the visit of a foreign economic and trade delegation, Deng Xiaoping gave a speech where he mentioned four major inventions created by the ancient Chinese which found their way to the rest of the world. These scientific contributions were paper, gunpower, printing and the compass. Nonetheless, beyond praising the scientific prowess of China's ancient civilization, Deng pointed out that China should not be hesitant to make use of advanced technology from abroad. In fact, he considered advanced technologies and achievements as the starting point of China's development.(Deng, 1978) As I will later explain, the incorporation of foreign science, technology, innovation and investment was instrumental for the development of Deng's Reform and Opening and for explaining China's current development.

Nevertheless, China's current position as a global leading economy and world power stands in stark contrast with the country's position from 1839 to 1949. During the so-called century of humiliation China was invaded by foreign powers, which by way of force, compelled the Qing Dynasty to grant extraterritorial rights to foreign nationals, cede territories and trade privileges to the invading powers through unequal treaties. (Lanteigne,2020)

In order to understand the extent of the devastation this traumatic encounter with the west caused, it is important to highlight that China considered itself as the civilizational core of all under heaven (天下 tianxia). Therefore, the kingdoms which surrounded China were regarded as political and cultural satellites which were inferior to the Middle Kingdom. (Hunt, 1996) The legitimacy of the Chinese Emperor derived from a mandate heaven had bestowed on him (天命 tianming), and the preservation of the cosmic equilibrium was closely linked to his moral behaviour and performance. (Kornberg & Faust,2005) Moreover, China had not yet embraced the Westphalian notion of sovereignty and consequently rejected the idea of equality among states.(Kornberg & Faust,2005) In line with this notion of moral and civilizational superiority, establishing political and commercial relations with western powers on an equal footing, was deemed an anathema.

The century of humiliation made evident that even if China perceived it held a higher moral and civilizational ground vis-à-vis foreign powers, its scientific and technological development lagged far behind the power of its foreign aggressors. (Hunt, 1996) Therefore the Middle Kingdom came to the painful realization that its capacity to defend itself hinged upon a scientific and technological development which was absent in China. Consequently, if China was to stand against further external aggression, self-strengthening was an absolute imperative. In line with this thought, prominent figures of the Qing government such as Li Hongzhang, considered that the incorporation of western education, science to create domestic capacity and the embrace of international law were regarded as a line of defense against further encroachments into Chinese sovereignty. (Hunt, 1996).

Therefore, the traumatic confrontation with foreign powers forced China's way into a process of modernization along western canons which spanned education, governance methods, science and technology, among other fields. Hence, as Freeman notes, Science and Technology have been at the core of China´s endeavor to modernize since the 19th century.(2019). Nevertheless, as Fairbank and Goldman posit, the process of modernization was progressive, and started from borrowing machinery to technology, from learning science to the rest of the fields of knowledge, from the tolerance of ideas to the reform of institutions and from constitutional reforms to a republican revolution which came to fruition in 1911 and ultimately led to the establishment of the Republic of China in 1912.(2006)

Furthermore, seven years after the foundation of the Republic of China, in 1919 Chen Duxiu, then leader of the May Fourth movement and who two years later became one of the founders of the Chinese Communist Party, stated that "Mr.democracy" and "Mr.science" were vital to save China from its political, moral, academic and intellectual darkness.(Gu,2001) Nevertheless,

the aim of a full-fledged scientific development and industrialization became elusive within the next three decades, where warlordism, the Japanese Invasion, the Second World War and the subsequent Civil War took a toll on the country.

3. The foundation of the People's Republic of China

The foundation of the People's Republic of China (PRC) in 1949, marked a watershed moment in a country which had gone through a century of turmoil and war and, therefore, essentially remained an agrarian society with a low industrial development. In the context of the Cold War, China's alignment with the Union of Socialist Soviet Republics (USSR) barred it from the acquisition of western technology. (Zhang et al.,2006) Therefore, China's cooperation with the USSR became its most consequential relationship at the political, economic and scientific level.

According to PRC's first Five-Year Plan (1953-1957), the country's scientific development imperatives were closely tied to the development infrastructure of basic and defense industries.(Chinese Government, 2005) During the 1950s the USSR cooperated to develop 304 industrial projects, 84 of which were related to military industries. (Zhang et al.,2006) Additionally, until the early 60's China adopted Soviet technological standards,imported USSR and Eastern European technology and prototypes, hosted thousands of scientific advisors and sent Chinese students to study science and technology programs in the USSR.(Zhang et al., 2006).

Nevertheless, the initial comradeship and concord between the nascent PRC and the USSR, progressively faded away.The process of de-Stalinization launched by Kruschev since 1953, was condemned by Mao Zedong as revisionist, souring political relations between the two major powers of the socialist camp (Garver,2016). Furthermore, China understood that to acquire a greater autonomy, it was required to become a nuclear power, hence, it requested the USSR´s assistance to develop strategic weapon capabilities. Nonetheless, the Soviet leadership dismissed China´s request and advocated for a non-proliferation agenda which was antagonized with the PRC's security imperatives.Therefore, the increasing political divergences, the weakening of cooperation and the strengthening

of mistrust ultimately led to the Sino-Soviet Border Conflict in 1969. (Lanteigne,2020) Furthermore,The USSR-China Schism paved the way to the rapprochement between China and the United States and the emergence of the strategic triangle. (Garver, 2016)

In 1958, while Sino-Soviet relations frayed, Mao Zedong launched a policy called the Great Leap Forward (大跃进, Da yuejin). As Mitter argues, the rationale behind the Great Leap Forward was to modernize China through industrial technology (2008) Therefore, In order to achieve this goal, China intended to dramatically increase its production of steel, coal and electricity with the aim of surpassing the United Kingdom's industrial output in 15 years.(Mitter, 2008) Furthermore, agriculture was collectivized by turning individual plots into collective farms and applying non-tested agrarian technology. The Great Leap Forward turned out to be a flawed experiment which led to a massive famine that caused an estimate of 30 million deaths. (Brown, 2012)

Furthermore, in 1966, the Cultural Revolution (文化大革命 WenHua Da Geming) brought a new major disruption to the country's economy, social and political structure. Consequently, in an alleged attempt to fight revisionism and the four olds (old ideas, old culture, old customs and old habits), schools, universities and several research centers were either closed or saw their operations significantly reduced. (Freeman & Huang, 2015) Nevertheless, given the salience of national defense, military technology projects related to nuclear weapons and missiles, optics and communications, were not disrupted. Consequently, China's first thermonuclear bomb was successfully tested in 1967 and in 1970 the PRC launched the Satellite "East is Red 1" (东方红 1 Dong Fang Hong 1)(Schneider,1981). Moreover, it is important to underscore that China's zeal for scientific development in the defense industries can be explained in the light of historical foreign aggression during the century of humiliation, the menacing imprint of the Korean War and the First Taiwan Strait Crisis and the growing tensions between the PRC and the USSR.

4. The Reform and Opening

Upon Mao Zedong's death and the subsequent end of the Cultural Revolution in 1976, the orthodox communist vision opened the way to a more pragmatic approach regarding social and economic development, which led to an unprecedented growth. In 1977 Deng Xiaoping revisited the

Four Modernizations, a proposal presented by the Prime Minister Zhou En Lai in 1964, which was reincorporated into the national agenda in 1975. The Four Modernization´s initiative intended to significantly develop China's agriculture, industry, science and technology and national defense. (Mitter, 2008)

In line with the Four Modernizations, during the Third Plenary Session of the Chinese Communist Party's 11th Central Committee,which was held in December 1978; China's new leader, Deng Xiaoping, launched the Reform and Opening Up policy (改革开放 Gaige Kaifang). In his opening remarks, Deng stated: "On the basis of self-reliance, we should actively develop economic cooperation featuring equality and mutual benefits with other countries in the world and strive to adopt world class technologies and advanced equipment."(In Yang,2018,p6). Hence, If during the Cultural Revolution, Scientific development had been mainly constrained to defense industries, Deng adopted an across-the-board approach to scientific modernization where industrial development gained greater prominence.

Moreover, Deng Xiaoping understood that strengthening human capital in the field of science and technology was instrumental for the sustainability of his ambitious and unprecedented reform program. Therefore, As Keo notes, Deng launched a program which aimed to train 800,000 researchers in critical fields such as energy production, computers, optics, space technology, physics, and genetics.(2020) Furthermore, he encouraged students and researchers to pursue studies and training programs abroad.(Keo, 2020) Hence, If during the Cultural Revolution the pursuit of scientific knowledge was condemned as an expression of foreign and counter-revolutionary subservience, under Deng's new vision, developing scientific capacity and strengthening cooperation with advanced economies was regarded to be crucial for the success of China's emerging reform program.This major shift allowed the country to attract foreign investment, technology transfer schemes which ultimately facilitated the development of an indigenous capacity in the field of STI.

5. China's modernization and STI

As I have illustrated in the previous sections, STI has been at the core of China's national modernization process over the past 150 years.The development of this field has been deemed crucial to buttress the defense

of national sovereignty, strengthening national development and regaining China's ancient civilizational grandeur.

In line with these historical priorities, in 2012, the General Secretary Xi Jinping stated that the Chinese Dream of national rejuvenation "has been the greatest dream of the Chinese people since the advent of modern times". (Xi, 2012). In the same remarks, he stated that "The goal of building China into a modern socialist country that is prosperous, strong, democratic, culturally advanced and harmonious can be achieved by 2049, when the PRC marks its centenary; and the dream of the rejuvenation of the Chinese nation will then be realized."(Xi, 2012). Therefore, as Economy posits, the dream of national rejuvenation is deeply connected to regaining China's centrality as a major civilization and strong world power in contrast to the country's decadence during the century of humiliation (Economy, 2018). Therefore, this goal of strengthening its role as a great power hinges on China's capacity to increase its relative power and shaping global governance, standards and agenda by excelling in the fields of the economy, military power and STI.

In line with these imperatives, at the 19th Congress of the Chinese Communist Party, held in 2017, Xi Jinping pointed out innovation is the primary force behind development, and vowed to upgrade basic research in applied sciences and to develop major national science, technology and innovation projects.Furthermore he stressed the need to give priority to innovation in key generic technologies, cutting-edge technologies, frontier technologies, modern engineering technologies and disruptive technologies (Xi,2017) . The rationale behind these commitments is to create a digital China and a smart society by strengthening product quality and upgrading the country's development in sectors such as aerospace, cyberspace and transportation.

The development of STI has also gained a central role in China's 14th Five-Year Plan. According to this strategic document, China has the goal of reinvigorating itself through science and education by adopting a talent powerhouse strategy and an innovation-driven development strategy. (CSET,2021) Furthermore, the country intends to upgrade its national innovation system and speed up the process to turn China into a Science and Technology powerhouse. Additionally, the plan highlights the core position of innovation in China's modernization and stresses the role of science and technology to achieve self-reliance, act as strategic support for national development, and be oriented toward the world's cutting edge in science and technology, to gain the upperhand in what it calls the "main economic battlefields" and in order to meet China's major needs. (CSET, 2021)

In addition, since the launch of the Reform and Opening in 1978, providing incentives for the return of Chinese foreign-trained scientists has been

crucial to develop the country's capacity in the field of STI and developing cooperation with other STI leading powers.(Cao,et al., 2020) Nonetheless, China is extending the reach of its talent recruitment endeavor to attract foreign talent. In line with this priority, the plan states the need to diversify the source of human capital by attracting high-end foreign talents. Hence, the General Secretary Xi stressed the importance of improving the immigration policies which apply to overseas professionals who come to China for work, scientific research, and exchanges. In the same vein, the improvement of the permanent residence system and the implementation of a skills-based inmigration program will be evaluated. (CSET, 2011)

Moreover, In the context of the Fourth Industrial Revolution, China is intending to lead the way in the field of emerging technologies, smart manufacturing and digitalization.As Zenglein and Holzmanann posit, China has already taken the lead in areas such as next-generation IT, High Speed Railways and ultra-high voltage electric transmissions.(2019). Furthermore, the country has also developed over 530 smart manufacturing industrial parks several of which focus on the development of big data, new materials and cloud computing. (Zenglein & Holzmann 2019).

On the other hand, another STI-based signature initiative called "Made in China 2025" (MIC 2025), was launched by Premier Li Ke Qiang with the aim to boost China's industrial capacity. To this end, the ambitious plan has focused on the development of 10 main sectors, namely: new information technologies, numerical control tools, aerospace equipment, high-tech ships, railway equipment, energy saving, new materials, medical devices, agricultural machinery and power equipment. (ISDP,2018). In line with this initiative, China has launched a program called "Standards 2035" which intends to shape, set and influence the technical standards related to the fields deemed prioritary by MIC 2025.(Gargeyas, 2021) The rationale behind this strategy is to increase China's leverage in standard-setting, boosting its international prestige and the competitiveness of its industries in the field of critical technologies.

In regards to critical technologies, the establishment of 5G networks has been a particularly contentious issue in the competitive dynamic between China and the United States. Chinese Technological giants such as Huawei and ZTE have the upper hand to gain global dominance in the field, while the United States warns its partners against implementing Chinese developed networks on the grounds of security considerations.(Reuters, 2021) Therefore, If the cold war tightly demarcated spheres of economic influence based on political considerations, in a globalized economy said approach cannot be fully replicated given the extent of economic interdependence. Nevertheless, an STI-based divide in emerging technologies seems imminent, which could bear serious consequences.

6. MOST and Science Diplomacy

Since the reform and opening in 1978 and after the launch of the Going Out Policy in the late 90s, China's global interests have expanded dramatically.A consequence of this greater international engagement has been the inclusion of a wider array of bureaucratic actors in the decision-making process and implementation of foreign policy. (Yu & Ridout,2021) These entities have an even greater degree of specialization in their functional areas and better defined and more specific agendas. In the field of STI, the Ministry of Science and Technology (MOST) has extended its global reach by way of its Department of International Cooperation.Through this office, MOST has broadened China's international cooperation and has adopted Scientific Diplomacy as an instrument of its external action

Scientific Diplomacy is a foreign policy instrument which is gaining an increasing relevance for the sake of incorporating science-based advice into decision making, upgrading scientific development through international cooperation and improving the quality of diplomatic relations by promoting scientific exchanges. Even if the concept is relatively recent, it has gained currency in a context where the STI agenda is increasingly regarded as strategic. According to a report issued by the Royal Society in 2010, Scientific Diplomacy has three dimensions: Science in Diplomacy, Diplomacy for Science and Science for Diplomacy. Science in Diplomacy implies informing foreign policy objectives with scientific advice.Diplomacy for science intends to foster international cooperation in the field of science. In the third place, science for diplomacy intends to use science in order to improve relations between countries. (2010).

In this section, I will focus on MOST's Science Diplomacy efforts through its Science and Technology Diplomatic Action Service (科技外交官服务行动), which was launched In 2008 (CISTC,2021). Ever since, MOST has posted over 140 science and technology diplomats who operate at the Science and Technology sections at Chinese diplomatic missions and consular offices in 52 countries. China currently has 72 Science and Technology sections abroad, which perform a wide range of roles, such as monitoring the state of STI development in the host country, identifying technological breakthroughs, finding opportunities of investment for Chinese firms from the STI sector, identifying areas of interest for cooperation, promoting scientific exchanges, building connections with Chinese students and scholars associations, among other tasks. (Fedasiuk et al. , 2021)

Moreover, on the grounds of strategic documents such as the Medium and long term Plan for Science and Technology Development and Made in China 2025, MOST has built databases which contain information regarding the deficiencies of Chinese research centers and enterprises which could be bridged by acquiring foreign technology or developing cooperation with international partners.These databases are regularly updated with the inputs of the aforementioned institutions and shared with the Chinese Science diplomats which are posted at the Science and Technology sections.(Fedasiuk et al, 2021)

In line with the STI priorities, MOST´s International Cooperation Department publishes a monthly report called International Technological Cooperation Opportunities (国际技术合作机). This online publication compiles information on STI related projects and initiatives developed by foreign universities, research centers, industries and individuals (CIST,2020). Consequently, on the grounds of China's STI-related priorities, this document enables actors from China's STI ecosystem and private sector firms to develop cooperation with foreign partners and acquire companies which have made progress in fields deemed prioritary by China.

7. Belt and Road Initiative and STI

In 2013, Xi Jinping, General Secretary of the Chinese Communist Party and President of the People's Republic of China, called for the development of the Silk Road Economic Belt and a 21st Century Maritime Silk, then called One Belt, One Road (OBOR) (Chatzky & McBride, 2020). Currently known as the Belt and Road Initiative (BRI), it has become China's paramount foreign policy initiative.

As Zhou and Esteban posit, through the BRI, China intends to advance geoeconomic imperatives by catalyzing the economic development of its less-developed western regions and reducing the existing imbalances between this extensive area and China's eastern coast (2018). In addition, beyond enhancing China's economic projection, strengthening the stability of neighboring countries and safeguarding the security and development of China's western regions, the initiative also intends to reduce China's excess industrial capacity by transferring it to neighboring countries and improving China's access to energy. (Zhou & Esteban, 2018)

Nevertheless, beyond the aforementioned geostrategic and geoeconomic imperatives, the BRI has developed an STI-based agenda. In 2015, China's National Development and Reform Commission, issued the BRI´s first comprehensive policy document called "Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road". In this document, China vowed to increase cooperation in STI, to establish joint laboratories and research centers, to promote STI personnel exchanges, to cooperate in key STI problems and jointly improve innovation capabilities. (NDRC, 2015).

In 2017, during the opening ceremony of the Belt and Road Forum for International Cooperation, Xi Jinping stated China would increase its cooperation with other countries in the field of innovation. To this end, Xi announced the launch of the "Belt and Road Science, Technology and Innovation Cooperation Action Plan". This ambitious plan (2017-2022) comprises a wide range of components such as the Science and Technology People-to-People Exchange Initiative, the Joint Laboratory Initiative, the Science Park Cooperation Initiative and the Technology Transfer Initiative. Moreover, Within a time frame of 5 years Xi stated China would offer 2,500 short-term research visits to China for young foreign scientists, commiting to provide training to 5,000 foreign scientists, engineers and managers, and to set up 50 joint laboratories. (Xi,2017).

Moreover, for the sake of strengthening the training of foreign scientists, In 2013, China's Ministry of Science and Technology launched the Talented Young Scientist Program (TYSP).Since its inception, the program has aimed to support young talented scientists under the age of 45 to conduct research at Chinese research institutes, universities and enterprises for 6 to 12 months.(TYSP,2021) Originally, TYSP participants have come from Asian and African countries (IRCIP,2016). Nevertheless, under the auspices of the BRI this program is expected to grow beyond its original geographical scope by reaching young scientists from developing countries in other regions.

8. China´s STI based global response to COVID-19

The COVID-19 pandemic has caused an unprecedented sanitary crisis with severe global social, economic and political ramifications. In the wake of the outbreak, China was accused of mishandling the epidemic and not

sharing information with the World Health Organization (WHO) and other countries, in a timely fashion. The then President of the United States, Donald J. Trump stated that he had a high degree of confidence to say that COVID-19 was created at Wuhan's Institute of Virology and harshly criticized the WHO labelling it as a "public relations agency of China". (BBC,2021) In response, the Chinese government framed the criticism as an unfounded act of aggression. The remarks of China's ambassador to the United Kingdom, Liu Xiaoming are a reflection of the stance taken by the Chinese Diplomacy: "Some politicians, some people, want to play at being the world's policeman - this is not the era of gunboat diplomacy, this is not the era when China was a semi-colonial, semi-feudal society."(Reuters,2020).This is an expression of the deeply-held notion that China is not a frail country which could be bullied, but a world power able to defend itself against foreign aggression.

Nevertheless, beyond the vocal response to foreign criticism, China understood that STI-based responses were deemed critical to position the country as a responsible global power willing to cooperate through multilateral and bilateral initiatives. Hence, China's STI-based foreign policy response to the crisis was multi-pronged. Initially, China sent abroad protective gear, facial masks,Covid-19 test kits,artificial ventilators and other medical supplies. Nevertheless, one of the most notorious instances of China´s STI-based foreign policy response most was the deployment of more than 50 foreign aid medical teams abroad. These teams intended to strengthen prevention measures, raise the technical and response capabilities, assess the trends of the epidemic and provide advice to the public health authorities of the host countries. (Xinhua, 2021). China understood that in a context of uncertainty and crisis, science-based advice could strengthen political relations with foreign nations while boosting the country's reputation amid criticism.The aforementioned measures represent a clear instantiation of how science for diplomacy operates to strengthen political relations, particularly in the face of global crises.

Furthermore, vaccination is regarded as a priority to mitigate the fatal consequences of the pandemic, by containing the expansion of the virus and mitigating the risk of the the emergence of new variants.Therefore, China's participation in the vaccine development race has been one of the most consequential aspects of its response to the global crisis.Thus far, Chinese laboratories have developed 6 vaccines, 2 of which (Sinopharm and Sinovac) have been authorized for emergency use by the World's Health Organization.(Covid Tracker, 2021) Hence, In a context where the epidemic was under control in China and the pressure over western vaccines supplies increased dramatically, Chinese vaccines became a viable supply alternative for low and middle income nations worldwide which would otherwise not have a sufficient supply of vaccines to immunize their populations.

It is important to note that by early September China had already administered over 2.1 billion doses to its population, leaving even a greater room for exports to third countries (CGTN 2021). At the BRICS virtual Summit Xi Jinping made public China's pledge to donate 100 million doses of COVID-19 vaccines to developing countries by the end of 2021. (SCMP,2021) Nonetheless, even if the donation commitment is considerably more limited than the 500 million doses donated by the Government of the United States, China's capacity to produce 5 billion doses of Covid-19 vaccines per year could be crucial to bridge the existing vaccine inequality between developed states and developing ones. (Xinhua, 2021). It is important to note that beyond ramping up domestic production, Chinese vaccine producers have developed license agreements to establish over 10 manufacturing facilities overseas which have been mainly opened in developing countries, such as Brazil, Mexico, Pakistan and Egypt. (Bridge Beijing,2021)

9. Conclusions

Since the mid 19th century, STI has been regarded as a line of defense against foreign aggression, an enabler of national progress and as the pathway to self-strengthening. Nontheless, until the end of the century of humiliation, China was not able to pursue an across-the board STI-based industrialization program. Therefore, the foundation of the People's Republic of China in 1949 marked China's journey to modernity by developing basic and defense industries, while the Reform and Opening enabled the country to attract foreign investment and to get access to a foreign technology on a massive scale. This major policy shift had a profound impact on China's development and on its orientation to develop a national capacity in the field of STI.

In the context of the Fourth Industrial Revolution, China has understood that its project of national modernization hinges upon strengthening its indigenous capacity in the field of STI. Therefore, it has prioritized the development of emerging and frontier technologies in several strategic documents,in order to decouple its industrial and scientific progress from foreign-developed STI solutions. Moreover, the development of these STI-based products and services, and the promotion of new standards in the field of critical technologies, intends to boost China's prestige and to expand its presence in the global markets.

Furthermore, in order to expand its development in the field of STI, China's Ministry of Science and Technology has resorted to Scientific Diplomacy

by establishing Science and Technology sections in over 52 countries. These offices have been instrumental to enable China's technological firms to acquire foreign companies and develop cooperation with foreign partners in areas where China lags behind. Finally, I have illustrated how China's Scientific development has given it a greater latitude to respond to Covid-19 and advance its foreign policy interests through the deployment of medical missions, the donation and export of home-grown vaccines and the establishment of production facilities abroad. In conclusion, the development of STI has paved China's way to modernity, while boosting its security, economic growth and self-reliance. This development has dramatically expanded the foreign policy instruments at its disposal and its capacity to provide global public goods and high-end solutions.

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