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The Missing Pillar in Rebooting Europe's Industrial Policy

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Executive Summary

Standardisation is emerging as a strategic battleground in global technological competition. Once confined to the realm of technical experts and engineers, standard-setting now plays a central role in shaping industrial ecosystems, global trade, interoperability, innovation flows and dependencies embedded in digital infrastructures and applications, ranging from 5G to AI chips and from steel quality to digital public passports. As the geopolitical dimension of technology becomes more pronounced, the ability to influence standards is a key driver to competitiveness and sovereignty.

Europe has historically occupied a central position in international standardisation, starting from the founding of the Geneva-based International Telecommunications Union (ITU) way back in 1865. While the European Standardisation Strategy of 2022 signalled newfound political attention on the topic, the current posture of the EU and its Member States remains out of step with the pace and coordination of other global actors – mainly China. Through an integrated strategy that connects domestic industrial policy and foreign affairs through long-term planning, China has transformed from a reactive standards-taker into a proactive standards-maker since 2018. Initiatives such as 'China Standards 2035', in tandem with the Belt and Road Initiative, have enabled China to align industrial champions, state institutions and global diplomacy behind a shared objective: embedding Chinese standards in the global economy of tomorrow.

The European Union and its Member States remain largely reactive. Despite a strong base in research, industry and international engagement, the EU's 2022 standardisation strategy still lacks key implementation steps. Its approach is fragmented, under-resourced and slow to align technical influence with broader economic and political goals. As a result, Europe risks ceding control over future rule-making processes in areas ranging from digital communications to automotive chips.

This report argues that Europe must see standardisation not as a niche technical field, but as a key site of geopolitical contestation and opportunity. Its focus is on the key challenger and the key domains: China and rapidly developing technologies that shape digital societies and economies. Building on an analysis of the main standard-setting organisations, the focus turns to the strategic

design and consequences of China's state-led approach to standardisation. A key characteristic of the Chinese government's approach lies in the push and empowerment of companies and experts as key players in standard-setting organisations and in the roll-out of technologies through its Digital Silk Road.

Zooming in on the domains of telecommunications and the internet, and electric vehicle chips, two industry snapshots present more detailed insights into the newly emerging power balance in the relevant standardisation bodies and processes. Taken together, these call attention to China's incorporation of standardisation into its strategic priorities with the aim of asserting economic and normative leadership in global markets.

To reassert European strength in this field, the report then offers a five-pronged approach that builds on the three pillars of Europe's Economic Security Strategy of 2023. This Blueprint for Action on standardisation centres on programming, promoting, protecting, partnering and process as parallel paths to help reorient Europe's stance on standardisation, including the EU and its Member States.

Success depends on several shifts, key among which are:

- Standardisation must be embedded more deeply in industrial strategy and policy planning;
- Early engagement is essential, with Europe positioning itself at the pre-standardisation and agenda-setting stages, rather than merely reacting to technical drafts;
- Stronger coordination across EU Member States is needed to consolidate influence in international standard-setting organisations;
- Resources – financial, human and digital – must be scaled up, especially in the formative stages of technical committee work, where critical scope and terminology decisions are made;
- Europe must also build alliances with like-minded partners to amplify its values and avoid isolation in multilateral forums.

The stakes are particularly high for the Netherlands, a European leader in key (emerging) technologies such as chip equipment and manufacturing, and quantum technologies. With major assets in the semiconductor sector, digital infrastructure and multistakeholder governance, the Netherlands is well positioned to contribute to a stronger European role in international standardisation. Its current position can be upheld and deepened with the

necessary institutional support, policy alignment and a long-term vision on standardisation and industrial policy.

Standardisation defines the rules of engagement for future technologies. If the EU and its Member States fail to act strategically, the European continent risks becoming a bystander in a system increasingly shaped by others. Swift action that puts policy to practice, reinvests in capabilities and empowers business players can ensure that Europe continues to define the standards of the next digital and industrial era on its own terms.

1 Introduction

Behind the political limelight, hidden behind a wall of acronyms and still largely off the public's radar, standardisation plays a critical role in defining how technologies evolve across industries in the long run. While technologies have long been an engine of industrial development, their role as a key factor in geopolitical power and influence has intensified over the past decade. This goes for established as well as emerging technologies, ranging from mobile and electricity networks to social media, advanced semiconductors, artificial intelligence (AI) and quantum technologies.

Standardisation is instrumental in defining the rules of the technological and economic systems, offering a significant advantage for first movers and determining access to and interoperability of markets. From manufacturing to information technology, standard-setting creates the foundation for interoperability between networks and devices, as well as safety, quality assurance and innovation. Without well-defined standards, industries face fragmentation, inefficiencies and barriers to trade that hinder economic growth and technological progress. Moreover, consumers would face higher prices, more vendor lock-in and less choice. As technological rivalry grows with the diversity of propositions, standardisation is becoming a geopolitical contention point too.

Western Dominance Challenged

Since the establishment of the International Telegraph Union (ITU) in 1865,[1] countries have sought to coordinate and cooperate on standardisation in multilateral settings. From the outset, these international standardisation bodies were largely dominated by Western powers. The development of the internet, for example, was led by the United States (US), while Europe dominated mobile communication networks, up until their fourth generation (4G).[2]

1 The International Telegraph Union is one of the oldest international organisations still in place. It evolved into the International Telecommunications Union (ITU), the oldest United Nations agency. See: ITU, *Overview of ITU's History (1)*; ITU, *About International Telecommunication Union (ITU)*.

2 Peter (Maxigas) Dunajcsik and Niels ten Oever, *Geopolitics in the Infrastructural Ideology of 5G*, 2023.

A country's position in standardisation is largely defined by its technological capabilities. China's emergence in recent decades as a technological powerhouse was thus set to redefine the balance of power in standardisation. Beyond this natural shift, China's shaking of the system is strengthened by its unique approach of state-directed strategic planning and company-level engagement, anchored in its comprehensive 'China Standards 2035' strategy, announced in 2018 – and adopted three years later with the National Standardisation Outline.[3] The Chinese government's strategic push is further reinforced by its 'Made in China 2025' industrial policy and promoted internationally through the Belt and Road Initiative (BRI) – and in particular, its Digital Silk Road (DSR).

China, once only a follower in technology development, played a decisive role in contributing to 5G standards in the 2010s. With Huawei as a leader in the sector, China actively participated in the main international collaboration body for mobile network standardisation: the 3GPP.[4] Huawei's global market share in 4G and 5G networks has grown significantly, supported by the Chinese government's foreign push through the BRI. Huawei's substantial contributions to 3GPP standards have enhanced its influence in the telecommunications sector and reinforced its capacity to reinvest in research and development for future technologies, such as 6G.

The cooperative nature of telecommunications has historically required alignment among global competitors. Nonetheless, China's efforts to weigh in more strongly are notable, and the increased presence of Chinese officials and companies has deepened competitive and normative differences between participants. The standardisation bodies that were mostly regarded as technical in nature have thereby gradually become seen more and more as political organisations too.

The Structure of this Report

This report examines the growing significance of standardisation and the shifts in standardisation governance that have occurred over the past decade. It starts with a brief history of standardisation, to explain how the issue has been increasingly politicised and why the European Union (EU) and the Netherlands

3 Keiti (Huiting) Wei, *China's National Standardisation Development Outline: Policy Implications and Future Directions*, 2022.

4 3GPP stands for Third Generation Partnership Project, a consortium of seven major national or regional standardisation bodies such as ETSI (Europe), ATIS (USA), CCSA (China) or TSDSI (India).

need to act to protect and promote their interests. This is especially urgent given that the EU's 2022 Standardisation Strategy, while commendable for elevating the political relevance of standards, still lacks robust mechanisms for enforcement and coordination. Its success largely depends on the actions of EU Member States, many of which have yet to develop comprehensive national approaches to technical standardisation.

The report starts from a discussion of the role of international standard-setting organisations, governments and industry stakeholders in developing standards; the balance between regulatory frameworks and market-driven approaches; and how the great powers have influenced standard-setting. It then turns to two industry snapshots of the domains of telecommunications and the internet, and electric vehicle (EV) chips. These testify to China's emergence in the global arena of standards-setting, given the strategic value and geopolitical, economic and technological implications of these domains. After all, telecommunications and the internet form the backbone of critical infrastructure, underpinning today's digital economy and even our modern way of living. EV chips underscore the role of supply chains, green industrial policy and technological ecosystems. Developments in EV chips are of particular relevance to the Netherlands, given the country's strong industrial base: with the global leader of semiconductor machinery equipment (ASML) and several EV chip manufacturers (notably NXP). Drawing on these insights and lessons from the industry snapshots, this report offers a targeted roadmap for Dutch and European policymakers and standardisation bodies. It provides concrete policy recommendations aimed at strengthening Europe's strategic approach to standardisation – linking it more directly to recent industrial policy goals and economic security priorities.

The State of Play in Europe

The European Commission's 2022 Standardisation Strategy marked a shift in the EU's view of standardisation. The strategy responds to a growing awareness that Europe is falling behind in shaping international standards, particularly in comparison to assertive moves by China. The strategy lays out five core priorities: anticipating standard needs in key tech sectors like chips, data interoperability and hydrogen; improving the governance and inclusiveness of the European standardisation system; reinforcing international leadership in key technologies, while promoting EU core values; better linking research and innovation to standard-setting; and cultivating the next generation of experts. While its

ambition is clear, the strategy's success largely depends on effective action by EU Member States – an area where progress so far has been limited.[5]

Important changes have followed since 2022, including the launch of a High-Level Forum to steer EU priorities, updates to Regulation (EU) 1025/2012 to enhance public control over harmonised standards, leading to the changes in the European Telecommunications Standards Institute (ETSI) governance mentioned above, a 'standardisation booster' initiative to link EU-funded research to European Standards Organisations (ESOs) technical committees, and a code of practice to raise awareness about and engagement with standardisation.[6]

While the strategy has aligned standardisation efforts with the EU's broader policy goals, Europe's ability to act strategically remains hindered by fragmented participation in international standardisation organisations and limited representation in global technical leadership roles. Unlike China's state-coordinated mirror committee system, which allows for fast alignment on international positions, the EU's bottom–up, consensus-based approach, while democratically robust, can lack agility and coherence.

The role of EU Member States is particularly pivotal but underdeveloped. Although the European Commission has urged national governments to adopt dedicated standardisation strategies and better support the participation of small and medium-sized enterprises (SMEs), academia and civil society, most countries have yet to respond with substantive plans or investments. This leaves insufficient implementation and risks deepening the disconnect between EU policy ambitions and on-the-ground influence in standard-setting forums. Without addressing these coordination and capacity gaps, the EU's geopolitical aspirations in standardisation will remain unrealised.

In the recently released Competitiveness Compass, the European Commission only briefly mentions the importance of accelerating and improving access to the standard-setting process. The Compass offers no concrete policy initiative or investment plan to address the rapidly evolving global standardisation landscape. Once a leader in global standard-setting, the EU must revive its position in global standardisation.

5 European Commission, *An EU Strategy on Standardisation: Setting Global Standards in Support of a Resilient, Green and Digital EU Single Market*, 1 February 2022.

6 European Commission, *Code of Practice on Standardisation in the European Research Area*, 1 March 2023.

2 The Strategic Reach of Technical Standards

Standards are documented and reproducible technical specifications that are typically adopted voluntarily, produced in a described procedural manner and accessible under defined conditions. They enable the organisation of production and the exchange of goods and services.[7] Technical standards ensure interoperability between networks and devices, allow for their quality control and safety when using them. In telecommunications, for instance, they define the processes that enable different technologies to connect with each other, facilitating communication and data exchange.

In some countries, such as the Netherlands and Germany, the term 'normalisation' (in Dutch: *normalisatie*) is used to refer to the standardisation process when this is conducted and facilitated at the national level by a national standardisation body (NSB), such as NEN in the Netherlands or DIN in Germany. The outcome of such processes is referred to as a norm. For consistency with common English usage, this report uses the term 'standardisation' rather than 'normalisation'.

Multilateral Collaboration

International coordination and collaboration by states and companies on standardisation take place in dedicated bodies, best known as standards development organisations (SDOs). At the international level, they are traditionally led by states in so-called ***formal* SDOs**, like the International Telecommunications Union (ITU), International Organisation for Standardisation (ISO) and the International Electrotechnical Commission (IEC). Formal SDOs produce or adopt technical standards that have formal recognition by the states that endorse those bodies. The voting rights in the ITU follow the principle of 'one country, one vote', which means that each member state has equal voting power, regardless of its size or technological capacity. In the case of the ISO and IEC, voting rights are exercised by NSBs that represent the states (one NSB per state), rather than by states per se. These organisations follow a more complex voting model: votes

7 Jean-Christophe Graz, *The Power of Standards: Hybrid Authority and the Globalisation of Services*, 2019.

on standards are typically cast by NSBs designated as 'participating members' (P-members) or 'observing members' (O-members), with P-members having formal influence over the development of standards.

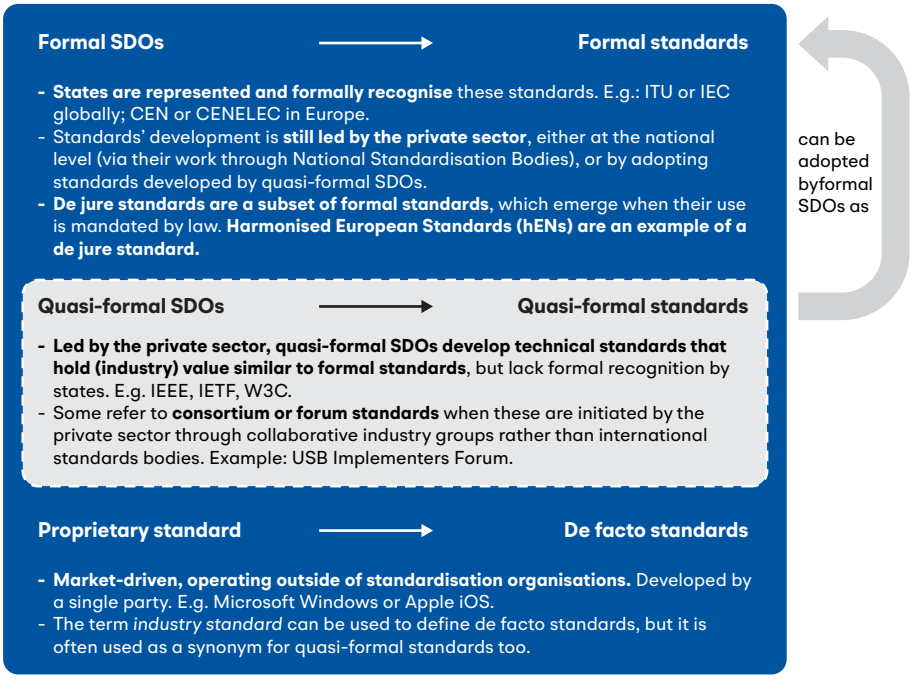
Since the 1980s, given the increasingly private nature of key tech sectors – including telecommunications and the internet – and the rise of an increasingly dynamic and powerful private sector, a parallel class of SDOs has emerged – known as ***quasi-formal* SDOs**. The Internet Engineering Task Force (IETF), for instance, is a well-known quasi-formal organisation, recognised for its contribution to the development of the internet. Standards produced by quasi-formal SDOs are not officially endorsed by states, and individuals and companies can participate and vote directly. Nonetheless, the importance of quasi-formal SDOs is comparable to that of formal SDOs in terms of developing well-established technical standards that are recognised and followed by the private sector for reasons discussed below. Formal SDOs can – and often do – adopt standards developed by quasi-formal SDOs as their own.

When standards are incorporated into legislation at the national or regional level (such as the EU), they become ***de jure* standards**. The adoption of USB Type-C as a common charging port, as described in Box 1 below, illustrates how a widely used technical specification, developed by the private sector, can become legally required once incorporated into EU law.[8] There are also proprietary, ***de facto* standards**, which emerge when industry players widely adopt them.[9] Figure 1 clarifies these concepts and their interrelationship.

8 European Union, *Directive (EU) 2022/2380 of the European Parliament and of the Council of 23 November 2022 amending Directive 2014/53/EU on the Harmonisation of the Laws of the Member States relating to the Making Available on the Market of Radio Equipment (Text with EEA relevance)*, 23 November 2022. See also: Compliance & Risks, *USB-C in the EU: A New Standard for Universal Charging*, 25 February 2025.

9 Electronic Design, *What's the Difference between De Jure and De Facto Standards?*, 14 November 2012.

Figure 1 Formal vs quasi-formal SDOs and de jure vs de facto standards



Source: authors' compilation.

In times of rapid technological development, de facto standards gain traction. They emerge as specific companies build (global) market share and set standards before regulatory frameworks are established. Microsoft's operating system and Google's search algorithms are examples of de facto standards. In practice, over the past four decades, the relative influence of (Western) states in standard-setting has declined as private sector actors have increasingly shaped quasi-formal and de facto standards.

Box 1 Standardisation in practice: the adoption of USB Type-C as a de jure standard for charging ports

1. USB Type-C was initially developed by the USB Implementers Forum (a quasi-formal industry consortium) and later adopted by the IEC, under the designation IEC 62680-1-3.
2. The European Commission issued a standardisation request to one of the three European Standardisation bodies: the European Committee for Electrotechnical Standardisation (CENELEC). CENELEC was responsible for aligning EU legal requirements with the objective of reducing e-waste and improving consumer convenience.
3. This led to the creation of a harmonised European standard (hEN), which becomes so when cited in the Official Journal of the EU. hENs provide a presumption of conformity with EU law.
4. The specification was then explicitly incorporated into the (amended) Radio Equipment Directive via EU Directive 2022/2380, making USB-C a legal requirement – that is, a de jure standard – for specific categories of devices, such as smartphones and tablets, as of 2024, and 2026 for laptops.

The Rise of Private Actors

Amid the growing role and influence of private companies in standardisation, current standardisation mechanisms – both in formal and quasi-formal SDOs – may be said to lack democratic legitimacy. Democratic legitimacy in this context refers to the inclusion of public-interest perspectives, transparent decision-making and accountability to citizens and consumers, who are ultimately affected by the standards in everyday technologies. Yet many standardisation processes are dominated by corporate actors, with limited involvement from civil society or governments. This argument is amplified by the rise of quasi-formal SDOs over the past four decades. But even NSBs, which represent states in international SDOs, are mostly funded by private-sector memberships.[10] As a result, both formal and quasi-formal organisations are essentially led by the private sector, rather than public mandates.

10 To give an example, part of the revenue of standards bodies comes from the sale of standardisation documents to companies, business and trade associations, and other stakeholders.

Industry and businesses generally prefer to work via quasi-formal bodies because they are quicker and more agile, while formal SDOs provide the political setting and procedural legitimacy that states seek. Formal and quasi-formal SDOs coexist and, at times, compete in developing standards.

The shift from traditional intergovernmental organisations to more flexible governance schemes, embodied by quasi-formal SDOs, reflects a broader trend towards new modes of governance. One such mode is orchestration,[11] where public actors coordinate intermediaries to achieve governance outcomes without direct control. This framework helps to describe China's approach to standardisation, in which tech companies and industrial consortia play an active role in advancing policy objectives and carry out decision-making on behalf of the Chinese state.

Great powers, notably China, and the biggest private-sector companies have come to see standards as a strategic asset to introduce and enforce their worldview and economic power and preferences via technical means. China's 'New Internet Protocol' (or New IP) proposal, discussed in Section 4.1 of this report on Telecommunications and the Internet, is a case in point.

As the so-called Global South increasingly demands a stronger voice in global decision-making, and new groupings such as BRICS and the G77 promote alternative models of global governance, it becomes essential to understand the role of standardisation – politically and technologically. Standardisation depends on international cooperation – between states, companies and institutions. From this point of view, China's active participation in international SDOs can be seen as a constructive contribution. However, ongoing geopolitical shifts – with an increasingly affirmative China on the one hand and the US under President Trump II that looks more inwards on the other – make standardisation, often an overlooked theme, an important geopolitical arena. Amid such geopolitical change, standardisation adds an additional layer of complexity in power dynamics and in how those affect the Netherlands and Europe.

11 Abbott *et al.*, *International Organisations as Orchestrators*, 2015.

2.1 The International Landscape

This section offers a concise overview of the landscape of SDOs at the global, EU and national levels. Figure 2, below, presents a schematic overview, with a focus on the US and China, next to the EU and the Netherlands.

Global Standardisation Organisations

The three key formal SDOs with global membership are the ITU (for technical standardisation, incorporated into the UN in 1947 as its first specialised agency), the International Electrotechnical Commission (IEC, for electrical engineering and electronic technology) and the International Organisation for Standardisation (ISO, for industrial products and processes, excluding telecommunications and electrical/electronic fields, which are covered by the other two organisations).

When it comes to quasi-formal SDOs on telecommunications and internet-related matters, the key bodies include the Institute of Electrical and Electronics Engineers (IEEE), the Internet Engineering Task Force (IETF), the World Wide Web Consortium (W3C), and the Internet Corporation for Assigned Names and Numbers (ICANN). While IEEE covers a broad range of technologies, the latter three are particularly focused on the development and governance of internet protocols, architecture and naming systems. These organisations closely resemble formal SDOs, having gained comparable status and influence in standards-setting. Indeed, they are increasingly preferred for their faster, more streamlined adoption processes, direct industry involvement and better responsiveness to innovation and market trends. However, voting procedures in quasi-formal SDOs differ significantly from those of formal ones. In these bodies, voting rights are generally based on individual or organisational participation rather than state representation. For instance, in the IETF, decisions are made by 'rough consensus' rather than formal votes.[12] At the W3C, votes are usually conducted within working groups where each member organisation typically has one vote, and consensus is encouraged.[13] The IEEE employs a more structured voting process, where individuals participate as members in working groups and

12 IETF, *On Consensus and Humming in the IETF*, June 2014.

13 W3C, *W3C Process Document*, 3 November 2023.

vote during various stages of the development of standards.[14] In all cases, active participation and technical contribution are essential for influencing outcomes.

EU and National Standardisation Bodies

Besides international SDOs, standardisation organisations exist at the regional and national levels too. At the European level, European Standardisation Organisations (ESOs) are formal bodies guiding standardisation efforts. One example is the European Telecommunications Standards Institute (ETSI), which contributed to the development of some of the first digital mobile telecommunications standards. The other two ESOs are the European Committee for Standardisation (CEN), which develops standards in a broad range of sectors excluding electrotechnical fields, and the European Committee for Electrotechnical Standardisation (CENELEC), which focuses specifically on electrical and electronic engineering.

Since its creation in 1988, ETSI has provided a platform for direct industry participation in the standards' development process. Over recent years, criticism and concerns have been raised about the influence of Chinese and American companies on ETSI's decision-making. In response, and following recommendations outlined in the 2022 European Standardisation Strategy, governance reforms were introduced to strengthen European oversight via NSBs and reduce the sway of non-European actors within the organisation.[15] CEN and CENELEC allow industry participation exclusively through national standardisation bodies.

Roughly 20 per cent of the standards developed by ESOs result from formal requests by the European Commission to support regulations in the public interest, such as hENs. Once cited in the *Official Journal of the European Union*, hENs grant a 'presumption of conformity' with the corresponding essential legal requirements set out in EU legislation. In practice, this allows manufacturers using hENs to demonstrate compliance more easily and benefit from access to the internal market without undergoing additional conformity assessments.[16]

14 IEEE, *IEEE SA Standards Board Bylaws*, September 2024.

15 ETSI, *ETSI Welcomes the Strengthened Role for NSOs in the Decision-making Process of European Standards*, 19 October 2022.

16 CEN–CENELEC, *European Standardisation*.

Voting procedures vary across the ESOs. In CEN and CENELEC, voting rights are held by the NSBs of EU and European Free-Trade Association (EFTA) countries, following a weighted voting system based on population size and pre-determined approval thresholds.[17] In contrast, ETSI operates on a direct membership model, where companies, research institutions and public authorities participate directly. In ETSI, voting is generally conducted on a 'one member, one vote' basis within Technical Committees, although some decisions use weighted voting depending on membership category.[18]

At the national level, NSBs are in charge and represent countries' positions in international bodies. NEN is the Dutch national standardisation body.[19] NSBs identify market needs for standards and typically address these in three ways: by developing new national standards using a technical committee representing relevant stakeholders; by adopting existing international standards; or by participating in international technical committees with national experts to jointly develop standards. NSBs contribute to CEN, CENELEC and ETSI to coordinate their efforts and support harmonised European standards.[20]

This multitude of organisations not only reflects the complex nature of standardisation but also its growing geopolitical importance. Standard-setting has evolved into a competitive arena where standards-makers seek to consolidate their technological primacy.

Figure 2 shows a non-exhaustive graphical representation of the global SDO landscape, with a focus on Europe, the US and China.

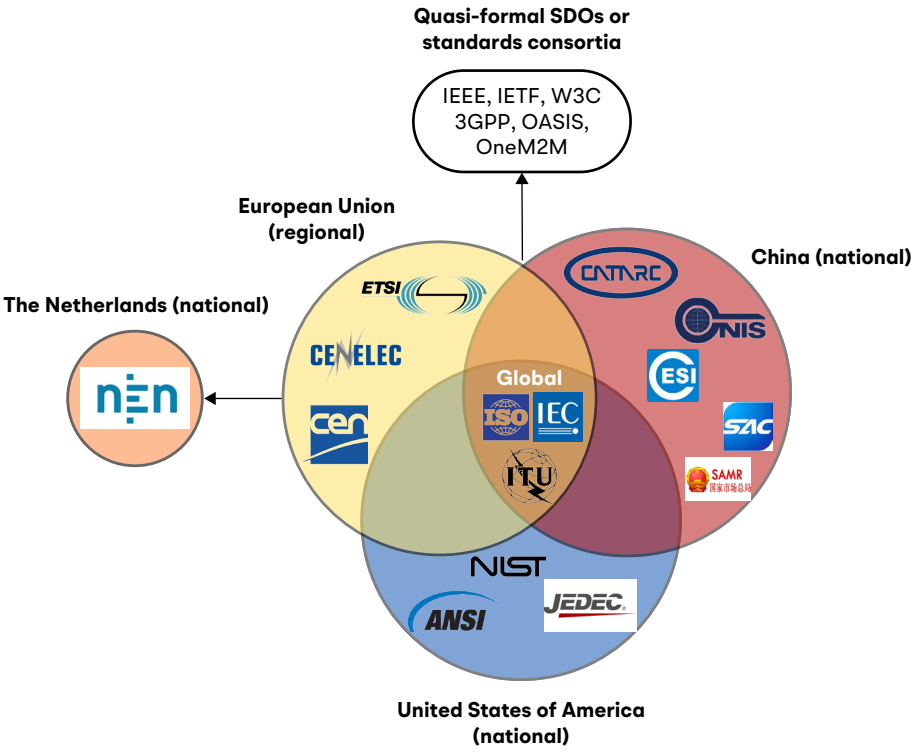
17 European Committee for Standardisation, *Common Rules for Standardisation Work: Internal Regulations, Part 2*, January 2025.

18 ETSI, *TM Approval Procedure*.

19 NEN, *Who is NEN and What Do We Do?*. NEN stands for *Nederlands Normalisatie Instituut*, or Royal Dutch Standardisation Institute (in English).

20 European Commission, *Key Players in European Standardisation*.

Figure 2 The SDO landscape: key governmental and private organisations at the global, EU and national level



Source: authors' compilation. Please note that there is a geographical and hierarchical nature to these organisations, moving up from the national level, to the regional level, to the global level.

2.2 From Economics to the Geopolitics of Standardisation

Geopolitical competition plays out in the different governance models used to develop standards. Broadly speaking, the US follows a predominantly **market-driven model**, where firms shape standards through their global market leadership. The EU is best characterised as a **mixed model**, combining private-sector input with oversight by public institutions. However, the EU and its Member States have so far struggled to mobilise effectively and significantly private-sector actors to engage strategically in global standardisation efforts.

In contrast, through a **state-led approach**, the Chinese Communist Party (CCP) plays a directive role in setting and promoting standards.[21] While the US and EU have historically relied on innovation-driven influence, China is the first to implement a comprehensive national strategy to shape global technical standardisation. This assertive model is increasingly viewed as a geopolitical challenge by European and American actors.

The differences between governance models to develop standards matter. Standards-setting has ramifications across a wide range of domains, as standards structure the economy and technical characteristics of each and every domain they cover. Over recent decades, largely unnoticed, technical standards have been a driving force behind globalisation. As well as ensuring the safety and interoperability of products and services, standards facilitate international trade by reducing transaction costs and providing unified frameworks to prevent market fragmentation. Originally designed to maintain quality in particular sectors, standards have evolved to regulate safety and become regulatory tools that establish the 'rules of the game' for economic actors.[22]

The harmonising nature and regulatory influence of standards were reinforced by the Technical Barriers to Trade (TBT) Agreement, signed in 1994 by over 130 nations under a World Trade Organisation (WTO) Treaty. The TBT Agreement advanced the internationalisation of standards by encouraging WTO members to base technical regulations on them. While the Agreement does not make standards themselves legally binding, it promotes their use in domestic regulation.[23] Furthermore, the agreement established a framework enabling WTO members to challenge another member's technical regulations, if perceived as unnecessary obstacles to trade, through the WTO's dispute settlement mechanism. While the WTO does not create technical standards itself, it promotes the use of internationally agreed standards to reduce trade barriers and ensure fair regulatory practices.[24]

21 Alexi Drew, *The Critical Geopolitics of Standards Setting*, 7 May 2021.

22 JoAnne Yates and Craig N. Murphy, *Engineering Rules: Global Standard Setting since 1880*, 2020; and Sabrina Weithmann and Susann Luedtke, *Evaluating the Impact of Deviating Technical Standards on Business Processes, Trade and Innovation*, 1 January 2023.

23 Martin Kellermann, *Ensuring Quality to Gain Access to Global Markets: A Reform Toolkit*, 2019.

24 World Trade Organisation, *Technical Barriers to Trade*.

Although the benefits of standards and international harmonisation for trade are well recognised, critics often highlight their potential negative impact on innovation. Standardisation may limit alternative approaches, potentially stifling the emergence of new and improved solutions. It may also create barriers to market access and foster lock-in effects.[25] The QWERTY keyboard layout is often cited as an example of status quo bias, where a non-optimal de facto standard persists because of high conversion costs and user familiarity, despite the potential availability of more ergonomic designs.[26]

However, this represents only one side of the story, as standardisation can also provide a significant foundation for innovation and progress. A notable distinction exists between national and international standards. Studies suggest that, in a globalised economy, national standards tend to restrict innovation, whereas international standards foster it.[27] While both types of standards incur compliance costs, international standards help to reduce the costs associated with commercialising an innovative product across multiple markets, because they reduce or eliminate the need to adapt products to differing national specifications and certification procedures. This streamlining allows firms to scale faster, access global supply chains more efficiently and avoid duplicative compliance burdens.

In fact, the relationship between technology standards and innovation is best understood in how they mutually impact each other in the short and long term: developing standards prepares the markets, while missing standards can close them. In the short term, standards help to set expectations, compatibility and guidelines that enable new technologies to enter and grow in the global market. Without these standards, innovations might struggle to gain acceptance, slowing or even preventing their adoption. In the long term, established standards shape the direction of innovation, guiding development along certain paths and sometimes restricting it in others.

25 Frances Farrugia, *The Paradox of Standardisation and Innovation*, 17 January 2022.

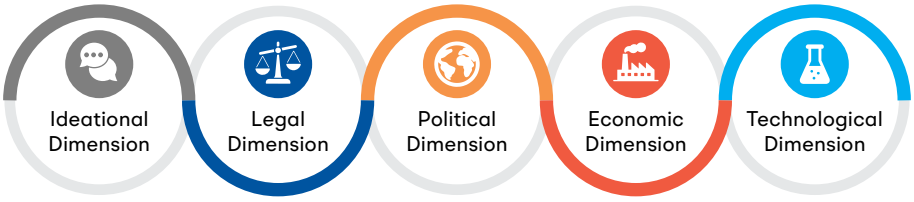
26 The view that QWERTY is non-optimal has faced criticism, with research questioning the methodological rigour and neutrality of studies comparing it to alternatives like the Dvorak layout.

27 Knut Blind and Florian Münch, *The Interplay between Innovation, Standards and Regulation in a Globalising Economy*, February 2024.

Five Power Dimensions of Standardisation

A country's technological leadership significantly shapes its influence in international standardisation. This is illustrated by the shifting balance of power from traditionally dominant actors like the EU, US and Japan to emerging players like China.[28] Moreover, the creation or revision of standards results in 'winners and losers'.[29] Standards are a source of power that stretches in various dimensions, as Figure 3 shows.

Figure 3 Five dimensions of standardisation as a source of power



Source: S. Lüdtke's compilation, based on Tim Rühlig, *The Shape of Things to Come: The Race to Control Technical Standardisation*, 2021.

First, there is an **ideational dimension**. Standards influence global reputation and soft power, shaping perceptions of technological leadership and values. This is exemplified by debates around China's 'New Internet Protocol' proposal in 2019, which sparked international concerns over surveillance and digital governance. Standards also raise ethical implications, especially in areas like data privacy and state control.

Second, standardisation has a **legal dimension**. Standards serve as benchmarks for non-tariff trade barriers, affecting over 80 per cent of global trade.[30] They are

28 The 'Three-Phase Standardisation Development Concept' (SDC) is an established indicator to clarify the state of technology development and therefore the likelihood that deviating technology standards emerge as a result of technology leadership. See: Sabrina Weithmann, *The Evolvement of Standards in China: Insights from the Electric Vehicle Sector*, 2018; and Susann Lüdtke, *Standardisation in China's Building Energy Efficiency Industry: The Development of a National Standard for Passive Houses in China*, 2024.

29 Sabrina Weithmann and Susann Lüdtke, *Evaluating the Impact of Deviating Technical Standards on Business Processes, Trade and Innovation*, 1 January 2023.

30 Tim Rühlig, *China, Europe and the New Power Competition over Technical Standards*, 2021.

frequently referenced in national regulations, providing legal certainty and ensuring compliance across jurisdictions.

Third, there is a **political dimension**. Technical standards create long-term dependencies and lock-in effects, which may have serious geopolitical consequences. Set against this context, China's Digital Silk Road initiative has raised national security and strategic concerns. With its government push, Huawei positioned itself at the forefront of 5G infrastructure rollouts in countries like South Africa, Indonesia and Cambodia.[31] Cybersecurity standards are another critical area, with emerging technologies like quantum-secure communication posing both risks and opportunities.[32]

Fourth, there is an **economic dimension**. Standards influence trade by harmonising regulations and reducing technical barriers, as divergent product standards remain a major obstacle to international commerce. They also affect costs, including patent licensing fees and compliance expenses. Companies that fail to establish their technology as a global standard face adaptation costs to comply with dominant alternatives. The German standardisation body DIN notes that standards foster efficiency and innovation, contributing to broader economic growth.[33]

Fifth, there is a **technological dimension**. High-tech standards drive innovation by enabling collaboration among experts and aligning with cutting-edge research. They improve the market success of new technologies and are closely tied to Standard Essential Patents (SEPs), which influence licensing models and industrial policy.[34] Companies that lead in standards-setting can not only avoid adaptation costs but also earn royalties from SEPs – enhancing both competitiveness and their economic advantage.[35]

31 David Sacks, *China's Huawei is Winning the 5G Race: Here's What the United States Should Do to Respond*, 29 March 2021.

32 ILNAS and ANEC, *Quantum Communication and Technical Standardisation*, November 2024.

33 Sabrina Weithmann and Susann Lüdtke, *Evaluating the Impact of Deviating Technical Standards on Business Processes, Trade and Innovation*, 1 January 2023; DIN, *Standardisation and the TTIP with the USA: Opportunities and Risks*, September 2014.

34 Group of Experts on Licensing and Valuation of Standard Essential Patent, *Contribution to the Debate on SEPs*, January 2021.

35 Sabrina Weithmann and Susann Lüdtke, *Evaluating the Impact of Deviating Technical Standards on Business Processes, Trade and Innovation*, 1 January 2023; and T. Pohlmann, K. Blind and P. Hess, *Studie zur Untersuchung und Analyse der Patentsituation bei der Standardisierung von 5G* (in German), January 2020.

Ownership of core technologies also confers strategic power in standardisation, particularly from a security perspective. Developers of a technology have detailed knowledge of its workings – including potential vulnerabilities. Once a technology becomes an international standard, it is widely adopted across borders, giving the original developers potential insight into flaws that could be exploited to undermine the security of others, raising serious national security concerns. Although not directly related to standards, this concern underpins the bans or restrictions imposed by the US and several European countries on equipment and digital infrastructure from Chinese companies such as Huawei, ZTE and Alibaba.

The following section explores China's rise in the past decade as a standardisation power along these five dimensions. Its expanding technological prowess, together with its state-led model, have helped to reshape the rules of the standardisation game.

3 China's Rise as a Standards Power: The Basis of Long-term Dominance

Over the past decade, the global standardisation landscape has undergone a significant transformation, with China evolving from merely adopting global standards to actively shaping them. As a key player in developing cutting-edge technology and dominating areas like solar energy and EV chips, China's growing technological leadership has elevated its role in global standardisation efforts. Recognising the strategic value of standardisation in enhancing competitiveness, China has made standardisation one of its comprehensive industrial policy's central elements. China has now established a distinctive standardisation system, characterised by strong government involvement, while also increasingly engaging the private sector to drive innovation and disseminating it abroad.

'*Third tier companies make products; second tier companies make technology; first tier companies make standards*'. This mantra effectively encapsulates China's standardisation approach,[36] which has been strategically promoted and planned since the 18th National Congress of the CCP in 2012. The internationalisation of standards gained momentum with the launch of China's Belt and Road Initiative in 2013. The promulgation of the 'Made in China 2025' technological upgrading strategy in 2015 further accelerated this process, laying the groundwork for the 'China Standards 2035' (CS2035) initiative, which was introduced in 2018. Alongside the development of the CS2035 strategy, China actively began executing plans to shape global standards for emerging technologies such as 5G, the Internet of Things and artificial intelligence (AI).[37] These diverse strategies and policies highlight China's coordinated use of standards to stimulate industrial growth and align with broader economic goals. National and international standards are to be developed closely together, bringing about a shift from a nationally oriented approach to a so-called 'national–international mutual transformation'. By 2035, the Chinese standardisation system should become

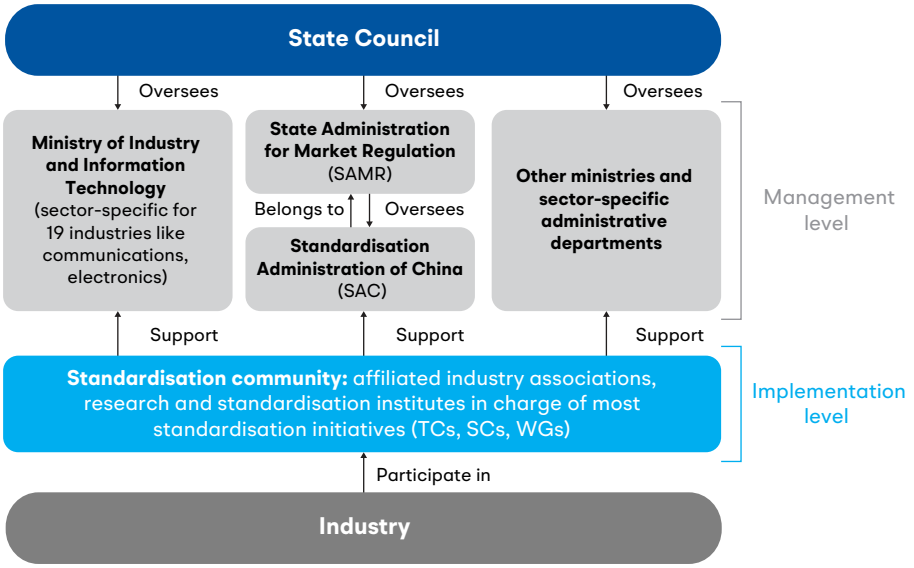
36 John Seaman, *China and the New Geopolitics of Technical Standardisation*, January 2020.

37 EAC International Consulting, *China Standards 2035: Shaping the World of Tomorrow?*

internationally compatible, fitting a 'standardisation management system with Chinese characteristics'.[38]

The active role of the government in China's standardisation approach is evident in the multitude of state bodies involved in the process. The Standardisation Administration of China (SAC), operating under the State Administration for Market Regulation (SAMR) and the State Council, primarily sets overall strategies and oversees China's standardisation efforts. SAC is responsible for strategic coordination, project approval and represents China in the ISO and IEC. In the ITU, China is represented by the Ministry of Industry and Information Technology (MIIT). National and sector standards are developed by Technical Committees (TCs), composed of experts from both the public and private sectors. TCs report to their corresponding ministries, on a sector basis.

Figure 4 China's government-led standardisation approach: key actors



Source: Susann Lüdtke's compilation, adapted from Seconded European Standardization Expert in China (SESEC), 2024.
Note: TCs stands for Technical Committees; SCs stands for Sub-Committees; and WGs stands for Working Groups.

38 CPC Central Committee and the State Council, *National Standardisation Development Outline*, 10 October 2021.

This structure marks a significant contrast to the United States and the European Union, where industry-driven and non-governmental organisations typically guide the development of standards. Additionally, it highlights the political priority that standardisation holds in China, positioning it as a key national priority rather than simply a technical or business concern. SAC is also the Chinese representative in the international formal SDOs.

The SAC is responsible for coordinating national strategies and policies related to standardisation, while specific technical standards are developed by research institutes affiliated with various Chinese government ministries. For example, the Ministry of Industry and Information Technology (MIIT) plays a pivotal role, with specialised institutes such as the China Electronics Standardisation Institute (CESI), which focuses on AI standards, and the National Technical Committee of Automotive Standardisation (NTCAS), which handles, among others, EV standards. This high level of state involvement not only ensures a **cohesive and coordinated strategy** for the development of standards, but also allows for the strategic allocation of state subsidies to standardisation bodies and rewards companies for working on patents and standards.[39]

China is also intensifying its efforts to **encourage greater industry involvement** in standards-setting. With the 2018 amendment to China's Standardisation Law and the introduction of the National Standardisation Development (NSD) Outline in 2021, the Chinese government granted legal status to 'association standards' developed by industry associations. While national and sector standards are developed within technical committees, much of the work is now reportedly driven by experts from the private sector, with state institutions retaining formal overall leadership.[40] The new law has also abolished mandatory industry and local standards, which were previously overseen by ministries and local authorities, leaving only mandatory national standards under SAC's control.[41] The new system reflects a clearer **governance model of orchestration**, combining state-led initiatives with market-driven participation, where the government acts as a facilitator and coordinator rather than the sole

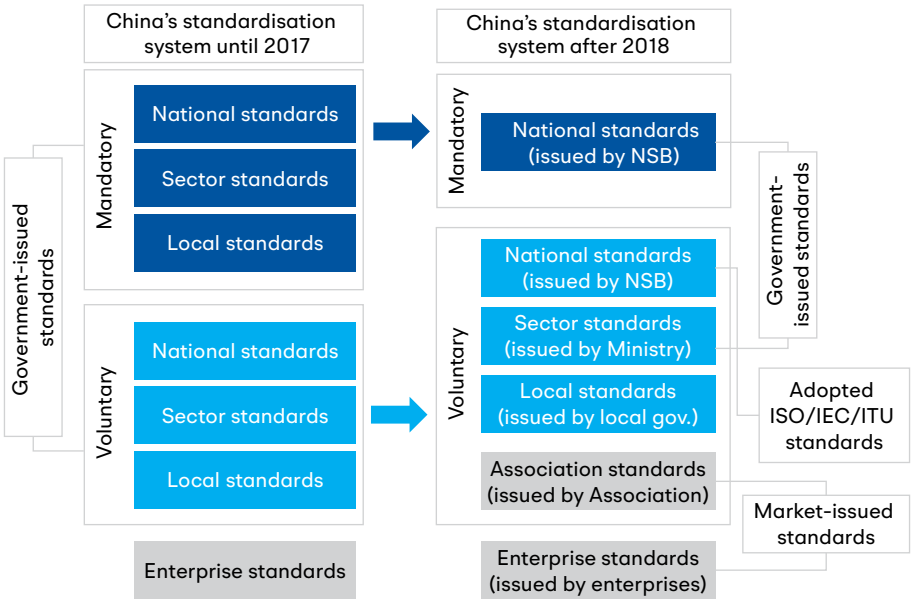
39 John Seaman, *China and the New Geopolitics of Technical Standardisation* (p. 12), January 2020.

40 Sorina Teleanu, *The Geopolitics of Digital Standards: China's Role in Standard-Setting Organisations*, 14 December 2021.

41 John Lee, Eric Zhang and Rogier Creemers, *China's Standardisation System: Trends, Implications and Case Studies in Emerging Technologies* (p. 8), 2022.

decision-maker. Figure 5 illustrates the changes brought about by the 2018 standardisation law amendment.

Figure 5 Changes in China's standardisation governance after the 2018 standardisation law amendment



Source: Adapted from John Seaman, China and the New Geopolitics of Technical Standardisation, January 2020; and authors' compilation.

This shift towards more private-sector involvement was deemed necessary to improve the quality and competitiveness of Chinese standards, as it is the industry that brings the technical expertise needed for the development and standardisation of modern technologies. Therefore, the governance shift that occurred in 2018 should not be viewed as a move away from state control, but rather as a strategy to strengthen the capabilities of the state-centred standards system.[42] The Chinese government will continue to oversee national mandatory standards in critical areas related to national security, the technologies of the

42 Matt Sheehan, Marjory S. Blumenthal and Michael R. Nelson, *Three Takeaways from China's New Standards Strategy*, 2021.

future like AI and quantum, environmental protection and economic and social governance – thus ensuring that standardisation serves broader competitiveness and geopolitical objectives.

3.1 From Domestic Control to Regional Dominance

The Belt and Road Initiative (BRI) marked China's ambition to expand its global presence, and with that its global role and influence.[43] This ambition was also extended to standardisation. In 2015 and 2018, China's State Council and SAC released two action plans promoting China's standardisation cooperation with BRI countries. These plans enabled China to promote bilateral recognition of standards in manufacturing industries and the adoption of Chinese telecommunications standards by BRI partner countries.[44] As part of the initiative, China started translating its domestic technical standards into foreign languages to support their adoption in other countries. By September 2019, China had entered into 90 bilateral agreements on technical standardisation cooperation with 52 nations and regions.[45]

These agreements show that China promotes its standards through a **bilateral, sector-specific approach** rather than attempting to build a unified regional standards regime. This suggests that China is not aiming to replace existing international standardisation frameworks, but rather to reshape them incrementally from within. Bilateral agreements with partner countries create long-term interoperability and dependencies, particularly in developing countries that lack the capacity to develop their own standards. As these countries adopt Chinese technical norms, it increases the likelihood that such standards will be proposed – and accepted – in international SDOs. In this way, China leverages bilateral engagement under the BRI to strengthen its collective voting power and influence in global standardisation forums.

43 Brigitte Dekker and Maaike Okano-Heijmans, *Unpacking China's Digital Silk Road*, 27 July 2020.

44 John Lee *et al.*, *China's Standardisation System: Trends, Implications and Case Studies in Emerging Technologies*, April 2022.

45 Tim Rühlig, China, Europe and the New Power Competition over Technical Standards (p. 8), January 2021.

3.2 From Regional Dominance to Global Influence

Over the past fifteen years, China has made significant strides in its engagement with formal SDOs, making this a central element of its standardisation strategy. This effort has yielded significant results, of which the rise of Chinese official Houlin Zhao to become ITU Secretary-General from 2015 to 2022 is a prime example.[46] Key strategies to achieve this include: submitting more proposals for international standards; increasing the volume and quality of technical input from Chinese stakeholders; and expanding the presence of Chinese experts in technical committees – particularly by securing leadership and secretariat roles within those bodies.[47]

From 2020, SAC prioritised increasing its active participation in the three formal international SDOs: the ITU, ISO and IEC. A key way to do so was to enhance China's presence in formal SDOs' Technical Committees (TCs), which play a critical role in shaping the content and direction of international standards. These committees are where technical specifications are drafted, reviewed and negotiated, which makes them the backbone of the standardisation process.[48] Taking the example of the ISO, China is currently involved in 778 ISO TCs, ranking as the country with the largest number of TCs in which it participates (see Table 1).

46 Chinese official Houlin Zhao was elected ITU Secretary-General in late 2014, following a decades-long career at the ITU. Notably, Zhao has a background in developing telecom standards for the Chinese government and during his tenure at ITU he has been a vocal supporter of Chinese telecom giant Huawei, especially in the context of 5G technology. See: CSIS, *The International Telecommunication Union: The Most Important UN Agency You Have Never Heard Of*, 14 December 2020; and Philip Lott, *How China Became the Standard Maker*, 11 October 2022.

47 The allocation of secretariat positions within the Technical Committees (TCs) is a key factor in the ISO and IEC, as these committees are responsible for drafting technical standards. See: Björn Fägersten and Tim Rühlig, *China's Standard Power and its Geopolitical Implications for Europe*, February 2019.

48 Sorina Teleanu, *The Geopolitics of Digital Standards: China's Role in Standard-Setting Organisations*, 14 December 2021.

Table 1 Countries' participation in ISO Technical Committees (TCs) and Secretariat positions, as of March 2025

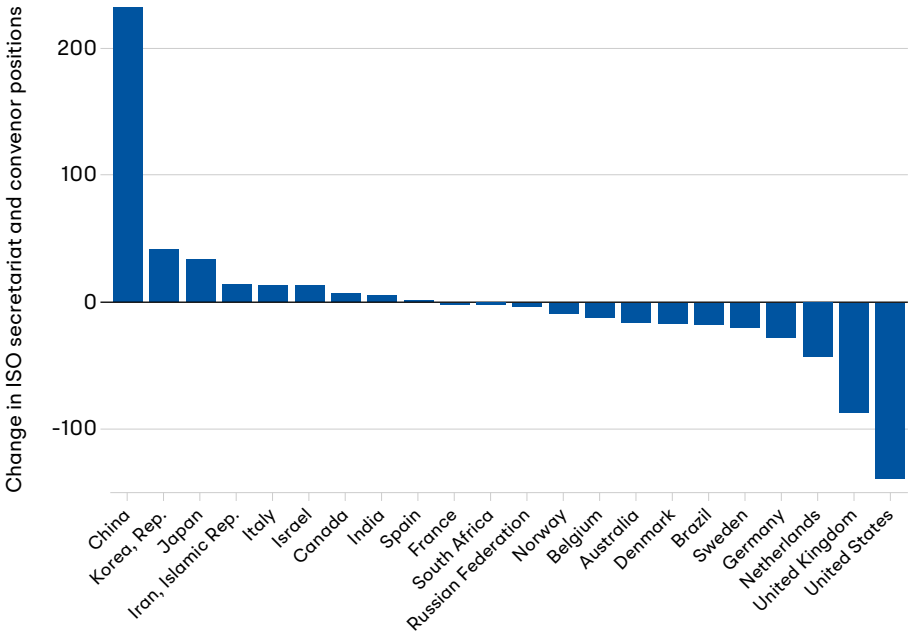
Country	TC Participation	TC Secretariat
China (SAC)	778	90
France (AFNOR)	651	82
Germany (DIN)	721	134
Japan (JISC)	665	84
Netherlands (NEN)	454	10
United Kingdom (BSI)	702	76
United States (ANSI)	562	92

Source: authors' compilation based on ISO Technical Committee data.
See: ISO, ISO Technical Committees Metadata, May 2025.

However, mere participation in committees does not guarantee influence over standards-setting outcomes. Securing a secretariat position is a key factor in determining a country's influence, as it often reflects a member's dedication to deeper involvement and the commitment of additional resources to standardisation efforts, as well as to setting the agenda. In this regard, China holds the second largest number of secretariat positions (90), following Germany (134). While Table 1 shows that EU Member States are still far more represented than China in the ISO, Figure 6 illustrates the trend in ISO leadership positions among selected countries between 2013 and 2023.[49]

49 A more detailed analysis of the specific TCs is required to provide insight into how strategic the positions held by China are.

Figure 6 ISO leadership positions change, 2013–2023



Source: United States Studies Centre, *Standards Development Organisations in an Era of Strategic Competition*, 16 December 2024.

In 2019, Chinese companies submitted 830 technical specifications for wired communications in the context of the ITU. This is more than the combined total of the three next-largest contributors: Japan, the US and South Korea.[50] Since 2020, China has consistently boosted its ISO and IEC proposals by 20 per cent each year.[51] While the ITU does not play a leading technical role in developing mobile telecommunications standards – where the 3rd Generation Partnership Project (3GPP) is the primary arena – it remains influential in legitimising technologies through official adoption processes. In September 2024, the ITU approved three Chinese proposals related to 6G mobile technologies as candidate frameworks for further study, underscoring China's ambition to shape benchmarks. This trend

50 Brett Schaefer and Danielle Pletka, *Countering China's Growing Influence at the International Telecommunication Union*, 7 March 2022.

51 Kommission Arbeitsschutz und Normung, *China: A Developing Global Power in Standardisation*, 2021.

is expected to continue across several sectors, as the Chinese government's goal is to lead over 100 international standardisation projects by 2030.[52]

China's increased involvement in international SDOs is strongly supported from Beijing. Both China's central and regional governments are reported to allocate annual financial incentives to companies leading the development of standards, through an incentive and reward mechanism to compensate their efforts.[53] However, this incentive scheme is not without drawbacks. Practitioners have noted that an emphasis on the quantity of contributions does not always translate into technical quality, and that the large volume of submissions from Chinese stakeholders can at times slow down the work of international SDOs or overwhelm committee processes. Another approach involves replicating ISO and IEC TCs at the national level, a strategy also adopted by the US and the EU. This practice is known as mirroring, or twinning. Mirror committees review drafts issued by international TCs, gather input from domestic experts, and align stakeholders on national voting positions and contributions. This process ensures that a country's voice is coherent, technically sound and strategically positioned in global standardisation efforts. China has approximately 870 mirror committees for ISO/IEC TCs and their subcommittees (SCs) that closely follow international standardisation developments.[54] In contrast, the European mirror committee system reflects the diversity of national standardisation bodies and stakeholder processes across EU Member States. This leads not only to slower consensus building but also often to a heterogenous vote, while China is sometimes able to use a 'bandwagon' strategy to convince others to vote with them.[55]

Overall, China's approach demonstrates strategic planning, with standardisation seen as a key component of its industrial and innovation policy. Driven by strong government involvement and capabilities, China is increasingly positioning

52 Ministry of Industry and Information Technology (MIIT) of China, *SESEC IV Translation: Key Points of Automotive Standardisation in 2021*, 2021.

53 Sorina Teleanu, *The Geopolitics of Digital Standards: China's Role in Standard-Setting Organisations*, 14 December 2021; and CCATS, *Guiding Opinions of the Standardisation Administration of the People's Republic of China on Carrying out Pilot Projects for National Standardisation Innovation and Development and Taking the Lead in Realising the 'Four Transformations'*, 31 August 2022.

54 Sorina Teleanu, *The Geopolitics of Digital Standards: China's Role in Standard-setting Organisations*, 2021.

55 Although aligning votes is officially not allowed, European and other practitioners have reported that this is the case.

itself as a leading player in shaping international standards. In contrast, standardisation in Europe still appears to lack priority, putting the European Union at risk of falling behind in establishing the standards that will drive the next wave of technological innovation.

4 Standardisation in Practice: Industry Snapshots

As global competition in emerging technologies intensifies, standardisation becomes a powerful tool of strategic influence. To illustrate the nature of standardisation bodies and the shift that has occurred in the power balance over recent decades, two domains are analysed: (1) telecommunications and the internet; and (2) electric vehicle (EV) chips. Telecommunications underpin global connectivity but also national security, while EV chips are critical to the next generation of mobility and smart infrastructure. By examining these two domains, this section highlights how standardisation not only buttresses technological progress, but also reflects China's incorporation of standardisation into its strategic priorities, with the aim to assert its leadership in global markets.

4.1 Telecommunications and the Internet

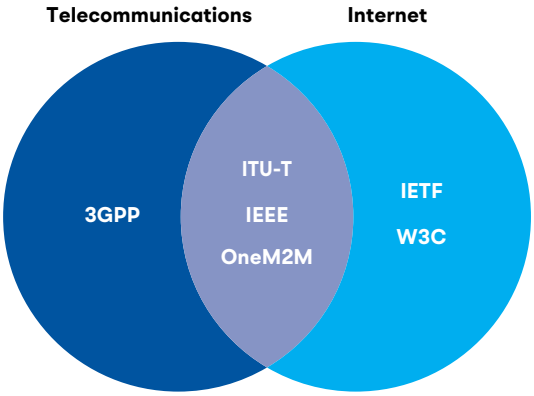
Telecommunications and the internet are foundational to the functioning of modern economies, public services and national security systems. As illustrated in Figure 7, most of the standardisation work on telecommunications and the internet occurs at the quasi-formal level, in the context of organisations like the IEEE or IETF; or standards consortia such as 3GPP.[56] The internet is, in fact, a prime example of how standardisation is increasingly left to private actors. As the internet developed, standardisation increasingly shifted towards private-led bodies, while the ITU remained more central to traditional telecommunications' infrastructure and coordination. Initially, the internet operated under a loose governance model that emerged in the 1980s, primarily driven by American entities.[57] Notably, the establishment of a private multistakeholder internet

56 The 3GPP's organisational format is exceptional. It is not a formal SDO per se, but rather an umbrella organisation of predominantly formal national and regional SDOs, which automatically take over 3GPP outputs. The secretariat of 3GPP is held by ETSI.

57 Laura Denardis, *The Global War for Internet Governance*, 2014; and Janet Abbate, *Inventing the Internet*, 2000.

governance regime resulted in the industry-led Internet Engineering Task Force (IETF) in 1986, which spearheaded the technical standardisation of the internet.[58]

Figure 7 List of SDOs involved in standards-setting on telecommunications and the internet (non-exhaustive)



Source: authors' compilation.
Note 1: The ITU is the only international formal body responsible for technical standardisation in the fields of telecommunications and the internet.
Note 2: While ICANN is not a standardisation body, it plays a crucial coordination role in internet governance by managing the global Domain Name System (DNS), IP address allocation and protocol parameter assignments, all of which rely on standards developed by other organisations like the IETF.

The history of mobile networks' development, from 2G to 5G, also showcases the complexity of the interaction between formal and quasi-formal SDOs. In practice, the ITU's role has been to define the requirements and approve standards that meet these requirements, rather than developing the standards themselves.

Europe has historically played a significant role in these forums, particularly through bodies like the European Telecommunications Standards Institute (ETSI), which contributed to key mobile technology standards like the Global System for Mobile Communications (GSM). However, part of the momentum has shifted. Today, influence over standards in telecommunications and the internet

58 IETF, *Introduction to the IETF*.

increasingly reflects wider geopolitical trends – with China's rising prominence and the United States' continued dominance pressing Europe to rethink its strategic positioning.

Since the late 1990s, China's role in telecommunications has changed rapidly from follower to innovator. China entered the telecommunications standardisation game by developing the domestic 3G standard TD-SCDMA, with the intention to foster internal industry growth and protect its domestic market from foreign competition.[59] The initiative was partly successful: in spite of not having gained global traction, TD-SCDMA 'was approved by ITU as one of the candidate standards for 3G mobile communications in May 2000 and accepted by 3GPP in March 2001'.[60] This initiative allowed China to develop knowledge about the processes around standardisation, both at home and abroad. In parallel, the Chinese government stimulated the sector by giving subsidies to national champions like Huawei, ZTE and China Unicom, showcasing its ability to integrate and embed different strategies working towards the same goal.[61]

A high-profile example of these dynamics is the (ultimately unsuccessful) attempt by China to promote a 'New Internet Protocol' (New IP) at the ITU in 2019, led by Huawei. Although presented as a next-generation internet architecture, the proposal raised red flags over risks to openness, decentralisation and net neutrality. Ultimately, the lack of technical details and political resistance stalled the proposal. Interviews with internet routing specialists indicate that no technical disruptions or routing anomalies have been observed in relation to internet traffic to and from China.[62] While this might suggest a successful defence of the open internet model by Western and multistakeholder actors, this case also highlights China's growing coordination across telecommunications firms (like Huawei and ZTE), state-linked institutes, and research entities and experts within SDOs like the ITU and 3GPP. This should be regarded as a wake-up call for others, as China continues to shape how future standards are drafted, for instance in areas like 6G or smart cities.

59 Tomoo Marukawa, *Diminishing Returns to High-Tech Standards Wars: China's Strategies in Mobile Communications Technology*, August 2014.

60 H. Chen, C. Fan and W. Lu, *China's Perspectives on 3G Mobile Communications and Beyond: TD-SCDMA Technology*, April 2002.

61 E. Harwit, *China's Telecommunications Revolution*, 2008.

62 P. Brand, N. ten Oever, R. van der Berg, J. Verweij. *Internetinfrastructuur: Standaardisatie, Techniek En Geopolitiek* (in Dutch), 2022.

From Europe's and the Netherlands' perspective, China's growing influence poses both a challenge and an opportunity. The challenge lies in the risk of losing normative influence over global internet and telecom standards. But there is also an opportunity: by leveraging its strong digital infrastructure, technical expertise and multistakeholder governance tradition, the Netherlands could play a much more active role in shaping the future of standardisation.

As noted above, one of the key governance features in telecom and internet standardisation is that while the ITU plays a convening and high-level coordination role, the actual technical drafting of standards often takes place in quasi-formal bodies such as 3GPP and the IETF. These working groups are largely dominated by industry actors, with limited formal mechanisms for public-interest oversight. This structure can undermine Europe's normative priorities – including transparency, human rights protections and digital sovereignty – as these values may not always be embedded in technically driven, industry-led processes.
For the private sector, this should also serve as a wake-up call. If European companies remain underrepresented or disengaged from these technical bodies, they risk losing influence over the standards that will define their markets, shape global compliance environments and determine long-term competitiveness.

Summing up, China's approach to telecom standardisation strategy today has distinctive elements: it involves the proactive allocation of Chinese state resources to companies participating in SDOs; there is clear alignment between industrial policy and standards' diplomacy, reflected in broader initiatives such as 'Made in China 2025' and 'China Standards 2035'; and by building leadership in technical committees, hosting key meetings and conferences, and developing full technical proposals ahead of the curve, China maximises its influence while remaining formally compliant with multilateral procedures.

Actionable Steps for Europe and the Netherlands:

1. **Prioritise early engagement:** Europe must shape the agenda at the earliest possible phase – from pre-standardisation research to early drafting of technical requirements. This includes coordinating positions well before standards reach the voting stage.
2. **Invest in multistakeholder presence:** The Netherlands, leveraging its digital infrastructure strengths and technical expertise, can increase its presence in both formal and informal telecom standardisation processes. This includes seconding technical experts to SDOs and offering travel and coordination support to Dutch stakeholders.

3. **Link standards to industrial strategy:** Technical standards are not neutral – they underpin future markets. Aligning Dutch and EU R&D efforts in telecommunications networking technologies, such as 6G or quantum communication, with proactive standardisation efforts can strengthen Europe's competitive position. Strategic foresight and data-driven decision-making can play pivotal roles in guiding and amplifying these efforts.
4. **Build coalitions with like-minded partners:** Aligning with countries such as Japan, South Korea and India within the ITU and 3GPP can amplify Europe's influence and counterbalance coordinated Chinese proposals.
5. **Safeguard democratic values:** As decisions migrate to industry-led SDOs, it becomes crucial to embed safeguards for openness, privacy and human rights in technical specifications. European actors must continue to champion these values and push for transparency reforms in bodies like the 3GPP and ITU.

4.2 Electric Vehicle Chips

The importance of the automobile sector to Europe's economy makes the standardisation of electric vehicle (EV) chips a matter of long-term strategic significance. The automotive industries of Germany and France, in particular, have been major drivers of economic growth, exports and employment – not only within their own borders, but also across their extended value chains throughout the EU. This includes the Netherlands, which is home to several key semiconductor firms that supply the increasingly digitalised automotive sector. As mobility systems become more software-defined and chip-reliant, aligning industrial capabilities with standardisation priorities becomes a critical task for Europe's competitiveness and resilience.

Against this backdrop, various types of chips are increasingly important to automotive systems, a trend that is expected to continue as the market for EVs, new energy vehicles (NEVs), intelligent connected vehicles (ICVs) and autonomous driving vehicles grows. As EVs become increasingly embedded in global mobility and infrastructure systems, EV chips – the semiconductors powering these vehicles – are emerging as critical chokepoints. The case of EV chips is particularly interesting, as EVs use legacy chips (also known as mature nodes) alongside advanced chips to support basic functions and ensure compatibility with existing systems. They are essential not only for propulsion,

but also for safety, communication, power electronics, battery management and autonomous functionality.

The international EV chip standardisation ecosystem is notably fragmented. Formal SDOs such as the ISO (with its ISO 26262 standard on functional safety) and the IEC (notably TC 22 for power electronics) play central roles. In parallel, quasi-formal and industry-led bodies – like the IEEE, Society of Automotive Engineers (SAE International), Joint Electro Device Engineering Council (JEDEC), Automotive Open System Architecture (AUTOSAR) and the International Automotive Task Force (IATF) – contribute standards on reliability, communications, safety and software architecture. Regulatory frameworks from the United Nations Economic Commission for Europe (UNECE), such as WP.29 (the world forum concerning motor vehicles and their equipment), complement this architecture.

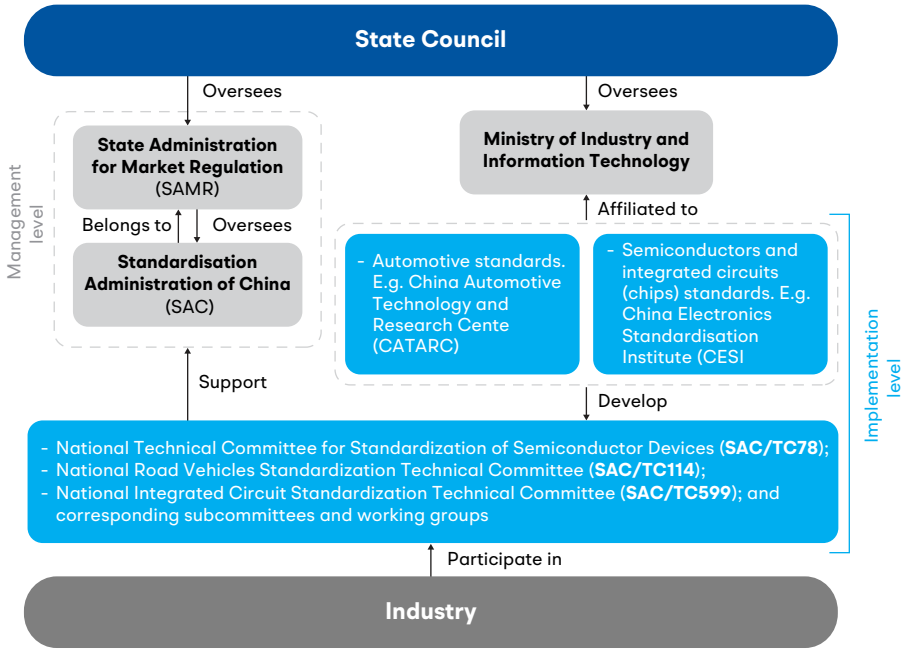
Chinese stakeholders not only seek to influence international EV chip standards, particularly in areas such as battery safety, chip reliability (such as with the EU's Trusted Chips Initiative) and data protection, but are also very active in national EV chip standardisation. China's EV chip standardisation system is characterised by strong central government leadership, primarily through China's Ministry of Industry and Information Technology (MIIT), which coordinates the development and implementation of both national and industry standards covering reliability, safety, cybersecurity and testing protocols. Recent years have seen the introduction of a formal automotive-grade chip[63] certification system and accelerated timelines for mandatory standards, reflecting China's strategic ambition to enhance domestic chip quality and reduce reliance on foreign chip technology.[64] As with other areas, EV chip standardisation involves collaboration among government agencies, industry associations, large Chinese firms and research institutes. Besides, it increasingly aligns with – or seeks to influence – international standards. The standardisation of EV chips in China is roughly split between automotive standards and integrated circuits (chips) standards. For instance, automotive standards are orchestrated by

63 Automotive-grade chips refer to semiconductor chips that meet automotive industry standards and are used in automotive electronic systems. The distinction is made between computing chips, power chips and sensor chips.

64 Simultaneously, state-led efforts from China's MIIT, like the Guidelines for Developing National Automotive Chip Standard System (2024), aim to deliver 70 national standards by 2030, with a strong focus on reliability, cybersecurity and compatibility.

China's National Technical Committee of Automotive Standardisation (NTCAS) and via its TC 144 'Road Vehicles'. Moreover, integrated circuits (i.e. chips) standards are developed by China's National Integrated Circuit Standardization Technical Committee (NICSTC) and via its TC 78 'Semiconductor Devices' and the new TC 599 'Integrated Circuits'. The latter was established as a response to international restrictions and export controls. Both committees are part of China's comprehensive strategy for technological independence and leadership in the global automotive chips' standards landscape. While regulatory responsibility is divided among different departments within MIIT, the related standardization work for automotive and EV chips standards is organized and implemented by specific research institutes like the China Automotive Technology and Research Cente (CATARC) and associations like the China Electronics Standardisation Institute (CESI), among others. Figure 8 presents a visual representation of the main actors involved in China's EV and automotive chips standardisation landscape.

Figure 8 High-level organisation of China's automotive standardisation landscape



In theory, foreign enterprises and Chinese companies can participate in equal terms in the various EV chip-related working groups and TCs. Since 2024, this pattern has seemed to diminish as China's MIIT established the China Automotive Chip Alliance (CACA), composed of Chinese original equipment manufacturers (OEMs, such as BYD and SAIC), automotive electronics and software vendors (like CATL), chipmakers (such as SMIC and Black Sesame) and state-affiliated research bodies. CACA's main intent is to reduce China's high import dependency on foreign chips and bring China towards autonomy in automotive chips through the entire automotive chip value chain – but this purely Chinese consortium also likely enables strategic coordination on EV chip standardisation, serving as a model for how technical coordination can be leveraged for geopolitical influence.

In this context, Europe – including the Netherlands – faces twin challenges. First, despite the EU Chips Act, strategic focus remains skewed towards advanced chips for data centres or AI, while legacy and application-specific chips, which are essential to the EV ecosystem, receive limited attention. Second, the EU's engagement on standards remains reactive and fragmented, resulting in diminished leverage in settings where China coordinates large voting blocs and places state-supported experts in leadership roles across committees.

The Netherlands, although relatively underrepresented in EV chip standardisation, holds a strong position in the broader semiconductor value chain. Global leaders like NXP – headquartered in Eindhoven and with deep automotive integration – are central to both design and production. In addition, Dutch academic institutions and innovation hubs such as Brainport Eindhoven form a key node in Europe's chip research and development infrastructure. These assets offer a strategic opportunity to deepen Dutch influence on standardisation – both directly and via EU coordination.

Actionable Steps for Europe and the Netherlands:

1. **Recognise the strategic role of legacy chips:** These chips are not 'outdated' – they are indispensable in EVs, medical devices and defence systems. Europe should allocate research and industrial resources to areas where it has latent strengths and align these with standardisation agendas.
2. **Refocus the EU Chips Act:** Current apparent emphasis on high-end manufacturing risks missing the broader industrial and societal implications of EV chips. As discussions on a Chips Act 2.0 advance, European funding

and policy should explicitly support standardisation efforts that are tied to mobility, energy transition and supply chain resilience – not just advanced node manufacturing.[65]

3. **Create a central coordination mechanism:** The establishment of the China Automotive Chip Alliance (CACA) in 2024 illustrates how China is strategically aligning its standardisation activities across industry, government and research. Europe should consider sector-specific coalitions that integrate governments, industry leaders and NSBs to define shared positions in SDOs and pre-standardisation processes.
4. **Leverage Dutch industrial strengths:** The Netherlands would do well to elevate companies like NXP, linking them to standardisation leadership roles. This includes supporting participation in ISO/IEC technical committees and working on placing Dutch experts in rapporteur and chairing positions.
5. **Strengthen coordination on standardisation with partners:** EU Member States should move from fragmented, individual participation in international SDOs towards more coordinated, collective engagement. In addition, informal strategic standardisation dialogues can be enhanced with partners that share interests and concerns, such as Japan and South Korea, for example on automotive technology.

Lessons and Implications for Other Sectors

Our analysis of telecommunications and the internet, and EV chips, illustrates how China leverages technical standardisation as a tool of industrial strategy and geopolitical influence. For Europe, this dual use of standardisation poses both a strategic challenge and a window of opportunity. This goes in particular for innovation-driven countries like the Netherlands.

While the two industry snapshots on telecommunications and the internet, and EV chips, focus on high-profile technologies, it is important to recognise that much of the standardisation work – especially within NSBs – takes place in far more specific domains. This includes areas such as steel quality, fire safety protocols and food safety procedures. Although often overlooked, such standards can shape industrial processes, regulatory compliance and cross-border market access just as much as frontline technologies.

65 Tobi Sterling, *EU Chips Act 2.0 Should Include Legacy Chips, Says Industry Group Chief*, Reuters.

The current development of a Digital Product Passport (DPP) is such an example. The DPP is being designed as a digital record containing standardised information about a product's characteristics, lifecycle and environmental performance, in line with the implementation of the Ecodesign for Sustainable Products Regulation (ESPR). Within the EU, a joint technical committee under CEN and CENELEC is tasked with creating a standard for DPPs. In parallel, the IEEE also launched a similar initiative in September 2024, also aimed at shaping a global framework. While CEN frequently integrates IEEE standards, the output of this dual-track approach will be a test of influence – as to whether CEN as a European SDO, or the IEEE as a quasi-formal organisation, ultimately sets the benchmark.

Building on the preceding analysis, section 5 sets out a series of recommendations and action pointers designed to address both high-profile technology areas – like those covered in the industry snapshots above – and the less visible, more operational dimensions of standardisation that shape day-to-day technical and regulatory outcomes.

5 Blueprint for Action

The findings of our industry snapshots point to a pressing need for the EU and its individual Member States, including the Netherlands, to invest far more time and (political) capital in standardisation. Standardisation must be integrated in industrial, economic security and foreign policies – from engagement with multilateral institutions to projects in the context of Global Gateway.[66] Building on the three core pillars of action of the 2023 EU Economic Security Strategy,[67] this section provides a comprehensive overview of policy recommendations along five lines of action: (1) Programming; (2) Promoting; (3) Protecting; (4) Partnering; and (5) Process.

5.1 Programming: Strategising Standardisation

On programming, the Netherlands and Europe can learn two lessons from China's strategy on standardisation. First, **standardisation should be considered part of an overarching industrial and technology policy**, regarded as one of its strategic spearheads and part of its overarching technology vision. Second, **orchestrating the private sector** is a powerful way to leverage standardisation as a mechanism for asserting technological dominance, thereby establishing a strong position to shape the development and direction of standards across multiple arenas.

To the first point, China's acknowledgement of standardisation's importance contrasts with the still-evolving role of standardisation in the EU's agenda. While institutional attention for standardisation in Europe has increased significantly since the adoption of the 2022 European Standardisation Strategy – most notably through the creation of the High-Level Forum on European Standardisation, chaired by successive European Commissioners – the

66 Global Gateway is the EU's programme to assist partner countries with their green and digital twin transitions by mobilising up to EUR 300 billion in infrastructure development projects between 2021 and 2027. See: Alexandre Gomes and Maaike Okano-Heijmans, *Dutch Niches for Global Gateway in the Digital Domain: An Initial Inquiry*, October 2023.

67 European Commission, *Joint Communication to the European Parliament, the European Council and the Council on 'European Economic Security Strategy'*, 2023.

integration of standardisation into Europe's broader industrial and technological strategy and its implementation remains incomplete. The forum, which brings together 55 members including EU and European Economic Area (EEA) countries, European SDOs such as CEN and CENELEC, industry, academia and civil society, has produced several deliverables through its sectoral workstreams. However, despite its mandate to convene twice annually, no meeting took place in 2024, raising concerns about continuity and political follow-through.

Relying on a fragmented approach to technical standardisation is increasingly untenable, but in the context of escalating geopolitical fragmentation, there is a real risk that standardisation falls behind other, short-term priorities. Rather, standardisation should be embedded in a broader industrial strategy that nurtures native innovation ecosystems and reduces long-term vulnerabilities. Without this, Europe risks falling behind in defining the rules for technologies of the future.

Second, regarding orchestration, standardisation efforts involve a wide range of stakeholders, particularly from the private sector. States can support and guide these efforts by deploying policy tools such as public procurement, targeted funding, and education and training initiatives. To this end, the Netherlands and the EU must take a more proactive and leading role in standardisation. Recognising the long-term effects of standardisation is the first step in doing so. The second step is to define objectives and translate them into goals that can be achieved through a coordinated approach with societal actors – learning from China's orchestration strategy. Greater coordination among the private sector and industry, and the academic and research communities – both within the Netherlands and in Europe – is a necessary condition for a successful industrial policy that places standardisation as one of its core elements.

5.2 Promoting: Aligning Industrial Priorities and Global Standards' Leadership Ambitions

Policies aimed at strengthening Dutch and European influence in technical standardisation bodies should be closely linked to the EU's broader knowledge strategy. This includes leveraging Research, Development and Innovation (R&D&I) ecosystems, which form the foundation of the EU bloc's long-term competitiveness. This means developing an agenda that focuses on **policies to foster research and innovation**, intellectual property (IP) and patents

development. Crucially, these efforts must have commercialisation and the development of customer-facing applications as their ultimate goals, so that the EU can reap the social and economic benefits of the research done within its borders. Inability to **bridge the gap from research to commercialisation** and entrepreneurship remains a major challenge in the EU.

However, the Netherlands and the EU cannot realistically aim to compete on all fronts, as that would not be economically viable and would be unlikely to yield positive results. Industrial policy comes at a cost, meaning that difficult policy decisions have to be made: deciding where to focus current and future investments is one such decision. For example, investing in sectors where China already holds a significant lead, such as solar panels, is unlikely to prove worthwhile. The European Commission and EU Member States like the Netherlands would benefit from **mapping the areas where they hold a future-ready position** and designing appropriate standardisation mechanisms and targeted resource allocation strategies that best optimise efforts in those areas. The goal ought not to be picking winners, but rather avoiding overinvesting in sectors or industries where Europe is already behind and/or which are not of strategic importance. Trying to compete with the US and China in technologies where these countries are already dominant is unlikely to be a winning strategy.

Moreover, in line with recent initiatives such as the European Semiconductor Coalition,[68] **building coalitions of the willing** and explicitly incorporating standardisation as one of the pillars of EU-wide initiatives related to, for example, emerging technologies may prove beneficial. This would help in making standardisation a political theme in forums where the theme is most often omitted. To raise the profile and importance of standardisation further, EU Member States could consider establishing dedicated national representatives or envoys (ambassador-like roles) tasked with leading and coordinating negotiations on standards, mobilising national multistakeholder communities and strategising their participation in international technical standards-setting. A complementary approach would be to reinforce and institutionalise strategic standardisation dialogue within the EU. While the High-Level Forum on European Standardisation provides a valuable platform, this dialogue could be strengthened by formalising annual meetings among all – or a coalition of

68 Government of the Netherlands, *European Countries Agree to Strengthen Position in Semiconductor Industry*, 12 March 2025.

willing – EU Member States and the European Commission to assess jointly key priorities, set shared objectives and align public-sector perspectives on international technical standardisation.

Finally, tying Promoting to Programming, Europe must realise that the lead-time for professionals to build experience on standardisation, as well as on R&D and SEPs, and to bear (commercial) fruit is long. Impactful engagement requires **sustained, long-term investment** aligned with broader industrial and strategic goals. This means making adequate resources and dedicated funding streams available at both national and EU levels to support expertise development, participation in standardisation bodies and the commercialisation of strategic technologies.

5.3 Protecting: Defending Strategic Technologies, Detecting Power Shifts

Protecting the Dutch and EU's position in international standardisation requires action on several fronts. The first is to **prevent technology transfers** according to two criteria: where there is dual-use potential; and in critical areas where Europe wants to keep its technology superiority. This element connects well with the outbound investment screening plans that the European Commission is currently developing.[69]

Moreover, Europe would benefit from working on **data analytics-driven intelligence and digital tools** to understand and assess the distribution of power on standardisation. Information regarding participation in international standardisation forums is scattered across multiple sources and difficult to assemble. A communications system or monitoring platform for trends and developments in standardisation that are made by China – and others – on key technologies would help European stakeholders interested in standardisation to organise themselves better and align their engagement strategies. Proper understanding of how the Chinese orchestration model for standardisation works in practice is lacking, and funded research on this area could bring about insights and better information on China's standardisation system. The Australian

69 European Parliament – Legislative Train Schedule, *Outbound Investment Screening: In 'A New Plan for Europe's Sustainable Prosperity and Competitiveness'*, 20 February 2025.

Strategic Policy Institute's Critical Technology Tracker, which monitors countries' research performance and potential technology capabilities, could serve as inspiration for a framework to monitor developments and technology trends on standardisation.[70]

Furthermore, an in-depth discussion on sanctions, bans or export controls could also be carried out. The fine balance between protecting our industries and knowledge spill-over effects and making sure that Europe is not actually stimulating Chinese efforts to further and more quickly develop native capabilities – and thereby catch-up – is worth a thorough analysis. Conducting such an analysis could help Europe to define measures to avoid making our ecosystems dispensable for China – be they EV chips or lithography equipment. The progress made by China in AI and semiconductors over the past two years, despite export controls by the US, the Netherlands and Japan, provides a case study to assess and learn about this matter. Other, older chips, although less advanced in design, are strategically indispensable across critical sectors – from automotive and healthcare to aerospace and defence. The challenge that Europe faces not only stems from global overcapacity, as often portrayed, but also from a lack of competitive European production. This has concrete implications for policy. Rather than focusing primarily on protectionist tools such as sanctions or export controls – which may have a limited effect or unintended consequences – the EU should prioritise 'promote' and 'partner' strategies, as described in the previous and the following sections. The EU should nonetheless adopt proactive strategies to maintain and strengthen its technological edge where it still holds competitive advantages.

These technological advancements are closely linked to standardisation efforts, as Chinese companies like SMIC and BYD increasingly participate in international technical committees related to automotive as well as semiconductor standards. Monitoring their progress also means monitoring how they contribute to and influence global standards.

This challenge is compounded by the **asymmetry in how standardisation access is structured**. While Chinese companies can participate in EU Member States' NSBs and European SDOs – often without significant barriers – foreign companies face more restricted access to China's standards-setting system.

70 See: Australian Strategic Policy Institute, *ASPI's Critical Technology Tracker*.

Participation in China's domestic standardisation processes requires local registration and formal partnerships with government-affiliated entities, limiting meaningful foreign input – or, as in the case of CACA, it is simply not allowed. Assessing this imbalance is crucial for shaping EU policy on whether and how principles of reciprocity should be integrated into European standardisation governance.

5.4 Partnering: Mobilising Local Action and European Alignment to Achieve Global Impact

The theme of partnering is of particular interest for the EU and ties well with promoting and protecting, as discussed above. Only when **EU Member States partner among themselves and cooperate with others** such as Japan, South Korea, the UK or India can Europe ensure leadership in the global standardisation arena. Such collaboration helps to bridge knowledge gaps, align technical priorities and consolidate voting power in international standards bodies, which often operate on consensus or weighted participation systems.

It remains essential for European stakeholders to align informally around shared priorities in voting rounds, which are often unpredictable and labour-intensive. Developing a mutual agenda – grounded in transparent coordination, timely information exchange and early engagement – can help to ensure that European interests are effectively represented, without breaching the principles of openness and neutrality that underpin international standardisation.

Electric vehicles offer a particularly illustrative example of the **opportunities and challenges involved in international technology partnerships**. In fact, European automotive chip suppliers continue to pursue technology partnerships with Chinese companies. However, also from a self-protection point of view, there is a growing need to reassess cooperation with Chinese companies like Huawei and BYD, since they are also producing EV chips, which may lead to increased competitive pressure on European suppliers, potential IP leakage and long-term dependency risks in a strategically critical technology domain. In parallel, the EU can work on exerting its influence by strengthening interactions with relevant Chinese standardisation organisations, ensuring that it partakes in the development of standards and thereby minimises future technical differences. This implies encouraging China's entanglement by working on the development of EV chip standards with CATARC to avoid diverging standards. Autonomy and

strategic entanglement must be properly balanced, and this balance will differ per technology area and depend on the level of European ambition in each area.

5.5 Process: Scanning Opportunities, Selecting Priorities and Scaling What Works

There is ample opportunity to improve the processes of standardisation bodies. Standardisation is a complex process that requires adhering to several formal procedures, while also relying on informal coordination and negotiations – both during and outside of meetings.

Process and outcome documents related to standardisation present two main challenges. On the one hand, the sheer volume and complexity of documentation – especially within Technical Committees – make it difficult for practitioners to navigate the process and keep track of developments. On the other hand, there is a significant transparency gap: access to many documents remains restricted to participating members (P-members), with limited visibility for the broader public and even for some stakeholder groups.

For instance, in ISO/TC 197 on Hydrogen Technologies, only P-members such as the Netherlands have access to the committee's materials, while the public remains excluded. Although national committees are expected to consult their constituencies, in practice this input channel is often limited. Conversely, when a country is not a P-member – as in the case of the Netherlands and ISO/TC 351 on Contact Centres – it lacks access to the documents altogether, thus complicating inclusive participation. Ensuring more transparency regarding participation in standardisation meetings, as well as easier access to public archives on the topic, are needed to allow for **greater accountability and openness**. All documentation on standards should be made more accessible and – every time it is feasible and acceptable – publicly available in machine-readable format by default, to ensure that it can be analysed by external experts. Additionally, the names of participants and institutions involved in standard-setting processes should be made public, in order to enhance transparency and democratic legitimacy. These are matters that EU Member States can promote within formal SDOs.

Early documentation of procedures and methods in technical standards can provide companies or governments with a **first-mover advantage** by shaping

the direction of the standard before others have the chance to contribute. This dynamic can place latecomers – often from countries or organisations with less-developed standardisation infrastructures – at a disadvantage, as their ability to influence or adapt to the standard is diminished. In the ISO, for example, once standards on a certain area are documented and put up for discussion and voting, changing their content is very difficult. ISO processes are cumbersome and time-consuming, often making them voluntary, rather than mandatory – such as ISO 27001, despite it being the golden standard on information security.[71] However, as this report has alluded to, the outcome of standardisation does not always represent the best solutions for the industry or the consumers. This is partly because influencing standards is an expensive, complicated and lengthy process and the theoretically best technical solutions do not always win. In addition to allocating fewer resources on standardisation than China, European governments and companies do not always allocate their existing resources effectively.[72] Developing an ISO standard, for instance, can take up to three years, while undergoing regular revisions.[73] In order to influence the process more directly, European countries that **prioritise a particular topic can benefit from taking on the secretariat of the technical committee(s)** addressing that topic. The advantages include chairing the TC, setting the agenda and indirectly influencing the work programme.

Another reason why standardisation is more effectively driven in China than in the Netherlands relates to insufficient **cooperation between the public and private sectors**. In the Netherlands, processes are largely dominated by the private sector, also for formal SDOs. While the Dutch government co-funds topics that it considers important, such as national building codes (which refer to mandatory construction and safety regulations, that often incorporate formal technical standards), the guidance it provides on other, less obvious areas – but perhaps more strategic – is minimal. This contrasts sharply with China's state-centric approach, where projects and experts receive financial support that is aligned with broader industrial strategy goals, leading to more leadership roles and shorter lead times overall.

71 ISO, *ISO/IEC 27001:2022*, 2022.

72 European Commission, *An EU Strategy on Standardisation: Setting Global Standards in Support of a Resilient, Green and Digital EU Single Market* (p. 6), 2 February 2025.

73 ISO, *Stages and Resources for Standards Development*.

In the Netherlands, the communication between NEN, the government and industries regarding developments on specific industries remains a challenge. For instance, there seems to be insufficient signalling – in both directions – regarding important standardisation and technical developments in areas of common interest. To address this flaw, the establishment of **a national Dutch standardisation platform, or dialogue,** would benefit all of the stakeholders involved or with an interest in standardisation. This would include stakeholders from the government, industry and academia. Another element is that of **tracking Chinese developments**: an important function that is currently unavailable is monitoring, for example, newsletters from SDOs, the work of TCs (proposals and change requests, etc.) and the data points embedded in standardisation documents. These data points can reveal divergences in technical standards and potential risks, and are essential for evaluating Chinese initiatives and coordinating responses with relevant stakeholders in the corresponding field of expertise.

Another **challenge regarding the allocation of resources is time, which partly reflects the perception that standardisation costs yield little benefit**. Dutch stakeholders do not allocate sufficient time to delve deeply into the technical matters at stake in SDOs, as standardisation is often treated as an 'add-on' rather than having dedicated employees working on the topic. Simply put, functions that are taken as full-time jobs in China are considered side projects in the Netherlands. Consequently, members of the Technical Committees often only have time to attend meetings and vote, leaving little room for drafting or reviewing text proposals – which is where the real impact can be made. One illustration of the lack of sense of urgency relates to some Technical Committees, where months or years can pass until the relevance of a topic is assessed in the EU Member States, while fundamental documents were already being developed internationally. In practice, this means that the risks and impact of the standards being developed are not assessed during these early but key phases. The consequence is that when an EU Member State becomes a permanent member of those TCs, the subject matter often only receives broader attention when the voting rounds begin – when it is too late to have actual influence over the outcomes.

Adopting a **long-term vision for standardisation** in the Netherlands would be a stepping stone to improve the current approach and avoid the pitfall of engaging with a topic only once an ISO/TC is already established and operational. In relation to this, the role of the Netherlands in existing Technical Committees

can be assessed from a more strategic point of view, namely by identifying opportunities to influence the outcome. For instance, if the development of a certain standard is advanced and is not of key importance to the Netherlands, participation may have limited impact and resources may be better used elsewhere. An **initial step in this direction would be to evaluate a few – up to five – key ITU/ISO/IEC Technical Committees**. A thorough analysis of those bodies' workings and operational challenges, engaging stakeholders from NSBs, academia and industries working on them, could provide valuable insights into how standardisation works in different sectors, what the actual costs and effort involved are and thus inform better policymaking.

The organisational model of most NSBs is another key aspect affecting how resources are allocated. Companies pay an annual subscription fee to their national standardisation institute and send experts to SDO meetings, whose costs (including labour, travel and accommodation) they are responsible for covering. An ISO meeting, for instance, can take up to three or four days. In Europe, it is **often underestimated how costs can increase significantly** once an ISO/TC project is approved (i.e. when a standard is authorised for development), leading to insufficient follow-up. This is even more of a challenge for small and medium-sized enterprises, which lack the economic power and influence to participate in these forums, regardless of their intellectual merits and despite some EU-level instruments at their disposal for participation.

In order to move from a reactive approach to standardisation, the Netherlands – and the European Union – should assign more resources and establish teams that can enable a **greater role for countries in preparatory activities**. Such teams would work on developing or adjusting fundamental documents such as roadmaps, scopes, definitions and baseline standards. These preparatory steps set boundaries and scope for the proposals that come later. Establishing teams that support these activities and also participate (or that support industry experts participating) in projects defined as relevant, focusing on the pre-standardisation phase where foundational principles, such as the scope, are defined, is key to having effective impact. Such a structure across EU Member States would enhance cooperation across the bloc.

Finally, the societal aspects of standardisation are, overall, insufficiently assessed. **Impact assessments of human rights** should become an inherent part of standardisation processes in all SDOs – at least the formal ones. When it comes to the internet, for instance, this could be a step towards realising the

vision of the United Nations General Assembly that human rights online should be protected as human rights offline, a goal also outlined in the Dutch International Cyber Strategy 2023–2028.[74]

74 United Nations Digital Library, *The Promotion, Protection and Enjoyment of Human Rights on the Internet: Resolution / Adopted by the Human Rights Council on 5 July 2018*, 5 July 2018; and Government of the Netherlands, *International Cyber Strategy 2023–2028*, 12 September 2023. See also: United Nations General Assembly, *Human Rights and Technical Standard-setting Processes for New and Emerging Digital Technologies*, 18 September 2023.

6 Maintaining Europe's Edge

Long regarded as a technical afterthought, standardisation has evolved into a central lever of geopolitical influence and element of industrial strategy. As is often remarked in standardisation circles, 'whoever owns the standard, owns the market'.[75] China's deliberate integration of standardisation into its technology, industrial and foreign policies is elevating the country from a standards-taker to a standards-maker. This transition is facilitated by the orchestration of public and private actors, strategically coordinated interventions in international standard-setting bodies and concentrated investments in sectors such as telecommunications and EV chips.

By contrast, Europe all too often treats standardisation as a predominantly technical matter. Despite a strong industrial base, deep experience in international standardisation and renewed political attention by way of the 2022 European Standardisation Strategy, the EU and its Member States lack a coordinated, strategic and long-term approach. The result is a fragmented landscape marked by reactive behaviour and underinvestment – both in terms of material resources and institutional capacity. This undermines Europe's ability to shape the global rules of tomorrow's industrial and digital economies. If standards define the playing field, then failing to shape them means competing on terms set by others.

The answer does not lie in isolationism. The right balance between asserting the interests of European countries and companies and ensuring interoperability and interdependence with other countries and regions differs between sectors. Strengthening Europe's influence means deepening alliances with countries that share normative interests and concerns – such as Japan, South Korea and the UK – while simultaneously investing in domestic capabilities, aligning EU Member State efforts, and stepping up engagement in global standard-setting bodies.

For the Netherlands and the EU alike, reclaiming leadership in standardisation demands a shift in mindset. Standardisation must be seen not as an isolated technical task but as a core element of technological, industrial and foreign

75 Foreign Policy, *China Wants to Run Your Internet*, 25 August 2023.

policy. This requires long-term planning, robust public–private coordination, and the political will to focus on areas where Europe has the capacity to lead and define the standards of the future.

Five interconnected levers for action can be drawn from the insights from this analysis of the evolving dynamics of standardisation – particularly China's strategic approach – and two industry snapshots on telecommunications and the internet and on EV chips. These levers offer a framework to rebalance European influence by: setting clear priorities (programming); advocating European positions globally (promoting); defending against adverse norms (protecting); forming strategic alliances (partnering); and improving internal mechanisms (process).

The proposed Blueprint for Action on Standardisation calls for:

1. Programming: Embedding standardisation more explicitly in strategic planning and industrial policy;
2. Promoting: Prioritising sectors with a high potential for European leadership through targeted investment, commercialisation support and cross-border coordination to maximise the impact of European standardisation efforts;
3. Protecting: Controlling critical tech transfers, improving standardisation monitoring and addressing access asymmetries to national or regional SDOs with China;
4. Partnering: Building strategic coalitions with like-minded countries and engaging selectively with China to align standards and manage long-term dependencies;
5. Process: Improving transparency, coordination and early engagement in standardisation processes by investing in capacity, digital and data-driven monitoring tools and strategic participation.

Time is of the essence. By making standardisation a foundational pillar of its geopolitical and industrial agendas, Europe still has the agency to influence the global technological order – rather than to be shaped by it.

List of Abbreviations and Acronyms

AI	Artificial intelligence
AUTOSAR	Automotive Open System Architecture
BRI	Belt and Road Initiative
BRICS	Brazil, Russia, India, China, South Africa and other leading emerging economies
CACA	China Automotive Chip Alliance
CATARC	China Automotive Technology and Research Centre
CCP	Chinese Communist Party
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CESI	China Electronics Standardisation Institute
CS2035	'China Standards 2035' initiative
DNS	Domain Name System
DPP	Digital Product Passport
DSR	(China's) Digital Silk Road
EEA	European Economic Area
EFTA	European Free-Trade Association
ESO	European Standards Organisation
ESPR	Ecodesign for Sustainable Products Regulation
ETSI	European Telecommunications Standards Institute
EU	European Union
EV	Electric vehicle
GSM	Global System for Mobile Communications
G77	Group of 77 developing nations
hEN	Harmonised European standard
IATF	International Automotive Task Force
ICANN	Internet Corporation for Assigned Names and Numbers
ICV	Intelligent connected vehicle
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IP	Intellectual property
ISO	International Organisation for Standardisation
ITU	International Telecommunications Union
JEDEC	Joint Electron Device Engineering Council

MIIT	(China's) Ministry of Industry and Information Technology
NEV	New energy vehicle
NSB	National standardisation body
NSD	(China's) National Standardisation Development (outline)
NTCAS	(China's) National Technical Committee of Automotive Standardisation
OASIS	Organisation for the Advancement of Structured Information Standards
OEM	Original Equipment Manufacturer (company that produces components used in another company's finished product)
OneM2M	Global standardisation initiative to develop a common service layer for Machine-to-Machine (M2M) and Internet of Things (IoT) technologies
R&D&I	Research, development and innovation
SAC	Standardisation Administration of China
SAMR	State Administration for Market Regulation
SC	Subcommittee (of Technical Committee)
SDC	Standardisation Development Concept
SDO	Standards Development Organisation
SEP	Standard Essential Patent
SME	Small and medium-sized enterprise
TBT	Technical Barriers to Trade
TC	Technical Committee
UNECE	United Nations Economic Commission for Europe
US	United States
W3C	World Wide Web Consortium
WG	Working Group
WTO	World Trade Organisation
3GPP	Third Generation Partnership Project
4G / 5G / 6G	Fourth generation / Fifth Generation / Sixth Generation (wireless mobile telecommunications technology)

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