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THE POLITICAL ECONOMY OF TECHNOLOGY TRANSFER RULES OF THE US-CHINA PHASE ONE TRADE AGREEMENT: COMPETITION OF GLOBAL TECHNOLOGY LEADERSHIP

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Keywords: Intellectual Property, Technology Transfer, Trade War, Phase One Agreement, Competition, Global Technology Leadership, WTO, TRIPS, the United States, China

ABSTRACT

Over the past four decades, Intellectual Property (IP) has been one of the main controversies of US-China trade relations. But the current US-China trade war contains a new focus – technology transfer. This article adopts a socio-legal and economic approach to examine the current technology and trade tensions between these two countries and why China became an Information Technology (IT) powerhouse. It first provides an overview of IP and technology transfer rules under the *Phase One US-China Economic and Trade Agreement* (POA). It then explores different forms of forced technology transfer activities and the in-depth reasons for the US to shift its main IP concerns from IP enforcement to technology transfer. It explains why the US and China trade war is inevitable, why the current US-China IP-trade war is significantly different from previous ones, and the economic and political reasons behind the global technology leadership competition by the two countries. Finally, the author concludes that the POA and its technology transfer rules are not the ends of the game but just the start of the global technology leadership competition between the US and China.

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I. INTRODUCTION

Over the past four decades, intellectual property (IP) has been one of the “main controversies of US-China trade relations.”¹ Under the current US-China trade war, IP remains “one of the core issues behind the two countries.”² However, the current trade war has developed a new focus which previous trade wars have not sufficiently emphasized – technology transfer.³ Such a shift naturally brings many new challenges for existing IP laws, investment laws, and

1. Jyh-An Lee, *Shifting IP Battlegrounds in the U.S.–China Trade War*, 43 COLUM. J.L. & ARTS 49, 147 (2020).

2. *Id.*

3. *Id.* at 176; see also Dan Ciuriak, *The US-China Trade War: Technological Roots and WTO Responses*, 4 GLOB. SOL. J. 130, 130 (2019) (asserting that the current US-China trade war is “a watershed event that is reshaping the global economic and political order.”).

international trade laws, including new issues that have not been sufficiently covered or addressed by current legislation.

The US-China trade war started on March 23, 2018 when the US imposed a twenty-five percent tariff on all steel imports and a ten percent tariff on all aluminium imports, including those from China.⁴ On April 2, 2018, China retaliated by imposing tariffs (ranging from 15-25 percent) on 128 products (worth 3 billion US dollars).⁵ Thereafter, while both countries continued to threaten and apply trade sanctions on each other, they also continued negotiations in an attempt to find a peaceful resolution to their disputes, including the disputes over IP and technology transfer issues. Finally, in January 2020, the two countries signed “a historic and enforceable agreement on a Phase One trade deal,” covering several essential areas, such as IP, technology transfer, agriculture, financial services, currency and foreign exchange.⁶ Nevertheless, the breakout of the Covid-19 pandemic in the same month significantly affected the world economy, including economic growth in both the US and China. It arguably created further uncertainty for the enforcement of the *US-China Phase One Agreement* (POA).⁷

This article adopts a socio-legal and economic approach to examine the current development of the US-China trade war.⁸ It attempts to demystify the foundation of China's IP and technology transfer policies. The article considers the current technology and trade tensions between the US and China in a broad social, political, and economic context, including why China became an IT powerhouse.

The article proceeds as follows: Part II provides an overview of the POA, mainly focusing on its IP and technology transfer chapters. It explores both achievements and limits of the technology transfer rules under the POA. Part III explores new features and unprecedented challenges of the current IP trade war between the US and China, particularly focusing on the primary forms of forced technology transfer, the US's accusations and China's responses to the IP and technology transfer issues. Part IV examines the in-depth reasons for the US to shift its main IP concerns from IP enforcement to technology transfer. It

4. See Dorcas Wong & Alexander Chipman Koty, *The US-China Trade War: A Timeline*, DEZAN SHIRA & ASSOCS. (Aug. 25, 2020), <https://www.china-briefing.com/news/the-us-china-trade-war-a-timeline/> [https://perma.cc/ZS34-7U2D] (stating “the US imposes a 25 percent tariff on all steel imports (except from Argentina, Australia, Brazil, and South Korea) and a 10 percent tariff on all aluminium imports (except from Argentina and Australia)”).

5. *Id.*

6. See OFF. OF U.S. TRADE REPRESENTATIVE, EXEC. OFF. OF THE PRESIDENT, ECON. AND TRADE AGREEMENT BETWEEN THE UNITED STATES OF AMERICA AND CHINA, FACT SHEET (2020) [hereinafter *Intellectual Property Fact Sheet*].

7. See Economic and Trade Agreement between the Government of the United States of America and the Government of the People's Republic of China, *China-US*, Jan. 15, 2020 [hereinafter *Phase One Agreement*].

8. Law and economics have played important roles in regulating international trade. See Andrew Farran, *The Interplay of Law and Economics in International Trade Regulation*, in ISSUES IN WORLD TRADE POLICY (Snape R.H. ed., 1986).

explains why a trade war between the United States and China is inevitable, why the current US-China IP-trade war is significantly different from previous ones, and the economic and political reasons behind the global technology leadership competition between the two countries. Finally, Part V concludes that the POA and its technology transfer rules are not the end of the game but just the start of the global technology leadership competition between the US and China. Therefore, when seeking practical legal solutions for implementing technology transfer rules, it is imperative for future regulators of the US and China to understand both the political and economic dimensions behind the current trade and the technology tensions between these two countries.

II. PHASE ONE AGREEMENT AND CHAPTER ON TECHNOLOGY TRANSFER

A. POA and Its IP and Technology Transfer Chapters

After several rounds of intense negotiations, US President Donald Trump and Chinese Vice Premier Liu He finally signed a deal dubbed as the “*Phase One Trade Agreement*” (POA) on January 15, 2020, only days before the coronavirus shut down of the Chinese city of Wuhan.⁹ Many believe the POA will prevent the further escalation of the on-again, off-again trade battle between the US and China, which has lasted over 18 months.¹⁰ The agreement will almost certainly lay the groundwork for future management of US’s and China’s ferocious competition, at least for the next several years.¹¹

The POA covers intellectual property rights, technology transfer, agriculture, financial services, currency, trade expansion, and dispute resolution.¹² Through this agreement, the US reduces some of its tariffs on Chinese goods in exchange for China’s pledge to purchase more of the US agriculture, energy and manufactured goods and to address some of the US’s complaints concerning IP protection and forced technology transfer (FTT) in China.¹³ China has committed to 77.7 billion US dollars in additional purchases of manufactured goods, agricultural goods, energy products, and services during the two years from January 1, 2020 through December 31, 2021— an amount that is up from the 2017 levels.¹⁴ Specifically, this will be a 32.9 billion dollar spending increase in 2020, and a 44.8 billion dollar increase in 2021.¹⁵ China

9. *Phase One Agreement*, *supra* note 7.

10. David A. Gantz et al., *The Scorecard of the Phase One Trade Agreement*, EUR. J. INT’L L. (Feb. 14, 2020) <https://www.ejiltalk.org/the-scorecard-of-the-phase-one-trade-agreement/> [<https://perma.cc/DAK6-W4VH>].

11. *Id.*

12. See *Phase One Agreement*, *supra* note 7.

13. Andrea Shalal et al., *What's in the U.S.-China Phase 1 Trade Deal*, REUTERS (Jan. 15, 2020), <https://www.reuters.com/article/us-usa-trade-china-details-factbox/whats-in-the-u-s-china-phase-1-trade-deal-idUSKBN1ZE2IF> [<https://perma.cc/F3JN-HEDP>].

14. See *Phase One Agreement*, *supra* note 7, at 6-1.

15. *Id.* at 6-3.

has also committed to addressing some of the US's complaints in relation to the practices of IP protection and FTT in China. These two issues could have "important consequences on the technology industry" in the US.¹⁶

The POA contains a particular IP chapter (Chapter 1) that addresses numerous long-standing IP protection and enforcement concerns in China. First, it obligates China to impose stronger legal protections for trade secrets, patents and pharmaceutical-related intellectual property, geographical indications, trademarks, and enforcement against pirated and counterfeit goods,¹⁷ including improved criminal and civil procedures to combat online IP infringement.¹⁸ Second, besides long-standing IP issues, China committed to addressing additional IP issues, such as "data protection for pharmaceuticals, unauthorized camcording of motion pictures, and copyright protection for sporting event broadcasts, in future negotiations."¹⁹ Third, to improve the enforceability of these provisions, the IP chapter requires China to issue an Action Plan to specify the structural changes that it will take for implementing its obligations under this chapter.²⁰ Finally, the agreement also asks China to provide a public comment period of at least 45 days for all proposed implementation measures.²¹

The trade agreement also contains a particular chapter against forced technology transfers - Chapter 2: Technology Transfer.²² This chapter can be seen as an extension to the IP chapter. It focuses on the specific unfair practices in relation to IP commercialization, such as forced patenting arrangements, forced licensing/assignment arrangements, and compelled confidential information disclosure.²³ More specifically, it establishes binding and enforceable obligations to address various forms of the unfair technology transfer practices identified in the *USTR's Section 301 Investigation Report in 2018*.²⁴ These obligations include at least four aspects.²⁵ First, concerning technology transfer and market access, the chapter provides that persons (including natural and legal persons) from each country should be able to "operate openly and freely in the jurisdiction of the other Party without any force

16. Lauren Feiner, *China Trade Deal Has New Provisions to Safeguard US Tech Secrets*, CNBC (Jan. 15, 2020), <https://www.cnbc.com/2020/01/15/us-china-trade-agreement-on-ip-enforcement-and-forced-tech-transfers.html> [<https://perma.cc/ZS34-7U2D>].

17. See *Intellectual Property Fact Sheet*, *supra* note 6.

18. *Id.* (including "Deterrent-Level Remedies and Penalties and Issues in the Judicial System.").

19. *Id.*

20. *Id.*

21. *Id.*

22. See *Phase One Agreement*, *supra* note 7, at 2-1.

23. *Id.* at 2-1 and 2-2.

24. See *generally* OFF. OF THE U.S. TRADE REP., FINDINGS OF THE INVESTIGATION INTO CHINA'S ACTS, POLICIES, AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION UNDER SECTION 301 OF THE TRADE ACT OF 1974 (2018) (illustrating examples of China's unfair technology transfer regime for U.S. companies in China and China's discriminatory licensing restrictions in Part II and Part III respectively).

25. See *Phase One Agreement*, *supra* note 7, at 2-1.

or pressure from the other Party to transfer their technology to persons of the other Party.”²⁶ Second, concerning ground rules for technology transfer and licensing, it requests that any transfers of technology or licenses between persons of each country occur on voluntary and market-based terms, reflecting mutual agreement.²⁷ In other words, neither the government nor the private sector should impose or compel technology transfer as a condition to approving administrative or licensing requirements.²⁸ Third, in relation to the technology-related outbound investments, it requires persons from each country to commit to refraining from supporting or directing outbound investment activities aimed at obtaining foreign technology pursuant to their industrial plans that create distortion.²⁹ Fourth, in relation to law enforcement, it requires both parties to ensure transparency, fairness, and due process in administrative actions and to allow for market-based technology transfer and licensing.³⁰

B. Achievements and Limits of Technology Transfer Chapter

Concerning the chapters on FTT, as the USTR pointed out, it is the “first time” in any trade agreement that China formally and explicitly agrees to stop any practice that forces or pressures foreign companies (the US companies) to transfer their technology or disclose sensitive technical information to their Chinese partners in order to obtain market access (Article 2.2.), licensing or administrative approvals, or acquiring any government advantages for such transfer (Article 2.3).³¹

The FTT prohibitions under Chapter 2 are comprehensive. They prohibit any FTT conducted by individual companies (privacy sectors) and set up the obligations for each government. Moreover, it obligates each country’s government to not intervene in technology-related outbound investments, specifically prohibiting each State from requiring its domestic companies to target “foreign technology, pursuant to its industrial plans” when conducting outbound investment activities.³² It is noteworthy that, before this agreement, China had never addressed the US’s allegations on this subject in any of its policies, laws, regulations, or statements.³³

26. *Id.*

27. *Id.*

28. Lee, *supra* note 1, at 174 (“while China has already addressed these issues in its Foreign Investment Law, this is the first time the country has agreed to prohibit forced technology transfer as a condition of market access in an international agreement”).

29. *Phase One Agreement*, *supra* note 7, at 2-1.

30. *Id.* at 2-2.

31. *Id.* at 2-1, 2-2 (stating “the Parties affirm the importance of ensuring that the transfer of technology occurs on voluntary, market-based terms and recognize that forced technology transfer is a significant concern”).

32. *Phase One Agreement*, *supra* note 7, at 2-1.

33. Lee, *supra* note 1, at 175.

Most of these provisions have a one-sided effect – in favor of the US.³⁴ Although the text of the POA uses the terms “the Parties” to demonstrate that the commitments on IP and technology transfer are mutual, in practice, they are mainly obligations for China since China is a net importing country of technology and a primary receiver of US technology. Although Article 2.5 of the POA includes a one-sentence provision on “Scientific and Technological Cooperation,” stating: “The Parties agree to carry out scientific and technological cooperation where appropriate,” it has not provided any details concerning how such cooperation can be conducted.³⁵

As Lawder et al. noted, many technology-related transactions between China and the US have already been restricted by strong US security reviews.³⁶ Moreover, implementing enforced technology transfer prohibitions brings China further obstacles to acquiring new technologies and cooperating with the US. Thus, in a small way, Chapter 2 of the POA reflects the efforts of the US in limiting China’s (as a later coming competitor) pace of developing technology capabilities, and maintaining the US’s leadership in the global technology market.

Nevertheless, the effects of Chapter 2 (on Technology Transfer) should not be overstated. It also has its limits. Compared with 18-page IP chapters, the Technology Transfer Chapter is only two and a half pages and does not provide a detailed enforcement mechanism. Unlike the IP chapter, which contains a specific action plan and a specific timeline for implementation, the technology transfer chapter only highlights some general principles for performances – “Due Process and Transparency.”³⁷ As Lee criticized, “without an enforcement mechanism, this commitment may easily become a symbolic one.”³⁸ More importantly, as Gantz et al. have noted, several critical issues on technology were left unresolved, such as Chinese government subsidies, disagreements over Huawei’s sale of 5G telecommunications equipment, and US export controls on high-tech goods.³⁹ These arguably create significant uncertainty in the implementation of the forced technology transfer provisions.

In order to evaluate the enforceability of the POA, particularly the enforceability of the technology transfer rules, it is necessary to review the history of the US-China IP Trade War, examine the issues in the broad context

34. See also Gantz et al, *supra* note 10. For example, as Gantz et al. summarised, the phrase “China shall” appears 97 times in the text, whereas “the United States shall” appears just five times, two of which refer to commitments made by China and the US. And China’s obligations in several areas, such as pharmaceutical-related intellectual property rights and patent rights more broadly, surpass those of the US. *Id.*

35. *Phase One Agreement*, *supra* note 7, at 2-1.

36. Shalal et al., *supra* note 13.

37. *Phase One Agreement*, *supra* note 7, at art. 2.4.

38. Lee, *supra* note 1, at 175 (stating, “. . . the language of this commitment is quite imprecise. It is not clear how a party can prove that the other party directs or supports outbound investment at acquiring technologies targeted by its industrial plans.”).

39. Gantz et. al, *supra* note 10.

of international economic law, and explore the in-depth economic, political and legal reasons behind the technology transfer rules.

III. TECHNOLOGY TRANSFER IN THE CONTEXT OF THE CURRENT US-CHINA IP TRADE WAR

This section examines technology transfer issues, particularly FTT practices, in a broad context of the current US-China trade conflicts and international economic law.

A. Forced Transfer Technology under the International Law

The concept of FTT is not new. However, the prohibition of FTT is not only a requirement of the POA but also a special obligation of China as a World Trade Organization (WTO) member since 2001.

1. Technology Transfer and WTO Rules

Most WTO agreements are silent on the issues of FTT.⁴⁰ By contrast, as Qin noted, many WTO agreements even contain express terms encouraging technology transfer, particularly technology transfer from developed countries to developing countries.⁴¹ For example, concerning IP rights and technology transfer, Art. 7 (*Objectives*) of the *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS Agreement) explicitly provides that IP protection and enforcement “should contribute” to technology transfer and dissemination. In addition, art. 8.2 (*Principles*) allows WTO members to adopt any measures they think appropriate to prohibit IPR abuse and any other conduct that may unreasonably restrain trade or “adversely affect international technology transfer.”⁴²

Furthermore, Article 66.2 (*Least-Developed Country Members*) explicitly states that developed country members must provide incentives to their companies and institutions to promote and encourage ““technology transfer to least-developed country members’ and help them create a sound and viable technological base.”⁴³

40. For example, Art 7 and 8 of TRIPS Agreement focused on “transfer of technology” rather than FTT. See TRIPS Agreement, art 7 and art 8.2.

41. Julia Ya Qin, *Forced Technology Transfer and the US-China Trade War: Implications for International Economic Law*, WAYNE STATE UNIV. L. SCH. LEGAL STUD. RSCH. PAPER SERIES No. 2019-61 at 12-13 (2019).

42. The Agreement on Trade-Related Aspects of Intellectual Property Rights art. 8, Apr. 15, 1994, 1867 U.N.T.S. 31874, Annex 1C (“Appropriate measures, provided that they are consistent with the provisions of this Agreement, may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology.”) [hereinafter *TRIPS Agreement*].

43. *Id.* at art. 66.2.

2. *WTO Plus Protocol - Seeds of Conflict*

Although most WTO agreements focus on promoting technology transfer rather than prohibiting forced (or mandatory) technology transfer, there are exemptions, such as the China-specific rules under its accession protocol.⁴⁴ In contrast to other WTO members, China's admission protocol imposes a unique obligation on FTT.⁴⁵ Paragraph 7.3 of Part I of the WTO's *Protocol on the Accession of the People's Republic of China* (2001) (Protocol) explicitly provides, "China shall ensure that . . . the right of importation or investment by national and sub-national authorities, is not conditioned on . . . performance requirements of any kind, such as . . . the transfer of technology, . . . or the conduct of research and development in China."⁴⁶ In other words, under this protocol, China is required to ensure that any official clearance of foreign investment is not conditional on performance requirements such as technology transfer or the conduct of research and development in China.

As noted by Qin, this general requirement well exceeds the obligations of most WTO members and thus constitutes one of the "WTO-plus obligations" of China.⁴⁷ This China-specific requirement has arguably placed China in a difficult situation for potential WTO dispute settlement on technology transfer and set up the potential for future conflicts, as demonstrated by the recent WTO complaints against China by the EU and the US.⁴⁸

For example, on June 1, 2018, the European Union (EU) requested consultations with China concerning specific measures of China on foreign technology transfer. In addition to the relevant provisions under the TRIPS Agreement and the GATT 1994, the EU referred to *China's Protocol of Accession*.⁴⁹ In its revised consultation submission, the EU directly referred to the protocol and claimed that China's existing law on joint ventures "is inconsistent with China's commitments under Paragraph 7.3 of Part I of the Protocol..."⁵⁰ On January 18, 2019, the US requested to join the revised consultations initiated by the EU also.⁵¹

44. Qin, *supra* note 41, at 12.

45. *Id.* at 13.

46. World Trade Org., *Protocol on the Accession of the People's Republic of China*, section 7(3), WT/L/432 (Nov. 10, 2001) [hereinafter *Protocol*].

47. Qin, *supra* note 41, at 14.

48. USTR, 2021 SPECIAL 301 REPORT 40 (2021) ("USTR has also successfully pursued dispute settlement proceedings at the World Trade Organization (WTO) to address discriminatory licensing practices.").

49. DS549: *China — Certain Measures on the Transfer of Technology*, World Trade Org. (2018).

50. In Jan 2019, the EU revised the consultation submission. See WTO, *China - Certain Measures on the Transfer of Technology - Request for Consultations by the European Union - Revision*, 2019.

51. See World Trade Org., *supra* note 46.

*B. A Shift in Focus for the US-China IP War and Main Forms of
Forced Technology Transfer*

1. Shift in Focus

Historically, technology transfer issues were not a major concern of the US-China IP Trade Wars. As Lee observed, the conventional claims made by the US before focused on the economic losses resulting from China's inactive enforcement of IP laws and its ignorance of widespread IP infringement.⁵² However, under the current US-China trade war, the US's focus has shifted from "China's inactive enforcement of US companies' IP rights" to "its active involvement in acquiring IP and confidential information from US companies."⁵³

Such a shift has been reflected throughout the USTR's *Section 301 Investigation Report* published in March 2018,⁵⁴ a later report on China's controversial IP practices published in November 2018,⁵⁵ as well as the recent *2021 Special 301 Report*. These reports have highlighted some significant forms of enforced technology transfers.

2. Major Forms of Forced Technology Transfer and Examples

The USTR summarised four types of FTT in its *Section 301 Investigation Report* (2018). However, Qin has reclassified them into two groups. *Group One* refers to the technology transfer arrangement, "the result of disclosure of proprietary information compelled by administrative processes."⁵⁶ More specifically, the USTR's *Section 301 Investigation Report* (2018) explicitly states:

The Chinese government uses its administrative licensing and approvals processes to force technology transfer in exchange for the numerous administrative approvals needed to establish and operate a business in China . . . China uses discretionary and non-transparent administrative reviews and licensing processes to pressure technology transfer or force the unnecessary disclosure of sensitive technical information.⁵⁷

52. Lee, *supra* note 1, at 183 ("Before President Trump's August 2017 memorandum to the USTR initiated the current IP trade war, the U.S. IP claims against China had focused on the pervasive counterfeiting and piracy activities in the country, which had caused enormous losses to the U.S. economy.").

53. Lee, *supra* note 1, at 184.

54. See generally OFF. OF THE U.S. TRADE REP., *supra* note 24, at 41-43.

55. See OFF. OF THE U.S. TRADE REP., UPDATE CONCERNING CHINA'S ACTS, POLICIES AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY AND INNOVATION (Nov. 20, 2018) [hereinafter *USTR, Update Concerning China's Acts, Policies and Practices*].

56. Qin, *supra* note 41, at 3.

57. OFF. OF THE U.S. TRADE REP., *supra* note 24, at 19-22; Lee, *supra* note 1, at 153-54.

The USTR claimed, through administrative processes, foreign businesses sometimes have to reveal sensitive technological information, such as proprietary formulae or designs, source code, databases, and trade secrets.⁵⁸ The practices in *Group One* are less controversial. Such practices may not only breach Article 39 of the *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS), which requires member countries to preserve unclosed information provided to government agencies from unfair competition and commercial use but also may breach Article 22 of the recently enacted *Foreign Investment Law of P.R. China* (2020), which explicitly outlawed any requirements on forced transfer of technology.⁵⁹

Group Two refers to the technology transfer arrangement, which is “the result of ownership restrictions on foreign investment, such as mandatory joint venture (JV) requirements.”⁶⁰ The US alleged that China used foreign ownership restrictions to facilitate *de facto* technology transfers from American companies to Chinese partners. In addition, it argued that such limits slow foreign product entry into the Chinese market and allow Chinese companies to access foreign technologies and confidential information.⁶¹

Additionally, the report provided some specific examples. It pointed out that, while foreign businesses generally prefer to engage in China under the framework of a wholly-owned foreign enterprise (WFOE), some existing Chinese regulations have precluded foreign companies from adopting such a structure in specific industries.⁶² They include *China's Catalogue of Industries for Guiding Foreign Investment* (Revised in 2017) (Foreign Investment Catalogue 2017)⁶³ and the *Negative List of Special Administrative Measures for Foreign Investment Access* (Negative List).

Part 1 of the *Foreign Investment Catalogue 2017* contains a unique session - the *Catalogue of the restricted foreign investment industry*. It explicitly

58. See Qin, *supra* note 41, at 3; see also OFF. OF THE U.S. TRADE REP., *supra* note 24, at 41-43.

59. Ton Zijdwijk, *Understanding the Intellectual Property Disputes between China and the United States*, CIG ONLINE (2019) (art. 22 of *Foreign Investment Law of P. R. China* (2020) “[n]o administrative department or its staff member shall force any transfer of technology by administrative means”); see *Foreign Investment Law of P.R. China*, P. R. CHINA (2020), https://en.ndrc.gov.cn/policies/202105/t20210527_1281403.html [[https:// perma.cc/WR76-LB4S](https://perma.cc/WR76-LB4S)].

60. Qin, *supra* note 41, at 3.

61. Lee, *supra* note 1, at 153.

62. *Id.*; see also OFF. OF THE U.S. TRADE REP., *supra* note 24, at 27.

63. See China's Catalogue of Industries for Guiding Foreign Investment (2017) (外商投资产业指导目录 [2017 年修订]) [in Chinese], P. R. CHINA (2017), http://www.gov.cn/xinwen/2017-06/28/content_5206424.htm [<https://perma.cc/NH6E-TSWH>] [hereinafter *Foreign Investment Catalogue 2017*]. It is noteworthy that, in order to address the concerns of the US, in 2019, the Foreign Investment Catalogue 2017 has been replaced by China's *Catalogue of Industries for Encouraging Foreign Investment (2019 Version)* 鼓励外商投资产业目录 and 中西部地区外商投资优势产业目录 (2019年版), P. R. CHINA (2019), [http:// www.gov.cn/xinwen/2019-06/30/content_5404701.htm](http://www.gov.cn/xinwen/2019-06/30/content_5404701.htm) [<https://perma.cc/3PAS-X2E4>].

requires foreign companies, which invest in specific sectors, to enter into cooperative agreements, such as contractual joint ventures (CJV) or equity joint ventures (EJV), with Chinese companies. These industrial sectors include the exploration and development of both oil and natural gas (Item 2), general aircraft design, manufacturing and maintenance (Item 10), and medical institutions (Item 32).⁶⁴ It also requires that the Chinese party must hold the majority of shares (more than fifty percent) of joint ventures in specific industries, including, but not limited to, the selection and cultivation of new varieties of crops and production of seeds (Item 1); special and rare coal exploration and mining (Item 3); publication printing (Item 5); the construction and operation of nuclear power plants (Item 12); and essential telecommunications services (Item 21). Furthermore, it provides that the Chinese party's investment cannot be lower than fifty percent of JV in specific industries, such as automobile manufacturing (Item 7). In contrast, foreign investment cannot exceed fifty percent, such as in the business of value-added telecommunications services (Item 21).

These requirements have arguably placed US investors in a very disadvantageous situation. As the USTR has noted, once a US or foreign company enters a joint venture with a Chinese company, it often has little choice but to provide the partnered Chinese company with IP and private information.⁶⁵

3. Limits of Existing Law and Implications of Focus Shift

Compared to the allegation of forced disclosure of proprietary information in *Group One*, the allegation of FTT via ownership restrictions in *Group Two* appears to "raise a more complex set of issues."⁶⁶ These rules are not illegal per se and must be examined on a case-by-case basis.⁶⁷ More specifically, on the one hand, no fundamental principle of international law prohibits countries from putting ownership limits on foreign investment. Therefore, China is usually free to restrict foreign ownership unless it has established particular treaty obligations, such as in the automobile industry under China's WTO accession protocol (introduced above).⁶⁸ On the other hand, although Article 22 of China's *Foreign Investment Law* (2020) has explicitly prohibited any administrative department or employee from adopting administrative measures to coerce technology transfer, it may not be an easy task to implement it. In practice, it is tough to determine whether the demand for technology transfer is driven by government pressure or just by the Chinese party engaged.⁶⁹ Again, this places

64. See *Foreign Investment Catalogue 2017*, *supra* note 63, Part 1, 22-23.

65. See, e.g. *USTR Update Concerning China's Acts Policies and Practice*, *supra* note 55, at 23-27; Lee, *supra* note 1, at 153.

66. Qin, *supra* note 41, at 4.

67. *Id.*

68. *Id.*

69. *Id.* at 5.

US companies in a disadvantageous situation when fighting against any government-oriented FTT activities in China. It may arguably constitute one of the direct reasons for introducing a particular chapter on Technology Transfer under the POA (Chapter 2).

As Qin noted, FTT has arisen as “a new issue of systemic importance due to the US-China trade conflict.”⁷⁰ The introduction of a new technology transfer chapter in the POA has indicated that US claims against China’s IP regime “have shifted in a different direction”⁷¹ – technology transfer. More specifically, the introduction of a particular chapter for preventing FTT, on the one hand, will create a more friendly business environment for US technology companies operating in China. But, on the other hand, it indicates that the trade war between the US and China has transferred from a traditional trade war into a “technology war” – a competition of global technology leadership.⁷²

Such a shift is phenomenal and does not happen incidentally. There are profound political and economic reasons behind it. As former Chief Economist for the Canadian government Dan Ciuriak observed, the current US-China trade war is a “watershed event reshaping the global economic and political order.”⁷³ Therefore, it is crucial to examine the primary rationale behind such a shift before exploring possible solutions.

IV. REASONS FOR SHIFTING AND GLOBAL TECHNOLOGY LEADERSHIP COMPETITION

The economic reason for the US to shift its focus from traditional IP enforcement issues to current technology transfer issues has been discussed by many researchers – a competition of global technology leadership.⁷⁴ Next, this section explores why both the US and China are interested in global technology leadership, particularly the leadership of the high technology market (e.g. 5G market).

70. *Id.* at 2.

71. Lee, *supra* note 1, at 183.

72. MARIANNE SCHNEIDER-PETSINGER ET AL., US-CHINA STRATEGIC COMPETITION: THE QUEST FOR GLOBAL TECHNOLOGICAL LEADERSHIP 4 (2019).

73. See Ciuriak, *supra* note 3, at 130. See also Daniel Gros, *This Is Not a Trade War, It Is a Struggle For Technological and Geo-Strategic Dominance*, 73 CESIFO F. 21, <https://www.ifo.de/DocDL/CESifo-Forum-2019-1-gros-us-china%20trade-war-march.pdf> [<https://perma.cc/9QHS-JHN2>].

74. Qin, *supra* note 41; Lee, *supra* note 1; Ciuriak, *supra* note 3.

*General Economic Reasons for Pursuing Technology Leadership –
Why Targeting in China*

1. Significance of Digital Economy

Over the past decade, the Internet economy, now called the digital economy, has developed rapidly. The digital economy plays an increasingly determining role in a country's economic growth.⁷⁵ According to a study conducted by the United Nations Conference on Trade and Development (UNCTAD), digital platforms have become increasingly important in the world economy. The total value of digital platform businesses with a market valuation of more than \$100 million was predicted to be over \$7 trillion in 2017, up sixty-seven percent from 2015.⁷⁶ Concerning the proportion of the digital economy contributing to national GDP, the US reaches about sixty percent, China is about forty percent, and Germany is more than sixty percent.⁷⁷ It has become a tendency that the accumulation of national wealth will depend on the digital economy rather than natural resources. The world's most significant resources for economic growth will no longer be mineral or petroleum resources but data resources.⁷⁸ As the *UNCTAD Digital Economy Report 2019* stated, "Data have become a new economic resource for creating and capturing value. Control over data is strategically important to be able to transform them into digital intelligence. In virtually every value chain, the ability to collect, store, analyze and transform data brings added power and competitive advantages."⁷⁹ In other words, the ability to "turn data into digital intelligence" has become "the key to success" in the digital economy.⁸⁰ So naturally, technology, mainly digital technology, has become the main driving force for innovation and economic growth worldwide. It is the same with the current trade war between the US and China. As Ciuriak noted, the current US-China trade war is "rooted in the technological revolution based on big data, artificial intelligence and machine learning."⁸¹

75. See also UNCTAD, DIGITAL ECONOMY REPORT 2019 (OVERVIEW) xv (2019) (stating that "the digital economy continues to evolve at breakneck speed, driven by the ability to collect, use and analyse massive amounts of machine-readable information (digital data) about practically everything. These digital data arise from the digital footprints of personal, social and business activities taking place on various digital platforms.").

76. *Id.* at xvii.

77. Yan Xuetong, *Why 5G Will Become the Core of Sino-U.S. Strategic Competition*, US-CHINA PERCEPTION MONITOR (2019), http://www.uscnpm.com/model_item.html?action=view&table=article&id=19772 [<https://perma.cc/8DEV-J4TU>] [hereinafter *Speech on 5G*]. For a Chinese perspective, see Yan Xuetong, *The Age of Uneasy Peace: Chinese Power in a Divided World*, FOREIGN AFFS. (Jan. 2019), <https://www.foreignaffairs.com/articles/china/2018-12-11/age-uneasy-peace> [<https://perma.cc/3FE2-57TN>].

78. *Speech on 5G*, *supra* note 77.

79. UNCTAD., *supra* note 75, at xvii.

80. *Id.* at xvii.

81. Dan Ciuriak, *A Trade War Fuelled by Technology*, CTR. FOR INT'L GOVERNANCE INNOVATION (Jan. 11, 2019), <https://www.cigionline.org/articles/trade-war-fuelled-technology/>

2. *Economic Significance of Technology Leadership, Particularly 5G*

Digital technology, particularly 5G technology, is crucial for a country's economic prosperity and security.⁸² The US Defense Innovation Board defined 5G technology as the “oncoming fifth generation of wireless networks and technology that will produce a step-change improvement in data speed, volume, and latency (delay in data transfer) over fourth-generation (4G and 4G LTE) networks.”⁸³

The application of 5G technology would significantly increase “efficiency.” For example, researchers anticipate that 5G technology will enable the world's first “smart factories,” which would use the increased speed and reliability of 5G networks to reduce cabled connections, enhance automated processes, and, most crucially, collect more data.⁸⁴ Furthermore, along with the use of machine learning algorithms, this data can assist businesses in predicting when costly equipment is likely to fail, therefore minimizing the probability of expensive downtime.⁸⁵ In other words, every country equipped with 5G technology would have the ability to transform data into increased income.⁸⁶

Concerning direct contribution that 5G may bring, based on a recent study conducted by Raconteur, by 2035, 5G networks are to create 13.2 trillion dollars in worldwide sales activity, benefiting the following five industries in particular:⁸⁷

[<https://perma.cc/86AU-HQJL>] (“which create the grounds for strategic trade and investment policies and geostrategic rivalry.”).

82. *Speech on 5G*, *supra* note 77.

83. MILE MEDIN & GILMAN LOUIE, *THE 5G ECOSYSTEM: RISKS & OPPORTUNITIES FOR DOD 2* (2019).

84. Marcus Lu, *Visualized: Where 5G Will Change The World*, VISUAL CAPITALIST (2020), <https://www.visualcapitalist.com/visualized-where-5g-will-change-the-world/#:~:text=out%20an%20advantage.,China,other%20countries%20on%20this%20list> [<https://perma.cc/W747-HDXQ>].

85. *Id.*

86. *Speech on 5G*, *supra* note 77.

87. Lu, *supra* note 84.

***Table 1: The economic impact of 5G – ranked by industries (Source: Raconteur)⁸⁸**

Rank	Industry	Sales (\$B)	Share of Industry Sales (%)
#1	Manufacturing	\$4,687	5.4%
#2	Information and Communication	\$1,569	10.7%
#3	Wholesale and Retail Sales	\$1,198	5.1%
#4	Public Services	\$985	6.3%
#5	Construction	\$731	4.3%

The manufacturing industry alone will reap significant 5G-enabled revenues of 4.6 trillion dollars by 2035 (see Table 1).⁸⁹

Former US President Donald Trump reaffirmed the significance of 5G leadership in a speech on US 5G Deployment in April 2019. Trump pointed out that “winning the race to be the world’s leading provider of 5G cellular communications networks” is a “critical issue” for the US’s future, and that securing 5G networks are unquestionably critical to America’s prosperity and national security in the twenty-first century.⁹⁰ He explains the reasons behind it:

5G will be as much as 100 times faster than the current 4G cellular networks. It will transform the way our citizens work, learn, communicate, and travel. It will make American farms more productive, American manufacturing more competitive, and American healthcare better and more accessible. Basically, it covers almost everything, when you get right down to it... And just as 4G networks paved the way for smartphones and all of the exciting breakthroughs ... this will be more secure and resilient. 5G networks will also create astonishing and really thrilling new opportunities for our people — opportunities that we’ve never even thought we had a possibility of looking at.⁹¹

Therefore, Trump concluded that the US “cannot allow any other country to out-compete the US in this powerful industry of the future” and “[t]he race to 5G is

88. *The Economic Impact of 5G*, RACONTEUR (2019), <https://www.raconteur.net/infographics/the-economic-impact-of-5g> [https://perma.cc/E93N-G4Y6].

89. *Id.*

90. Donald Trump, *Remarks by President Trump on United States 5G Deployment* (Apr. 12, 2019, 2:35 PM), <https://trumpwhitehouse.archives.gov/briefings-statements/remarks-president-trump-united-states-5g-deployment/> [https://perma.cc/VW4H-XWM2].

91. *Id.*

a race America must win.”⁹² As Trump’s remarks demonstrate, the technology of 5G determines the future of the US. In the same way, this technology also determines the future of China.⁹³ It is one of the main reasons why both countries target 5G leadership when developing their digital economy.

3. Why the US Targets China

Although 5G leadership is essential, developing 5G networks and implementing them into various local industries is “a massive undertaking.”⁹⁴ It is not a race that every country can play or afford to play. It is mainly a game of technology-advanced countries.

A recent study by Raconteur shows that “just seven countries are expected to account for seventy-nine percent of all related investment.”⁹⁵ The study has also anticipated the ranking of these countries by 2035.

***Table 2: The Economic Impact of 5G – Ranked by Countries (Source: Raconteur)⁹⁶**

Country	Share of Value Chain R&D and Capital Expenditure	5G-enabled Output (\$B)	5G-enabled Employment (million people)
United States	26.7%	\$786	2.8
China	25.5%	\$1,130	10.9
Japan	12.4%	\$406	2.3
Germany	3.9%	\$171	0.7
France	3.9%	\$124	1.5
United Kingdom	3.8%	\$114	0.5
South Korea	2.9%	\$128	0.7

The top seven nations on the diagram are all the most innovative economies in the world.⁹⁷ But, by 2035, China will be the only country with the potential to exceed the US concerning 5G-enabled Output. In other words, the race for 5G leadership is a race between the US and China. Aside from political

92. *Id.*

93. See generally Xueting, *The Age of Uneasy Peace: Chinese Power in a Divided World*, *supra* note 77.

94. Lu, *supra* note 84.

95. *Id.*

96. *The Economic Impact of 5G*, *supra* note 88.

97. Lu, *supra* note 84.

differences, this may partially explain why the US is currently targeting China rather than the other five countries.

Actually, not only in the 5G technology area, in the whole digital technology area, the US faces increased competitive pressure from China. For example, a recent *5G Ecosystem Report* produced by the US Department of Defense found, in 2009, the top ten Internet companies in terms of revenue were all based in the US, but currently, four of the top ten are Chinese.⁹⁸ These transitions have occurred not just because Chinese equipment is cheaper but also because Chinese equipment is also superior to its Western rivals in many instances, according to the report.⁹⁹

Concerning infrastructure for 5G applications, China now has 350,000 5G-operable base stations domestically, which is about ten times as many as the United States has deployed.¹⁰⁰ Globally, China's major manufacturers, such as Huawei and ZTE, are driving 5G deployment through commercial sales of 5G-enabled hardware and devices (mainly for non-standalone networks).¹⁰¹ Huawei has already shipped over 10,000 base stations overseas.¹⁰² The US Department of Defense has anticipated that 5G has the potential to tilt future networks in China's favour significantly.¹⁰³ If China's expansion in the global wireless device industry continues, eventually, even if the US denies access of the Chinese suppliers to the US market, they can still expand their market share and sophistication because of their devices' appeal in all other countries.¹⁰⁴

Therefore, it is not hard to understand why the US would adopt all possible measures to stop China's expansion in the global 5G market and take all possible steps to prevent transferring the US technology to China.¹⁰⁵

98. MEDIN & LOUIE, *supra* note 83, at 17 (It further stated: "In the last decade, significant shifts have occurred in the wireless vendor community as well. . . Chinese telecom equipment giant Huawei grew global revenues from approximately \$28B in 2009 to \$107B in 2018. . . . Chinese handset vendors like Huawei, ZTE, Xiaomi, Vivo, and Oppo have grown market share from less than approximately 6% in 2009 to over 30% share in 2018.").

99. *Id.*

100. *Id.* at 12-13.

101. *Id.*

102. *Id.*

103. *Id.* at 2.

104. *Id.* at 25.

105. See also Chi Hung Kwan, *The China-US Trade War: Deep-Rooted Causes, Shifting Focus and Uncertain Prospects*, 15 ASIAN ECON. POL'Y REV. 55 (2020) (stated "The USA has waged a trade war against China, whose rapid rise has come to be seen as a threat to US hegemony. Besides imposing additional tariffs on imported Chinese products, the USA is also tightening restrictions on the transfer of technology to China and the business activities of some Chinese high-tech companies, notably Huawei").

B. Economic Reasons for the US to Pursuing Technology Leadership

1. Comparative Advantages of the US

Why does the US have a deep concern about the leadership of the global technology market? First, it has been the US's comparative economic advantage in international market competition. A study conducted by the US National Academy of Engineering in 1993 found, among the many strengths of the US technology enterprise, four warrant attention in particular: (1) "the large scale, broad scope, and relative openness of the US basic research enterprise;"¹⁰⁶ (2) Its domestic market's size, affluence, openness and technological sophistication, which continues to provide "a rich testbed and large demand for technologically advanced products and services;"¹⁰⁷ (3) The US has a strong "capacity for spawning new technology-intensive businesses, goods, and services;"¹⁰⁸ and (4) Many high-tech industries in the US have "continuing competitive strength and global reach."¹⁰⁹

The strength of the fundamental research enterprise and the size and richness of the home market has created an unparalleled domestic capability for developing new technology-intensive goods, services, and industries in the US,¹¹⁰ as well as successfully retaining its competitive advantages in high-tech industries. According to a recent study conducted by the US National Science Board (NSB) in 2018, the Knowledge- and Technology-Intensive (KTI) sectors are a significant component of the global economy. The US has "the highest KTI share of GDP (38%) of any large economy closely followed by Japan (36%)."¹¹¹

It is also noteworthy that China has "the largest KTI share of any large developing economy (35%), and its KTI share is comparable to those of large, developed economies' including the US."¹¹² China is rapidly catching up. For example, concerning Global Science and Technology Capabilities, the *NSB Report 2020* found that China's Science and Engineering (S&E) publication output has risen about tenfold since 2000, and "as a result, China's output in

106. See NAT'L ACAD. OF ENG'G., MASTERING A NEW ROLE: SHAPING TECHNOLOGY POLICY FOR NATIONAL ECONOMIC PERFORMANCE 61-63 (The National Academies Press 1993) (further stating that "the strength of the U.S. basic research enterprise is that its largest, broadest, and probably most creative segment resides primarily within U.S. universities").

107. *Id.* at 61, 64.

108. *Id.* at 61.

109. *Id.*

110. *Id.* at 65.

111. *Science and Engineering Indicators 2018*, NAT'L SCI. BD. 715 (2018), <https://www.nsf.gov/statistics/2018/nsb20181/assets/nsb20181.pdf> [<https://perma.cc/PAA6-3X8L>].

112. *Id.* (further stated "[t]he KTI shares in other large developing economies are significantly lower than China's").

terms of absolute quantity now exceeds that of the United States.”¹¹³

In the current digital environment, as Henry-Nickie et al. noted in 2019, only countries that lead the globe in developing innovative technologies and fully using their digital economies’ productive capacity will acquire “a strategic competitive advantage.”¹¹⁴ Therefore, it is understandable why the US views China as “its most dynamic and formidable competitor in modern history.”¹¹⁵

2. Limits of Existing Industry Structure and Risk of Innovation Downgrading

Second, the US has a long-standing global technology leadership. It makes the current industry structure of the US highly rely on Research & Development (R&D) of high technology products or services (high-end industry) rather than the manufacturing sectors. The product manufacturing sectors of the global value chain are primarily located in developing countries, particularly in China. This structure works efficiently when the US holds the technology leadership role, but it would be vulnerable once the US loses its technology leadership.

According to the data provided by the NSB Report 2018:

In high-technology manufacturing, the United States is the largest global producer (31% global share). The US global share has remained stable for the last decade. China is the second largest global producer (24%). Rapid growth of China’s industries more than doubled China’s global share over the last decade. China surpassed Japan in 2008 and the EU in 2012 . . . China is the world’s dominant producer in medium-high-technology industries (32% global share). China’s global share nearly tripled over the last decade, and it surpassed the United States in the late-2000s and the EU in the early-2010s.¹¹⁶

In other words, the US lost its leadership position for medium-high-

113. *The State of U.S. Science and Engineering 2020*, SCI.AND ENG’G INDICATORS (2020), <https://ncses.nsf.gov/pubs/nsb20201/global-science-and-technology-capabilities> [https://perma.cc/REW4-GU7M].

114. Kwadwo Frimpong, Makada Henry-Nickie, & Hao Sun, *Trends in the Information Technology Sector*, BROOKINGS INST. (2019), <https://www.brookings.edu/research/trends-in-the-information-technology-sector/> [https://perma.cc/D74N-LAX7].

115. Aaron L. Friedberg (2018) *Competing with China*, *Survival*, 60:3, 7-64, DOI: 10.1080/00396338.2018.1470755 or <https://www.tandfonline.com/doi/full/10.1080/00396338.2018.1470755> (stated “In a recent, widely read article in *Foreign Affairs*, two former Obama-administration officials conclude that, after years of “hopeful thinking” about China’s future, the United States finds itself confronting “its most dynamic and formidable competitor in modern history. Republican Senator Marco Rubio described the challenge in similar terms, noting that in the 240 years since its founding, the United States has never before “faced an adversary of this scale, scope, and capacity.”).

116. *Science and Engineering Indicators 2018*, *supra* note 111.

technology manufacturing starting from the late 2000s.¹¹⁷ China has become the dominant producer in medium-high-technology industries in the world.¹¹⁸ Consequently, once the US loses its current leadership in high-technology sectors, it could not immediately rely on medium-high-technology sectors either (since the medium-high-technology sectors have been dominated by China). Instead, it may have to rely on other industrial sectors, such as energy and agriculture industries, business travel and tourism, and other low-end technology products or services.¹¹⁹

The US export data in 2017 also reflects such a trend. Based on the data provided by the US Government, the US exports of goods to China were an estimated 130 billion dollars in 2017, and 120.3 billion dollars in 2018, respectively.¹²⁰ The US exports of services to China were an estimated 57.6 billion dollars in 2017 and 58.9 billion dollars in 2018. Most US service exports to China accounted for tourism, intellectual property (trademark, computer software), and transportation sectors.¹²¹ In 2017 alone, the US received over 35 billion dollars in expenditure from Chinese visitors on travel and tourism-related products and services, accounting for around 18.7 percent of US exports to China.¹²² By contrast, overall IP service costs were approximately 22.6 billion dollars, accounting for only twelve percent of US exports to China in 2017. Thus, it is clear that IP related exports have not played a dominant role in the US-China trade war.

A similar tendency may be seen in the POA export list. The POA requires China to guarantee that its purchases and imports of manufactured commodities, agricultural goods, energy products, and services specified in Annex 6.1 surpass the 2017 baseline amount by at least 200 billion dollars during the two-year term (January 1, 2020 to December 31, 2021).¹²³ More specifically, among the 200 billion dollars of additional export, the portion of IP services is not very high. The total additional amount of IP service charges, business travel and tourism,

117. *Id.* (stating that “China is the world’s dominant producer in medium-high-technology industries (32% global share). . . . and it surpassed the United States in the late-2000s . . .”).

118. *Id.*

119. This is arguably in line with the view of Trump that the US must maintain its leadership of high technology sectors, such as 5G. As Trump said, the US “cannot allow any other country to out-compete the United States in this powerful industry of the future” and “[t]he race to 5G is a race America must win.” (as discussed above, the texts between footnote 93 and footnote 96). *See* Trump, *supra* 90.

120. *See Foreign Trade: Trade in Goods with China*, <https://www.census.gov/foreign-trade/balance/c5700.html#2017> [<https://perma.cc/FJP9-BPZK>].

121. OFF. OF THE U.S. TRADE REP., EXEC. OFF. OF THE PRESIDENT, THE PEOPLE’S REPUBLIC OF CHINA: U.S.-CHINA TRADE FACT, <https://ustr.gov/countries-regions/china-mongolia-taiwan/peoples-republic-china> [<https://perma.cc/9AXE-QAFB>] (further stating “[l]eading services exports from the U.S. to China were in the travel, intellectual property (trademark, computer software), and transport sectors”).

122. *China Country Commercial Guide: China - Travel and Tourism*, (Jul. 30, 2019), <https://www.export.gov/apex/article2?id=China-Travel-and-Tourism> [<https://perma.cc/HDX4-V6SD>].

123. *Phase One Agreement*, *supra* note 7, at art. 6.2.

is 37.9 billion dollars, accounting for nineteen percent of total additional export.¹²⁴ So assuming the portion of US IP export is similar to that in 2017, the additional IP service export is estimated to be less than ten percent of the total additional export. The POA list indicates that US exports to China increasingly rely on agriculture and energy products (84.4 billion), business travel and tourism, and other low-technology products or services rather than IP services.¹²⁵ In other words, the US is under a potential risk of transferring or downgrading from an “innovation driven” country to a non-innovation driven country, such as an agriculture and energy export-driven country.¹²⁶

The US government has identified such risks over recent years. Since the Obama administration, the US has realized it is important to reinvest in the US manufacturing capabilities and believes this is important for maintaining a “robust, broad-based economic growth” and the nation’s “innovation capacity.”¹²⁷ The Trump Administration was also “serious about growing US manufacturing”¹²⁸ and sped up the process. Comparing the final twenty-one months of the Obama administration to the first twenty-one months of the Trump administration revealed that more than ten times the number of manufacturing jobs were gained during Trump's leadership.¹²⁹ The policy for promoting US manufacturing capabilities has been followed by the current Biden Administration also. After eight months of evaluating the legacy of former President Trump’s trade war with China, on October 4, 2021, US Trade Representative Katherine Tai confirmed the Biden administration’s determination to continue implementing the POA, as well as the administration’s intention to retain US tariffs on hundreds of billions of dollars in Chinese imports in place for the time being.¹³⁰ This decision is essential to

124. *Id.* at annex 6.1.

125. *Id.*

126. See Antonio Varas & Raj Varadarajan, *How Restricting Trade with China Could End US Semiconductor Leadership*, BOS. CONSULTING GRP. (2020), <https://www.bcg.com/en-au/publications/2020/restricting-trade-with-china-could-end-united-states-semiconductor-leadership> [https://perma.cc/CU83-7WQR] (stating that “once the US loses its global leadership position, this dynamic effectively reverses the industry’s virtuous innovation cycle and throws US companies into a downward spiral of rapidly declining competitiveness and shrinking market share and margins.”).

127. NAT’L ECON. COUNCIL, *REVITALIZING AMERICAN MANUFACTURING: THE OBAMA ADMINISTRATION’S PROGRESS IN ESTABLISHING A FOUNDATION FOR MANUFACTURING LEADERSHIP* 5 (2016).

128. ROBERT D. ATKINSON & STEPHEN EZELL, *TEN PRINCIPLES TO GUIDE THE TRUMP ADMINISTRATION’S MANUFACTURING STRATEGY* 1 (2017).

129. Chuck DeVore, *The Trump Manufacturing Jobs Boom: 10 Times Obama’s Over 21 Months*, FORBES (Oct. 16, 2018) <https://www.forbes.com/sites/chuckdevore/2018/10/16/the-trump-manufacturing-jobs-boom-10-times-obamas-over-21-months/?sh=55d4f8de5850> [https://perma.cc/L935-67G6].

130. Chad P. Bown, *Why Biden Will To Enforce Trump’s Phase One Trade Deal with China*, PETERSON INST. FOR INT’L ECON. (Dec. 15, 2021), <https://www.piie.com/blogs/trade-and-investment-policy-watch/why-biden-will-try-enforce-trumps-phase-one-trade-deal-china> [https://perma.cc/3Y4J-4PYJ].

the US manufacturing sectors because US manufacturing exports are the most economically significant component of the POA, which account for seventy percent of covered products.¹³¹ As Bown observed, “anyone looking for a dramatic policy change toward China from the last administration will not find any evidence of it.”¹³²

C. Covid-19 and Urgency of Addressing the Risk

The Covid-19 pandemic further demonstrated the importance and necessity of pushing US companies to bring back production from overseas. It is not only crucial for economic growth but also crucial to national security. As Harvard Business School Professor Willy C. Shih pointed out, it surprises many people that the US does “not have the capacity to manufacture many products for which there is a sudden urgent need — everything from critical care ventilators, N95 face masks, and personal protective equipment to everyday items like over-the-counter pain relievers.”¹³³ While the US is still a manufacturing powerhouse in many sectors (such as some high-end market sectors),¹³⁴ many everyday basic items must be imported (such as products produced in most medium and low-end market sectors).¹³⁵

As Shih noted, the current pandemic-related shortages have further “fuelled calls from political leaders of both parties for US manufacturers to start producing critical supplies domestically.”¹³⁶ President Trump reaffirmed at the recent *2020 Council for National Policy Meeting* on August 21, 2020 that “[w]e’ll fully restore America’s manufacturing independence, bring home our critical supply chains, and permanently end our reliance on China.”¹³⁷ Trump further warned, if his industrial and economic policies cannot continue, the US will be “a totally different country . . . and ultimately, it will fail . . . economically,” and the US “will go into . . . a depression . . . maybe worse . . . than what happened in 1929.”¹³⁸ Although this is a speech during the presidential election, it indicated that the Trump administration was aware of the urgency of addressing the downgrading risk.

However, it is not easy for the US to restore its manufacturing capabilities

131. *Id.*

132. *Id.*

133. Willy C. Shih, *Bringing Manufacturing Back to the U.S. Is Easier Said Than Done*, HARV. BUS. REV. (Apr. 15, 2020), <https://hbr.org/2020/04/bringing-manufacturing-back-to-the-u-s-is-easier-said-than-done> [<https://perma.cc/6DPL-DGMT>].

134. *Id.*

135. *Id.* (the author pointed out, at the beginning stage of the Covid Pandemic, the US did not “have the capacity to manufacture many products . . . everything from critical care ventilators, N95 face masks, and personal protective equipment to everyday items like over-the-counter pain relievers”).

136. *Id.*

137. Remarks by President Trump at the 2020 Council for National Policy Meeting, 2020 Daily Comp. Pres. Doc. 15 (Aug. 21, 2020).

138. *Id.* at 11-12.

because the US and other advanced industrial countries have set up “a highly efficient and productive product manufacture-and-delivery system” globally.¹³⁹ Such a system provides them with a wide range of products at low costs.¹⁴⁰ Nevertheless, the current pandemic arguably pushes each country to rethink the limits of such a system, particularly the “dependencies and expectations” inherent in that system.¹⁴¹ At least, it may arguably create an opportunity/extra motivation for US enterprises to return to the US or diversify their production bases.

1. Political and Economic Reasons for China to Pursue Technology Leadership

Like the US, China also treats the global technology leadership as strategically important and tries to build up its competitive advantages in high technology, such as 5G technology. For example, artificial intelligence (AI) and 5G development are crucial components of Xi Jinping’s “China Dream” vision and “Made in China 2025” roadmap.¹⁴² But, again, there are in-depth political and economic reasons behind this.

2. The Political Economy behind the Transition into High-End Manufacturing and Services

First, constant economic growth and development in high technology are directly related to the vitality of the Chinese political regime. As Medin and Louie noted in the recent *5G Ecosystem Report*, social stability and economic growth have been treated as the top priority of the Chinese Communist Party “because failures in those two areas are seen as direct existential threats to the regime. . . .”¹⁴³ Therefore, China must transfer its economic structure toward high-end industry sectors in order to maintain sustainable economic growth.

Based on the data from the World Bank, since China adopted the Open Door Policy in 1978, its GDP growth has averaged almost ten percent per year, and “more than 850 million people have been lifted out of poverty.”¹⁴⁴ As a result, China has become “an upper-middle-income country.”¹⁴⁵ However, China’s per capita income remains around a fourth of that of high-income nations, and over 373 million Chinese live below the US \$5.50 per day upper-middle-income

139. Shih, *supra* note 133.

140. *Id.*

141. *Id.*

142. MEDIN & LOUIE, *supra* note 83, at 13.

143. *Id.* at 13.

144. *The World Bank In China – Overview - Context*, WORLD BANK (Oct. 12, 2021), <https://www.worldbank.org/en/country/china/overview#1> [<https://perma.cc/D5L8-68GM>].

145. *Id.*

poverty line.¹⁴⁶

Furthermore, as the World Bank noted, China's rapid economic growth mainly relies on resource-intensive manufacturing, exports, and low-wage labour.¹⁴⁷ However, such a growth pattern has essentially reached its limits, and has resulted in economic, social, and environmental imbalances.¹⁴⁸ Therefore, to address these imbalances, China's economic structure must transition away “from low-end manufacturing to high-end manufacturing and services” and from investment to consumption.”¹⁴⁹ This drives China to pursue global leadership in high technology to transform its economic structure from low-end to high-end industries. As a result, China is naturally beginning to pay more attention to high technology, such as 5G, which can transform the country from a “capital- and labour-intensive” manufacturing economy to an “innovation-led, consumption-driven” one with less reliance on foreign investment.¹⁵⁰

3. Limits of Existing Economy Stimulation Method - Monetization of Financial Deficit

In addition to the economic transformation plan the World Bank has described, China often adopts two methods to stimulate its economic growth; (1) the Monetisation of Financial Deficit (MFD)¹⁵¹ and (2) the domestic demand stimulation.¹⁵² Nevertheless, it does not seem that either method can sufficiently resolve the bottleneck of China's economic growth.

Under the monetarist theory, the money supply is the most critical determinant of the rate of economic growth.¹⁵³ Therefore, money supply also plays a crucial role when applying the Monetization of Financial Deficit (MFD or Monetization) policy to stimulate economic growth. In recent years, in addition to two conventional fiscal policy choices for governments to finance their deficits - via (1) issuing debts or (2) raising taxes, more and more governments have started to adopt a third, unconventional choice:

146. Jason Shvili, *Is China A Developing Country?* WORLD ATLAS (Jan. 18, 2021), <https://www.worldatlas.com/articles/is-china-a-developing-country.html>

147. *The World Bank In China – Overview – Context*, *supra* note 144.

148. *Id.*

149. *Id.*

150. MEDIN & LOUIE, *supra* note 83, at 13.

151. See Jia Kang and Zhang Jingjing, *Understanding of the Monetization of Fiscal Deficit*, SINA SPECIAL COLUMN, (Mar. 03, 2021) (贾康、张晶晶：财政赤字货币化的相关认识探讨，新浪專欄，2021年03月03日)，<http://finance.sina.com.cn/zl/china/2021-03-03/zl-ikftssa0156740.shtml>).

152. See also YU Yongding, *China's Reaction to the Global Economic Crisis* RIETI REPORT (Nov. 2009) https://www.rieti.go.jp/en/rieti_report/112.html (stated “China's strong fiscal position and its large domestic market allow China to use expansionary fiscal and monetary policy to stimulate domestic demand to replace rapidly shrank external demand. However, in the longer run, if China fails to change its growth pattern through structural adjustments, China will not be able to sustain its growth in the next 10-20 years.”).

153. Will Kenton, *Monetarist Theory*, *Investopedia*, <https://www.investopedia.com/terms/m/monetaristtheory.asp> [<https://perma.cc/6D3M-F2AV>].

monetization.¹⁵⁴ Additionally, Quantitative Easing (QE) has been frequently used as one of the effective monetary policy choices to increase the money supply.¹⁵⁵ The central bank increases the money supply in the market by purchasing financial assets (such as securities and government bonds) through the secondary markets.¹⁵⁶ In doing so, economic activity is stimulated.¹⁵⁷

However, it is noteworthy that the increase in the money supply may result in inflation risks. According to recent research on Monetary-Fiscal Interaction and QE, when fiscal dominance exists, unconventional monetary policy (such as QE) has similar inflationary consequences to conventional monetary policy because wealth effects impose “downward pressure on prices.”¹⁵⁸ Researchers also discovered that, under the current financial integration environment, “domestic financial conditions are increasingly influenced by global financial conditions.”¹⁵⁹ Accordingly, the unconventional monetary policies implemented in advanced economies have led to “a surge in global liquidity.”¹⁶⁰ In other words, the inflation risk caused by the implementation of QE policy in some advanced economies may have direct impacts or have been directly passed on to other countries. As Iwuala found, as economies become more interconnected, QE in rich countries may result in more money flowing into developing countries, disrupting their currencies, exports, and inflation levels.¹⁶¹

154. See Aidan Lawson and Greg Feldberg, *Monetization of Fiscal Deficits and COVID-19 - A Primer*, Yale School of Management (Aug. 31, 2020), <https://som.yale.edu/blog/monetization-of-fiscal-deficits-and-covid-19-primer> [<https://perma.cc/HH8G-TMKA>] (“monetization—also known as ‘money-financed fiscal programs’ or ‘money-printing’—occurs when the government finances itself by issuing non-interest-bearing liabilities: that is, either currency in circulation or central bank reserves, if the central bank can avoid paying interest on those reserves.”).

155. Kimberly Amadeo, *Explaining Quantitative Easing (QE): How It Allows Central Banks To Create Massive Amounts of Money*, THE BALANCE, (Oct 25, 2021), <https://www.thebalance.com/what-is-quantitative-easing-definition-and-explanation-3305881> (stated “Quantitative easing is a nontraditional technique used by the Federal Reserve to stimulate the economy in times of crisis. It increases the money supply and lowers long-term interest rates, making it easier for banks to lend.”).

156. *Id.*

157. See also Anna-Louise Jackson & Benjamin Curry, *Quantitative Easing Explained*, FORBES ADVISOR, <https://www.forbes.com/advisor/investing/quantitative-easing-qe/> [<https://perma.cc/AZ4A-EJ67>].

158. Josef Hollmayr & Michael Kühl, Monetary-Fiscal Interaction and Quantitative Easing, Deutsche Bundesbank n. 50 (2018) (Our results show that under fiscal dominance, unconventional monetary policy has similar effects to conventional monetary policy on inflation because these wealth effects exert downward pressure on prices.”).

159. Sukhdave Singh, *Spillovers from Global Monetary Conditions: Recent Experience and Policy Responses in Malaysia*, BANK FOR INT’L SETTLEMENTS No. 78 at 229 (2014) (As a result of growing financial integration, domestic financial conditions are increasingly influenced by global financial conditions. This phenomenon has intensified after the advanced economies implemented their unconventional monetary policies, which have led to a surge in global liquidity.”).

160. *Id.*

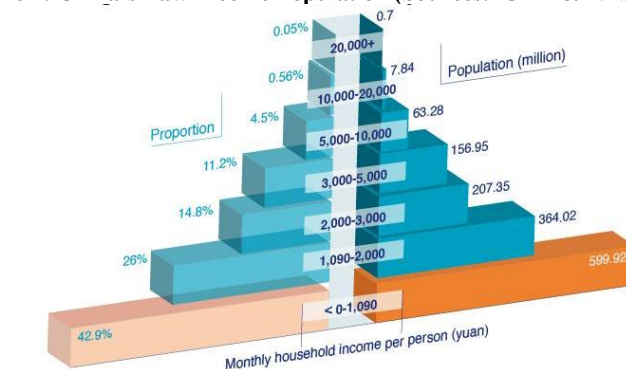
161. See Larry Chukwuemeka Iwuala, *Quantitative Easing, a Necessary Monetary Policy Tool for Post-Coronavirus Economic Recovery*, BUS. DAY (May 31, 2020),

Since China is the largest developing country in the world,¹⁶² it may arguably have to undertake such an impact which is also a further obstacle to the sustainable growth of the national economy in China.

D. Limits of Domestic Demand Stimulation & Dual Cycles Methods

When analyzing the trends of China's economy, many researchers have "focused almost exclusively on consumption," and contend that increasing domestic demand/consumption is one of the "principal means of redressing global imbalance."¹⁶³ However, it does not seem realistic for any country to constantly increase domestic demand/consumption, particularly for developing countries like China. According to the International Monetary Fund (IMF), China became the biggest economy in 2014, measured by purchasing power parity (PPP).¹⁶⁴ Still, China's capability for increasing domestic demand/consumption should not be overstated.

* **Figure 1: China's Low Income Population (Sources: CIID & NBS)**



Based on the data collected in 2019, in 2020, the China Institute for Income Distribution (CIID) of Beijing Normal University and China's National Bureau of Statistics (NBS) completed a joint survey report on family incomes in China (see Figure 1).¹⁶⁵ After analyzing a random sample of 70,000 families collected

<https://businessday.ng/life/article/quantitative-easing-a-necessary-monetary-policy-tool-for-post-coronavirus-economic-recovery/> [<https://perma.cc/9VL3-L8EY>].

162. Jason Shvili, *Is China A Developing Country?* WORLDATLAS (Jan. 18, 2021), <https://www.worldatlas.com/articles/is-china-a-developing-country.html#:~:text=China%20is%20the%20largest%20developing,the%20world's%20second%20largest%20economy.>

163. See generally Peter Wood, *Ch 3 - The Chinese Economy in the Next Decade*, in CHINA 2020: THE NEXT DECADE FOR THE PEOPLE'S REPUBLIC OF CHINA 47-75 (Kerry Brown ed., 2014).

164. China's Economic Rise: History, Trends, Challenges, and Implications for the United States (June 25, 2019) (RL33534) at https://www.everycrsreport.com/reports/RL33534.html#Content_.

165. See Wan Haiyuan & Meng Fanqiang, *Opinion: China Has 600 Million People With Monthly Income Less Than \$141. Is That True?*, CAIXIN GLOB. (Jun. 6, 2020, 6:54 PM),

by the NBS, the CIID found that near 600 million people (42.9 percent of the people in the sample) had a monthly household income per person of less than 1,090 RMB Yuan (around 168 USD per month). Only 8.54 million people (0.61 per cent of the sample) had a monthly household income per person of more than 10,000 RMB Yuan (around 1,545 USD per month).

As some International Monetary Fund (IMF) researchers observed, “China has experienced rapid economic growth over the past two decades and is on the brink of eradicating poverty. However, income inequality increased sharply from the early 1980s and rendered China among the most unequal countries in the world.”¹⁶⁶

Such income inequality has also been recognized by the Chinese government. In May 2020, Chinese Premier Li Keqiang remarked at a press conference following the annual session of the country’s top legislature that China has 600 million people with a monthly income of 1,000 RMB (USD 154).¹⁶⁷ As one commentator observed, the figures opposed popular perception, and demonstrated that more than forty percent of the Chinese population remains low-income.¹⁶⁸

Over the past several decades, China’s economic growth has mainly relied on its manufacturing sector, driven by export markets.¹⁶⁹ China would not be able to transition into “a consumer-oriented society” overnight.¹⁷⁰ Therefore, as a more practical and feasible solution, China may still need to rely on exports to drive the growth of economy.¹⁷¹ China should focus more on “how to turn

<https://www.caixinglobal.com/2020-06-06/opinion-china-has-600-million-people-with-monthly-income-less-than-141-is-that-true-101564071.html> [https://perma.cc/6UKS-BVRT]. See also Research Team of Income Distribution (收入分配研究团队), China Institute for Income Distribution of Beijing Normal University, Beijing Normal U., <http://www.ciidbnu.org/intro.asp?lang=EN> [https://perma.cc/2B9A-XA2U].

166. See Sonali Jain-Chandra and et al., *Inequality in China - Trends, Drivers and Policy Remedies*, (June 2018), IMF Working Papers 18(127):1 DOI:10.5089/9781484357538.001 or https://www.researchgate.net/publication/326453829_Inequality_in_China_-_Trends_Drivers_and_Policy_Remedies at 1-2.

167. Premier Li Keqiang Meets the Press: Full Transcript of Questions and Answers, State Council People's Republic of China (May 29, 2020), http://english.www.gov.cn/premier/news/202005/29/content_WS5ed058d2c6d0b3f0e9498f21.html [https://perma.cc/9JEP-RPCK].

168. Yang Danxu, *600 Million Chinese Earn 1,000 RMB a Month — So Are the Chinese Rich or Poor?*, LIANHE ZOWAO, 2020 (This also poses the questions “Are Chinese people moving up the income ladder and are their lives becoming better as is the common refrain?”).

169. JOHN JOSHUA, *CHINA'S ECONOMIC GROWTH: TOWARDS SUSTAINABLE ECONOMIC DEVELOPMENT AND SOCIAL JUSTICE* 185 (Palgrave MacMillan UK, vol. 1, 2016).

170. See *Transformation to Consumer-Oriented Society: What are Demanding for the Policies?* ANBOUND (May 28, 2019) (“Anbound’s researchers have suggested that China’s gradual entry into a consumer-oriented society is feature of this new era, and it is something that should not be brushed aside.”).

171. Sumathi Bala, *Exports could be Key Driver for China’s Growth as Covid Drags Down Spending, Say Analysts*, CNBC (Jan. 19, 2022), at <https://www.cnbc.com/2022/01/20/china-economy-exports-seen-as-growth-driver-domestic-market-is-weak-.html> (“Exports will continue

China's problem of excess capacity in manufacturing into an opportunity for growth – by encouraging its firms to “go out” in search of foreign customers”¹⁷² rather than how to stimulate domestic consumption. China has also realized that the role of exports cannot be ignored. For example, in response to the instability of the external environment, in 2020, the Chinese government has started to implement a “dual circulation and new infrastructure” strategy, aiming to “develop[] a new circulation system integrated into the international economy by strengthening the internal economic cycle function.”¹⁷³ The dual circulation strategy includes two parts: (1) a “domestic circulation” for activating and expanding domestic markets (for stimulating domestic demands) and reducing China's reliance on outside markets and technology; and (2) an “international circulation” for China to stay on “the current global industrial chain.”¹⁷⁴ Jia summarized the two circulations' interrelationships and pointed out that “domestic circulation is not a denial of international circulation, but a supplement to the existing international circulation.”¹⁷⁵ Therefore, it does not imply a closure of the Chinese economy. By contrast, China is expected to “pursu[e] the fight for international circulation.”¹⁷⁶ In other words, China has never abandoned its export strategy to stimulate its economic growth, including promoting the exports of high-end technology products.

E. Summary and Remarks

Concerning exports in the manufacturing sector, as introduced above, China's manufacturing industry is undergoing a rapid transformation from low-tech assembly to high-tech manufacturing.¹⁷⁷ According to the US National Science Board, China has become the world's leading producer in medium high-

to drive China's economy for the rest of the year as the domestic market remains sluggish, according to analysts.”).

172. See also He Yafei, *China's Overcapacity Crisis Can Spurt Growth through Overseas Expansion*, SOUTH CHINA MORNING POST (Jan. 7, 2014, 12:15 PM), <https://www.scmp.com/comment/insight-opinion/article/1399681/chinas-overcapacity-crisis-can-spur-growth-through-overseas> (“He Yafei suggests how to turn China's problem of excess capacity in manufacturing into an opportunity for growth- by encouraging its firms to 'go out' in search of foreign customers.”).

173. Seung Lee, *China's Economic Challenges Beyond COVID-19* 1-3 (Oct. 29, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3901585 [https://perma.cc/V72M-2CA8] (“Since 2020, the U.S.-China trade war, economic de-globalization, and global epidemic outbreak have exacerbated the instability of the external environment in China.”).

174. Kang Jia, *Accelerating the Construction of a New Development Pattern with the Domestic Circulation as the Mainstay and Mutual Promotion of Dual Circulation*, J. OF CHINESE ECON. BUS. STUD., May 2021, at 8.

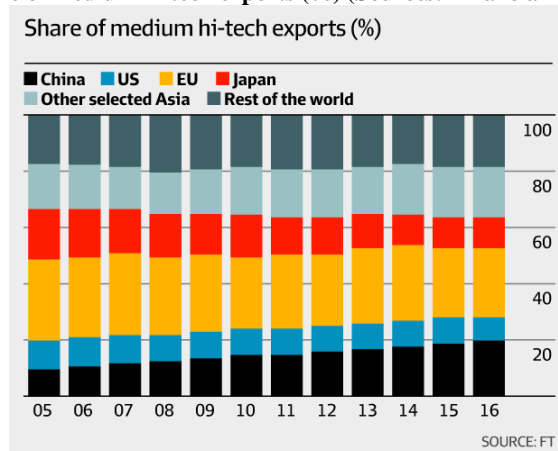
175. *Id.* at 3.

176. *Id.* at 9.

177. Joshua, *supra* note 169.

tech sectors.¹⁷⁸ Its worldwide share nearly tripled in the past decade and reached thirty-two percent.¹⁷⁹ China has surpassed the US in the late 2000s and the EU this decade.¹⁸⁰ (See Figure 2)

***Figure 2: Share of medium hi-tech exports (%) (Sources: Financial Review)**



In other words, China's economic development has started to touch on the areas where the US has had comparative economic advantages for decades – high-end manufacturing and services.¹⁸¹ Therefore, it is clear that the conflict between the US and China in the high-technology market is unavoidable.¹⁸² It seems that both countries cannot afford to lose such a technology war. If the US loses, it may lose its global leadership and may even be at risk of downgrading (or temporarily downgrading) from a high-end and innovation-driven economy to a low-end and non-innovation driven economy.¹⁸³ If China fails, its economic

178. Tom Hancock, *China's Relentless Rise Up the Value-Added Export Chain*, FIN. REV. (Sept. 24, 2018, 4:11 PM), <https://www.afr.com/world/chinas-relentless-rise-up-the-valueadded-export-chain-20180924-h15rhx> [<https://perma.cc/86PS-DDPX>].

179. *Id.*

180. *Id.*

181. MADE IN CHINA 2025 AND THE FUTURE OF AMERICAN INDUSTRY WEDNESDAY, FEBRUARY 27, 2019, UNITED STATES SENATE, COMMITTEE ON SMALL BUSINESS AND ENTREPRENEURSHIP, Washington, DC. <https://www.govinfo.gov/content/pkg/CHRG-116shrg35699/pdf/CHRG-116shrg35699.pdf> (“In May 2015, the government of China released a 10-year plan known as Made in China 2025 to transform its high-tech manufacturing capabilities and achieve new breakthroughs in 10 key industries, including aerospace, biomedicine, and artificial intelligence. China's stated goal is to be 70 percent self-sufficient in high-tech industries by 2025 and a leading manufacturing power by the year 204”).

182. *Id.* (“... China's aggressive strategy to dominate these emerging high- tech manufacturing sectors raise serious concerns, not just in the area of national security, but also to U.S. businesses, both large and small.”).

183. See also Varas and Varadarajan, *supra* note 126 (“once the US loses its global leadership position, this dynamic effectively reverses the industry's virtuous innovation cycle and throws US companies into a downward spiral of rapidly declining competitiveness and shrinking market share and margins.”). Nevertheless, as discussed above, the text between footnote 129

growth may not be sustainable.¹⁸⁴

Under this big picture, we can see that the technology transfer rules in the POA are not a simple codification or specification of China's obligation under the WTO access protocol. Nevertheless, these technology transfer rules are a crucial component of the US's strategies for maintaining its comparative advantages in the global high-technology market and for winning the competition of the global technology leadership.

V. CONCLUSION AND REMARKS

This article examined the political economy behind the technology transfer rules of the POA. It explored different forms of forced technology transfer activities and discussed the in-depth reasons behind the current technology and trade tensions between the US and China. It then explained why the US and China trade war is unavoidable and what economic and political reasons for the global technology leadership competition by the two countries are.

Based on the above analysis, this article concludes that the technology and trade tensions between the US and China cannot be simply resolved by any unilateral approach or POA-like unbalanced, bilateral agreements. Implementing technology transfer rules has become an essential part of the current competition of global technology leadership between the US and China. Such a competition would not be affected or weakened by the change of the US Government Administration from President Trump to President Biden.¹⁸⁵ Similarly, China would not slow down its pace to become an IT powerhouse or miss any opportunities to catch up with the US in high technology markets.

The POA and its technology transfer rules are not the ends of the game but just the start of the global technology leadership competition between the US and China. Therefore, before seeking practical legal solutions for implementing technology transfer rules, it is imperative for future regulators from the US and China to understand both political and economic dimensions behind the current trade and technology tensions between these two countries.

and footnote 135. Since the Obama administration, the US has adopted strong policies to reinvest in the US manufacturing capabilities. This may arguably help the U.S. to minimize the risks of losing the leadership in the high technology market.

184. *The World Bank In China – Overview – Context*, *supra* note 144 (“China’s high growth based on resource-intensive manufacturing, exports, and low-paid labor has largely reached its limits and has led to economic, social, and environmental imbalances. Reducing these imbalances requires shifts in the structure of the economy from low-end manufacturing to higher-end manufacturing and services, and from investment to consumption.”).

185. Bown, *supra* note 130.