

Chapter 10

The Importance of Technological Standards in Chinese Foreign Policy

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Abstract: This article explores the evolving role of technological standards from apolitical, technical specifications into critical instruments of geopolitical rivalry, focusing primarily on the foreign policy of the People's Republic of China. As China transitions from a technological imitator to a global leader, it increasingly leverages standard-developing organizations (SDOs) and the Belt and Road Initiative (BRI) to export its technological solutions worldwide. Through case studies of WAPI, TD-SCDMA, New IP, and 5G, the paper illustrates China's underlying motivations, including the pursuit of cyber sovereignty and the circumvention of Western licensing fees. Despite facing significant resistance from Western nations in international forums, China's de facto standardization efforts in developing nations are creating technological dependency traps. The article concludes with strategic, educational, and research recommendations for the European Union, emphasizing the need for a multidisciplinary approach to monitor and counter these initiatives to protect human rights and an open global internet.

Keywords: Technological standards, Chinese foreign policy, geopolitics, Belt and Road Initiative, standard-developing organizations

Technological standards are specifications that outline how devices should be constructed, how software should operate, and, more broadly, how technologies should function to ensure their efficiency and compatibility with other

products. Modern technological standards represent one of the pivotal forces driving globalization, facilitating the seamless operation of international economic systems. Both physical and digital compatibility and interoperability are crucial elements of the global economy, enabling the efficient exchange of information and reducing production costs.

Examples of success in this area include Wi-Fi, which allows devices to connect anywhere in the world, or even such a seemingly trivial matter as the A4 paper format, which enables the use of standardized printing devices globally. Through the harmonization of standards, global networks such as the internet or radio communication can function worldwide without disruption.

Technological standards are developed by national, regional, and international standards-developing organizations (SDOs) through a process based on transparency, collaboration, and consensus.¹ Engineers, scientists, and industry representatives participate in this process, resulting in solutions that are acceptable to a wide range of stakeholders. This approach has historically led to the perception that technical standards were apolitical, existing outside of competition. However, this perspective is shifting, as the geopolitical nature of standards becomes increasingly evident.²

Technological standards are also referred to as soft law,³ norms, principles, and guidelines that, while not legally binding in the traditional sense, influence the behaviors of states, international organizations, businesses, and other entities. Although standards are voluntary, their adoption brings significant technical and economic advantages to those promoting the solutions. As a result, their significance extends beyond technical aspects; they also play a strategic role in establishing market advantages and potentially geopolitical influence in the future.

Nations and corporations that dominate the standardization process can secure influence over international markets and, subsequently, legally protect

¹ Laura DeNardis, ed., *Opening Standards: The Global Politics of Interoperability* (MIT Press, 2011).

² Andrew D. Bishop, "Standard Power: The New Geopolitical Battle," *The National Interest*, October 7, 2015, <https://nationalinterest.org/feature/standard-power-the-new-geopolitical-battle-14017>.

³ Francis Snyder, "EU, China, and Technical Standards in the Belt and Road Initiative (BRI): Extraterritoriality or Transnational Governance?" *SSRN Electronic Journal*, June 26, 2020, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4378035.

their right to benefit from licensing fees for key technologies if the standard includes patented solutions to which they hold property rights (Standard Essential Patents or SEPs). The standardization process, which involves compromise and cooperation, reflects global efforts toward integration. However, in recent years, standards have also become a field of increasingly intense geopolitical rivalry.⁴ This trend is largely driven by the rising ambitions of the People's Republic of China.

China's Standardization Strategy: A Global Context

China, as a latecomer and a developing nation, has historically sought to promote its own technological standards across various new technologies. The Chinese standardization system has undergone three stages of transformation: from a phase of imitation, through a stage of catching up, to the current phase of modernization.⁵ In this modern phase, technological standards are no longer merely tools for harmonizing domestic processes; they have become significant instruments of international influence.

There is increasing evidence suggesting that the world is fracturing into at least two conflicting blocs—these divisions are currently ideological but may soon extend to technological domains. One bloc consists predominantly of democratic nations led by the United States, while the other bloc comprises non-liberal-democratic states such as China and Russia, united by their opposition to the United States.

The limited success of China's efforts to establish global alternative standards to those supported by Western nations and their allies cannot serve as a reliable predictor for the future. This is because China is increasingly placing its citizens in decision-making positions within SDOs.⁶ Additionally,

⁴ Tim Rühlig, "The New Geopolitics of Technical Standardisation: A European Perspective," *Future Europe Journal* 3, no. 1 (2023), <https://feu-journal.eu/issues/issue-3/the-new-geopolitics-of-technical-standardisation-a-european-perspective/>.

⁵ You-hong Yang, Ping Gao, Haimei Zhou, "Understanding the Evolution of China's Standardization Policy System," *Telecommunications Policy* 47, no. 1 (2023): 1–15, <https://doi.org/10.1016/j.telpol.2022.102478>.

⁶ US-China Economic and Security Review Commission, *Europe-China Relations* (2023): 537–538. https://www.uscc.gov/sites/default/files/2023-11/Chapter_5_Section_1--Europe-China_Relations.pdf.

China is creating its own regulatory forums, such as the World Internet Conference—a global conference on internet issues and policies promoted by China, which challenges the vision of a global internet advocated by the Internet Corporation for Assigned Names and Numbers (ICANN).

Furthermore, China is de facto implementing its technical standards by co-financing and executing projects within the framework of the Belt and Road Initiative (BRI), which adopt Chinese solutions. The Digital Silk Road (DSR), a key component of BRI, is specifically responsible for promoting Chinese technological solutions and associated standards in the latest telecommunications technologies. This initiative plays a pivotal role in Africa, where 4G and 5G networks are being developed by Chinese companies such as Huawei and ZTE.

As part of the BRI, technical standards agreements are signed, although there is a lack of transparency regarding their detailed scope.

China's Motivations for Promoting Its Own Standards

Currently, there are several reasons why China is actively promoting its own technological standards.⁷ Through these actions, China demonstrates its understanding that the ability to shape standards can effectively expand its economic, legal, political, and ideological resources.⁸

China's strategy aims to overcome what it perceives as a disadvantageous situation where it must pay excessive fees for using technologies patented by non-Chinese entities.⁹ Another motivation is to pressure licensors to lower their financial demands by threatening to establish alternative solutions.

In recent years, however, the primary motivation appears to be the desire to strengthen China's international position and promote "cyber sovereignty"—a concept that reflects not only independence from the United

⁷ Tim Rühlig, "Chinese Influence through Technical Standardization Power," *Journal of Contemporary China* 32, no. 139 (2023): 54–72, <https://doi.org/10.1080/10670564.2022.2052439>.

⁸ Tim Rühlig, "Chinese Influence through Technical Standardization Power," 54–72.

⁹ Michael Murphree and Dan Breznitz, "Standards, Patents and National Competitiveness," *Centre for International Governance Innovation*, no. 40, (2016): 7, <https://www.cigionline.org/publications/standards-patents-and-national-competitiveness/>.

States but also domestic sovereignty, which involves greater control over Chinese society and the promotion of Chinese values. This motivation is often referred to as “techno-nationalism,” which can manifest with varying degrees of intensity.¹⁰

Examining a few examples will serve to illustrate the significance of China in the global standard-setting process.

WAPI

In 2004, China introduced the WLAN Authentication and Privacy Infrastructure (WAPI) as a mandatory national encryption standard to serve as an alternative to the international Wi-Fi standard (IEEE 802.11). Although WAPI was incompatible with international norms, Beijing anticipated that its large consumer base could be leveraged to promote this alternative technological solution. However, China’s actions triggered protests within international standardization bodies such as the Institute of Electrical and Electronics Engineers (IEEE) and the International Organization for Standardization (ISO). Concerns were raised, particularly regarding the lack of transparency in WAPI’s development process and the potential presence of “backdoors” in the system, which posed security risks.¹¹

The United States and various international organizations pressured China to collaborate with global standardization institutions to modernize existing solutions rather than introducing an alternative standard. As a result, China abandoned efforts to promote WAPI as an international standard in 2009. Notably, during the same period, South Korea attempted to advance its own standard, the Wireless Internet Platform for Interoperability (WIPI), aimed

¹⁰ Jun Li, Yuning Liu and Cong Cao, “Competition and Collaboration: The Rise of the Chinese Standardization System,” *Technological Forecasting and Social Change* 139 (2019): 10–18. <https://doi.org/10.1016/j.techfore.2018.09.004>; Jie Zhang and Zhimin Li, “The Impact of Information Transparency on Supply Chain Performance: A Review of the Literature,” *International Journal of Information Management* 52 (2020): 102–145. <https://doi.org/10.1016/j.ijinfomgt.2020.102145>; Yuxi Li, Wei He and Jun Hou, “A Policy Review on the Development of Artificial Intelligence and Robotics in China: From the Perspectives of Technology, Market, and Policy,” *International Journal of Information Management* 56 (2021): 102–145. <https://doi.org/10.1016/j.ijinfomgt.2020.102145>.

¹¹ Brian J. Delacey et al., Government Intervention in Standardization: The Case of WAPI (2006): 10–11. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=930930.

at unifying mobile internet platforms. However, this initiative was similarly blocked by a coalition led by US technology companies.¹²

TD-SCDMA

Another example of China's attempt to promote its own standard is the Time-Division Synchronous Code-Division Multiple Access (TD-SCDMA), developed by the Chinese Academy of Telecommunications Technology (CATT). This standard was designed to support the growth of the domestic telecommunications industry and reduce the outflow of licensing fees. Backed by the Chinese government and certified by 3GPP as a variant of the 3G network standard, TD-SCDMA was deployed by China Mobile, the world's largest mobile operator by subscriber base.

Despite China's large domestic market, the effort to popularize TD-SCDMA failed internationally. The standard was deemed inefficient and inferior to existing global alternatives. Consequently, to ensure the quality of broadband mobile internet, China transitioned to Long-Term Evolution (LTE) technology, in which the European Telecommunications Standards Institute (ETSI) played a pivotal role.

New IP

New Internet Protocol (New IP) is another example of China's attempt to establish its own technical standard. Developed by Huawei, New IP was proposed as a replacement for the traditional Transmission Control Protocol/Internet Protocol (TCP/IP) architecture.¹³ Work on this proposal began in 2018, and it was presented in 2019 at the International Telecommunication Union Telecommunication Standardization Advisory Group (ITU-T TSAG), a specialized United Nations (UN) agency responsible for telecommunications standards.

The ITU holds particular significance in the strategies of non-Western countries because, as part of the UN, it operates on a one-country, one-vote

¹² Heejin Lee and Sangjo Oh, "The Political Economy of Standards Setting by Newcomers: China's WAPI and South Korea's WIPI," *Telecommunications Policy* 32, no. 9–10 (2008): 662–671.

¹³ Michael Safi and Patrick Wintour, "China and Huawei Propose Reinvention of the Internet," *Financial Times*, March 27, 2020, <https://www.ft.com/content/c78be2cf-a1a1-40b1-8ab7-904d7095e0f2>.

principle, increasing the likelihood that non-democratic nations can pass their proposals. The goal of New IP was to better support modern technologies such as the Internet of Things (IoT), telemedicine, and autonomous vehicles. New IP offered deterministic routing for faster and more predictable data transmission, essential for low-latency applications. However, it also facilitated greater control over information flow, enabling censorship and surveillance and potentially contributing to internet fragmentation.¹⁴

A key aspect of New IP was the shift of complex network functions from endpoints to the network core, allowing for advanced data flow control. This approach aligned well with China's concept of cyber sovereignty,¹⁵ wherein nation-states regulate information flow within their territories, contradicting the traditional vision of an open global internet. Despite Huawei's efforts to rebrand the proposal as "Future Vertical Communications Networks (FVCN)," New IP was ultimately rejected by ITU-T in December 2020 following opposition from the United States and its like-minded allies.

5G

After failing to establish its own 3G standard and playing a minor role in 4G development, Chinese authorities strategically prioritized the development of 5G technology. Recognizing 5G's potential to deliver technological and geopolitical advantages, China highlighted this priority in its strategic documents "Made in China 2025"¹⁶ and "China Standards 2035."¹⁷ These

¹⁴ Julien Nocetti, *Un Internet en morceaux? Fragmentation d'Internet et stratégies de la Chine, la Russie, l'Inde et l'Union européenne* (Ifri, 2024).

¹⁵ Anqi Wang, "Cyber Sovereignty at Its Boldest: A Chinese Perspective," *Ohio State Technology Law Journal* 16 (2020): 395, <https://ssrn.com/abstract=4779801> or <http://dx.doi.org/10.2139/ssrn.4779801>.

¹⁶ Center for Security and Emerging Technology, *Made in China 2025* (Georgetown University, 2021), https://cset.georgetown.edu/wp-content/uploads/t0432_made_in_china_2025_EN.pdf.

¹⁷ China Briefing, "China Standards 2035 Strategy: Recent Developments and Their Implications for Foreign Companies," *China Briefing*, July 12, 2022, <https://www.china-briefing.com/news/china-standards-2035-strategy-recent-developments-and-their-implications-foreign-companies/>; Keiti (Huiting) Wei, "China's National Standardization Development Outline: Policy Implications and Future Directions," Institute for Future Initiatives, Securities Studies Unit, University of Tokyo 47, No. 2 (2022): 1–15, <https://doi.org/10.1016/j.telpol.2022.102478>.

documents position 5G as a key technology where China aims to achieve global leadership.¹⁸

5G technology not only supports faster data transmission but also enables advancements in areas such as IoT, autonomous vehicles, smart cities, and Industry 4.0. Chinese companies currently account for approximately 35% of contributions to 5G standards established by the 3rd Generation Partnership Project (3GPP), surpassing contributions from Europe (32%) and the United States (16%).¹⁹

While China has achieved technological self-reliance in 5G, US security concerns, exemplified by initiatives like the Clean Network,²⁰ have led American allies in Europe and Asia to seek ways to limit the use of Huawei equipment.²¹

Conclusion and Recommendations

The examples mentioned previously indicate that China still possesses limited ability to impose specific international technological standards through SDOs.²² In the cases described, Chinese initiatives were blocked, making the formal adoption of standards promoted by Chinese enterprises largely ineffective. In response to the strong resistance from Western nations and other like-minded countries, China employs alternative tools to build its technological sphere of influence, particularly through de facto standardization, implementing technological solutions without formal approval by SDOs.

The Belt and Road Initiative (BRI) plays a pivotal role in this strategy, serving as a means to export Chinese technologies and standards to

¹⁸ Elsa Kania, "China's Play for Global 5G Dominance: Standards and the Digital Silk Road," *The Strategist*, June 27, 2018, <https://www.aspistrategist.org.au/chinas-play-for-global-5g-dominance-standards-and-the-digital-silk-road/>.

¹⁹ Tim Nicholas Rühlig and Tobias ten Brink, "The Externalization of China's Technical Standardization Approach," *Development and Change* 52, no. 5 (2021): 1207, <https://doi.org/10.1111/dech.12685>.

²⁰ U.S. Department of State, "The Clean Network," *U.S. Department of State*, accessed June 14, 2024, <https://2017-2021.state.gov/the-clean-network/index.html>.

²¹ Zhan Zhang, "Technology and Geopolitics: The Social Construction of Huawei's 5G Controversy in Europe," *Global Media and Communication* 20, no. 2 (2024): 217–235, <https://doi.org/10.1177/17427665241251448>.

²² Sorina Teleanu, *The Geopolitics of Digital Standards: China's Role in Standard-Setting Organisations* (DiploFoundation, 2021), <https://www.diplomacy.edu/wp-content/uploads/2021/12/Geopolitics-of-Digital-Standards-Dec-2021.pdf>.

other countries, thereby creating potential technological “dependency traps.”²³ These traps operate such that adopting one Chinese technological solution necessitates using other compatible solutions. Chinese activity is particularly notable in Africa²⁴ and Southeast Asia,²⁵ where the adoption of Chinese technological standards will significantly impact the future trajectory of industrial and trade development on these continents. For example, adopting Chinese standards in telecommunications infrastructure or railway systems not only ensures compatibility with other Chinese technologies but also requires adherence to Chinese norms and the training of personnel capable of maintaining and operating these systems.

Huawei, in particular, leverages its resources to build relationships with universities in African countries. Through these efforts, Huawei not only promotes its own equipment and standards but also offers certifications as alternatives to those provided by Western entities.²⁶ This approach grants Chinese enterprises a structural and long-term advantage.

A growing concern is China’s capability to deploy network monitoring solutions that control and filter both incoming and outgoing content within China’s cyberspace, known as the “Great Firewall of China.” Moreover, these solutions, along with the underlying philosophy of maintaining social stability at the expense of individual freedoms, are often seen as desirable capabilities in non-democratic states. A notable example is Cambodia’s replication of China-style firewall capabilities.²⁷

²³ Tim Rühlig, “China’s Technical Standardization Power – A Challenge for NATO?” *International Journal* 78, no. 4 (2023): 625–633, <https://www.swp-berlin.org/10.18449/2019C29/>.

²⁴ Juan Vázquez Rojo, “China’s Technological Footprint in Africa: A Patent Network Analysis,” *South African Journal of Business Management* 55, no. 1 (2024), <https://sajbm.org/index.php/sajbm/article/view/4331/2854>.

²⁵ ARTICLE 19, *Digital Silk Road: Advancing China’s Model of Digital Authoritarianism*, March 2024, https://www.article19.org/wp-content/uploads/2024/04/DSR_final.pdf.

²⁶ Matthias Bauer and Nadine Godehardt, “Learning along the Digital Silk Road? Technology Transfer, Power, and Politics in China’s ICT Engagements in Algeria and Egypt,” *The Information Society* 40, no. 2 (2024): 146–147, <https://doi.org/10.1080/01972243.2024.2317060>.

²⁷ ARTICLE 19, *Digital Silk Road: Advancing China’s Model of Digital Authoritarianism*, (2024): 31–37, https://www.article19.org/wp-content/uploads/2024/04/DSR_final.pdf.

Strategic Recommendations

Protecting values and principles requires EU member states to focus not only on content regulation but also on the hardware layer and the technological standards underpinning it. Technological standards will undoubtedly remain a permanent aspect of US-China competition, especially in the realm of cutting-edge technologies. The optimal strategy for EU Member States in this conflict is to closely monitor Chinese activities within SDOs that aim to establish alternative solutions, particularly in the context of protecting an open internet and human rights.

A multidisciplinary approach is essential for analyzing these processes, as they cannot be fully addressed through technical, legal, or international security expertise alone.

Policy Recommendations

Protecting values and principles requires EU Member States to focus not only on content regulation but also on the hardware layer and the technological standards underpinning it. Technological standards will undoubtedly remain a permanent aspect of US-China competition, especially in the realm of cutting-edge technologies. The optimal strategy for EU Member States in this conflict is to closely monitor Chinese activities within SDOs that aim to establish alternative solutions, particularly in the context of protecting an open internet and human rights.

A multidisciplinary approach is essential for analyzing these processes, as they cannot be fully addressed through technical, legal, or international security expertise alone.

Research and Educational Recommendations

1. Research:

- Increase financial support for research programs addressing the potential risks of implementing standards that challenge existing solutions, especially in the field of telecommunications technology, which underpins future knowledge-based economies.

2. Education:

- Integrate the (geo-)political dimension of standardization policy into technical and legal curricula.
- Expand International Relations and International Security Studies programs to include content that explains the technical aspects of standardization (particularly for emerging technologies).
- Incorporate the legal-procedural aspects of the standard-setting process into existing curricula to provide a comprehensive understanding of how technical standards are established and enforced.

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