

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY
HEARING CHARTER**

Setting the Standards: Strengthening U.S. Leadership in Technical Standards

**Thursday, March 17, 2022
10:00 am – 12:00 pm
Hybrid In-Person/Remote Hearing**

PURPOSE

On Thursday, March 17, 2022, the Subcommittee on Research and Technology of the Committee on Science, Space, and Technology will hold a hearing to discuss the nature and importance of the standards-setting process to U.S. competitiveness and national security. The Subcommittee will examine the technical standards-setting processes both domestically and internationally; the current intergovernmental processes that support Federal coordination and information exchange activities for standards engagement; the barriers that U.S. organizations face to participating in standards development; and the risks to loss of U.S. leadership in standards setting.

WITNESSES

- **Dr. James K. Olthoff**, Acting Director, National Institute of Standards and Technology
- **Ms. Mary Saunders**, Vice President, Government Relations and Public Policy, American National Standards Institute (ANSI)
- **Dr. Alissa Cooper**, Vice President and Chief Technology Officer, Technology Policy and Cisco Fellow, Cisco Systems Inc.
- **Mr. Andrew Updegrave**, Partner, Gesmer Updegrave L.L.P.

OVERARCHING QUESTIONS

- What role do standards play in society, innovation, and U.S. competitiveness?
- What emerging challenges in international standards setting bodies or actions by foreign nations in their domestic markets may affect U.S. industry in foreign markets?
- What role has the Federal government traditionally played in voluntary consensus standard setting and how can the Federal government's standards activities be strengthened to better support U.S. stakeholders in international standards bodies?

STANDARDS OVERVIEW

Simply put, a standard is a repeatable, harmonized, agreed-upon and documented way of doing something. Standards contain technical specifications, requirements, guidelines, or characteristics that can be used to ensure that materials, products, processes, and services are fit

for their purpose. They provide a common language to measure and evaluate performance, make components made by different companies interoperable, or protect consumers by ensuring safety, durability, and market equity.¹ Adherence to standards is usually voluntary. Technical standards can become mandatory when governments adopt them as a requirement in legislation or regulation, usually for safety or consumer protection reasons.

In recent years, the pace of technological change and globalization has made standardization increasingly important. International standards enable the interoperability necessary for companies to export products to other countries, increase economies of scale, lower costs, and boost innovation. Many countries increasingly see international standards as another tool to gain competitive advantage for domestic industries. As a result, there is a renewed focus on technical standards, how they are set, and who sets them.

HOW STANDARDS ARE SET

The standard-setting ecosystem is complex and multifaceted, both within the U.S. and internationally. Standards development organizations (SDOs), sometimes referred to as standards setting organizations, develop, coordinate, promulgate, or otherwise produce and maintain technical standards. SDOs vary significantly by their role, position, governance structure, and the extent of their influence on the standardization landscape. Standards organizations may be run by a government agency, be quasi-governmental in nature, or be entirely non-governmental entities.

Standards setting occurs on several geographic levels: national, regional, and international.

On the national level, each country has a single recognized national standards body (NSB) that supports national standard setting and represents that nation in certain international fora. While most NSBs around the world are government agencies, these organizations can differ widely in their governance, financing, and functional organization. In the United States, the NSB is called the American National Standards Institute (ANSI), a private, nonprofit organization that supports the development of standards and conformity assessment in collaboration with industry and government stakeholders. ANSI does not create standards itself, but rather supports the ideal environment for SDOs to create them. It does so through an accreditation process that ensures SDOs meet requirements for openness, balance, consensus, and due process. This process ensures all interested parties can participate in a standard's development. Importantly, organizations do not need to be accredited with ANSI to create their own standards in the United States, a process only necessary if an organization is seeking to broaden the applicability and reach of their standards to a national or international audience. This bottom-up approach to standard setting has allowed for a rich, varied ecosystem of standards across the United States.

On a regional level, some organizations set standards for a group of countries or economies. Examples of these organizations include the European Committee for Standardization, the African Organization for Standardization, the Pacific Area Standards Congress, and more.

¹ "Standards & Measures," [NIST](#), accessed February 28, 2022.

Finally, there are organizations that develop international standards. There are two primary types of international standards organizations: treaty-based organizations and non-treaty organizations. A lot of attention is currently being directed at the International Telecommunication Union (ITU), the primary treaty-based international standards organization for information communications technology. ITU was established as a permanent agency of the United Nations. Governments are the primary members of the ITU, but other organizations, like NSBs or individual companies, can hold a form of direct membership status. The largest non-treaty international standards organization is the International Organization for Standardization (ISO). Another major non-treaty organization is the International Electrotechnical Commission (IEC), which is focused on information communications technology. The ISO membership is comprised of NSBs, one per country. The IEC is similarly composed of national committees from each country. The U.S. committee to the IEC is led by ANSI and made up of members from companies and Federal agencies. There are also many other independent international standards development organizations that develop and publish standards for a variety of international uses. The Institute of Electrical and Electronics Engineers (IEEE) and the 3rd Generation Partnership Project (3GPP) sets standards for a broad range of technologies.

THE FEDERAL GOVERNMENT’S ROLE IN STANDARD SETTING

While most countries around the world have a top-down approach for setting standards, the United States has traditionally had an industry-led, bottom-up approach to most standard setting. This approach protects against suboptimal standards by enabling competition and ensuring technical merit prevails. The government plays a supportive role by providing technical inputs to enable standard setting, identifying gaps, and adopting standards wherever possible.

While the U.S. government has played a role in standard setting for well over a century, in 1995 Congress signed the *National Technology Transfer and Advancement Act* (NTTAA) to guide Federal agencies standard setting activities (Public Law 104-113).² The NTTAA directs Federal agencies to adopt voluntary consensus standards wherever possible to avoid duplication of efforts. It also makes Federal agencies responsible for evaluating the efficacy of their adoption of standards through conformity assessment activities. In supporting or adopting standards, each agency must coordinate its activities with those of other appropriate agencies and the private sector. To provide agencies with guidance for how to implement NTTAA, the Office of Management and Budget (OMB) created and later revised OMB Circular A-119.³ This document promotes agency participation and coordination in standard setting activities, encourages the adoption of consensus-based technical standards, and informs agencies of their statutory obligations related to standards.

The National Institute of Standards and Technology

The National Institute of Standards and Technology (NIST), originally named the National Bureau of Standards, was established by Congress in the National Bureau of Standards Organic

² The National Technology Transfer and Advancement Act of 1995, 104th Congress, [P.L. 104-113](#).

³ OMB Circular A-119: Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities, Office of Management and Budget, revised 2016, hosted on [nist.gov](#).

Act of 1901 (Public Law 56-177).⁴ The agency supports U.S. competitiveness by advancing measurement science, standards, and technology. The NIST Director is designated by Congress to be the President’s principal adviser on standards policy pertaining to the Nation’s technological competitiveness and innovation ability (Public Law 114-329).⁵ NIST is housed within the Department of Commerce. The agency operates five laboratories and two national user facilities that conduct measurement research to inform standards.

NIST is responsible for providing and maintaining many inputs and tools that support standard setting activities. NIST offers standard reference materials, data, and instrumentation to help users verify the accuracy of specific measurements. NIST also provides calibration services to disseminate the physical measurement standards for commerce, industry, and research. In addition, the agency provides third-party accreditation to testing and calibration laboratories in response to legislative actions or requests from government agencies or private-sector organizations. NIST also plays the role of convener, bringing together industry, academia, and government stakeholders to facilitate the development of standards that meet national priorities.

NIST directly engages in standards setting bodies and tracks U.S. representation in those bodies. In the 1979 *Trade Agreements Act*, Congress required the Secretary of Commerce to keep informed regarding international standards-related activities and identify those that may substantially affect the commerce of the United States (Public Law 96-39).⁶ This responsibility has been designated to NIST. If there is no appropriate U.S. representation, NIST is required to make appropriate arrangements to provide for the adequate representation of U.S. interests. The Government Accountability Office reviewed NIST’s role in facilitating standards activities in 2018, and as a result, NIST implemented several changes to better track U.S. representation in international standards bodies.⁷

NIST is also responsible for promulgating the standards that govern Federal computer systems, called the Federal Information Processing Standards (FIPS), in accordance with the *Federal Information Security Modernization Act* (Public Law 113-283).⁸ These standards and guidelines are developed when there are no acceptable consensus-based alternatives or solutions for a particular government requirement.

Finally, NIST facilitates coordination between Federal, State, and local governments for standards engagement, adoption, and conformity assessment activities. NIST chairs the Interagency Committee on Standards Policy (ICSP), which brings together relevant federal agencies to foster standardization activities.⁹ The ICSP advises Federal agencies on standards policy and fosters cooperation between the Federal government, industry, and private sector organizations around standard setting activities. The ICSP current has working groups devoted to advanced communications technologies, artificial intelligence, and conformity assessment.

⁴ The National Bureau of Standards Organic Act of 1901, 57th Congress, [P.L. 56-177](#).

⁵ The American Innovation and Competitiveness Act, 114th Congress, [P.L.114-329](#).

⁶ The Trade Agreements Act of 1979, 96th Congress, [P.L. 96-39](#).

⁷ “Additional Review and Coordination Could Help Meet Measurement Service Needs and Strengthen Standards Activities,” Government Accountability Office, [GAO-18-445](#), July 2018.

⁸ The Federal Information Security Modernization Act (FISMA), 113th Congress, [P.L.113-283](#).

⁹ “Interagency Committee on Standards Policy,” [NIST](#), updated April 7, 2021.

The Department of State

The Department of State advises the President on foreign policy issues and leads on behalf of the United States in treaty-based international standards bodies, such as the ITU. Because the State Department lacks the technical expertise to engage on many technical standards, it sometimes delegates leadership to other expert agencies. In recent years, some stakeholders have raised concerns that the Department of State (and the Federal government in general) have ceded presence and leadership in these international fora to authoritarian countries.¹⁰

One proposal in the Senate *U.S. Innovation and Competitiveness Act* (Sec. 3210) would put the State Department in charge of coordinating U.S. engagement in international ICT standards. Yet another (Sec. 2517) would put NTIA in the lead. Both of these proposals reflect the growing interest in Congress in international standards setting processes as they relate to U.S. competitiveness. They also reflect a widespread lack of understanding of how standards development works and the appropriate role of different agencies. A widely vetted provision in the House *America COMPETES Act* (Sec. 10245) would codify NIST's important role in leading government coordination of international standards engagement.

ONGOING CHALLENGES

Overcoming Closed National Standards Systems

International standards enable international trade. If countries create an indigenous standards regime that is significantly different from international standards, it can significantly increase costs for companies seeking to export products into that country. For example, in the early 2000s, China created an alternative to the Wi-Fi standard called "WAPI." This divergent standard threatened to fracture the wireless equipment market to favor Chinese domestic industry.¹¹ Under international pressure, China dropped the standard in 2004. Countries with closed standards systems can also inadvertently harm their economies. For example, Japan's choice to use Japan-only technology standards created innovations that were not widely adopted by the rest of the world, which ultimately damaged the country's technology industry.¹²

Certainty, differences between one country and another in their technical standards may have legitimate origins and purposes. For example, countries in geographic areas that are prone to hurricanes might have stricter building codes. When considering if a technical standard is based on legitimate differences or protectionism, the World Trade Organization (WTO) agreement on technical barriers to trade says a country must avoid unnecessary obstacles to trade when it is preparing a technical standard to achieve a policy objective.¹³ The Office of the U.S. Trade Representative engages (USTR) engages with the WTO when nations create standards that create unnecessary barriers to trade for U.S. industry.

¹⁰ Mark Montgomery and Theo Lebryk, "China's Dystopian "New IP" Plan Shows Need for Renewed US Commitment to Internet Governance," [Just Security](#), April 13, 2021.

¹¹ Grant Gross, "China agrees to drop WAPI standard," [Computer World](#), April 22, 2004.

¹² Stephen Ezell and Robert D. Atkinson, "The Middle Kingdom Galapagos Island Syndrome: The Cul-De-Sac of Chinese Technology Standards," [The Information Technology and Innovation Foundation](#), December 2014.

¹³ "Technical Information on Technical barriers to Trade," [World Trade Organization](#), accessed March 10, 2022.

Competing in International Standards Bodies

International standards bodies have become increasingly relevant for countries seeking to advance the competitiveness of their domestic industry. One example of this is the standardization policies of the People’s Republic of China. In October 2021, China announced a plan called “China Standards 2035,” a document that lays out the nation’s plans to set the global standards over the next 15 years.¹⁴ With this plan, China announced it would align 85 percent of its domestic standards with international standards.¹⁵ But China is not the only country seeking to gain competitive advantage in international standards bodies. In February 2022, the European Commission released a standardization strategy to use its NSBs to advantage EU industry and “shape international standards in line with its values and interests.”¹⁶

Some policymakers worry that the United States is losing its competitive advantage in international standards due to the rise of Chinese participation. There has been a rise in the number of Chinese companies participating in SDOs, the number of proposals and submissions submitted by Chinese companies, and the number of Chinese nationals taking leadership positions in these organizations.¹⁷ However, the number of participants, proposals, and leadership positions that a nation holds does not equate to effectiveness in international standards. While stakeholders submit proposals of varying degrees of quality to these bodies, only the ones with the most technical merit are adopted. Standards experts from U.S. industry argue that “success” of a standard can be better measured by the degree to which that standard is adopted in the marketplace because it meets a market need or opportunity. While the United States remains the leader in setting international standards, without sustained investments in R&D and sustained engagement on the part of the United States, other countries may one day surpass the U.S.

Countering Undue Influence in International Standards

Some stakeholders have also raised concerns over undue influence by foreign nations seeking to undermine SDO processes to benefit their domestic industry. For example, there are accusations of coordinated voting, where a group votes as a block for a government’s preferred standards outcome rather than one with the highest technical merit.¹⁸ Because SDOs differ widely in terms of governance and processes, these activities may vary between bodies. Reports of undue activities are not widespread. NIST put out a request for information on Chinese influence in international standards bodies in November 2021.¹⁹ Of the fifteen private sector organizations

¹⁴ Emily de La Bruyere, Doug Strub, and Jonathan Marek, “China’s Digital Ambitions A Global Strategy To Supplant The Liberal Order,” [the National Bureau of Asian Research](#), Special Report #97, March 2022, 52-65.

¹⁵ Matt Sheehan, Marjory Blumenthal, Michael Nelson, “Three Takeaways from China’s New Standards Strategy,” [Carnegie Endowment for International Peace](#), October 28, 2021.

¹⁶ “An EU Strategy on Standardisation - Setting global standards in support of a resilient, green and digital EU single market,” [European Commission](#), February 2, 2022.

¹⁷ Xirui Li and Dingding Chen, “Should the West Fear China’s Increasing Role in Technical Standard Setting?” [The Diplomat](#), April 15, 2021.

¹⁸ Alexandra Bruer and Doug Brake, “Mapping the International 5G Standards Landscape and How It Impacts U.S. Strategy and Policy,” [Information Technology and Innovation Foundation](#), November 8, 2021.

¹⁹ “Study on People’s Republic of China (PRC) Policies and Influence in the Development of International Standards for Emerging Technologies,” NIST, November 4, 2021, hosted on [Federal Register](#).

that commented, three claimed Chinese participants attempted to unfairly influence proceedings and only one identified a specific incident.²⁰

Some governments have engaged in forum shopping, where countries seek to develop standards in specific bodies where the rules favor their approach. For example, in 2019, a bloc of Chinese companies and government agencies proposed a new internet protocol at the ITU. This type of standard setting activity would be more appropriate for multistakeholder international standards organizations, like the Internet Engineering Task Force, than the multilateral ITU.²¹ The ITU process offered advantages for national governments over other multistakeholder fora, where stakeholders from civil society and industry favor proposals that do not restrict the open internet.²² Increased U.S. government participation in ITU may be necessary to counter these efforts.

Developing a Federal Strategy on Standards

There are calls for the Federal government to take a more aggressive role in coordinating U.S. standard setting activities. The European Union and China can create aggressive standards engagement policies because standards in those countries are set from the top down, with the government controlling most if not all decision making. The bottom-up U.S. approach to standards means that the U.S. government must take a different approach to standards strategies. The current U.S. strategy for standards engagement was developed by ANSI, based on feedback from the U.S. government, industry, SDOs, and other stakeholders. First published in 2000, the document is updated every five years to ensure that it reflects U.S. interests, technological advancements, national priorities, and U.S. government policy. The last update occurred in January 2021.²³

On a limited basis, the U.S. government has also developed strategies for the Federal approach to standards regarding specific technologies or government priorities. For example, in August 2019, NIST developed a strategy for Federal engagement in developing technical standards and tools for artificial intelligence.²⁴ Additional Federal strategies that outline priorities and plans for government engagement, identify needed expertise within government, and support information exchange may be appropriate to bolster U.S. interests in international standards bodies.

Boosting U.S. Participation in Standard Setting Bodies

Participating in standard setting activities, especially international ones, is an expensive and time-consuming process. The most effective companies hire dedicated experts to engage in standards bodies over many years. As a result, large companies participate more often than small

²⁰ Jacob Feldgoise, “How U.S. Businesses View China’s Growing Influence in Tech Standards,” [Carnegie Endowment for International Peace](#), December 23, 2021; International Code Council, “Comments of the International Code Council on the Study on People’s Republic of China (PRC) Policies and Influence in the Development of International Standards for Emerging Technologies,” submitted December 06, 2021, 86 FR 60801, hosted on [Federal Register](#).

²¹ Montgomery and Lebryk, 2021.

²² Montgomery and Lebryk, 2021.

²³ “U.S. Standards Strategy,” [The American National Standards Institute](#), 2021.

²⁴ “U.S. Leadership in AI: A Plan for Federal Engagement in Developing Technical Standards and Related Tools,” [NIST](#), August 9, 2019.

to medium sized companies. Academia, civil society, and other nonprofit organizations similarly lack the resources to participate effectively in international standards organizations.

To overcome this limitation and spur domestic companies to participate in standard setting, some countries offer incentives for participation in international standard setting. For example, Chinese programs at the local, provincial, and national levels provide financial subsidies to Chinese companies for submitting standards applications to international SDOs.²⁵ The European Union has considered regulations on SDOs to require feedback from smaller companies and nonprofits.²⁶ In the United States, there is no current policy to subsidize private sector engagement in standard setting. Both NIST and ANSI conduct education and outreach to teach organizations about the value of standards and how to engage in the process, but these efforts are limited. In addition, in terms of creating a pipeline of standards experts, little is done to integrate standards into engineering curricula. Provisions in both the *America COMPETES Act of 2002* and the *U.S. Innovation and Competitiveness Act* seek to boost U.S. engagement in international standards bodies by expanding educational efforts or through grants awarded to private companies, nonprofits, and academics. Such grants may not fully address the challenges that smaller organizations face to participating in standard setting, including lack of employee bandwidth and technical expertise.

²⁵ “Standardization and revision of subsidy policies in all regions of the country in 2019,” Guangdong Indoor Environmental Health Association, July 27, 2019, accessed March 10, 2020, [link to insecure website not provided].

²⁶ “An EU Strategy on Standardisation - Setting global standards in support of a resilient, green and digital EU single market.”