RECONNECT CHINA POLICY BRIEF 19

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Technical Standards, Soft Connectivity and China's Belt and Road: Towards greater convergence or fragmentation?

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Executive summary:

As the intensification of geopolitical competition points toward increased global fragmentation, the definition of technical standards for future markets and industries will play an important role in determining just how deep the fissures will run. China has been a proactive contributor to the development of global standards via established international forums for more than a decade. Its participation has not been without friction, but nevertheless helps to ensure a meaningful level of technological and market convergence across the global economy.

Running in parallel to its engagement in global standards forums, China has multiplied its pathways of engagement in the field through bilateral and regional standards cooperation and "mutual recognition" agreements. Today, Beijing has concluded 108 such agreements with 65 national, regional and other institutional partners. Such developments have raised concerns about the potential for fragmentation of regional standards and the development of economic spheres of influence organized around competing technical standards regimes. The Belt and Road Initiative (BRI) serves as a framework for concluding many of these agreements, but ultimately has little value as a platform for cooperation in and of itself. So far, on standardisation, the BRI is rather a patchwork of distinct bilateral, regional, and often sector-specific collaboration efforts between China and a diverse range of partners. Yet, as Beijing angles to present alternative pathways for global development, seeking to position itself as the voice of the Global South, outreach and technical assistance in areas such as standardisation have an important diplomatic role to play.

Yet the de-facto pathway to an internationalization of Chinese standards ultimately runs through concrete investments, wherein the "soft" connectivity of standards accompanies the "hard" connectivity of infrastructure and technology. Herein, Chinese firms play a vital role in carrying Chinese standards overseas, and while companies are increasingly central in defining China's own national standards, they also have a keen interest in ensuring that their standards are compatible with global partners and competitors alike.

Policy recommendations:

- In this context, the EU must strengthen its own standards diplomacy, deepening engagements with overseas partners, particularly across the Global South.
- Such engagements must serve to complement and strengthen global standards frameworks, better integrating partners into the international standards ecosystem, rather than reinforce fragmentation.
- Investing in European technological and industrial competitiveness is ultimately the most important pathway to ensuring Europe remains a global standards leader.

INTRODUCTION

As China has emerged as a formidable global economic and techno-industrial powerhouse, Beijing has come to view technical standards as important catalysts for future growth and development, as a means for cementing China's place at the centre of the global economy, and as a pathway for establishing China as "a modernized socialist world power".¹ For much of the last decade, the notion of connectivity has been a pillar of China's efforts to deepen integration with regional and global partners, notably through its Belt and Road Initiative (BRI). Complementary to "hard connectivity" through wellpublicized infrastructure projects such as railways, power grids, internet cables or telecommunications networks, technical standards fulfil a less visible but no-less important "soft connectivity" function. Indeed, standardisation eases technical barriers to trade and investment, creating better synergies within and across markets by improving the interoperability of goods and services. But setting and promulgating standards can also be a source of competition, even tension, particularly in areas where global standards have not been formed and where national and regional standards markedly diverge.

This Policy Brief sets out to frame the importance of technical standards, particularly in today's increasingly contentious geopolitical environment, and to focus in on one dimension of China's international standardisation strategy – that of regional and bilateral cooperation and de-facto standardisation, particularly as framed in the context of the BRI. It will notably draw examples from China's deepening cooperation with Southeast Asia and Africa in the field.

THE HIGH STAKES OF SEEMINGLY BENIGN STANDARDS

Technical standards are the definition of processes or technical specifications that are designed to improve the quality, security, environmental impact and interoperability of goods and services in any field. For example, Internet Protocol standards, which for the time being are largely recognized and applied worldwide, lay out the technical specifications for how the global internet functions – from defining domain names to how data flows and is stored. Electric vehicle (EV) charging standards, which are rather market-specific, define the electrical currents used to charge a vehicle and offer specifications for the size and shape of charging plugs. In the case of high-speed rail (HSR), which also have national and regional specificities, standards clarify technical definitions for infrastructure such as railway gauges and electrical systems, rolling stock, or operational functionalities such as signalling and long-range control features as well as related security features.

To be sure, technical standardisation can vastly improve the quality of life, bringing tangible health, environmental and social benefits. They can furthermore help to catalyse innovation and facilitate technology adoption and diffusion. Still, what may appear as benign technical specifications developed by trained engineers and experts can in fact have wide-ranging economic, security, and even political implications. In an era of heightened geopolitical competition, they have therefore taken on greater salience, particularly as the digital and energy transitions gain momentum and the technical standards that will underpin the technologies of the future are still being developed.

Importantly, standardizing processes and specifications can shape entire technological ecosystems, producing lock-in effects and path dependencies for associated products and services. While typically voluntary by nature, technical standards can indeed take on such constraining features through at least three processes:

- De-facto standardisation occurs through large-scale adoption and market dominance. This is the case, for instance, with the nearly global adoption of Microsoft's standards for computing software. As Chinese firms become industry leaders in a broad range of fields, from clean energy to the digital economy, they will increasingly be in a position to shape de-facto industry standards through dominant market positions, for instance in highspeed rail, smart city designs or energy infrastructure.
- Standards are embedded into key technologies or core infrastructure through consensus. Multistakeholder groupings such as the 3rd Generation Partnership Project (3GPP), for example, can coordinate the development of global standards, for instance for 3G, 4G and now 5G telecommunications systems, wherein Chinese firms such as Huawei have played a key role in shaping

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technology. In another example, the reference architecture that defines the broad parameters of the Internet of Things (IoT) – a set of standards developed by China's Wuxi IoT Research Institute – was adopted as an international standard by the International Organization of Standardization (ISO) in 2018 (ISO/IEC 30141).

• Standards take on regulatory functions. The EU's system of harmonized standards, for instance, has been developed to ease the process of certifying conformity with European regulations, such as the AI Act adopted in 2023. China, meanwhile, uses a mandatory standard label (guobiao, GB) to ensure nation-wide application of certain standards. In the healthcare sector, for instance, and estimated one quarter of technical standards in China are mandatory.²

There are clear economic incentives to defining standards, as they afford comparative advantages for those who know how to master and apply them. At times, intellectual property rights, and thus questions around associated royalties, are integrated into technical standards themselves, particularly in the high-tech realm. Moreover, technical standards can play an important role between market openness and in adjusting fragmentation. On the one hand they can ensure synergies and interoperability across markets. On the other, they can be used to lock out competition as a way to protect domestic markets or, in effect, to develop economic spheres of influence in foreign markets.³ The worldwide application of Internet Protocol or of 3G, 4G and 5G telecommunications standards, for instance, has helped to grease the wheels of globalization, but national and regional divergences in technical standards can also produce market fragmentation and reinforce underlying geopolitical fissures. Indeed, more than economic tools, standards often reflect the worldview of those who develop them, integrating cultural or political norms,⁴ for instance around user anonymity and data privacy or contrasting notions of an open vs. sovereign Internet. More broadly, standards can generate a conceptual framework for how goods and services are developed and applied and define what can technically be achieved within a standardized set of parameters.

CHINA'S STANDARDISATION STRATEGY AND ITS EVOLUTION

China has rapidly emerged as a standard setting-power.⁵ From a position of standards taker, riding in the tide of globalization through the 1990s and early 2000s, it has since espoused and made good on its ambitions to become a global standards maker, as it increasingly carves out a leading position in the development of new technologies and capitalizes on the pull factor of its considerable market size.⁶

Such a shift is part of a broader, long-term strategy to build and consolidate national power. As China has sought to capitalize on what Xi Jinping and the country's leadership has framed as "changes unseen in a century",⁷ including the emergence of breakthrough, or disruptive technologies such as AI, quantum or new energy technologies, coupled with changes in the geopolitical landscape and the regional and global balance of power, technical standardisation has played a key role.

The ability to define standards that ultimately shape technologies and markets is intricately tied to the notion of sovereignty and power. China's reliance on foreign standards for the early development of its telecommunications infrastructure (namely the USderived CDMA and Europe's GSM), for instance, was seen in Beijing as posing a considerable security risk to the nation's ICT infrastructure.⁸ The ambition not only to be competitive in the telecommunications market but also to shape the standards of later generations of ICT technology therefore helped to spur the emergence of leading Chinese firms such as Huawei and ZTE that are now central players in setting global standards in the field. Across the board, whether in broad industrial strategies such as Made in China 2025, technology-specific plans in Al or quantum, or industry and application-specific policies towards autonomous vehicles or Lithium-ion batteries, the Chinese authorities have highlighted the key role that standardisation plays in ensuring technological competitiveness and cementing leadership.⁹

In order to fulfil such high expectations for technical standardisation, China has redoubled its efforts since 2015 to upgrade its national standardisation

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infrastructure and improve its ability to both set standards at home and better participate in and influence standardisation abroad. Following the adoption of a new legal framework for technical standardisation in 2017, a process known as China Standards 2035 was then undertaken as a multistakeholder exercise to devise a long-term strategy. China's National Standardisation Development Outline, published by the Central Committee of the Chinese Communist Party and the State Council in 2021, was a direct result of this process.¹⁰ Two features of the 2021 Outline are worth highlighting for the purposes of the analysis to follow on China's bilateral and regional cooperation and de-facto standards dissemination.

Reinforcing a more multistakeholder approach to Chinese standards development and promotion. One important feature of the technical standardisation process in China is the direct implication of the state. In the United States or Europe, standards development bodies are independent from the government. The Standards Administration of China (SAC) – the agency in charge of overseeing national standards development and coordinating Chinese participation in standardisation abroad - is an arm of the State Administration for Market Regulation (SAMR), which is under the direct authority of the State Council. This means that standardisation is directly tied into the political structure of the state and more tightly woven into the patchwork of national strategy. Yet, the reforms that China has undertaken aim at bolstering the multistakeholder standardisation process. Indeed, the 2017 standardisation law, ¹¹ for instance, underlined the role of "enterprise standards" (i.e. those developed by firms) and established a new category of "association standards" that essentially allow independent, multistakeholder groupings, including industry associations, to develop and certify their own standards. The 2021 Outline stipulates that by 2025 standardisation will be equally government and market driven, meaning that firms and other stakeholders – i.e. those who possess a more precise understanding of technologies and markets – have a more prominent role to play in developing standards. As such, the state is no longer the only promoter of technical standards and firms themselves are expected to play a more prominent role not only in developing but in purveying Chinese standards overseas. The Outline also confirms China's intention, inscribed in Article 15 of the Foreign Investment Law¹² in force since 2020 though applied with varying degrees of effectiveness, ¹³ to give full play to foreign-invested enterprises within China's standard-setting process.

Α multi-vectored approach international to standardisation. The Outline shifts the focus from an approach oriented primarily towards domestic standards development to "a model of mutual promotion between domestic and international interests". To be sure, China has been a highly proactive participant in international standardisation over the last decade. The strategy to 2035 confirms this trend and highlights a multi-vectored, multi-layered approach. China will seek to reinforce the international standardisation architecture centred around forums such as the ISO as well as those couched within the United Nations system (for instance International Telecommunications Union, ITU). At the same time, China has forged and will continue to develop standards cooperation both outside and in complement to these international forums through bilateral and regional standards cooperation with partners across the globe. What's more, the strategy explicitly encourages the "relocation of international professional standards organizations to China". This implies that, as China establishes leadership positions in the industries of the future, it will seek to enhance convening power over discussions around how global standards for these industries should be set, in much the way that today's multistakeholder industry groupings such as the European Telecommunications Standards Institute (ETSI), the Institute of Electrical and Electronics Engineers (IEEE) or the Internet Engineering Task Force (IETF) are located in Europe and the United States.

CHINA'S REGIONAL AND BILATERAL STANDARDS COOPERATION

The political and geopolitical implications related to China's increasingly proactive involvement in international standards development organizations such as the ISO, the ITU or the International Electrotechnical Commission (IEC) have been well documented and studied. ¹⁴ While China has invested considerable time and attention into these consensus-based forums, with some notable successes, it has not gained the degree of

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influence that it may have otherwise hoped. In complement to this growing body of literature, it is worth reflecting on the implications of China's efforts to develop standards cooperation at the bilateral and regional levels and engage in de-facto standards diffusion, particularly in light of the country's evolving standardisation strategy.

As of today, China has concluded 108 standards cooperation agreements with 65 countries and regional organizations, a number that has doubled over the last ten years (see Figure 1).¹⁵ These agreements span a broad range of countries, regions and sectors. They include agreements with organizations such as the ISO, IEC or UN institutions such as UNIDO, regional groupings such as ASEAN and European standards organizations (CEN and CENELEC), as well as countries across all 5 continents, including France, Germany or the UK. While the impressive number of China's agreements give pause, and are often flagged as a potential source of concern, such regional and bilateral arrangements are by no means unique, with European counterparts also engaging in standards outreach and diplomacy, including with China.

A few examples from Southeast Asia and Africa will help to illustrate the diversity of scope. The China-ASEAN Standardization Cooperation Forum, for example, is an arrangement with a broad, multifaced scope that provides regular opportunities for exchange. Launched in 2019, the forum meets every other year to address standards development across a range of areas from agriculture to new energy vehicles to smart cities. Other instance the African agreements, for with Standardization Organization (ARSO) in 2021 or African Electrotechnical Standardization Commission in 2023, are simple Memorandums of Understanding (MoUs). They appear to be mere framework agreements wherein few details are available on the types of dialogue or cooperation envisioned, which does not preclude a further deepening of exchanges in the future. Indeed, the Action Plan for the Forum on China-Africa Cooperation (FOCAC), agreed upon by Chinese and African leaders in Beijing in September 2024, foresees the establishment of a China-Africa Center for Standardization Cooperation and Research within the next two years.¹⁶ Still other cooperation formats are much narrower in scope, such as twinning assistance programs for Laos and Nigeria, launched in 2021, to assist with capacity building and integration of these countries into the ISO and IEC. Indeed, China often hosts standardisation workshops and training sessions for partner countries.



Figure 1. China's Bilateral and Multilateral International Standardisation Cooperation Agreements

Source: State Administration for Market Regulation (Standardization Administration of China) [市场监管总局(国家标准委)], Belt and Road Initiative 10th Anniversary Standardization Achievement Report [一带一路 10 周年标准化成果报告], December 2024.

One major difference in China's case as compared for instance to the experiences of European standards organizations is the tight linkages between the SAC and national policy, which gives such agreements a higher degree of political significance, whether the agreements themselves are substantive or purely symbolic. In this sense, China's efforts to promote "mutual standards recognition" should be seen within a broader diplomatic context. Particularly as Beijing angles to present alternative pathways for global development, angling to position itself as the voice of the Global South, outreach and technical assistance in areas such as standardisation, which has the net effect of assisting partner countries to better integrate into regional and global trade networks, have an important diplomatic role to play.

THE BELT AND ROAD LABEL

Importantly, China's Belt and Road Initiative has played a prominent role in framing this cooperation. Starting in 2015, the SAC and the National Development and Reform Commission (NDRC) laid out multi-year BRI action plans to guide the development of cooperation in the field, establishing for instance digital platforms for translating and sharing information on national standards among BRI countries. New bilateral or regional cooperation agreements are often publicized during BRI summits, and in Beijing's reporting, half (54) of the identified standardisation agreements have been concluded with 43 "countries participating in the Belt and Road Initiative". Over the course of the China Standards 2035 deliberation process, moreover, a proposal was floated to create a formal institution in the form of a BRI Regional Standards Forum, which could have functioned as an international standards development organization in its own right.¹⁷ The proposal was ultimately not retained explicitly in the 2021 long-term strategy, but it nevertheless reflects the degree to which the BRI functions as an important conceptual framework for considering how China may engage with its partners in promoting standards development outside of the established international frameworks, particularly in pursuit of China's goal to on-shore international collaboration on the development of global industry standards. The BRI is therefore often interpreted as a

primary platform upon which China seeks to formalize its internationalization strategy in the standards domain.

However, available evidence, including a closer reading of the recently-published Belt and Road Initiative 10th Anniversary Standardization Achievement Report generated by the SAC in December 2024,¹⁸ suggests that what is pitched as co-constructed collaboration on standards among BRI countries is, in reality, a patchwork of distinct bilateral, regional, and often sector-specific collaboration efforts between China and a diverse range of partners, whether or not those partners themselves engage actively in the BRI. Key goals of the BRI standards action plans also appear to fall short of expectations. The common BRI standards information platform set up by the China National Institute of Standardization in 2019 to help coordinate standardisation across BRI countries, for instance, yields little content and, at the time of writing, has not been updated since 2022.¹⁹ For the time being, at least, the BRI label seems in fact to be just that, a conceptual label, behind which the only common thread that links otherwise disparate standards coordination initiatives is China.

DE-FACTO STANDARDISATION AND THE CENTRAL ROLE OF CHINESE FIRMS

Underneath the veneer of framework agreements to enhance standards cooperation, standards diffusion ultimately takes place within the scope of concrete investment projects. A careful reading of the 2024 BRI Standardization Achievement Report indeed confirms what some have previously observed in this respect,²⁰ that the de-facto internationalization of Chinese technical standards is in large part carried by Chinese investments into overseas markets where relevant standards have yet to be established. In other words, "soft" connectivity of common technical standards that help facilitate interoperability across markets is often linked to "hard" connectivity projects. In the construction of major highspeed rail networks, for instance the Jakarta-Bandung railway in Indonesia, the Abuja-Kaduna railway in Nigeria, the Ethiopia-Djibouti railway or the China-Laos railway, Chinese firms such as the China Railway Corporation and China Civil Engineering Construction Corporation tasked with building infrastructure and

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supplying technology use their own standards, which ultimately structure the technological pathways for the local HSR market.²¹ What is seen in railway projects is also visible in the development of highway, port, energy and digital infrastructure in Africa,²² as well as telecoms hardware, smart city designs, data centre and cloud computing projects and ultra-high voltage (UHV) power transmission and smart grid infrastructure deployed in the context of China's Digital Silk Road.²³

What is notable, particularly in the context of China's shift towards a more multistakeholder approach to technical standards development at home, is the key role played by Chinese firms in de-facto standardisation. Indeed, it is ultimately the Chinese companies that master the associated technologies and implement the investment projects who carry the standards over to new markets. Herein lies a notion that deserves careful observation and closer study moving forward. Whereas there are concerns that geopolitical tensions could lead to a broader push for technological and economic decoupling, with divergences in technical standards ultimately structuring the development of fundamentally incompatible technological ecosystems, the initiatives of firms themselves may ultimately have a moderating effect, perhaps even pre-empting a more structural fragmentation of the global economy. As Alex He notes, the corporate strategies of Chinese firms, particularly in

digital fields where there is fierce competition from foreign, particularly American and European firms, may not always perfectly align with the views of Beijing.²⁴ While Chinese firms are often keen to profit from state backing in capturing overseas markets, they nevertheless have a strong interest in ensuring that their technical standards ultimately align with those of global technological trends. As such, there remains a significant space within which a convergence of global technical standards, including in the highly competitive realm of emerging technology, will continue to be in the interest of Chinese and European firms alike. Ensuring that European interests continues to be reflected in the standards of future technologies and industry therefore requires that Europe not only continue to be invested at multiple layers of standards development, but that it converts the growing political will to reinvigorate its industrial competitiveness into tangible results.

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ENDNOTES

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