Centre for International
Governance Innovation

CIGI Papers No. 357 — July 2026

China's Influence on Standards Development Organizations in the Digital Age

Alex He

Centre for International
Governance Innovation

CIGI Papers No. 357 — July 2026

China's Influence on Standards Development Organizations in the Digital Age

Alex He

About CIGI

The Centre for International Governance Innovation (CIGI) is an independent, non-partisan think tank whose peer-reviewed research and trusted analysis influence policy makers to innovate. Our global network of multidisciplinary researchers and strategic partnerships provide policy solutions for the digital era with one goal: to improve people's lives everywhere. Headquartered in Waterloo, Canada, CIGI has received support from the Government of Canada, the Government of Ontario and founder Jim Balsillie.

À propos du CIGI

Le Centre pour l'innovation dans la gouvernance internationale (CIGI) est un groupe de réflexion indépendant et non partisan dont les recherches évaluées par des pairs et les analyses fiables incitent les décideurs à innover. Grâce à son réseau mondial de chercheurs pluridisciplinaires et de partenariats stratégiques, le CIGI offre des solutions politiques adaptées à l'ère numérique dans le seul but d'améliorer la vie des gens du monde entier. Le CIGI, dont le siège se trouve à Waterloo, au Canada, bénéficie du soutien du gouvernement du Canada, du gouvernement de l'Ontario et de son fondateur, Jim Balsillie.

Credits

Research Director, Digital Economy Odun Olowookere
Director, Programs Dianna H. English
Senior Program Manager Ifeoluwa Olorunnipa
Publications Editor Christine Robertson
Publications Editor Lynn Schellenberg
Graphic Designer Sepideh Shomali

67 Erb Street West
Waterloo, ON, Canada N2L 6C2
cigionline.org

Table of Contents

About the Author

Xingqiang (Alex) He is a CIGI senior fellow. Alex is an expert on digital governance in China, the Group of Twenty (G20), China and global economic governance, domestic politics in China and their role in China's foreign economic policy making, and Canada-China economic relations.

Prior to joining CIGI in 2014, Alex was a senior fellow and associate professor at the Institute of American Studies at the Chinese Academy of Social Sciences (CASS) and a visiting scholar at the Paul H. Nitze School of Advanced International Studies, Johns Hopkins University, in Washington, DC (2009–2010). Alex was also a guest research fellow at the Research Center for Development Strategies of Macau (2008–2009) and a visiting Ph.D. student at the Centre of American Studies at the University of Hong Kong (2004).

Alex is the author of *The Dragon's Footprints: China in the Global Economic Governance System under the G20 Framework*, published in English (CIGI Press, 2016) and Chinese editions, and co-author of *A History of China-U.S. Relations* (Chinese Social Sciences Press, 2009). Alex has published dozens of academic papers, book chapters, and newspaper and magazine articles.

Alex has a Ph.D. in international politics from the Graduate School of CASS and previously taught at Yuxi Normal University in Yunnan Province, China. Alex is fluent in Chinese and English.

Acronyms and Abbreviations

3GPP	3rd Generation Partnership Project
AAP	alternative approval process
AI	artificial intelligence
ANSI	American National Standards Institute
BRI	Belt and Road Initiative
ICTs	information and communication technologies
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IoT	Internet of Things
ISO	International Organization for Standardization
IT	information technology
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication Standardization Sector
IVs	independent variables
JTC	joint technical committee
NGOs	non-governmental organizations
SCs	subcommittees
SDOs	standards development organizations
SEPs	standard-essential patents
SGs	study groups
TAP	traditional approval process
TCs	technical committees
TMB	Technical Management Board
WGs	working groups
WP	working party
WTSA	World Telecommunication Standardization Assembly
ZTE	Zhongxing Telecommunication Equipment Corporation

Executive Summary

Using literature analysis and case studies, this paper examines China's influence on the international standardization of digital technologies, focusing on biometrics and artificial intelligence (AI). Employing an analytical framework that considers institutional power, technical expertise, political elements, market dynamics and the governance models of standards development organizations (SDOs), the paper argues that both technological capabilities and institutional power are essential to shaping international standards. Building on its technological advances, China has gained institutional influence in areas where its companies excel, particularly within SDOs that allow active participation by non-state member entities.

Despite its technological strengths, China still lacks broad influence across key areas of international digital standardization, a gap that can be understood from three perspectives. First, its growing institutional influence has been concentrated primarily in conventional or legacy technologies, while remaining limited in emerging digital domains. Second, as a latecomer, China's ability to shape digital standards is often constricted by the state member-driven governance of major digital standard-setting bodies, especially within the International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC) joint technical committee (JTC) 1, a leading SDO for information technology (IT), where established powers continue to dominate agenda setting and decision making. Third, China's influence in digital technological standard setting is often overstated. High-profile and sometimes controversial proposals, especially in areas such as facial recognition, have drawn disproportionate attention and amplified perceptions of its leadership and, in doing so, have helped create a distorted impression of China's dominance in digital standardization.

Introduction

The US sanctions on China's telecommunications giants Huawei and Zhongxing Telecommunication Equipment Corporation (ZTE) in 2018 marked an escalation in US-China technological competition and the emergence of a new round of tension in one of the world's most important bilateral relationships. Since then, technological rivalry has increasingly become the defining feature of the competition between the world's two largest economies in the digital age. Within this broader contest, competition for influence in setting standards for emerging digital technologies — such as AI, big data, 5G, the Internet of Things (IoT), cloud computing, AI data centres and quantum computing — has gained particular prominence.

Technical standards facilitate communication among products, systems, and services across regions and jurisdictions by ensuring compatibility and interoperability. They serve as a shared language that underpins trust, safety and cooperation in global networks.[1] Beyond their technical function, these standards carry significant economic, social and geopolitical implications. Companies or nations whose technologies become de facto international standards enjoy first-mover advantages in global markets and can derive substantial revenues when their patents qualify as standard-essential patents (SEPs). Widely recognized standards help firms and states reduce technical barriers to trade, facilitate market access and strengthen consumer confidence by aligning with globally accepted criteria.

Beyond economic benefits, technical standards contribute to improved domestic and international governance. In theory, they can help foster trust, transparency and accountability in emerging technologies by establishing criteria for safety, reliability and ethical behaviour, while also upholding human rights. In doing so, standards bridge the gap between broad principles and regulatory compliance and can even guide regulation itself. Moreover, standards increase social acceptance of emerging technologies in new markets, helping societies capitalize on the opportunities presented by digital transformation.

1 See www.iso.org/benefits-of-standards.html.

Because standards are instrumental in achieving policy goals — such as promoting innovation, enhancing technological and market competitiveness, and protecting critical infrastructure and national security — the standardization process is inherently political. While policy attention can yield valuable resources for standardization work, excessive politicization, particularly amid intensifying US-China technological rivalry since 2018, has infused the process with pronounced geopolitical dimensions.

China's awareness of the strategic significance of standards dates back to the late 1990s. Recognizing the vast technical and economic advantages of having its domestic standards adopted internationally, China began engaging with international SDOs, such as the International Telecommunication Union (ITU), to promote its 3G mobile standard for international recognition (Stewart et al. 2011; Soh and Yu 2010). More than two decades later, China has emerged as a heavyweight presence in major SDOs, including the ITU, the ISO and the IEC, with its companies, government representatives and industry experts actively participating in international standard setting.

This paper examines and assesses China's influence in setting standards for digital technologies — such as AI (including its subdomains such as biometrics and smart cities), 5G, big data and the IoT — within major SDOs, particularly ISO/IEC JTC 1, a leading SDO for digital technologies, and the ITU. Drawing on literature analysis and case studies, the paper argues that both technological capabilities and institutional power are essential for shaping international standards. Building on its technological progress, China has expanded its institutional influence, particularly at the ITU, by submitting proposals, assuming secretariat roles, establishing new technical committees (TCs) or subcommittees (SCs) and promoting Chinese experts to leadership positions.

Nevertheless, in the domain of digital technological standardization, China continues to lag in securing key leadership and coordination roles, such as TC and SC secretariats and chairs and leadership positions in working groups (WGs), as well as other influential roles, including convenors and editors within ISO/IEC JTC 1. This shortfall helps explain China's limited institutional power in critical areas of digital standardization, particularly within SDOs characterized by the state member-driven governance structure, a factor that ultimately constrains its overall impact.

The paper further contends that China's influence in digital standardization is frequently overstated due to the disproportionate attention and amplified perceptions of its leadership generated by geopolitical and normative political considerations. In this context, the intensified geopolitical and normative political scrutiny often acts as a counterproductive force to China's influence in standardization. Furthermore, increased market share does not automatically yield greater influence on technical standard setting. Although China's promotion of standards through the Digital Silk Road aligns with its broader foreign policy agenda, this effort has not translated into direct influence within SDOs.

The remainder of this paper is structured as follows. The next section provides a literature review of scholarly and policy analyses from think tanks worldwide on China's growing influence in SDOs. Building on this review, the paper develops an analytical framework consisting of five variables to measure China's influence on digital standardization, which underpin its main argument. The third section presents the core analysis of China's influence on digital technology standardization within ISO/IEC JTC 1 and the ITU, organized into four subsections addressing the following dimensions: institutional power, technological capabilities, the role of political factors and the market lock-in effect. The fourth section offers case studies on standard setting in biometrics and AI, illustrating China's influence in these cutting-edge fields. The final section concludes with implications for the global standardization process for digital technologies.

Literature Review

China's growing influence within SDOs has become an increasingly prominent research topic over the past two decades, attracting particular attention in the last five years. This section summarizes the main areas of scholarly interest and key conclusions drawn from the existing literature.

Significant Growth of China's Presence at Major SDOs

There is broad consensus that China has significantly increased its participation in international SDOs (Rühlig 2020; Russel and Berger 2021; Teleanu 2021; Schott and Schaefer 2023; Gamito 2023). This trend is evident from data on China's memberships in major SDOs such as the ISO, the ITU and the IEC, covering TCs, SCs, study groups (SGs) and WGs, as well as the number of Chinese nationals holding senior positions or attending SDO meetings.

Publicly available data from the ISO, the ITU and the IEC websites confirms China's steady growth in participation. At the ISO, China has led all other countries in participation in TCs and SCs since at least 2021, currently taking part in 781 TCs.[2] The number of TC secretariats it holds increased from 58 in 2012 to 71 in 2020 (a 58 percent rise) (Gamito 2023), and has now reached 95, ranking second globally after Germany and ahead of the United States, Japan, France and the United Kingdom.[3]

China's presence at the IEC mirrors its position at the ISO: it participates in 194 TCs and SCs, jointly ranking first with Germany (194), followed by Japan (186), Italy (178), the United States (174), France (172), the United Kingdom (172) and Korea (160).[4] China holds 14 IEC secretariats, ranking sixth after Germany (37), the United States (28), Japan (24), France (23) and the United Kingdom (20).[5]

China's presence at the ITU has drawn the most attention. Chinese official Zhao Houlin served as ITU secretary-general for two terms (2015–2022), following eight years as deputy secretary-general and eight years as director of the Telecommunication Standardization Bureau. China had 86 registered ITU member entities in 2021 (second only to the United States with 118), a number that has since grown to 136,[6] surpassing the United States (119).[7] Furthermore, Chinese entities chaired two among 11 SGs in 2021 and hold the largest number of vice-chairs of SGs. They also led in working party (WP) chair, vice-chair and rapporteur roles (Teleanu 2021).

From Increased Participation to Influence

From a perspective of institutional power, China's expanded representation — measured by indicators such as more secretariat roles, leadership positions and proposals submitted for standards — suggests growing influence in some SDOs. However, there remains limited empirical evidence on whether this heightened participation translates into substantial influence over standardization outcomes.

Julia Voo and Rogier Creemers (2021, 8) argue that Chinese entities' numerous leadership roles at the ITU allow them to "fram[e] the parameters for standardization processes." Marta Cantero Gamito (2023), however, cautions that greater involvement does not automatically confer greater influence, focusing instead on China's institutional role in AI governance within the ITU. Tim Rühlig (2023) supports the hypothesis that China's growing presence enhances the party-state's influence, using seven indicators — leadership, technical positions, participation levels, contributions, SEP declarations, peer perceptions and activities outside SDOs — to measure this impact.

Sorina Teleanu (2021) acknowledges China's growing role but concludes that whether it is or could become dominant remains uncertain. It is difficult, she argues, to determine whether China could reshape SDOs in a way that allows it to dictate their operations or the standards they produce. Jeffrey Ding (2021), Alex He (2022), and Matt Sheehan and Jacob Feldgoise (2023) argue that the United States has overstated China's influence on international standard setting but provide limited empirical evidence. Conversely, some think tanks (Russel and Berger 2021) and media outlets (Gross, Murgia and Yang 2019; Kynge and Liu 2020) claim that China has come to dominate the standardization process across technologies such as AI, 5G, IoT, smart cities and facial recognition, yet these claims are also insufficiently substantiated.

2 See www.iso.org/about/members.

3 Ibid.

4 See www.iec.ch/national-committees#nclist.

5 Ibid.

6 See www.itu.int/hub/membership/our-members/directory/?myitu-members-states=true&request=organisations&id=1000100502.

7 See www.itu.int/hub/membership/our-members/directory/?myitu-members-states=true&request=organisations&id=1000100445.

Despite extensive scholarship, gaps remain regarding the specific technological domains where China has gained the most influence, particularly in digital technologies such as AI, biometrics (including facial recognition), 5G and IoT. Research providing systematic evidence of China's impact on standardization processes within both the ITU and ISO/IEC JTC 1 remains limited.

China's Strategies and Approaches to International Standardization

China's approach to international standardization is largely state-driven, with major state-owned enterprises and private companies serving as key sources of technical input (He 2022; Rühlig 2023). This strategy aligns with national industrial and innovation policies and seeks to increase China's voice within SDOs through both a greater number of proposals and strategic leadership positions.

Studies identify several specific strategies. First, China expands participation in established technological domains where it has industrial advantages but limited international recognition (Teleanu 2021; He 2022). Second, it actively promotes new areas of standardization, pushing to establish new TCs or SCs and placing Chinese experts in chair positions (ibid.).

China's state-centric model has raised concerns. Critics highlight its submission of numerous, sometimes low-quality, proposals (Teleanu 2021; Rühlig 2023). Yet scholars also note a "learning curve," as Chinese participation has become more sophisticated over the past decade (Teleanu 2021). The surge in proposals likely reflects both government incentives and industry enthusiasm rather than a deliberate "numbers game."

Western actors have also expressed concern about potential risks associated with China's expanding role at SDOs, particularly regarding national security, human rights and governance norms such as privacy and transparency. These debates intensified during the development of international facial recognition standards (Gross, Murgia and Yang 2019; Kynge and Liu 2020; Teleanu 2021; Sheehan and Feldgoise 2023).

Scholars note a two-pronged strategy (He 2022; Fuchs and Eaton 2024): increasing participation and representation at SDOs to shape technical standards, and promoting domestic standards abroad through the Belt and Road Initiative (BRI) and its digital sub-initiative, the Digital Silk Road. However, the effectiveness of this "lock-in" approach is disputed. Matt Sheehan and Jacob Feldgoise (2023) describe BRI standards' mutual-recognition agreements as a "paper tiger," while Rühlig (2023) argues that China's use of standards is more about securing market share than establishing technical dominance. Most research to date has focused on traditional industries (for example, railways) rather than digital technologies.

Institutional Structure of SDOs and Implications for Influence

Extensive literature examines the nature and governance of SDOs such as the ITU, the ISO and the IEC. Scholars generally agree that standards enhance interoperability, economies of scale, market access and innovation diffusion (Wakke, Blind and Ramel 2016; Blind, Lorenz and Rauber 2020; Bagwell, Staiger and Mavroidis 2002; Tassey 2000), and that standardization is not a politically neutral process (Winner 1980; Büthe and Mattli 2011; Yates and Murphy 2019), but one that intertwines technical, economic, social, legal and political dimensions.

Standardization has also evolved into a form of supranational governance (Brunsson and Jacobsson 2002; Schepel 2005), while technical standard setting has become a domain of transnational private governance (Graz and Nölke 2008). This duality creates tension between the consensus-driven, industry-led character of SDOs and the growing role of governments pursuing public-interest and security objectives through industrial and technology policy.

The DiploFoundation report *The geopolitics of digital standards: China's role in standard-setting organisations* (Teleanu 2021) provides a systematic overview of the structures and processes of major SDOs, including the ITU Telecommunication Standardization Sector (ITU-T), the ISO, the IEC, 3GPP (3rd Generation Partnership Project), the IEEE (Institute of Electrical and Electronics Engineers) and others. Related research (Blind and von Laer 2021; Gamito 2023; Rühlig 2023; Baron and Kanevskaia 2023; Fuchs and Eaton 2024) explores how institutional power within these organizations shapes influence. However, no comprehensive study has yet examined China's influence over digital technology standards, specifically AI and biometrics, alongside a clear analysis of how

varying governance structures at SDOs shape China's impact on the standardization process.

Framework of Analysis

Building on the theoretical and empirical insights from the literature review, this paper adopts a five-variable analytical framework to examine China's influence on digital technology standardization — specifically in AI and its subdomain of biometrics/facial recognition — within SDOs, most notably ISO/IEC JTC 1 and the ITU. The framework consists of four independent variables (IVs) that serve as the primary dimensions of influence: institutional power, technical capability, political dimensions, and the market lock-in effect. It also includes one intervening variable: the governance structure of SDOs, specifically their consensus-driven decision-making processes, which mediates how effectively these dimensions translate into realized influence.

Among the four IVs, the "political dimensions" variable is inherently broad and potentially ambiguous. In this framework, it refers specifically to both power politics and normative politics. The former includes state-led efforts such as diplomatic pressure and broader geopolitical competition, while the latter encompasses value-based considerations — such as human rights and privacy — that shape technological standard setting within SDOs.

Institutional power and technical capabilities (including expertise and experience) constitute the core sources of influence within SDOs. While technical expertise is a necessary foundation, it is insufficient on its own; it translates into real influence only when combined with institutional power. In the context of SDOs, institutional power refers to the capacity to influence others in decision making through the established procedures, norms and hierarchies of an organization. It is about positional advantage within an organization. The primary indicators to measure institutional power within SDOs are listed in the sequence of importance here (see Table 1).

These indicators can be categorized into four distinct levels of power: administrative control, deliberative authority, technical ownership and resource presence (including strategic oversight, participation density, procedural influence, financial and host influence, and influence of leadership. See Table 1). Among these, the first three categories of indicators — the holding of TC/SC secretariats, chairs/vice-chairs positions and project leaderships — are the core indicators, as they represent the primary drivers of the actual standardization process. Other indicators function as peripheral elements with their own distinct impacts on specific stages of the cycle. For instance, holding seats in strategic advisory groups — such as the ISO Technical Management Board (TMB) or the ITU World Telecommunication Standardization Assembly (WTSA) — allows members to influence top-level agenda setting; however, an individual member's influence remains constrained by the collective decision-making nature of these bodies.

In contrast, political factors and market lock-in effects play a limited role, with political elements sometimes acting counterproductively. Empirical cases of China's participation in SDOs show that government support might help to increase a country's influence in standardization (Stewart et al. 2011; Soh and Yu 2010), but overt political involvement has often hindered rather than enhanced its influence (Teleanu 2021; Sheehan and Feldgoise 2023). Similarly, there is no direct causal relationship between a nation's market share and the adoption of its standards at SDOs. For instance, China's efforts to align its national standards with BRI countries did, to some degree, help expand its market share among these countries but have not translated into greater sway in international standardization processes (He 2022); in practice, the relationship tends to operate in the opposite direction.

The governance structure of SDOs, namely, their consensus-driven decision-making process, acts as a key intervening variable in this framework. It can either constrain or reinforce a member's influence. The impact of a country's "power portfolio" is largely contingent upon the institutional "rules of the game." For instance, a more closed governance structure that prioritizes national-body representation (state-centric), versus a more open structure that empowers non-state actors and private enterprises, will yield different outcomes for a country's ability to shape global standards.

Table 1: Indicators of Institutional Power Within SDOs

Category	Indicators	What It Measures
Administrative control	Secretariats of TCs and SCs	Procedural power: control over the drafting process and timeline
Deliberative authority	Chairs and vice chairs (WGs in the ISO; SGs in the ITU)	Consensus power: control over the "closing" of debates and "reaching" of consensus on a standard's draft
Technical ownership	Project leaders (convenors) and lead editors (rapporteurs)	Textual power: control over the specific technical language and requirements within a standard draft
Strategic oversight	Strategic advisory group seats (for example, ISO TMB, ITU WTSA)	Top-level agenda-setting power: control over the high-level road map and deciding which new technologies get committees
Participation density	Number of experts sent to technical group meetings	Presence power: the ability to "flood the zone" to ensure national interests are represented in every granular discussion
Procedural influence	Number of non-state members participating in standardization process	Procedural power that is allowed at the ITU but not the ISO
Financial and host influence	Hosting TC, SC, WG or SG meetings	Logistic/soft power: "home-field advantage" that lowers barriers for domestic firms and builds informal networks
Influence of leadership	Head positions of SDOs	Diplomatic power, high-level strategic architect

Source: Compiled by the author.

Main Argument

China has substantially expanded its presence within major SDOs for digital technologies and has gained certain institutional advantages through leadership roles in TCs and SCs, as well as through its technological advances in 5G, IoT, biometrics, smart cities and AI. However, China's influence across key areas of international digital standardization is still limited and highly contingent upon the differing governance structures of these SDOs. The ITU's open structure allows Chinese industrial players to participate directly, effectively leveraging the country's massive industry scale. Conversely, the more restrictive model of ISO/IEC JTC 1 — where only official national members have a say — limits China to formal government channels and reinforces the dominance of traditional Western institutions that control the formal agenda. This paper contributes to this debate by presenting evidence from two central cases on biometrics and AI.

Furthermore, the paper argues that China's state-led approach to expanding its influence has augmented the constraining effects of both power politics and normative politics for standardization and intensified geopolitical concerns over what was

traditionally a transnational private governance process. Ultimately, value-driven contestation within SDOs, combined with the inherent limitations of a state-led approach, has contributed to an exaggerated perception of China's actual influence over global digital standards.

China's Influence on Digital Technology Standardization Within the ITU and ISO/IEC JTC 1

Institutional Power: Structure of ITU-T and ISO and Its Impact on China's Influence

International standardization operates on consensus-driven and industry-led principles, typically represented through national committees at the country level. This section examines how the governance structures of the ITU-T and the ISO/IEC, the most influential SDOs, shape China's institutional influence.

The ITU-T Structure

Established in 1865, the ITU is the oldest international standardization body. Its standardization arm, ITU-T, develops standards for information and communication technologies (ICTs), covering areas such as IoT, smart cities and future networks. ITU-T's membership includes member states, sector members (from industry, academia and non-governmental organizations [NGOs]) and associate members. While only member states vote on final adoption, all members can directly submit contributions, draft standards and participate in SGs.

At the core of ITU-T's standardization work are the SGs and their corresponding WPs. SGs develop standards, formally known as ITU-T Recommendations, with WPs coordinating their work. The WTSA serves as the highest decision-making body, meeting every four years to set the standardization agenda, establish SGs and elect their leadership (chairs and vice chairs).

The process begins when member states submit proposals, or "contributions," to SGs or WPs, which are then developed into work items. Rapporteurs and editors, often drawn from industry or academia, lead the technical drafting process. Once draft recommendations are finalized, they are circulated among member states and sector members for comment. Final approval is made either through the traditional approval process (TAP) or the alternative approval process (AAP). The TAP applies to politically or regulatorily sensitive areas (for example, numbering, tariffs), while the AAP applies to the majority of technical standards, requiring at least 70 percent approval from member states (ITU-T 2017).

The ISO/IEC Structure[8]

Unlike ITU's focus on telecommunications and sector-based participation, the ISO covers a broad range of industries, including ICT, energy, agriculture, transportation and health, and its membership is restricted to one national body per country. All participation occurs through these national bodies.

Standardization is organized through TCs, SCs, and WGs. More than 100,000 experts from industry, government, academia, research institutions and NGOs participate globally through national delegations (ISO, n.d.). The 15-member TMB functions as the ISO's principal supervisory body, holding substantial agenda-setting authority. It approves the creation of new TCs, assigns secretariats and oversees committee governance.

For a member state, holding a TC or SC secretariat — funded by the host national body — confers significant soft power and influence over agenda setting (Blind and von Laer 2021). Secretariats manage administrative and procedural processes, nominate chairs and influence agenda coordination (ISO 2018). TC chairs serve up to six years (extendable to nine), while SC chairs are nominated by the SC secretariat and approved by the parent TC by a two-thirds majority. Establishing new TCs or SCs, as well as defining their scope, requires two-thirds approval from voting members.

The standardization process begins with the submission of a work item proposal to a TC or SC, which can originate from national members,

8 This paper only examines the structure of the ISO, given the similarity between the ISO's and the IEC's structures.

existing committees, the TMB or the ISO Secretariat and must receive two-thirds support and commitments from several participating members. A WG is then formed to draft the standard under a convenor (project leader), who is appointed by its parent TC or SC. WGs are central to the standardization process, as they draft detailed technical content and build consensus among experts. Drafts produced by WGs move through committee review, draft international standard and final draft international standard stages, each requiring supermajority approval and limiting negative votes to less than one quarter. This multi-stage, member-driven process concentrates influence within national bodies and committee leadership structures.

A key factor in determining how a latecomer such as China could impact international standardization is the nuanced difference in governance structure between the ITU-T and the ISO/IEC. The ITU-T is more inclusive, allowing sectoral members such as industry, academia and NGOs to contribute directly to the standards-setting process, even if formal voting is reserved for member states. In contrast, ISO membership is exclusive to national standards bodies, providing no direct entry point for non-members such as companies and institutions to participate independently.

China's Institutional Presence and Influence

In principle, both ITU and ISO rules require personnel in leadership positions to be neutral and international in character, rather than representing national interests. However, in practice, key positions — including TC/SC chairs and secretariats at the ISO/IEC, SG chairs at the ITU, WG convenors at the ISO, WP chairs at the ITU, and even lower-level roles such as rapporteurs, editors and WG members — exercise considerable soft power through agenda setting, terminology framing, draft coordination and expert networking. These positions act as key institutional nodes where influence can be exerted throughout the standardization process.

China has significantly expanded its institutional presence at the ITU, holding more positions as chairs and vice chairs of SGs and WPs, as well as rapporteurs and editors. During the 2017–2020 study period, Chinese entities chaired two of 11 SGs, tied with Japan, while the remaining seven SGs were led by different countries. Chinese entities also held the largest number of vice-chair positions (10, followed by Korea with eight) and dominated WP leadership roles, representing 29 percent of chairs, vice chairs and rapporteurs, ahead of Korea and Japan. China also has the largest number of registered entities at the ITU in recent years. At the ISO, China participates in more TCs than any other country, with the second-highest number of secretariats after Germany (see Table 2). It is also represented on the ISO's TMB, the highest decision-making body.

Moreover, China's strategies, resources and willingness to invest in active participation are supposed to strengthen its influence at SDOs. Compared to other countries, China affords fielding large delegations comprising representatives from industry, government and academia, giving it greater capacity to engage, network and shape the standardization process.

However, China's influence in digital technology standardization remains comparatively constrained despite this broad participation. While it participates in all 100 committees related to digital technologies, it holds the secretariat for only seven (seven percent of the total). In comparison, the United States holds 24 percent, Germany 16 percent and Japan 14 percent of digital-related secretariats (Teleanu 2021). Although China is involved in all 22 SCs under ISO/IEC JTC 1 on IT, it held no secretariat roles as of 2021. By 2024, China held one secretariat for brain-computer interfaces (see Table 3) and convened three WGs, including quantum IT, smart city and unmanned aircraft systems, out of 16 WGs under ISO/IEC JTC 1, whose secretariat is held in the United States.

Within ITU SGs addressing digital technologies such as future networks and cloud computing (SG13, chaired by Japan) and IoT, digital twins and smart cities (SG20, chaired by Korea), China currently holds a few leadership positions, indicating a footprint that remains secondary to the primary governance roles held by Japan and Korea. For example, Chinese nationals hold one of a total of 13 vice chairs of SG13[9] and one of a total of 14 vice chairs of SG20,[10] chairing one WP under SG13 and two WPs under SG20. Overall, based on the distribution of key positions — specifically the three core indicators of TC/SC secretariat, chair/vice-chair roles and project leadership — China's institutional power within ISO/IEC JTC 1 and the

9 See www.itu.int/net4/ITU-T/lists/mgmt.aspx?Group=13&Period=18.

10 See www.itu.int/net4/ITU-T/lists/mgmt.aspx?Group=20&Period=18.

Table 2: ISO Participation

Country	Total No. of TCs Participated In	Total No. of Secretariats Held
China	785	95
Germany	726	134
United Kingdom	702	76
Japan	699	84
France	653	84
United States	566	91

Source: Author's compilation from the ISO.

Table 3: Participation of ISO/IEC JTC 1

Country	Total No. of Secretariats Held	Titles of SCs
United States	7	AI, biometrics, IT and data centres, cloud computing, programming languages, automatic identification, data management
Japan	5	Coded character sets, digitally recorded media, office equipment, coding of multimedia, document description
Republic of Korea	3	IoT and digital twin, telecom and information exchange, IT for learning, education and training
United Kingdom	3	Card security devices, computer graphics, consumer protection in the field of privacy by design
Germany	2	Interconnection of IT, information security, cybersecurity and privacy protection
France	1	User interfaces
Australia	1	IT service management and IT governance
India	1	Software and systems engineering
China	1	Brain-computer interfaces

Source: Author's compilation from the ISO.

ITU remains lower than that of traditional powers such as the United States, Japan, South Korea, the United Kingdom and Germany.[11] Furthermore, China's institutional influence in digital technologies is notably weaker than its broader participation in these SDOs might otherwise suggest.

Technical Expertise and Experience as Drivers of China's Influence

Technical expertise and experience are fundamental to China's influence at SDOs. Although China previously relied on a "swarming" strategy — submitting a large number of proposals of uneven quality — it has gained influence in areas where it holds technological breakthroughs or first-mover advantages, such as smart cities, 5G and IoT.

11 This assessment is based on a preliminary overview and statistical tally of these key leadership positions as listed on the official ISO/IEC JTC 1 and ITU websites.

China's influence in 5G and IoT standards largely stems from Chinese ICT companies such as Huawei and ZTE (Pohlmann and Buggenhagen 2020), whose technological leadership is reinforced through 3GPP, an industry-dominated SDO. In such bodies, participation reflects organizational membership rather than national representation, balancing private sector interests against national interests. Huawei's technical capabilities and experience explain its prominent representation of China at these SDOs, as reflected in its contributions to 5G standards (see Table 4).

In 3GPP, ITU-T SG15, WP1 on transport and smart grids, the Internet Engineering Task Force, and the IEEE, Huawei disproportionately represents China, occupying key positions built on its technological progress. Over the past decade, Huawei has had the largest number of attendees in these SDOs and is often overrepresented in WG chair positions (Baron and Kanevskaia 2023). Its strong presence exceeds that of peers such as Ericsson, Nokia and Qualcomm, supported in part by recruiting foreign experts with both technical expertise and prior SDO experience (Schaefer 2020).

However, in areas such as smart cities and IoT, China's institutional representation does not always match its technological dominance. For example, in ITU SG20 and ISO/IEC JTC 1 SC41 (IoT and digital twin), Korea holds stronger institutional positions, including the SC41 secretariat and the SG20 chair. This reflects differences in governance models: industry-dominated SDOs such as 3GPP allow later entrants with technical expertise to gain influence more quickly, whereas bodies such as the ISO and the IEC emphasize accumulated institutional power over time.

In the field of biometrics, Chinese companies and institutions leverage their technological expertise to dominate facial recognition standardization at the ITU but remain peripheral at ISO/IEC JTC 1/SC37. This discrepancy highlights a nuanced landscape shaped by the divergent governance models of these two organizations (see the case study section for further detail).

In summary, expertise and experience are the main determinants for appointment to key positions at SDOs, reflecting the meritocratic and independent nature of these organizations. The relative importance of technical expertise varies by governance model: it is more critical in industry- and individual-driven SDOs such as 3GPP and the IEEE than in state-influenced bodies such as the ISO/IEC, where institutional power plays a larger role in the standardization process (Baron and Kanevskaia 2023; Schott and Schaefer 2023). The ITU, on the other hand, demonstrates a hybrid governance structure, where state members provide representation while allowing direct participation by a broad range of non-state members.

Political Factors and China's Influence in Digital Technology Standardization

Both power politics and normative politics in standardization — such as geopolitical considerations, national security concerns and value-based inputs — have become more visible in recent years, particularly regarding digital technologies such as biometrics/facial recognition. However, concerns over China's negative influence in these domains are often overstated.

First, while issues of transparency, privacy protection and human rights are increasingly raised in standardization discussions, they have not traditionally been part of the standards-setting process. The recent involvement of human rights groups and privacy advocates in digital technology standardization represents a relatively new phenomenon (Gross, Murgia and Yang 2019). China is still navigating a learning curve in aligning its participation with these emerging expectations, particularly for technologies such as AI, 5G and big data.

Second, based on China's stated objectives and actual participation in SDOs, its primary interest lies in leveraging standards to promote industrial growth and economic development rather than exporting political ideology, a goal shared by most participants in SDOs (Teleanu 2021).

Third, most standards remain highly technical, apolitical and neutral, focusing on areas such as management, auditing, conformity assessment and testing. Only a small subset of AI or biometric standards touches on sensitive issues such as privacy. Within biometrics, for example, only a fraction of standards relates to video surveillance systems, and these focus primarily on technical matters such as system design, specifications, ground-truth data and video annotation procedures.

Fourth, although standardization can encompass privacy protection, transparency and human rights, the consensus-driven, voluntary model of SDOs makes it difficult for any single actor to impose political or ideological priorities. The consensus rules generally function effectively to prevent undue influence, even for countries with large delegations or multiple leadership positions (ibid.). China, like any other member, can advance its standards only when there is weak value-based opposition. Standards perceived as state-centric, geopolitically driven or violating widely recognized values such as privacy and human rights are likely to face strong resistance.

Fifth, while technological standards can have implications for values such as human rights or democratic governance, their real-world impact depends on how the technology is deployed, which lies outside the scope of standardization itself. Regulatory frameworks and national laws are the appropriate mechanisms to address these issues, rather than SDO processes.

Overall, while the visibility of political agenda has brought more attention to standardization, it has largely triggered a backlash that constrains, rather than enhances, China's influence within SDOs. The following case studies on biometrics/facial recognition and AI illustrate this dynamic.

Market Lock-In Effect and China's Influence on Standardization

The market lock-in effect does not automatically translate China's standards into internationally recognized ones. Research on lock-in effects (Bonardi and Durand 2003; Rühlig 2023) suggests that once a technical standard has been widely adopted, switching to a new standard entails high costs, such as redesign, production changes and reliance on suppliers who dominate the technology and network. National security and geopolitical

Table 4: 5G Patent Statistics by Company

Company	No. of declared 5G patent families	No. of patent applications filed with either the USPTO, EPO or PCT	No. of patents granted by at least one office	Technological contributions submitted to 5G standards	No. of attending engineers to 3GPP's 5G standards-setting meetings	SEP declarations for 5G
Huawei	3,147	2,342	1,274	19,473	3,098	2,343
Samsung	2,795	2,633	1,728	4,573	2,142	9,665
ZTE	2,561	1,878	837	4,692	1,128	–
LG	2,300	2,236	1,415	2,578	1,096	59
Nokia	2,149	2,074	1,584	11,555	1,618	–
Ericsson	1,494	1,461	768	15,072	2,193	5,990
Qualcomm	1,293	1,210	831	5,994	1,701	9,980
Intel	870	855	148	3,656	1,259	744

Source: Pohlmann (2019); Pohlmann, Blind and Hess (2020).

Note: USPTO = US Patent and Trademark Office; EPO = European Patent Office; PCT = Patent Cooperation Treaty.

considerations may also become critical criteria for the adoption or transition to a technical standard, particularly when those technical standards underpin essential digital infrastructure.

The advantages of Chinese companies in AI, AI-based smart cities, facial recognition, supervision technologies and smart grids are largely the result of the growth of China's domestic industries, which have developed global technological strengths and supply chain dominance over the years. China's industrial policies and government subsidies have also supported the rise of these sectors. The impact of these technological and supply chain advantages on countries adopting Chinese technologies, particularly along the BRI, depends on the governance structures and capacity of those countries.

However, the impact of China's promotion of standards through the Digital Silk Road should not be overstated. Adoption of Chinese standards abroad does not automatically translate into influence at SDOs; influence still depends on China's participation, technical contributions and engagement at these SDOs. China's representation and influence remain limited compared with those of traditional powers such as the European Union and the United States, except in areas such as 5G and IoT at 3GPP and the ITU (He 2022). For example, while China participates in ISO/IEC JTC 1 SC42 on AI and SC37 on biometrics, the United States maintains control of many key secretariats where standards are developed. As a result, Chinese companies' technological leadership and market share in AI-based facial recognition and surveillance have not translated into greater influence at major SDOs. It may suggest that getting its standards recognized at SDOs would facilitate their wider adoption and increase their market share, not the other way around.

Case Studies

The following two case studies examine China's increasing participation and influence in the standardization of biometrics and AI, two digital technologies that have attracted significant global attention. Using the analytical framework, the case studies examine the dimensions of institutional power, technological capabilities (expertise and experience), political elements and market share, whichever are relevant, as well as the variable of the consensus- and industry-driven nature of SDOs, to understand how these factors relate to standards in these fields.

Case Study 1: China's Influence on Biometrics/Facial Recognition Standardization

Facial recognition standards at the ITU have evolved across multiple SGs, particularly within the F-series on visual surveillance and intelligent video systems. Since 2009, ITU recommendations have defined surveillance camera requirements, intelligent analytics functions and digital-human facial modelling — all referring to facial features, facial recognition functionality or face-related processing. These standards, including F.743[12] and successive updates[13] to it, gradually incorporated emerging use cases and intelligent analysis functions such as facial feature recognition and mask detection. However, they largely remained capability-oriented technical standards and did not directly address broader legal or privacy safeguards.

In 2019, China Telecom submitted a proposal titled *Requirements for Face Recognition Application in Visual Surveillance* (F.FRAVSReqs) to ITU-T SG16, which managed visual-surveillance and video-analysis work during the 2017–2020 study period. Unlike previous technical specifications, this proposal sought to standardize functional and security requirements for facial recognition within visual surveillance. It specified structured extraction and storage of facial features, large-scale database matching and dynamic recognition across diverse data sources, including mobile images and real-time camera feeds. The document also outlined use cases ranging from public security and transportation hubs to commercial identity verification and population-flow analysis in public spaces.

The proposal triggered significant opposition, particularly from European delegations and civil society actors. Critics argued that its broad functional scope — combined with features such as detecting gender, age, race and physical characteristics and large-scale cross-database matching — could enable discriminatory profiling

12 See www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-F.743-200912-S!!PDF-E&type=items.

13 Including F.743 (2019) and F.743 (2022). See www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-F.743-201911-I!!PDF-E&type=items; www.itu.int/ITU-T/recommendations/rec.aspx?id=14102.

and mass surveillance without adequate safeguards for consent, proportionality or data protection (Teleanu 2021). Different from the ITU's long-standing facial recognition standards that have focused primarily on technical capabilities, China Telecom's proposal, by specifying application requirements and use cases, extended beyond technical parameters into areas typically governed by policy and law, such as privacy, consent and data governance. Most SDOs consider these issues to fall outside technical standardization's remit and to be more appropriately handled through regulatory frameworks.

The proposal drew strong media attention and was widely portrayed as evidence of China's attempt to export its state-centric, surveillance-heavy governance model and normalize authoritarian surveillance globally (Kynge and Liu 2020; Gross, Murgia and Yang 2019). While these critiques were largely political and ideological rather than technical, they shaped the international perception of China's intentions in the digital standards space.

After sustained debate within the WP, the proposal was discontinued in 2021 (ITU-T 2021).Yet this episode did not diminish China's structural influence within ITU surveillance standardization. During the 2017–2020 study period, 11 surveillance-related recommendations were approved, almost all under Chinese editorial leadership.[14] A further 10 were adopted between 2022 and 2024 in areas such as intelligent surveillance cameras, video surveillance security and software-defined cameras, again led predominantly by Chinese firms and research institutes, including Huawei, ZTE, Dahua, China Academy of Information and Communications Technology, and China Telecom.[15] Chinese experts continue to hold key editorial positions in the current study cycle.[16]

Notably, some adopted recommendations — such as those enabling large-scale facial or body-feature search across video data sets (ITU-T 2019) — contain capabilities similar to those debated in the withdrawn proposal but framed within technical rather than explicitly application-level language. Similarly, ITU-T F.743.19: Requirements and Service Description for Video Surveillance, submitted by China Telecom, includes scenarios such as "intelligent video retrieval" (ITU-T 2022); these allow users to search massive video data sets based on facial features, clothing colour or body characteristics, echoing the functions described in the controversial proposal that has been withdrawn.

Comparison with ISO/IEC JTC 1 SC37 on biometric standards, led by the United States, further contextualizes the geopolitical dimension. SC37 has published a total of 145 biometric standards[17] covering data interchange formats (notably the ISO/IEC 19794 series), biometric application programming interfaces, recognition of subjects in motion and surveillance-related applications. While these standards facilitate interoperability and large-scale biometric data exchange, they can present privacy risks if governance mechanisms are weak. These risks are similar to those of the Chinese proposal — notably concerning privacy and potential discrimination based on race or other personal traits (Voo and Creemers 2021). However, they have attracted far less political controversy.[18] The asymmetrical scrutiny suggests that reactions to China's proposal were shaped not only by technical content but also by normative political framing of digital governance.

Case Study 2: China's Influence on AI Standardization

ISO/IEC JTC 1 SC42 on AI

AI standards define the technical frameworks and governance principles guiding the development, deployment, evaluation and oversight of AI systems. Within the global standardization architecture, ISO/IEC JTC 1 SC42 is the central body responsible for comprehensive AI standard setting. Its mandate spans the entire AI life cycle, including terminology and taxonomy; data quality and governance; computational approaches; system performance and testing; risk management robustness; safety, and trustworthiness. SC42 also provides horizontal

14 Based on data drawn from the website on ITU-T program, using keyword "surveillance" search: www.itu.int/itu-t/workprog/wp_search.aspx.

15 Ibid.

16 Ibid.

17 See www.iso.org/committee/313770.html.

18 A relevant reason for this could be that US-led SC37 standards have taken a cautious approach, leaving security and privacy requirements for biometric data capture and transfer largely undefined.

guidance to other ISO and IEC committees integrating AI into sector-specific standards.[19]

China was actively involved in SC42's establishment and early agenda setting. It hosted the inaugural plenary meeting in Beijing in 2018 and fielded a large delegation representing government agencies, leading technology firms (including Huawei, Tencent, SenseTime and iFlytek) and research institutions. In the committee's initial structure, Chinese representatives held influential positions, including leadership roles in SG1 (terminology and taxonomy) and WG5 (computational approaches and characteristics of AI systems). China also supported the "Beijing Resolution," which advocated for incorporating societal concerns into SC42's program of work, though within the technical scope of JTC 1.

Despite this early visibility, China's structural influence within SC42 remains limited. The secretariat is hosted by the American National Standards Institute (ANSI), and key leadership roles — including chair, committee management and most WG convenorships — are largely held by representatives from the United States and other Western countries. Under the current structure of SC42, Chinese officials hold only the convener position of WG5. Since 2019, there has been only one Chinese representative among the SC42 project editors.[20]

Given SC42's comprehensive coverage of AI governance — from foundational terminology to risk management and trustworthiness — this distribution of institutional positions significantly shapes agenda control and normative framing. China has contributed to technical discussions and early agenda formation, but its ability to steer the overall direction of global AI governance standards within the ISO remains institutionally constrained.

The ITU-T on AI-Enabled Multimedia Applications

In contrast, China maintains strong influence within the ITU in specific AI-enabled multimedia applications. However, these efforts focus on narrower, application-oriented domains rather than on the full-spectrum governance architecture covered by SC42. Under the current 2025–2028 study period, SG21 — continuing earlier work of question 5 from SG16 — oversees AI-enabled multimedia services, media processing and related applications. SG21 is chaired by a Huawei representative, and three Chinese officials hold multiple vice-chair positions across three WPs under the group.

Within the specific work stream on question 5 on AI-enabled multimedia applications, Chinese representatives dominate rapporteur, associate rapporteur and editor positions across approved and ongoing work items.[21] This pattern has remained consistent across the 2017–2020, 2021–2024 and current study cycles.[22]

Discussion

The case of biometrics demonstrates that China exerts significant influence in areas where its companies have strong technical capabilities, particularly in facial recognition and related technologies, such as video surveillance systems, visual surveillance services and intelligent visual surveillance systems. Between 2017 and 2024, all ITU surveillance-related standards were submitted by Chinese entities, highlighting the combination of institutional presence and technical expertise as key drivers of influence.

China's technical leadership in facial recognition stems from long-standing expertise and experience accumulated over more than a decade. However, high-profile proposals — such as those attempting to establish wide and specific requirements for facial recognition systems — have sometimes been discontinued following media scrutiny and concerns over human rights, privacy and geopolitical tensions. This illustrates that in consensus- and industry-driven SDOs such as the ITU, excessive normative political or societal controversy can override technical expertise and institutional power, affecting the standardization process.

At the same time, China's influence is visible in numerous approved standards that have received little public attention but still incorporate facial recognition functionalities. This shows that China has effectively shaped

19 See https://jtc1info.org/sd-2-history/jtc1-subcommittees/sc-42/.

20 See https://jtc1info.org/sd-2-history/jtc1-subcommittees/sc-42/.

21 Data from the website on the ITU-T program: see www.itu.int/itu-t/workprog/wp_search.aspx.

22 Ibid.

technical standards when it leveraged its technical expertise under the radar of media scrutiny and did not trigger political backlash.

In contrast, China's limited institutional influence in ISO/IEC JTC 1 committees is reflected in the cases. At SC37 (biometrics) and SC42 (AI) — both overseen by ANSI — China holds few strategic positions, constraining its influence over agendas and decision making. At SC42, China currently only holds the WG5 convenorship on computational approaches, with two representatives involved. Among 40 published standards and 48 under development, only ISO/IEC TR 24372:2021 has been published[23] under Chinese leadership, indicating limited leverage over SC42's broader agenda.

A similar pattern appears at SC37. In addition, SC37 standards under the US leadership are cautious and have not yet addressed how to define security and privacy requirements for the capture and transfer of biometric data. Instead, they focus on peripheral technical issues, such as specifying a record format for storing, recording and transmitting information from one or more facial images or a short video stream of facial images, as in ISO/IEC 19794-5:2011 biometric data interchange formats. This is quite different from China's approach to intelligent video surveillance at the ITU. The different approaches to biometrics at the ITU and ISO/IEC JTC 1 further indicate that China currently has minimal influence in the agenda setting, drafting process and timeline of standardization at the SC37.

These differences highlight the impact of institutional design on standardization outcomes. The ITU allows direct participation by corporate actors, enabling Chinese firms — usually with state-backed or state-coordinated support — to leverage industrial capacity and technical depth in proposing, drafting and defending recommendations directly. In contrast, ISO/IEC JTC 1's closed, member-driven structure — where only member bodies can propose, vote or nominate experts — restricts Chinese influence to formal representation channels through its national body, while concentrating agenda control in established Western institutions.

In summary, the cases underscore the interplay between technical expertise, institutional power, political dynamics and SDO governance structure in shaping China's influence. Technical capability enables China to lead in specialized areas, while institutional positions determine the scope of its strategic influence. Political and societal concerns, however, can constrain influence even where technical and institutional strengths exist. Industrial presence, as seen in ITU submissions, complements and reinforces other factors in standardization but does not help yield equivalent influence in other standard-setting bodies such as the ISO/IEC.

Conclusion

This paper has examined China's growing participation and influence in international standardization for digital technologies, with a focus on biometrics and AI. The analysis demonstrates that China's influence is multifaceted, shaped by the interplay of technological capabilities, institutional power, political factors, market considerations, and the governance structure of SDOs.

China's industrial and technological strengths, particularly in areas such as (intelligent) video surveillance, have enabled its companies to exert substantial technical influence at SDOs such as the ITU. Chinese firms, leveraging extensive expertise, experience and active participation, have been able to contribute significantly to standards development. The ITU's relatively open structure allows non-state actors, including Chinese companies and experts, to propose and shape standards directly, enhancing China's leverage in these contexts.

By contrast, China's influence at ISO/IEC JTC 1, particularly SC37 on biometrics and SC42 on AI, remains limited. The closed, member-driven structure of the ISO/IEC confines influence to national body representation, with agenda control and key leadership positions largely concentrated among Western institutions. The limited number of Chinese experts holding convenorships or editorial roles indicates that their strategic control over standards development is minimal, highlighting the importance of institutional power in determining influence.

23 See www.iso.org/committee/6794475/x/catalogue/p/1/u/1/w/0/d/0.

Political factors, including human rights, privacy and broader geopolitical concerns, have been increasingly foregrounded, leading to amplified scrutiny of China's proposals, most notably in the field of facial recognition. Meanwhile, market dynamics and technological lock-in, while contributing to the adoption of Chinese technologies in certain sectors and regions, do not automatically translate into influence within formal standard-setting bodies.

Overall, China's experience underscores the critical role of technical expertise, experience and institutional access in global standardization, while also highlighting the limits imposed by political sensitivity and existing international hierarchies. Given the dynamic and evolving nature of digital standardization, further scholarly inquiry is warranted to navigate the complex architecture of standards development systems across specific digital technologies. Future research should explore in greater depth the scope and nature of China's influence in particular domains of digital technology, building on a comprehensive review of relevant standards, institutional structures and governance mechanisms within SDOs.

Works Cited

Bagwell, Kyle W., Robert W. Staiger and Petros C. Mavroidis. 2002. "It's a Question of Market Access." *American Journal of International Law* 96 (1): 56–76. https://scholarship.law.columbia.edu/faculty_scholarship/2619.

Baron, Justus and Olia Kanevskaia. 2023. "Global Rivalry over Leadership in ICT Standardization: SDO Governance amid Changing Patterns of Participation." In *The Evolution of Transnational Rule-Makers through Crises*, edited by Panagiotis Delimatsis, Stephanie Bijlmakers and M. Konrad Borowicz, 287–309. Cambridge, UK: Cambridge University Press. https://doi.org/10.1017/9781009329408.

Blind, Knut, Annika Lorenz and Julius Rauber. 2020. "Drivers for Companies' Entry Into Standard-Setting Organizations." *IEEE Transactions on Engineering Management* 68 (1): 33–44. https://doi.org/10.1109/TEM.2020.2975427.

Blind, Knut and Maximilian von Laer. 2021. "Paving the path: drivers of standardization participation at ISO." *The Journal of Technology Transfer* 47: 1115–34. https://doi.org/10.1007/s10961-021-09871-4.

Bonardi, Jean-Philippe and Rodolphe Durand. 2003. "Managing network effects in high-tech markets." *The Academy of Management Journal* 17 (4): 40–52. https://doi.org/10.5465/AME.2003.11851827.

Brunsson, Nils and Bengt Jacobsson. 2002. *A World of Standards*. Oxford, UK: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199256952.001.0001.

Büthe, Tim and Walter Mattli. 2011. *The New Global Rulers: The Privatization of Regulation in the World Economy*. Princeton, NJ: Princeton University Press. https://doi.org/10.23943/princeton/9780691144795.001.0001.

Ding, Jeffrey. 2021. "China's Growing Influence over the Rules of the Digital Road." *Asia Policy* 16 (2): 33–42. www.jstor.org/stable/10.2307/27023969.

Fuchs, Daniel and Sarah Eaton. 2024. "Practice diffusion in China's two-pronged engagement in global technical standardization." *China Information* 38 (2): 157–79. https://doi.org/10.1177/0920203X241245686.

Gamito, Marta Cantero. 2023. "The influence of China in AI governance through standardisation." *Telecommunications Policy* 47 (10): 102673. https://doi.org/10.1016/j.telpol.2023.102673.

Graz, Jean-Christophe and Andreas Nölke, eds. 2008. *Transnational Private Governance and its Limits*. Abingdon, UK: Routledge.

Gross, Anna, Madhumita Murgia and Yuan Yang. 2019. "Chinese tech groups shaping UN facial recognition standards." *The Financial Times*, December 1. www.ft.com/content/c3555a3c-0d3e-11ea-b2d6-9bf4d1957a67.

He, Alex. 2022. *The Digital Silk Road and China's Influence on Standard Setting*. CIGI Paper No. 264. April 4. Waterloo, ON: CIGI. www.cigionline.org/publications/the-digital-silk-road-and-chinas-influence-on-standard-setting/.

ISO. 2018. *Contributing to the UN Sustainable Development Goals with ISO standards*. Geneva, Switzerland: International Organization for Standardization. www.iso.org/files/live/sites/isoorg/files/store/en/PUB100429.pdf.

———. n.d. *ISO Membership manual*. www.iso.org/files/live/sites/isoorg/files/store/en/PUB100399.pdf.

ITU-T. 2017. *Resolution 1 — Rules of procedure of the ITU Telecommunication Standardization Sector*. WTSA. www.itu.int/dms_pub/itu-t/opb/res/T-RES-T.1-2016-PDF-E.pdf.

———. 2019. *Recommendation ITU-T F.743.7 Requirements for big data-enhanced visual surveillance services.* May. www.itu.int/rec/T-REC-F.743.7-201905-I/en.

———. 2021. "ITU-T Work Programme — Work item F.FRAVSReqs — Requirements for face recognition application in visual surveillance systems." www.itu.int/ITU-T/workprog/wp_item.aspx?isn=14434.

———. 2022. *Recommendation ITU-T F.743.19: Requirements for intelligent surveillance cameras in intelligent video surveillance systems.* December. www.itu.int/epublications/publication/itu-t-f-743-19-2022-12-requirements-for-intelligent-surveillance-cameras-in-intelligent-video-surveillance-systems.

Kynge, James and Nian Liu. 2020. "From AI to facial recognition: how China is setting the rules in new tech." *Financial Times,* October 7. www.ft.com/content/188d86df-6e82-47eb-a134-2e1e45c777b6.

Pohlmann, Tim. 2019. "Who is leading the 5G patent race?" IAM, November 20. www.iam-media.com/article/who-leading-the-5g-patent-race-0.

Pohlmann, Tim, Knut Blind and Philipp Hess. 2020. "Fact finding study on patents declared to the 5G standard." *IPLytics* 49: 0–62.

Pohlmann, Tim and Magnus Buggenhagen. 2020. "Who owns patents, SEPs and develops standards for smart home technologies?" IAM, July 22. www.iam-media.com/who-owns-patents-seps-and-develops-standards-smart-home-technologies.

Rühlig, Tim. 2020. "Who Controls Huawei? Implications for Europe." Utrikespolitiska institutet Paper No. 5. Swedish Institute of International Affairs. www.ui.se/globalassets/butiken/ui-paper/2020/ui-paper-no.-5-2020.pdf.

———. 2023. "Chinese Influence through Technical Standardization Power." *Journal of Contemporary China* 32 (139): 54–72. https://doi.org/10.1080/10670564.2022.2052439.

Russel, Daniel R. and Blake H. Berger. 2021. *Stacking the Deck: China's Influence in International Technology Standards Setting.* Asia Society Policy Institute, November 30. https://asiasociety.org/sites/default/files/2021-11/ASPI_StacktheDeckreport_final.pdf.

Schaefer, Kerstin J. 2020. "Catching up by hiring: The case of Huawei." *Journal of International Business Studies* 51: 1500–15. https://doi.org/10.1057/s41267-019-00299-5.

Schepel, Harm. 2005. *The Constitution of Private Governance: Product Standards in the Regulation of Integrating Markets.* London, UK: Hart Publishing. https://doi.org/10.5040/9781472563255.

Schott, Lennart and Kerstin J. Schaefer. 2023. "Acceptance of Chinese latecomers' technological contributions in international ICT standardization — The role of origin, experience and collaboration." *Research Policy* 52 (1): 104656. https://doi.org/10.1016/j.respol.2022.104656.

Sheehan, Matt and Jacob Feldgoise. 2023. "What Washington Gets Wrong About China and Technical Standards." Carnegie Endowment for International Peace, February 27. https://carnegieendowment.org/research/2023/02/what-washington-gets-wrong-about-china-and-technical-standards?lang=en.

Soh, Pek-Hooi and Jiang Yu. 2010. "Institutional environment and complementary assets: Business strategy in China's 3G development." *Asia Pacific Journal of Management* 27: 647–75. https://doi.org/10.1007/s10490-008-9121-4.

Stewart, James, Xiaobai Shen, Chengwei Wang and Ian Graham. 2011. "From 3G to 4G: standards and the development of mobile broadband in China." *Technology Analysis & Strategic Management* 23 (7): 773–88. https://doi.org/10.1080/09537325.2011.592284.

Tassey, Gregory. 2000. "Standardization in technology-based markets." *Research Policy* 29 (4–5): 587–602. https://doi.org/10.1016/S0048-7333(99)00091-8.

Teleanu, Sorina. 2021. *The geopolitics of digital standards: China's role in standard-setting organisations.* DiploFoundation/Geneva Internet Platform and Multilateral Dialogue Konrad Adenauer Foundation Geneva. www.diplomacy.edu/wp-content/uploads/2021/12/Geopolitics-of-digital-standards-Dec-2021.pdf.

Voo, Julia and Rogier Creemers. 2021. "China's Role in Digital Standards for Emerging Technologies — Impacts on the Netherlands and Europe." Leiden Asia Centre and Leiden University. May. https://leidenasiacentre.nl/wp-content/uploads/2021/05/Chinas-Role-in-Digital-Standards-for-Emerging-Technologies-1.pdf.

Wakke, Paul, Knut Blind and Florian Ramel. 2016. "The impact of participation within formal standardization on firm performance." *Journal of Productivity Analysis* 45: 317–30. https://doi.org/10.1007/s11123-016-0465-3.

Winner, Langdon. 1980. "Do Artifacts Have Politics?" *Dædalus* 109 (1): 121–36. www.jstor.org/stable/20024652.

Yates, JoAnne and Craig N. Murphy. 2019. *Engineering Rules: Global Standard Setting since 1880.* Baltimore, MD: Johns Hopkins University Press. https://doi.org/10.1353/book.66187.

67 Erb Street West
Waterloo, ON, Canada N2L 6C2
cigionline.org