

# **Quality Infrastructure: The road towards Nation's competitiveness**

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## **Introduction**

In the present era of Trade Globalization, market entry requires compliance to international standards and evidence of such compliance through an internationally recognized accreditation system of conformity assessment bodies. It means the strengthening and where needed the establishment of an internationally accepted infrastructure of accreditation, certification and testing.

A functioning quality infrastructure helps to increase productivity in manufacturing and service delivery. This helps to create jobs, encourages investment and can promote the careful use of natural resources. A quality infrastructure also helps bring about improvements in health care and distribute national wealth more equally.

All what preceded contributes to the nations' competitiveness and prosperity.

## **International Trade**

The expansion of global trade in the postwar era has promoted higher standards of living worldwide. Today, many nations around the globe have made great progress in moving toward market systems based on the principles of open trade and investment.

Considerable progress has been made since the Second World War in lowering international trade barriers, particularly those associated with tariffs. As tariff barriers have decreased, however, the relative significance of non-tariff barriers to trade, including those related to standards, has increased. In 1994, a major multilateral trade agreement was concluded in the Uruguay Round of the General Agreement on Tariffs and Trade (GATT). The Uruguay Round made significant progress in addressing the rise of non-tariff trade barriers. Strengthening of GATT provision on standards and conformity assessment-related barriers to trade, combined with the establishment of new enforcement mechanisms through the World Trade Organization (WTO), indicate the potential for significant progress in facilitating exports and future economic growth.

Being considered as a complex indicator for satisfaction of necessities and expectations of consumers, business environment and society as a whole, quality became a decisive factor for revival of economy and insurance for free circulation of goods on both regional and international aspects. Only a good quality, reasonable prices along with equilibrated policies for promotion of products and penetration into markets, are the ones to assure competitiveness and prosperity.

## **The WTO**

The World Trade Organization (WTO) is the international organization dealing with the global rules of trade between nations. Its main function is to ensure that trade flows as smoothly, predictably and freely as possible.

ISO (International Organization for Standardization) - together with IEC (International Electrotechnical Commission) and ITU (International Telecommunication Union) - has built a strategic partnership with WTO. The political agreements reached within the framework of WTO require infrastructure of 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.

## **WTO Came with Two Agreements (Jan 1995)**

The establishment of the WTO came with Sanitary and Phytosanitary (SPS) / Technical Barriers to Trade (TBT) agreement that have standards and conformity implications; WTO members have signed it in January 1995.

The World Trade Organization (WTO) Technical Barriers to Trade (TBT) Agreement recognizes the contribution that international standardization can make to the transfer of technology from developed to developing countries, and the role that international standards and conformity assessment systems have in improving the efficiency of production and facilitating the conduct of international trade.

Both the WTO TBT and SPS Agreements rely upon the efficient functioning of the underlying technical infrastructure to support the system and the exchange of products worldwide. Metrology, standards, and conformity assessment (including accreditation) are thus essential elements of technical infrastructures.

## **What is Globalization?**

Globalization is the movement toward greater interaction, integration and interdependence among people and organizations across national borders. The strongest manifestation of

globalization has been the increasing economic interactions among countries in trade and investment and in the international flows of capital, people, technology, and information.<sup>1</sup>

## **Globalization and Quality Infrastructure**

Globalization has, for more than two decades, been changing the “rules of the game” for nations competing in international trade and investment, to such an extent that it has, in some cases, weakened states' ability to exercise sovereign control over internal economic activities and transactions across their borders<sup>2</sup>.

Globalization of the international economy and increased consumer awareness have added a new entry to the world of terminology: Quality Infrastructure. This term relates to all the fields of metrology, standardization and testing, of quality management and conformity assessment, including certification and accreditation.

Globalization and technical change have strong policy implications for countries at all levels of development:

- Countries require new skills to manage technical change and so have to change the institutional structure for education and training (*Narula, 2003*).
- Countries need strong technical support agencies in metrology, standards, testing and quality (MSTQ), R&D, productivity and small and medium enterprise (SME) extension, in addition to institutions concerned with technology and innovation.
- Countries need advanced infrastructure in information and communication technologies (ICTs).
- Countries need new rules, legal systems and agencies to encourage enterprises to build competitive capabilities and allow knowledge to flow across nations.

It is not easy to meet such demands; this is why many governments mount competitiveness strategies (*Lall, 2001.b*).*Narula, R. (2003) Globalization and Technology (Cambridge: Polity Press)*<sup>3</sup>.

## **What is quality infrastructure?**

Quality infrastructure is a term that conveys meaning only to the experts on the topic. Producers and consumers make daily use of its components without always being aware of it. This is intentional as the workings of these components are usually invisible. Bolts fit nuts, mobile phones connect and substances in drugs are correctly dosed. This blind trust assumes a high degree of general regulatory conditions and technical possibilities.

A quality infrastructure is based on a number of components. These are closely related and form a network whose logical links are based on a technical hierarchy. This national network

must be geared to international requirements. Only if these requirements are met are international commodity trading and an exchange of services possible.

Quality infrastructure refers here to all aspects of metrology, standardization, testing, quality management, certification and accreditation that have a bearing on conformity assessment (abbreviated as MSTQ). This includes both public and private institutions and the regulatory framework within which they operate.

## Quality Infrastructure components

As stated above, a quality infrastructure is based on a number of closely related components. These components are:

- **Standards / Technical regulations** – the formal documentation containing the requirements that a product, process or service should comply with.  
Technical regulations are developed by public sector authorities and enforced by law, whereas standards are voluntary in nature and generally enforceable only when called up in a contract between buyer and supplier.  
A standard can be developed by the private sector, the public sector or the multilateral sector.
- **Testing** – the determination of product characteristics against the specifications/standards. This can range from a simple visual check to testing under a special laboratory condition.
- **Metrology** – the technology or science of measurement. Metrology is subdivided into:
  - **scientific metrology** (the organization and development of the highest level of measurement standards),
  - **legal metrology** (the accuracy of measurements where these have an influence on the transparency of economical transactions, health and safety) and
  - **industrial metrology** (the adequate functioning of measurement instruments used in industry, production and testing).
- **Quality management** – the prevention of non-compliance and continuing improvement of quality of a product or a process.
- **Certification** – the formal substantiation that a product, service, organization or individual complies with the specifications/standards.
- **Accreditation** – the formal confirmation by an independent third party that a body is competent to perform certain tasks. This is based on international standards. Accreditation is a means of building confidence in the work and the findings of testing and calibration laboratories and inspection and certification bodies.

## Benefits of Quality Infrastructure

- The establishment and development of a quality infrastructure is part of a trade related Technical Cooperation. It should enable the partners to utilize the advantages of globalization and to avoid disadvantages.
- Capacities for the implementation of existing international trade regulations are increased to achieve the best possible benefit for the national economy and a sustainable development (strengthening capacity to implement).
- Moreover quality infrastructure enables fair trade and contributes to a socially oriented development.

## How does quality infrastructure contribute to sustainable development?

- It is essential to companies' **competitiveness** and creates a vital basis for production based on a division of labor and facilitates the international trade in goods. This can lend a considerable boost to the private sector.
- A quality infrastructure is essential for **breaking down technical barriers to trade**. It is thus the key to the greater integration of the partner countries into the international trade system.
- It is required for the establishment of institutions and the shaping of the domestic enabling environment (good governance) and also the achievement of **political objectives in the fields of environment, health and consumer protection**.

## Three pillars of sustainable development: metrology, standardization and conformity assessment

Every country needs a sound infrastructure to achieve its societal goals. It means adequate internal transportation links, provision of healthcare and an accessible education system.

Societies wish to acquire the benefits of the wider world of international trade. They also wish to be part of initiatives. Accordingly, there is an increasing awareness of the need to discuss, compare and improve infrastructures in the context of global economic efficiency, and market access for goods and services for both developed and developing countries.

This is where metrology, standardization and conformity assessment come in. They are the pillars of knowledge for developing a technical infrastructure, and thereby enabling sustainable development and full participation in international trade. And they are firmly linked together.

### 1. The Metrology Pillar

Metrology includes work by national measurement institutes and international treaties such as the Metre Convention – which gives authority to the International Committee for Weights

and Measures (CIPM) and the International Bureau of Weights and Measures (BIPM) to act on measurement standards of ever-increasing accuracy, range and diversity. There is a need to demonstrate equivalence between national measurement standards.

The CIPM Mutual Recognition Arrangement provides governments and other parties with a secure technical foundation for wider agreements related to international trade, commerce and regulatory affairs. It helps to eliminate technical barriers to trade and instill greater confidence in the measurement capabilities of individual countries. The result is billions of dollars of increased trade.

*Legal metrology* is coordinated by the International Organization of Legal Metrology (OIML). Legal metrology specifications are produced within the OIML and are adopted in all countries. The OIML also provides other valuable services such as a model law on metrology that can be used in setting up national technical infrastructure.

## **2. The Standardization Pillar**

International standards and their use in technical regulations on products, production methods and services play a vital role in sustainable development and trade facilitation – through the promotion of safety, quality and compatibility.

Standardization contributes not only to international trade but also to the basic infrastructure that underpins society, including health and environment, while promoting sustainability and good regulatory practice.

The leading organizations that produce International Standards are ISO, IEC and ITU. The scope of ISO covers standardization in all fields except electrical and electronic engineering, which are the responsibility of the IEC, and telecommunications covered by the ITU. The three organizations have a strong collaboration on standardization in the field of information technology.

International standards, or national or regional adoptions of international standards, help domestic markets to operate effectively, increase competitiveness and provide an excellent source of technology transfer to developing countries.

They play an integral role in the protection of consumers and the environment.

Standards can be broadly sub-divided into three categories: product, process and management systems.

- Product refers to the quality and safety of goods or services.
- Process refers to the conditions under which products and services are to be produced, packaged or refined.

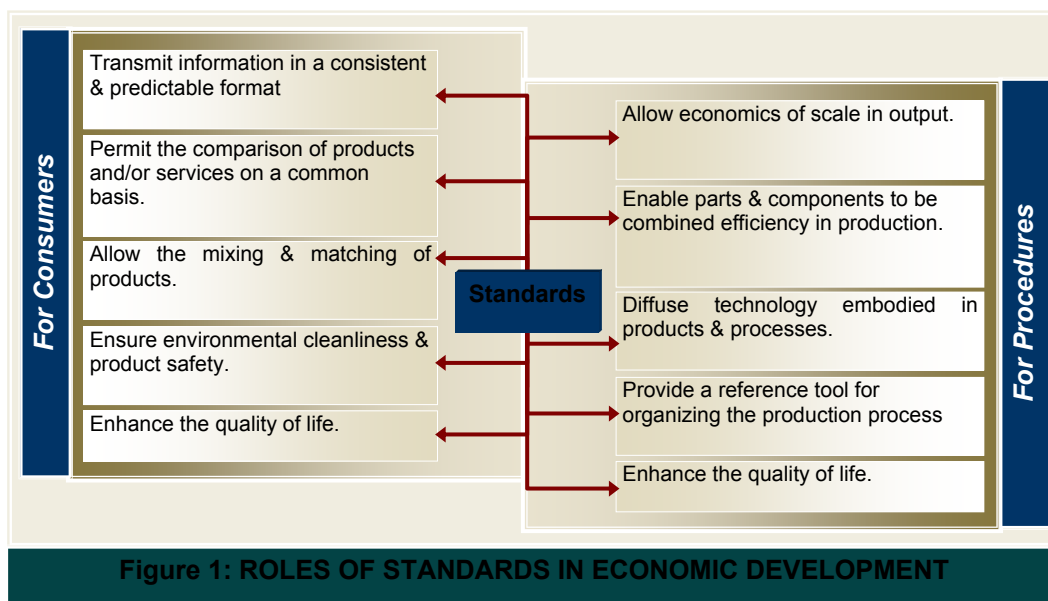
- Management system standards help organizations to manage their operations. They are often used to create a framework within which an organization consistently achieves the requirements set out in product and process standards.

### The Importance of Standards in Economic Development and Trade

Standardization is a key element in promoting industrial and economic development and trade, and covers nearly the entire range of the economy.

Internationally, standards and conformity assessment can facilitate trade or frustrate and slow down its expansion. It is very difficult to determine whether standards are being implemented to achieve the legitimate interests of protecting the public from unsafe or sub-standard products in ways that also minimize any adverse effects on trade flows.

Standards play an important role in many aspects of economic development (Figure 1 shows the various ways in which standards contribute to enhanced welfare for both consumers and producers).



#### For Consumers

- Standards serve to communicate information to consumers in a consistent and reliable manner which lowers the transactions costs for both buyer and seller.
- Standards permit the comparison of products on a common basis.
- Standards enhance competition in any given marketplace through allowing products that conform to a given standard to compete directly with each other.
- The consumer is spared the difficulty of having to determine the equivalency of products and can concentrate on a price comparison alone.

- Standards allow for the interfacing of products and the ability of the consumer to mix and match components of a given system.

#### **For Producers**

- Standards enhance productive efficiency.
- The manufacturing process itself is organized according to standards, many of which are internal to the firm.
- The standardization of parts and processes allows for repetitive production, reduced inventories and flexibility in substituting components on the assembly line.
- Production of standardized goods brings about great economies of scale, and the resulting reduction in cost is passed on to the consumer in the form of lowered prices.
- Standards embody technology and thus play a key part in the process of technology diffusion as other firms in the industry use the technological advance incorporated into standards by the developer. This process raises productivity and industrial competitiveness through increasing efficiency as firms are able to adopt standardized approaches rather than having to reinvent a similar technology.

Thus, standards serve an important role in promoting welfare and economic development. Standards are often seen by economists as having characteristics of “public goods”, that is goods, the consumption of which by one party does not diminish their value for another, nor change their price.<sup>4</sup>

### **3. The conformity assessment Pillar**

Conformity assessment plays a critical role in building confidence for sustainable development and trade.

International Standard ISO/IEC 17000 defines conformity assessment as a “demonstration that specified requirements relating to a product, process, system, person or body are fulfilled.”

Conformity assessment procedures, such as testing, inspection and certification, offer assurance that products fulfill the requirements specified in regulations and standards.

Conformity assessment is specific to the object being assessed – it can be a *product*, a *process* or a *management system* – and to the body undertaking the assessment.

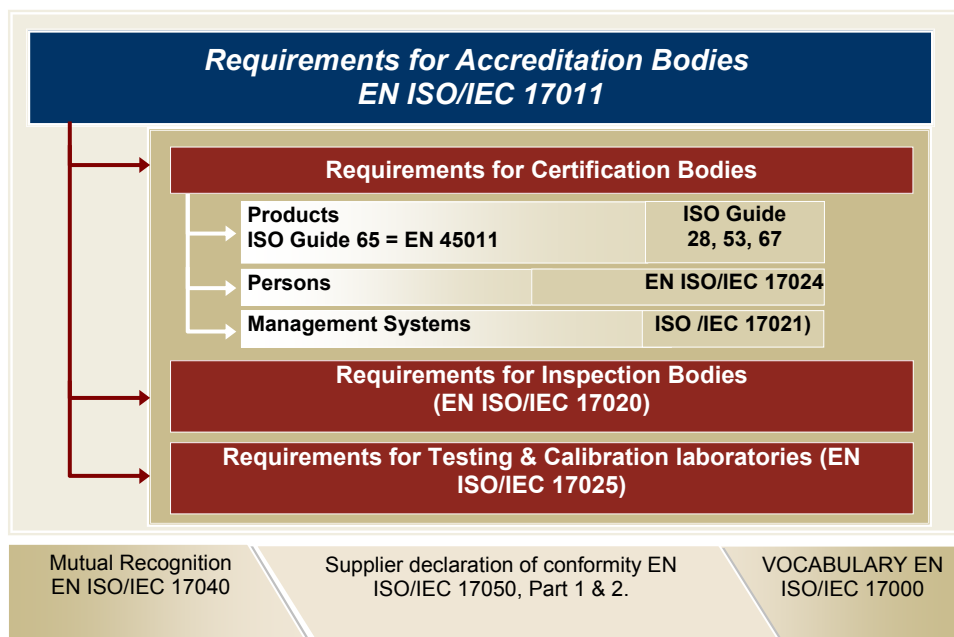
#### **For example:**

**First party**, such as the manufacturer of a product, which is making a supplier’s declaration of conformity using its own internal testing system *or*

**Third-party** certification or inspection, undertaken by an independent service provider. The service provider could be a government agency or a private company.

Successive reviews of the WTO/TBT Agreement have noted the usefulness of ISO/IEC conformity assessment standards and guides in harmonizing conformity assessment practice and as benchmarks for the technical competence of assessment bodies, thus enhancing credibility and confidence in their results.

ISO/IEC's conformity assessment work therefore helps to overcome technical trade barriers. Accreditation is the "third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks" (ISO/IEC 17000). Establishing accreditation systems based on international standards and guides and linked with membership of the International Laboratory Accreditation Cooperation (ILAC) and/or International Accreditation Forum (IAF) mutual recognition arrangements can help provide assurance to trading partners that suppliers of tests and certificates are competent. At the same time it helps in overcoming technical trade barriers and in complying with the requirements of the WTO/TBT Agreement.



**Figure 2: Requirements for Accreditation Bodies**

## Conclusions

It has proved more effective to promote the entire quality infrastructure system by means of an integrated approach than to focus in an isolated way on the individual components mentioned above (M-S-T-Q). The focus tends to be on institutional level (meso level) in the individual MSTQ areas.

An integrated approach must, however, also take in the political (macro) level and the level of individual businesses (micro level). At macro level, the necessary political support must be secured and must continue after assistance measures have come to an end. At micro level, the aim is to make institutions more service-oriented.

Regional cooperation promotes the mutual recognition of national structures (and standards) and thus breaks down technical barriers to trade. If an institutional infrastructure is to be built up from scratch, it often makes more sense to do so in a complementary way through regional groupings and to use it jointly. This can lend impetus to the process of regional integration.

Quality infrastructure is complex. It comprises a multiplicity of components, within each there are many key players. Value chain analysis is often a very useful tool to map out these roles and their relationships.

When quality is a problem, a standard is often focused on singly as a solution. A standard is not quality. Unfortunately this point is often confused. A standard without conformance is of no value. Neither is conformance without trust.

A well-functioning quality infrastructure is needed in order for any standard to have any value to the buyers and the sellers. A quality infrastructure is a totality of closely interrelated components. Poor performance by just one component can erode the usefulness of all other components.

Strengthening quality infrastructure requires a full understanding of this totality. Integrating quality infrastructure project into enterprise development is still very much in its Early.

Complying with the requirements of any highly formalized quality management system may appear to be out of reach of micro and small enterprises, the main targets of any enterprise development project.

Quality management can work for even the smallest of smallholders. Group certification may be the missing link that will bridge micro and small enterprises to modern quality infrastructure.

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