SPOTLIGHT 2

# International Standards Development Organizations

A variety of international standards development organizations emerged in the second half of the twentieth century, following the establishment of a core group of international bodies, including the International Telecommunication Union (ITU, founded in 1865), the International Electrotechnical Commission (IEC, founded in 1906), and the International Organization for Standardization (ISO, founded in 1947). This tripartite group is referred to as the "World Standards Cooperation" (WSC).[1] ISO and the IEC are networks (or federations) of national standards bodies that bring together a wide range of stakeholders to develop international standards. ITU functions as an intergovernmental organization. These institutions exemplify technocratic internationalism, although in many ways, their structure mirrors that of their national counterparts, because they bring together industry, academia, and other stakeholders to develop standards through consensus.

Table S2.1 highlights the remarkable growth in standards development by international standards development organizations. Since its founding, ISO has developed more than 20,000 standards, and a newer group, the Internet Engineering Task Force (IETF, founded in 1986), has already developed more than 7,600 standards. Additionally, the development of standards within international standards development organizations has increased since the 2000s because of the growing complexity of manufacturing systems, as well as demand in new areas ranging from technology to sustainability. For example, since 2000, ISO, the IEC, and Codex Alimentarius have published about 56 percent, 75 percent, and 52 percent, respectively, of the total standards they have developed since they were established. In 2024 alone, the organizations listed in table S2.1 collectively issued more than 7,000 new or revised standards. Although the number of standards is important and impressive, equally so is the relevance of the topic areas and the quality and level of consensus of those standards. The standards development bodies included in the table have adopted working methods that ensure stakeholder engagement and impact; they also manage gaps and overlaps to reduce duplication while addressing the needs of regulators and markets.

A reproducibility package is available for this book in the Reproducible Research Repository at https://reproducibility.worldbank.org/catalog/389.

**Table S2.1** Examples of international standards development organizations

| ORGANIZATION | YEAR ESTABLISHED | TOTAL NUMBER OF STANDARDS DEVELOPED | NUMBER OF STANDARDS DEVELOPED IN 2024 | NUMBER OF STANDARDS REVISED IN 2024 | TOTAL NUMBER OF STANDARDS DEVELOPED AS OF 2000 | TOTAL NUMBER OF STANDARDS DEVELOPED AS OF 1960 |
|---|---|---|---|---|---|---|
| ISO | 1947 | 20,953 | 1,126 | 671 | 11,461 | 132 |
| Codex | 1963 | More than 14,000[a] | 900[b] | Not available[b] | 7,000[c] | 16[d] |
| ASTM | 1898 | 12,960[e] | 148 | 1,706 | 12,636 (as of 2015) | Not available[f] |
| ICAO | 1947 | 9,018 | 997[g] | 408[g] | Thousands[h] | Hundreds[h] |
| IETF | 1986 | 7,661 | 120 | 47 | 1,748 | Not applicable[i] |
| IEC | 1906 | 7,617 | 455 | 320 | 5,967 | 146 |
| ITU[j] | 1865 | 6,834 | 240 | 87 | 2,612 | 405 |
| UNECE[k] | 1947 | 375 | 0 | 0 | 29[l] | 0 |

*Source:* WDR 2025 team, based on data provided by each organization.

*Note:* The organizations are arranged in descending order according to the total number of standards they have approved. The statistics include only standards, not amendments to standards or other types of guidance that the organizations may have issued, such as international workshop agreements, technical regulations, technical specifications, publications, and guidance notes (unless otherwise specified in the notes that follow). ASTM = American Society for Testing and Materials (originally), now ASTM International; Codex = Codex Alimentarius; ICAO = International Civil Aviation Organization; IEC = International Electrotechnical Commission; IETF = Internet Engineering Task Force; ISO = International Organization for Standardization; ITU = International Telecommunication Union; UNECE = United Nations Economic Commission for Europe.

a. Quantitative standards only, including 6,453 Codex Maximum Residue Limits and 63 Codex Extraneous Maximum Residue Limits for pesticides, 2,748 Codex Maximum Residue Limits for veterinary drugs, 4,939 provisions regarding food additives, and more than 200 maximum levels for contaminants.
b. Includes new and revised Codex standards (including quantitative standards), guidelines, and codes of practice. Data for quantitative standards only are not available.
c. Quantitative standards only.
d. Texts of standards only. Data are as of 1969.
e. Active standards only. ASTM International has more than 68,300 historical standards.
f. ASTM International did not provide data.
g. New standards, recommended practices, and definitions. Data that pertain only to new standards are not available.
h. Exact data are not available.
i. IETF was not established until 1986.
j. Standards for the Telecommunication Standardization Sector (ITU-T Recommendations) and Radiocommunication Sector (ITU-R Recommendations).
k. Standards for transport only, because data for these standards are available for 1960, 2000, and 2024.
l. Four standards on transport of dangerous goods and 25 standards for inland water transport. Data on standards developed for other types of transport as of the year 2000 are not available.

The establishment of the World Trade Organization (WTO) and the entry into force of the Agreement on Technical Barriers to Trade[2] and Agreement on the Application of Sanitary and Phytosanitary Measures in the mid-1990s encouraged the use of international standards published by international standards development organizations to facilitate international trade (refer to chapter 4 for details).

Although countries are encouraged to adopt international standards and withdraw national standards that conflict with international ones, legitimate deviations may occur as a result of national security, health, environmental, or geographic needs. To ensure global relevance, international standards must meet criteria such as responding to market and regulatory needs, avoiding market distortions, and supporting innovation. Active participation in the development of international standards, especially by developing countries, is therefore essential, so that the standards can directly reflect the unique conditions in these countries, which in turn encourages broader adoption.

## The role and evolution of international standards development organizations

International standards development organizations offer an administrative structure and a work process that enable interested parties to develop standards in a specific area and then share them. These organizations develop voluntary standards through consensus. Standards are not created by a single entity; rather, as in ISO, they are developed by experts representing a range of stakeholders, including industry, the public sector, academia, and others. Voluntary standards can become mandatory if they are referenced in national legislation. They are then known as "technical regulations."

Some of the more prominent private international standards development organizations, such as SAE International (formerly the Society of Automotive Engineers) and the Institute of Electrical and Electronics Engineers (IEEE), have a long history in the United States of developing voluntary standards through consensus. These organizations expanded internationally after World War II as industries globalized, and many new standards development organizations entered the field at that time as well.

ASTM International, established in 1898 as the American Society for Testing and Materials (ASTM) to ensure the reliability of steel rails, exemplifies the shift from national to global standardization. Initially focused on materials testing, particularly in the areas of metals and concrete, it formalized a participatory process in 1908 that required balanced representation from manufacturers, users, and public stakeholders. As technological advances multiplied, ASTM expanded its scope to include a growing range of industries. US industrial dominance in the early and middle parts of the twentieth century helped spread ASTM standards worldwide. Even as US manufacturing declined as the century progressed, ASTM's technical reputation endured, leading to its rebranding as ASTM International in 2001, which signaled its shift from national body to leader in international technical harmonization.[3]

Over its 125-year history, ASTM has evolved into a global platform serving more than 90 industries. As of 2025, it has developed nearly 13,000 active standards, over half of them adopted by more than 140 countries. Its 30,000 members from 150 countries participate in 147 technical committees that produce six types of voluntary consensus standards, ranging from test methods to specifications, that are regularly updated to reflect new knowledge and applications. Maintaining low membership fees and an open, transparent process, ASTM fosters broad and inclusive participation. Since 2001, it has signed cooperation agreements with 127 national and regional standards bodies, enabling them to adopt or adapt its standards. Today, ASTM standards underpin regulatory frameworks and international cooperation in sectors from construction to aerospace and organizations such as the North Atlantic Treaty Organization (NATO), Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Europe (UNECE), World Health Organization (WHO), and WTO.

In the realm of telecommunications technologies, the ITU Radiocommunication Sector develops and maintains a broad set of internationally recognized technical standards, known as "ITU-R Recommendations." These cover areas such as spectrum management, broadcasting, satellite communications, and radio astronomy. Though generally voluntary, they become binding when incorporated by reference into the ITU Radio Regulations. In practice, ITU-R Recommendations are widely adopted and respected, functioning as de facto global standards that ensure harmonization, interoperability, and efficient use of the radio-frequency spectrum and satellite orbits. Their global acceptance has been critical for enabling innovation, providing regulatory certainty, and ensuring that radiocommunication systems operate seamlessly across borders.

Beyond radiocommunications, the ITU Telecommunication Standardization Sector sets standards for transport and access networks, cybersecurity, digital financial services, and public key infrastructures. In contrast, the Internet Architecture Board (IAB) and IETF develop the core standards that underpin the internet's architecture, including those for fiber-optic transmission, routing protocols, and the Domain Name System, as well as management of Internet Protocol addresses. Together, these bodies create the technical foundation that allows global telecommunications and the internet to function reliably, securely, and at scale.

IETF (along with the IAB) is responsible for establishing the standards that underpin internet infrastructure, including fiber optics and routing systems. IETF's processes for developing standards are bottom-up, with multiple stakeholders participating. Decisions are made through email rather than in-person meetings to save on travel time and costs. Although the processes are inclusive in principle, they are much less so in practice. For example, in 2024, out of the 7,831 participants in all IETF activities, 85 percent were men, and 80 percent were from Europe and North America.[4]

IETF is, by design, a participative organization rather than a consultative one. Therefore, regular participation is essential, and those who participate frequently are highly motivated. On average, regular participants dedicate about nine hours per week to IETF activities. Experience is crucial, because the longer people participate in IETF, the better their understanding becomes. IETF estimates it takes 15 to 20 years of involvement for participants to feel they have a solid understanding of its processes, highlighting the significant time investment required to accomplish tasks, both personally and organizationally.[5]

At the same time, IETF's core principles include open participation, technical competence ("engineering quality"), reliance on volunteers, decision-making by rough consensus—broad agreement without requiring unanimity—and a commitment to "running code," meaning that standards are grounded in practical, working implementations rather than theoretical designs. These principles have enabled it to create a global internet architecture that serves billions, all with an annual budget of only about US$7 million. Its lean, agile, and developer-driven model has allowed IETF to respond quickly to emerging technical needs. However, its inclusiveness is uneven in practice, with barriers of time, expertise, and representation limiting participation. By contrast, ISO has a double layer of consensus—first among experts, then across countries—that can make its processes slower and can require more resources, but it can also make them more representative of diverse interests and more likely to result in broadly implementable and durable standards.

Although the internet is seen as a global technology, billions still struggle to access its full benefits because domain names and email addresses in their own languages and scripts are not available. To bridge this gap, the Internet Corporation for Assigned Names and Numbers (ICANN) has expanded the Domain Name System to include more than 26 scripts, from Arabic and Chinese to Cyrillic, and promotes universal acceptance so that software and websites recognize these multilingual addresses.[6] Enabling users to navigate and transact online in their own scripts not only preserves cultural identity but also boosts economic inclusion. By lowering barriers for consumers and firms, it can unlock vast new opportunities in e-commerce—an estimated US$10 billion in additional market value worldwide.

Food safety standards provide another example of international coordination. The Codex Alimentarius Austriacus of 1911 laid the groundwork for what would become, over the next century, a comprehensive global framework. Initially adopted in Europe as the Codex Alimentarius Europaeus, it focused on harmonizing testing of food samples to eliminate regional trade barriers. Later, in 1963, it joined forces with the Food and Agriculture Organization of the United Nations (FAO) and WHO to form the Codex Alimentarius Commission. The resulting Codex Alimentarius has provided guidance to governments on regulations in the area of food safety. The definitions and testing procedures shared by Codex have also served as reference points for private standards regarding food safety.

Some critics of Codex argue, however, that it is slow in developing Maximum Residue Limits for pesticides, which refer to the maximum levels of residues legally permitted in a crop, ensuring that the amount of pesticides humans and animals consume remains within safe limits based on scientific risk assessments. For example, in the case of rice, countries worldwide have established maximum residue levels for 1,144 different pesticides, but Codex has approved Maximum Residue Limits for only 66.

Private assurance systems for food safety often depend on international norms for auditing, certification, and accreditation developed by ISO. These systems make compliance assurance more affordable and enhance legitimacy, which is crucial for widespread adoption across diverse markets.

## Participation of national standards bodies in ISO

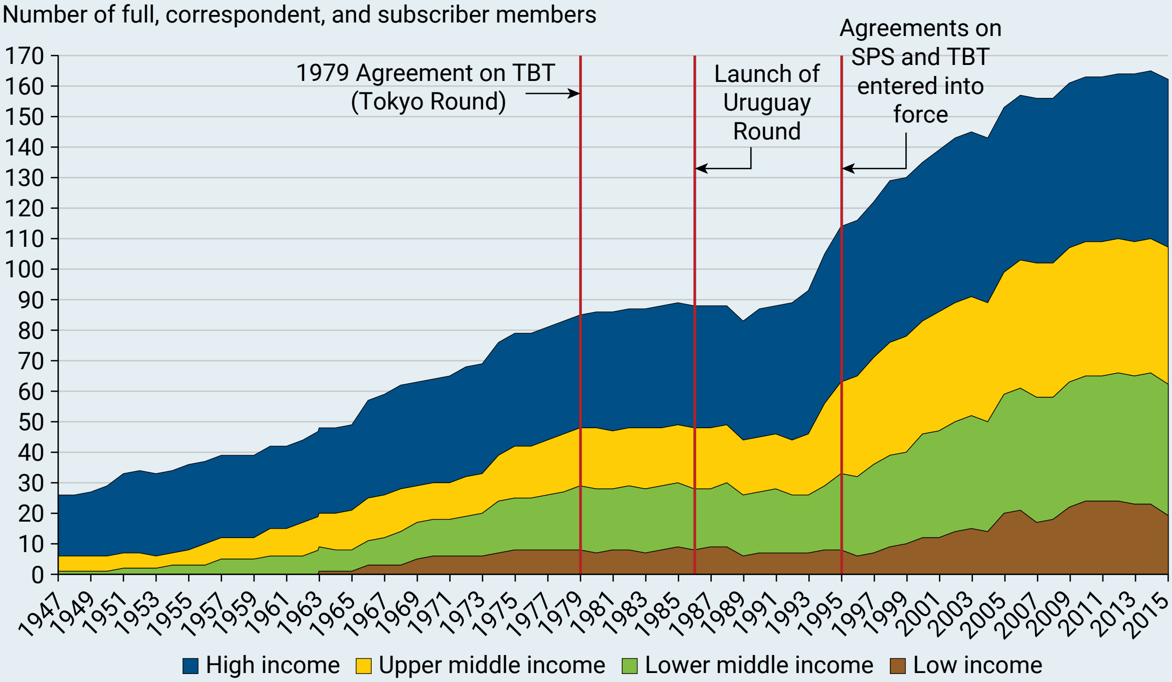
ISO is a not-for-profit organization and an international nongovernmental organization. Countries can become full members, correspondent members, or subscriber members.[7] Each membership type has a corresponding fee that provides different rights and opportunities to engage with the ISO standards system. The membership fees and sale of ISO standards are all based on cost recovery and are used to support the operation of the central secretariat in Geneva. The various membership categories offer opportunities for countries at all income levels to participate in developing international standards, although neither correspondent nor subscriber members can take part in the governance of ISO.

Full members of ISO can participate in developing standards, oversee the organization's governance, and sell ISO standards. Members choose to participate in committees related to national priorities and available expertise within the country among various stakeholder groups as either active, participating members, or observers.[8]

Figure S2.1 shows ISO's full membership by country income group since its founding in 1947. Whereas national standards bodies in most high-income countries have consistently been ISO members, membership among national standards bodies in upper-middle-income, lower-middle-income, and low-income countries increased significantly in 1993, following the end of the Uruguay Round of negotiations under the General Agreement on Tariffs and Trade (GATT), in anticipation of the WTO's creation in 1995.

The ISO system has 270 active technical committees, 509 subcommittees, 2,556 working groups, and 726 subgroups and ad hoc study groups.[9] The committees cover a wide range of economic, social, and environmental sectors.[10] Standards are actually developed or drafted within the working groups, which are mapped to "parent committees" that can be either technical committees or subcommittees, each with a specific title and scope of work. Each technical committee or subcommittee has a secretariat, hosted by a national standards body, that provides technical and administrative support to the committee. The secretariat reports to the ISO Technical Management Board, monitoring and reporting on the committee's progress, ensuring that it remains active, and verifying that ISO Directives and the Board's decisions are properly implemented.[11]

**Figure S2.1** Membership in ISO among low- and middle-income countries has increased

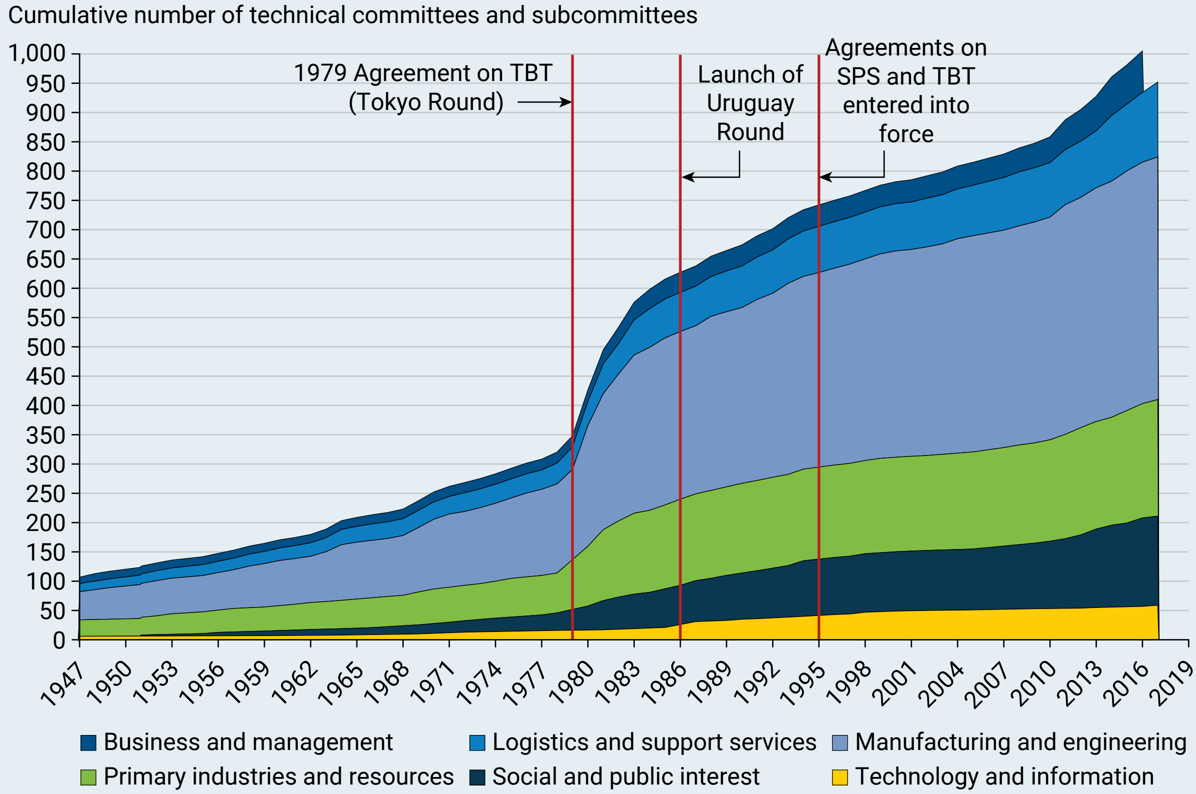



*Source:* WDR 2025 team, based on administrative data as of 2024 provided by the International Organization for Standardization (ISO).

*Note:* The figure plots the number of national standards bodies that are ISO members by country income group over time. Only one national standards body in each country is an ISO member. "Tokyo Round" and "Uruguay Round" refer to rounds of negotiations under the General Agreement on Tariffs and Trade. SPS = Application of Sanitary and Phytosanitary Measures; TBT = Technical Barriers to Trade.

Figure S2.2 shows the cumulative number of ISO technical committees and subcommittees over time. The manufacturing and engineering sector has the highest number of committees and subcommittees. The number of committees and subcommittees increased sharply after the 1979 Tokyo Round of negotiations for GATT, which yielded the Agreement on Technical Barriers to Trade. Committees and subcommittees proliferated on account of the resulting global shift in focus from traditional tariffs to nontariff barriers as major obstacles to international trade. The agreement specifically aimed to regulate the use of technical regulations and standards, encouraging the use of international standards as a basis for technical regulations, which led to a demand for international standards. It also aimed to promote transparency and cooperation among countries, which spurred greater engagement in activities related to international standardization.

**Figure S2.2** The number of ISO technical committees and subcommittees increased sharply beginning in 1979, after the Agreement on Technical Barriers to Trade encouraged the use of international standards as the basis for technical regulations




*Source:* WDR 2025 team, based on administrative data as of 2024 provided by the International Organization for Standardization (ISO).

*Note:* The figure plots the cumulative number of ISO technical committees and subcommittees over time by sector. “Tokyo Round” and “Uruguay Round” refer to rounds of negotiations under the General Agreement on Tariffs and Trade. SPS = Application of Sanitary and Phytosanitary Measures; TBT = Technical Barriers to Trade.

Table S2.2 presents data from a survey of 116 national standards bodies conducted jointly by the World Bank and ISO in 2025 (refer to spotlight 3 for details). As a country's income level increases, the number of ISO and IEC technical committees and subcommittees in which its national standards body participates also increases. Whereas low-income countries participate in only 7 percent of all active ISO technical committees, high-income countries participate in 84 percent of them. In addition, the number of delegates sent to ISO committee plenary meetings, including representatives from industry and academia and staff members of the national standards body, increases rapidly with a country's income level. These delegates provide technical expertise for developing standards and discuss the needs they expect standards to address from their country's perspective.

**Table S2.2** Participation by national standards bodies in development of international standards

| MEASURE | LOW-INCOME COUNTRIES | LOWER-MIDDLE-INCOME COUNTRIES | UPPER-MIDDLE-INCOME COUNTRIES | HIGH-INCOME COUNTRIES |
|---|---|---|---|---|
| Number of NSBs that responded to the survey | 13 of 24 members | 28 of 42 members | 34 of 47 members | 41 of 60 members |
| Share of NSB participation in ISO/IEC technical committees, 2024 (%) | 62 | 86 | 94 | 90 |
| Number of ISO/IEC technical committees that NSBs participate in, 2024 | 20<br>(3) | 41<br>(5) | 125<br>(48) | 228<br>(70) |
| Number of delegates sent by NSBs to ISO committee plenary meetings, 2024 | 9<br>(1) | 14<br>(3) | 65<br>(5) | 525<br>(58) |
| Share of NSBs that cover meeting expenses for NSBs that are not ISO members (%) | 38 | 24 | 18 | 33 |

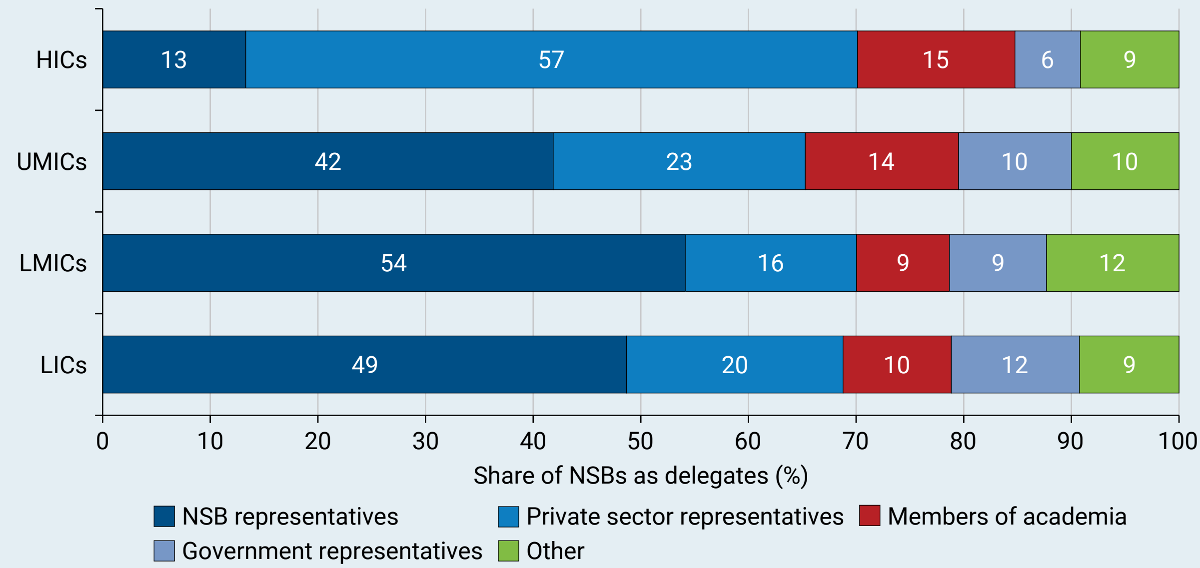
*Source:* WDR 2025 team, based on World Bank and ISO 2025.

*Note:* Data on the number of ISO/International Electrotechnical Commission (IEC) technical committees and the number of delegates include the mean and the median (50th percentile), the latter of which is reported in parentheses. (Note that technical committees for standards involving electronics are joint ISO/IEC committees; those for standards involving other sectors are committees of ISO.) The survey sample includes 116 national standards bodies (NSBs): 13 in low-income countries, 28 in lower-middle-income countries, 34 in upper-middle-income countries, and 41 in high-income countries. Survey data were collected between March and June 2025. The share of national standards bodies presented in the table is based on the number of such bodies that responded to the survey.

Figure S2.3 shows that participation of national standards bodies in ISO committees and subcommittees, as represented by the share of these bodies represented by delegates at meetings, declines as country income level increases. In low-income countries, staff members of national standards bodies constitute nearly half of the delegates. By contrast, private sector representatives primarily lead delegations from high-income countries and account for most of the delegates.

For this Report, ISO data for every standard ever published have been analyzed, including the number and income composition of countries on the committee responsible for the standard's development, as well as the time that elapsed from the request for development of the standard to its publication. The findings show that standards take longer to develop when more countries participate in the development process. Specifically, each additional participating country, irrespective of its income level, correlates with about three additional days from inception until publication. Furthermore, if the secretariat for the technical committee or subcommittee with responsibility for the standard is in a high-income country, the standard is, on average, published three to four months sooner.

**Figure S2.3** The share of national standards bodies represented on ISO and IEC committees and subcommittees declines with income




*Source:* WDR 2025 team, based on World Bank and ISO 2025.

*Note:* The survey sample includes 116 national standards bodies: 13 in low-income countries, 28 in lower-middle-income countries, 34 in upper-middle-income countries, and 41 in high-income countries. "Other" includes representatives from nongovernmental organizations, standards applications organizations, and labor organizations. Constituent scores within bars may not sum exactly to 100 as a result of rounding. HICs = high-income countries; IEC = International Electrotechnical Commission; LICs = low-income countries; LMICs = lower-middle-income countries; NSB = national standards body; UMICs = upper-middle-income countries.

## Motivation for and barriers to participation in developing international standards

Participating in the development of ISO standards requires national standards bodies and their stakeholders to invest a significant amount of time and resources. Hence, the decision regarding which ISO committees a national standards body participates in varies significantly with a country's income level and available expertise. In low-income countries, factors such as a national standardization strategy (important for 54 percent of national standards bodies in low-income countries; refer to box S2.1) and direct decisions by the national government (46 percent) mainly influence this decision.

As the income level of countries increases, decision-making shifts to an approach in which direct proposals or requests from a particular industry become the main factor that determines whether a country's national standards body participates in the development of standards for that industry and thus in the related ISO technical committee or subcommittee. In addition, the importance of proposals from researchers (noted as important in 18 percent of lower-middle-income countries but 46 percent of high-income countries) and civil society (not noted as important in low-income countries but noted as important in 29 percent of high-income countries) increases with a country's income level. This finding demonstrates that in high-income countries, a more complex and diverse set of actors beyond just government and industry affects the standards agenda.

The main benefits, for national standards bodies in low-income, lower-middle-income, and upper-middle-income countries, of participating in the development of international standards include gaining awareness of standards in view of national adoption (cited by 46 percent, 54 percent, and 50 percent of national standards bodies in countries at these income levels, respectively) and cooperating with other countries and regional partners (cited by 69 percent, 46 percent, and 41 percent of national standards bodies in countries at these income levels, respectively).

### Box S2.1 What is a national standardization strategy?

A national standardization strategy is a country's policy road map to ensure that relevant national and international standards support the country's strategic priorities. It is coordinated by the country's national standards body, which ensures that the strategy identifies, among standards under development, the most relevant ones for the national context to ensure an effective allocation of resources. One of the most critical aspects of a national standardization strategy is that it has as its foundation the country's economic, social, and environmental priorities—aligning it with the overall national strategy—and emphasizes the effective use of resources for standards development. It directly addresses both the mid- and long-term vision for the country's national standards body and can serve as a tool for strengthening the national quality infrastructure.

*Source:* ISO 2020.

Furthermore, as the income level of countries increases, more countries cite the importance of influencing the development and content of standards (62 percent of national standards bodies in low-income countries, 79 percent of those in lower-middle-income and upper-middle-income countries, and 83 percent of those in high-income countries). This is likely because more companies in higher-income countries want to invest in standards development to play a forerunner role.

Data on the five standards with the highest cumulative sales[12] in each country and on active participation by countries' national standards bodies in the development of these standards suggest a positive correlation: Standards developed with a country's participation are more likely to be adopted by that country and to make the list of the five most popular standards in that country.

Table S2.3 uses ISO administrative data on the composition, size, and productivity of technical committees in each sector. It reports, for each technical committee and corresponding sector, the average score on a complexity index for the products for which that technical committee develops standards. Technical committees in the food and agriculture sector and the sector covering mining of nonmetallic materials have a larger share of low-income countries as participants. Both of these sectors have low average scores on the complexity index. In fact, as the complexity of products considered by a technical committee increases, the number of participating lower-income countries declines, and the share of participating high-income countries increases. Echoing the results of figure S2.3, sectors with a higher average score on the complexity index tend to have more members that come from industry, rather than government.

**Table S2.3** Composition, size, and productivity of ISO technical committees, by sector

| ISO SECTORS | AVERAGE COMPLEXITY INDEX SCORE OF PRODUCTS COVERED BY TC'S STANDARDS | AVERAGE NUMBER OF COUNTRIES IN TC | SHARE OF LOW-INCOME COUNTRIES IN TC (%) | SHARE OF HIGH-INCOME COUNTRIES IN TC (%) | AVERAGE NUMBER OF STANDARDS PER TC | AVERAGE TIME TO DEVELOP AND PUBLISH STANDARDS (YEARS) | AVERAGE NUMBER OF MEMBERS IN TC | SHARE OF TC MEMBERS FROM INDUSTRY (%) | SHARE OF TC MEMBERS FROM GOVERNMENT (%) | SHARE OF TC MEMBERS FROM ACADEMIA (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Infrastructure and transport** | | | | | | | | | | |
| Transport (11) | 0.3 | 9.6 | 3.3 | 80.4 | 131.4 | 2.9 | 1,485 | 76.7 | 4.1 | 12.5 |
| Building and construction (22) | –0.3 | 4.9 | 4.2 | 66.4 | 26.1 | 2.7 | 395 | 65.8 | 6.4 | 16.8 |
| Freight, packaging, and distribution (5) | n.a. | 2.6 | 3.1 | 55.0 | 7.6 | 2.5 | 224 | 71.0 | 5.0 | 12.9 |
| **Science and environment** | | | | | | | | | | |
| Sustainability and environment (14) | n.a. | 13.6 | 5.6 | 73.3 | 26.6 | 2.6 | 637 | 63.8 | 11.0 | 17.3 |
| Energy (13) | –0.8 | 5.9 | 6.4 | 65.8 | 31.3 | 2.5 | 530 | 71.7 | 6.7 | 15.5 |

*(Table continues next page)*

**Table S2.3** Composition, size, and productivity of ISO technical committees, by sector *(continued)*

| ISO SECTORS | AVERAGE COMPLEXITY INDEX SCORE OF PRODUCTS COVERED BY TC'S STANDARDS | AVERAGE NUMBER OF COUNTRIES IN TC | SHARE OF LOW-INCOME COUNTRIES IN TC (%) | SHARE OF HIGH-INCOME COUNTRIES IN TC (%) | AVERAGE NUMBER OF STANDARDS PER TC | AVERAGE TIME TO DEVELOP AND PUBLISH STANDARDS (YEARS) | AVERAGE NUMBER OF MEMBERS IN TC | SHARE OF TC MEMBERS FROM INDUSTRY (%) | SHARE OF TC MEMBERS FROM GOVERNMENT (%) | SHARE OF TC MEMBERS FROM ACADEMIA (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Chemicals (10) | 0.4 | 3.6 | 3.1 | 68.5 | 30.0 | 2.6 | 159 | 72.0 | 4.6 | 17.6 |
| Ores and metals (12) | –0.2 | 4.7 | 3.8 | 67.3 | 37.0 | 2.5 | 267 | 71.4 | 2.7 | 20.2 |
| Nonmetallic materials (10) | –1.1 | 5.7 | 9.3 | 51.8 | 98.9 | 2.6 | 710 | 62.6 | 9.1 | 21.0 |
| **Technology and innovation** | | | | | | | | | | |
| Special technologies (19) | 0.2 | 4.6 | 2.9 | 64.0 | 30.9 | 2.7 | 524 | 65.0 | 8.2 | 21.5 |
| Information technology, graphics, and photography (13) | 0.8 | 9.5 | 1.4 | 85.8 | 149.2 | 2.3 | 3,194 | 69.3 | 9.0 | 17.2 |
| Mechanical engineering (38) | 0.9 | 3.7 | 2.5 | 67.9 | 29.3 | 2.6 | 371 | 80.4 | 2.0 | 8.8 |
| Business management and innovation (12) | n.a. | 10.2 | 3.1 | 73.6 | 8.1 | 2.7 | 458 | 67.2 | 7.5 | 11.6 |
| **Governance and safety** | | | | | | | | | | |
| Security, safety, and risk (5) | n.a. | 16.8 | 7.5 | 63.4 | 12.2 | 3.2 | 522 | 65.9 | 7.7 | 10.0 |
| Services (10) | n.a. | 5.7 | 8.0 | 67.5 | 13.6 | 2.6 | 333 | 62.5 | 11.9 | 15.8 |
| **Health and food systems** | | | | | | | | | | |
| Food and agriculture (7) | –0.9 | 11.5 | 13.1 | 54.7 | 50.7 | 2.0 | 708 | 60.2 | 15.6 | 16.2 |
| Health, medicine, and laboratory equipment (24) | 1.1 | 4.9 | 3.5 | 69.0 | 40.5 | 2.6 | 991 | 62.5 | 8.0 | 20.9 |

*Source:* WDR 2025 team, based on administrative data as of 2024 provided by the International Organization for Standardization (ISO).

*Note:* The table includes data only for standards whose development began in 2015 or later. The number in parentheses next to each sector name indicates the number of ISO technical committees (TCs) in that sector. The complexity index score measures the average complexity of products for which a particular TC develops standards. Because scores on the index are normalized, products can have negative scores. In addition, sectors that primarily involve providing services and have no physically traded products have no index scores (n.a. = not applicable). Refer to Hidalgo and Hausmann (2009); Products (PCI [Product Complexity Index]) Rankings (dashboard), Observatory of Economic Complexity, https://oec.world/en/rankings/pci/hs4/hs92?tab=ranking.

Given the growing importance of international standards, it is essential to reduce barriers to participation while ensuring that increasing participation does not slow down the process of developing standards. ITU supports the long-term participation of developing countries through several complementary mechanisms:[13] fellowships to attend meetings, translation and interpretation services, and country- or region-level programs that promote connectivity and standards implementation. Regional groups, meetings, and events provide a platform for addressing local issues and encourage broader engagement, and electronic tools ensure timely access to resources. In addition, ITU offers training on standards development, tailored for newcomers, advanced experts, and leaders, delivered both online[14] and in person as needed.

Through ISO's sponsorship program, eligible developing countries receive funding to attend meetings of ISO committees and working groups linked to their national priorities. The sponsorship program is provided under the ISO Action Plan for developing countries, which is the overall framework for its technical assistance and training support that is connected to the ISO Strategy 2030.[15]

Recent developments aimed at increasing the speed of standards development include online standards development and virtual participation in committee meetings. ISO's Technical Management Board is tasked with monitoring the performance of committees and developing new policies and procedures to continually improve in areas such as the time to market and quality of standards produced by ISO.

## Notes

1. For further details, refer to World Standards Cooperation (dashboard), International Electrotechnical Commission, International Organization for Standardization, International Telecommunication Union, https://www.worldstandardscooperation.org/.
2. WTO (2014).
3. OECD (2021).
4. IETF (2025).
5. IETF (2024).
6. Refer to Universal Acceptance (UA) (dashboard), Internet Corporation for Assigned Names and Numbers, https://www.icann.org/ua.
7. Refer to About ISO: Members (dashboard), International Organization for Standardization, https://www.iso.org/about/members.
8. ISO has 130 member bodies, 39 correspondent members, and 4 subscriber members. There is only one membership per country. Participating members actively participate in the development of standards and are expected to vote on all official committee ballots, whereas observer members observe and comment on the organization's work but are not obligated to vote.
9. Refer to ISO in Figures (dashboard), International Organization for Standardization, https://www.iso.org/iso-in-figures.html.
10. Refer to Technical Committees (portal), International Organization for Standardization, https://www.iso.org/technical-committees.html.
11. Refer to Directives and Policies (portal), International Organization for Standardization, https://www.iso.org/directives-and-policies.html.
12. National standards bodies typically sell standards, including both ISO standards and those developed by national standards bodies, to businesses, industries, governments, and the general public within the countries they represent. The five standards with the highest cumulative sales across countries are ISO 9001 (standard for quality management systems), ISO/IEC 27001 (standard for information security management systems), ISO 14001 (standard for effective environmental management systems), ISO 45001 (standard for occupational health and safety management systems), and ISO/IEC 17025 (standard that specifies the general requirements for the competence of testing and calibration laboratories).
13. Both ITU Plenipotentiary Conference Resolution 123 (ITU 2022) and WTSA Resolution 44 (ITU 2024) mandate that ITU provide specific support to developing countries.
14. Refer to ITU-T Delegate Training Resources—BETA (portal), International Telecommunication Union, https://www.itu.int/bsg/training-modules.
15. Refer to Capacity Building (dashboard), International Organization for Standardization, https://capacity.iso.org/home/about.html; Strategy 2030 (dashboard), International Organization for Standardization, https://www.iso.org/strategy2030.html.

## References


Hidalgo, César A., and Ricardo Hausmann. 2009. "The Building Blocks of Economic Complexity." CID Working Paper 186, Harvard Center for International Development, Harvard University.

IETF (Internet Engineering Task Force). 2024. "IETF Annual Report: A Summary of Internet Engineering Task Force, Internet Architecture Board, Internet Research Task Force, and RFC Editor Activities, as of 31 December 2024." IETF. https://www.ietf.org/media/documents/IETF-Annual-Report-2024.pdf.

IETF (Internet Engineering Task Force). 2025. "IETF Community Survey 2024." May 28, IETF. https://www.ietf.org/media/documents/IETF_Community_Survey_2024.pdf.

ISO (International Organization for Standardization). 2020. *National Standardization Strategies*. ISO. https://www.iso.org/publication/PUB100450.html.

ITU (International Telecommunication Union). 2022. "Resolution 123 (rev. Bucharest, 2022): Bridging the Standardization Gap Between Developing and Developed Countries." Plenipotentiary Conference of the International Telecommunication Union, Bucharest, 2022, ITU. https://www.itu.int/en/council/Documents/basic-texts-2023/RES-123-E.pdf.

ITU (International Telecommunication Union). 2024. "Resolution 44: Bridging the Standardization Gap Between Developing and Developed Countries." World Telecommunication Standardization Assembly, New Delhi, October 15–24. https://www.itu.int/dms_pub/itu-t/opb/res/T-RES-T.44-2024-PDF-E.pdf.

OECD (Organisation for Economic Co-operation and Development). 2021. "International Regulatory Co-operation and International Organisations: The Case of ASTM International." OECD. https://web-archive.oecd.org/2021-09-10/597825-irc-astm-case-study.pdf.

World Bank and ISO (International Organization for Standardization). 2025. "Joint Survey for National Standards Bodies." Internal document, ISO; World Bank.

WTO (World Trade Organization). 2014. *Technical Barriers to Trade.* Rev. ed. WTO Agreements Series. WTO. https://www.wto.org/english/res_e/publications_e/tbttotrade_e.pdf.