International Organization for Standardization

Why standards matter

What if standards did not exist?

If there were no standards, we would soon notice. Standards make an enormous contribution to most aspects of our lives - although very often, that contribution is invisible. It is when there is an absence of standards that their importance is brought home. For example, as purchasers or users of products, we soon notice when they turn out to be of poor quality, do not fit, are incompatible with equipment we already have, are unreliable or dangerous. When products meet our expectations, we tend to take this for granted. We are usually unaware of the role played by standards in raising levels of quality, safety, reliability, efficiency and interchangeability - as well as in providing such benefits at an economical cost.

ISO (International Organization for Standardization) is the world's largest developer of standards. Although ISO's principal activity is the development of technical standards, ISO standards also have important economic and social repercussions. ISO standards make a positive difference, not just to engineers and manufacturers for whom they solve basic problems in production and distribution, but to society as a whole.

The International Standards which ISO develops are very useful. They are useful to industrial and business organizations of all types, to governments and other regulatory bodies, to trade officials, to conformity assessment professionals, to suppliers and customers of products and services in both public and private sectors, and, ultimately, to people in general in their roles as consumers and end users.

ISO standards contribute to making the development, manufacturing and supply of products and services more efficient, safer and cleaner. They make trade between countries easier and fairer. They provide governments with a technical base for health, safety and environmental legislation. They aid in transferring technology to developing countries. ISO standards also serve to safeguard consumers, and users in general, of products and services - as well as to make their lives simpler.

When things go well - for example, when systems, machinery and devices work well and safely - then often it is because they conform to standards. And the organization responsible for many thousands of the standards which benefit society worldwide is ISO.

Who ISO is

ISO is a network of the national standards institutes of 148 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISO is a non-governmental organization: its members are not, as is the case in the United Nations system, delegations of national governments. Nevertheless, ISO occupies a special position between the public and private sectors. This is because, on the one hand, many of its member institutes are part of the governmental structure of their countries, or are mandated by their government. On the other hand, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations.

Therefore, ISO is able to act as a bridging organization in which a consensus can be reached on solutions that meet both the requirements of business and the broader needs of society, such as the needs of stakeholder groups like consumers and users.

What ISO's name means

Because "International Organization for Standardization" would have different abbreviations in different languages ("IOS" in English, "OIN" in French for Organisation internationale de normalisation), it was decided at the outset to use a word derived from the Greek isos, meaning "equal". Therefore, whatever the country, whatever the language, the short form of the organization's name is always ISO.

How it all started

International standardization began in the electrotechnical field: the International Electrotechnical Commission (IEC) was established in 1906. Pioneering work in other fields was carried out by the International Federation of the National Standardizing Associations (ISA), which was set up in 1926. The emphasis within ISA was laid heavily on mechanical engineering. ISA's activities came to an end in 1942.

In 1946, delegates from 25 countries met in London and decided to create a new international organization, of which the object would be "to facilitate the

international coordination and unification of industrial standards". The new organization, ISO, officially began operations on 23 February 1947.

What 'international standardization' means

When the large majority of products or services in a particular business or industry sector conform to International Standards, a state of industry-wide standardization can be said to exist. This is achieved through consensus agreements between national delegations representing all the economic stakeholders concerned - suppliers, users, government regulators and other interest groups, such as consumers. They agree on specifications and criteria to be applied consistently in the classification of materials, in the manufacture and supply of products, in testing and analysis, in terminology and in the provision of services. In this way, International Standards provide a reference framework, or a common technological language, between suppliers and their customers - which facilitates trade and the transfer of technology.

How ISO standards benefit society

For businesses, the widespread adoption of International Standards means that suppliers can base the development of their products and services on specifications that have wide acceptance in their sectors. This, in turn, means that businesses using International Standards are increasingly free to compete on many more markets around the world.

For customers, the worldwide compatibility of technology which is achieved when products and services are based on International Standards brings them an increasingly wide choice of offers, and they also benefit from the effects of competition among suppliers.

For governments, International Standards provide the technological and scientific bases underpinning health, safety and environmental legislation.

For trade officials negotiating the emergence of regional and global markets, International Standards create "a level playing field" for all competitors on those markets. The existence of divergent national or regional standards can create technical barriers to trade, even when there is political agreement to do away with restrictive import quotas and the like. International Standards are the technical means by which political trade agreements can be put into practice.

For developing countries, International Standards that represent an international consensus on the state of the art constitute an important source of technological know-how. By defining the characteristics that products and services will be expected to meet on export markets, International Standards give developing countries a basis for making the right decisions when investing their scarce resources and thus avoid squandering them.

For consumers, conformity of products and services to International Standards provides assurance about their quality, safety and reliability.

For everyone, International Standards can contribute to the quality of life in general by ensuring that the transport, machinery and tools we use are safe.

For the planet we inhabit, International Standards on air, water and soil quality, and on emissions of gases and radiation, can contribute to efforts to preserve the environment.

The hallmarks of the ISO brand Equal footing

Every participating ISO member institution has the right to take part in the development of any standard which it judges to be important to its country's economy. No matter what the size or strength of that economy, each participating member in ISO has one vote. ISO's activities are thus carried out in a democratic framework where each country is on an equal footing to influence the direction of ISO's work at the strategic level, as well as the technical content of its individual standards.

Voluntary

ISO standards are voluntary. As a non-governmental organization, ISO has no legal authority to enforce their implementation. A certain percentage of ISO standards - mainly those concerned with health, safety or the environment - has been adopted in some countries as part of their regulatory framework, or is referred to in legislation for which it serves as the technical basis. Such adoptions are sovereign decisions by the regulatory authorities or governments of the countries concerned; ISO itself does not regulate or legislate. However, although ISO standards are voluntary, they may become a market requirement, as has happened in the case of ISO 9000 quality management systems, or of dimensions of freight containers and bank cards.

Market-driven

ISO develops only those standards for which there is a market requirement. The work is carried out by experts on loan from the industrial, technical and business sectors which have asked for the standards, and which subsequently put them to use. These experts may be joined by others with relevant knowledge, such as representatives of government agencies, consumer organizations, academia and testing laboratories.

Consensus

Although ISO standards are voluntary, the fact that they are developed in response to market demand, and are based on consensus among the interested parties, ensures widespread applicability of the standards. Consensus, like technology, evolves and ISO takes account both of evolving technology and of evolving interests by requiring a review of its standards at least every five years to decide whether they should be maintained, updated or withdrawn. In this way, ISO standards retain their position as the state of the art, as agreed by an international cross-section of experts in the field.

Worldwide

ISO standards are technical agreements which provide the framework for compatible technology worldwide. Developing technical consensus on this international scale is a major operation. In all, there are more than 2,850 ISO technical groups (technical committees, subcommittees, working groups etc.) in which some 30,000 experts participate annually to develop ISO standards.

ISO and world trade

ISO - together with IEC (International Electrotechnical Commission) and ITU (International Telecommunication Union) - has built a strategic partnership with the WTO (World Trade Organization) with the common goal of promoting a free and fair global trading system. The political agreements reached within the framework of the WTO require underpinning by technical agreements. ISO, IEC and ITU, as the three principal organizations in international standardization, have the complementary scopes, the framework, the expertise and the experience to provide this technical support for the growth of the global market.

The WTO's Agreement on Technical Barriers to Trade (TBT) includes the Code of Good Practice for the Preparation, Adoption and Application of Standards. The TBT Agreement recognizes the important contribution that International Standards and conformity assessment systems can make to improving efficiency of production and facilitating international trade. Therefore, where International Standards exist or their completion is imminent, the Code states that standardizing bodies should use them as a basis for standards they develop. The Code requires that standardizing bodies that have accepted its terms notify this fact to the ISO/IEC Information Centre located at the ISO Central Secretariat. Standardizing bodies having accepted the Code must publish their work programmes and also notify the existence of their work programmes to the ISO/IEC Information Centre. On behalf of the WTO, ISO periodically publishes a directory of standardizing bodies that have accepted the WTO TBT Standards Code.

How to recognize an ISO standard

An ISO standard can be anything from a four-page document to one several hundred pages' long and, in the future, will increasingly be available in electronic form. It carries the ISO logo and the designation, "International Standard". In most cases, it is published in A4 format - which is itself one of the ISO standard paper sizes.

The big, wide world of ISO standards

Between 1947 and the present day, ISO published more than 13,700 International Standards. ISO's work programme ranges from standards for traditional activities, such as agriculture and construction, through mechanical engineering, to medical devices, to the newest information technology developments, such as the digital coding of audio-visual signals for multimedia applications.

Standardization of screw threads helps to keep chairs, children's bicycles and aircraft together and solves the repair and maintenance problems caused by a lack of standardization that were once a major headache for manufacturers and product users. Standards establishing an international consensus on terminology make technology transfer easier and can represent an important stage in the advancement of new technologies.

Without the standardized dimensions of freight containers, international trade would be slower and more expensive. Without the standardization of telephone and banking cards, life would be more complicated. A lack of standardization may even affect the quality of life itself: for the disabled, for example, when they are barred access to consumer products, public transport and buildings because the dimensions of wheel-chairs and entrances are not standardized.

Standardized symbols provide danger warnings and information across linguistic frontiers. Consensus on grades of various materials give a common reference for suppliers and clients in business dealings.

Agreement on a sufficient number of variations of a product to meet most current applications allows economies of scale with cost benefits for both producers and consumers. An example is the standardization of paper sizes.

Standardization of performance or safety requirements of diverse equipment makes sure that users' needs are met while allowing individual manufacturers the freedom to design their own solution on how to meet those needs.

Standardized protocols allow computers from different vendors to "talk" to each other. Standardized documents speed up the transit of goods, or identify sensitive or dangerous cargoes that may be handled by people speaking different languages. Standardization of connections and interfaces of all types ensures the compatibility of equipment of diverse origins and the interoperability of different technologies.

Agreement on test methods allows meaningful comparisons of products, or plays an important part in controlling pollution - whether by noise, vibration or emissions. Safety standards for machinery protect people at work, at play, at sea... and at the dentist's.

Without the international agreement contained in ISO standards on quantities and units, shopping and trade would be haphazard, science would be - unscientific - and technological development would be handicapped.

More than half a million organizations in more 60 countries are implementing ISO 9000 which provides a framework for quality management throughout the processes of producing and delivering products and services for the customer.

ISO 14000 environmental management systems are helping organizations of all types to improve their environmental performance at the same time as making a positive impact on business results.

What makes ISO 9000 and ISO 14000 so special

The ISO 9000 and ISO 14000 families are among ISO's most widely known and successful standards ever. ISO 9000 has become an international reference for quality requirements in business to business dealings, and ISO 14000 looks set to achieve at least as much, if not more, in helping organizations to meet their environmental challenges.

The vast majority of ISO standards are highly specific to a particular product, material, or process. However, the standards that have earned the ISO 9000 and ISO 14000 families a worldwide reputation are known as "generic management system standards". "Generic" means that the same standards can be applied to any organization, large or small, whatever its product - including whether its "product" is actually a service - in any sector of activity, and whether it is a business enterprise, a public administration, or a government department. "Management system" refers to what the organization does to manage its processes, or activities. "Generic" also signifies that no matter what the organization is or does, if it wants to establish a quality management system or an environmental management system, then such a system has a number of essential features which are spelled out in the relevant standards of the ISO 9000 or ISO 14000 families.

ISO 9000 is concerned with "quality management". This means what the organization does to enhance customer satisfaction by meeting customer and applicable regulatory requirements and continually to improve its performance in this regard. ISO 14000 is primarily concerned with "environmental management". This means what the organization does to minimize harmful effects on the environment caused by its activities, and continually to improve its environmental performance.

What makes conformity assessment so important

At its simplest, "conformity assessment" means checking that products, materials, services, systems or people measure up to the specifications of a relevant standard. Today, many products require testing for conformance with specifications or compliance with safety, or other regulations before they can be put on many markets. Even simpler products may require supporting technical documentation that includes test data. With so much trade taking place across borders, conformity assessment has become an important component of the world economy. Over the years, ISO has developed many of the standards against which products are assessed for conformity, as well as the standardized test methods that allow the meaningful comparison of test results so necessary for international trade. ISO itself does not carry out conformity assessment. However, in partnership with IEC (International Electrotechnical Commission), ISO develops ISO/IEC guides and standards to be used by organizations which carry out conformity assessment activities. The voluntary criteria contained in these guides and standards represent an international consensus on what constitutes best practice. Their use contributes to the consistency and coherence of conformity assessment worldwide and so facilitates trade across borders.

Where to find information on standards

ISO's entire portfolio of standards is listed in the ISO Catalogue which can be accessed online. The site also provides access to the World Standards Services Network (WSSN) which is a network of publicly accessible Web servers of standards organizations around the world. It contains links to international, regional and national standardization bodies, and also to other international and regional organizations which develop

standards in their specialized subject area, in addition to their principal activity.

In fact, there are several hundred thousand standards and technical regulations in the world containing special requirements for a particular country or region. Finding information about these, or about related conformity assessment activities, can be a heavy task. ISONET, the ISO Information Network, can ease the problem. This is a worldwide network of national standards information centres which have cooperatively developed a system to provide rapid access to information about standards, technical regulations, and testing and conformity assessment activities in operation around the world. The World Trade Organization's Agreement on Technical Barriers to Trade (WTO/TBT) calls upon its signatory countries to establish a national enquiry point to answer questions on these same areas in relation to that country. In many countries, the ISONET and WTO enquiry points are one and the same.

Who can join ISO

Membership of ISO is open to national standards institutes or similar organizations most representative of standardization in their country (one member in each country). Full members, known as "Member bodies", each have one vote, whatever the size or strength of the economy of the country concerned. In addition, ISO also has two categories of membership for countries with fewer resources. They pay reduced membership fees. Although such members do not have a vote, they can remain up to date on standardization developments. "Correspondent members" are usually organizations in countries which do not yet have a fully developed national standards activity. Correspondent members do not take an active part in the technical work, but are entitled to be kept fully informed about the work of interest to them. "Subscriber members" are institutes from countries with very small economies that nevertheless wish to maintain contact with international standardization.

Although individuals or enterprises are not eligible for membership, both have a range of opportunities for taking part in ISO's work, or in contributing to the development of standards through the ISO member in their country. Individuals may be selected by member institutes to serve on national delegations participating in ISO technical committees, or may provide their input during the process of developing a national consensus for presentation by the delegation. International organizations and associations, both non-governmental and representing industry sectors, can apply for liaison status to a technical committee. They do not vote, but can participate in the debates and the development of consensus.

How the ISO system is managed

All strategic decisions are referred to the ISO members, who meet for an annual General Assembly. The proposals put to the members are developed by the ISO Council, drawn from the membership as a whole, which resembles the board of directors of a business organization. ISO Council meets three times a year and its membership is rotated to ensure that it is representative of ISO's membership. Operations are managed by a Secretary-General, which is a permanent appointment. The Secretary-General reports to a President who is a prominent figure in standardization or in business, elected for two years. The Secretary-General is based at ISO Central Secretariat in Geneva, Switzerland, with a compact staff which provides administrative and technical support to the ISO members, coordinates the decentralized standards' development programme, and publishes the output.

How the ISO system is financed

ISO's national members pay subscriptions that meet the operational cost of ISO's Central Secretariat. The subscription paid by each member is in proportion to the country's Gross National Product and trade figures. Another source of revenue is the sale of standards. However, the operations of ISO Central Secretariat represent only about one fifth of the cost of the system's operation. The main costs are borne by the member bodies which manage the specific standards' development projects and the business organizations which loan experts to participate in the technical work. These organizations are, in effect, subsidizing the technical work by paying the travel costs of the experts and allowing them time to work on their ISO assignments.

How ISO decides what standards to develop

Working through the ISO system, it is the sectors which need the standards that are at the origin of their development. What happens is that the need for a standard is felt by an industry or business sector which communicates the requirement to one of ISO's national members. The latter then proposes the new work item to ISO as a whole. If accepted, the work item is assigned to an existing technical committee. Proposals may also be made to set up technical com-

mittees to cover new scopes of technological activity. In order to use resources most efficiently, ISO only launches the development of new standards for which there is clearly a market requirement.

The focus of the technical committees is necessarily specialized and specific. In addition, ISO has three general policy development committees with a more horizontal approach. Their job is to provide strategic guidance for the standards' development work on cross-sectoral aspects. They are: CASCO (conformity assessment); COPOLCO (consumer policy), and DEVCO (developing country matters). These committees help to ensure that the specific technical work is aligned with broader market and stakeholder group interests.

Who develops ISO standards

ISO standards are developed by technical committees comprising experts on loan from the industrial, technical and business sectors which have asked for the standards, and which subsequently put them to use. These experts may be joined by others with relevant knowledge, such as representatives of government agencies, testing laboratories, consumer associations, environmentalists, and so on. The experts participate as national delegations, chosen by the ISO national member institute for the country concerned. These delegations are required to represent not just the views of the organizations in which their participating experts work, but of other stakeholders too. According to ISO rules, the member institute is expected to take account of the views of the range of parties interested in the standard under development and to present a consolidated, national consensus position to the technical committee.

How ISO standards are developed

The national delegations of experts of a technical committee meet to discuss, debate and argue until they reach consensus on a draft agreement. This is then circulated as a Draft International Standard (DIS) to ISO's membership as a whole for comment and balloting. Many members have public review procedures for making draft standards known and available to interested parties and to the general public. The ISO members then take account of any feedback they receive in formulating their position on the draft standard. If the voting is in favour, the document, with eventual modifications, is circulated to the ISO members as a Final Draft International Standard (FDIS). If that vote is positive, the document is then published as an International Standard.

Every working day of the year, an average of eleven ISO meetings are taking place somewhere in the world. In between meetings, the experts continue the standards' development work by correspondence. Increasingly, their contacts are made by electronic means and some ISO technical bodies have already gone over entirely to electronic working, which speeds up the development of standards and reduces travel costs.

When speed is of the essence

ISO standards are developed according to strict rules to ensure that they are transparent and fair. The reverse side of the coin is that it can take time to develop consensus among the interested parties and for the resulting agreement to go through the public review process in the ISO member countries. For some users of standards, particularly those working in fast-changing technology sectors, it may be more important to agree on a technical specification and publish it quickly, before going through the various checks and balances needed to win the status of a full International Standard. Therefore, to meet such needs, ISO has developed a new range of "deliverables", or different categories of specifications, allowing publication at an intermediate stage of development before full consensus: Publicly Available Specification (PAS), Technical Specification (TS), Technical Report (TR), International Workshop Agreement (IWA).

ISO's international partners

ISO collaborates with its partners in international standardization, the IEC (International Electrotechnical Commission), whose scope of activities complements ISO's. In turn, ISO and the IEC cooperate on a joint basis with the ITU (International Telecommunication Union). Like ISO, the IEC is a non-governmental body, while the ITU is part of the United Nations Organization and its members are governments.The three organizations have a strong collaboration on standardization in the fields of information technology and telecommunications.

Special products

In addition to International Standards and the "new deliverables", ISO develops guideline documents, manuals for developing countries, standards compendia - as paper products and CD-ROM's - handbooks and a whole range of standards-related publications. ISO also publishes two magazines: the monthly ISO Focus which presents an overview of ISO's activities, and ISO Management Systems - The International Review of ISO 9000 and ISO 14000, published six times a year. [•]

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