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**INTERNATIONAL PRODUCT STANDARDS:  
TRENDS AND ISSUES**

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## PREFACE

As part of its work on regional policy issues, the Regional and Country Studies Branch of UNIDO carries out policy-oriented studies and provides advisory services in key issues of industrial policy that affect groups of developing countries. This includes issues of economic integration, issues in the relationship between technological change and industrial organisation and policy, and issues in international co-operation for industrial development. One such issue is that of industrial product standards.

Standards are needed for many reasons. Health and safety standards, for instance, may mean that a product must not be dangerous to the user, and quality or performance requirements may specify the degree to which a product meets the user's needs in terms of some physical quality. The potential purchaser, if the product meets a standard known to him or her, will be more encouraged to buy it. National and local authorities will, in the case of health and safety standards, often allow certain products to be sold only if these meet the established standards.

Standards raise important issues for developing countries, anxious to improve the quality of their manufactures. Many developing countries have their own national standards bureaux, who may promulgate national standards for products. However, there are other standard setting procedures in which developing countries are not involved, although the decisions taken may directly affect their ability to maintain or expand their exports of manufactures to other markets. International trade in many manufactures are often subject to the influence of standards regulations adopted in developed countries, especially the best known standards such as those of Germany (DIN), the United Kingdom (BSI) the United States (ANSI) and France (AFNOR). Moreover, there has recently been an acceleration in the regional standard setting process in Europe, as a consequence of the impetus provided by the establishment of the Single European Market in 1992.

Some developing countries have entered actively into the international standards development process through participation in the activities of the International Standards Organisation (ISO). Some have also been actively engaged in regional standards bodies, such as the African Regional Standards Organisation (ARSO). However there is scope for considerable increase in such participation. More generally, developing countries have to explore the wider implications for them of the trends and forces at work in the determination of industrial product standards, in order to ensure that decision affecting their industrial prospects can at least be fully known to them and conveyed to their own manufacturers.

The present study focuses on some of these questions, in an attempt to identify the major issues as far as developing countries are concerned. It begins with definitions (section 1) and an analysis of the costs and benefits of standards (section 2). This is followed in section 3 by a review of the standardisation process in developed countries, and trends in international standardisation (section 4). An examination of how quality standards influence markets is then followed by a review of activities in connexion with regional standards for developing countries (sections 5 and 6). The study concludes with a discussion of the main issues identified in the standards determination process.

The study was prepared by the Regional and Country Studies Branch, with Jacques Pelkmans and Declan Costello of Euroscope, Maastricht, Netherlands, as contractors to UNIDO.

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## INTRODUCTION

In the last ten years or so there has been increasing interest in international standardization. The GATT Code on Technical Barriers to Trade, negotiated during the Tokyo Round, came into force in 1980. The Code encourages the reference to or adoption of international standards, as well as non-discriminatory access to local conformity assessment in signatory countries. It led to numerous marginal improvements in signatory countries while prompting a reform of the Japanese standards system in 1983. The Code's three-yearly reviews, the current negotiations on further improvement of the Code in the Uruguay Round and the gradual increase in the number of signatories (and countries with observer status) all point in the direction of a sustained trend of increasing attention for international standardization. However, on its own the impact of the Code on removing technical barriers or on the effective promotion of quality and technological competitiveness through world standards would still be small, in view of its serious shortcomings.

Three other developments greatly bolster the trend towards global standardization and magnify its economic effects. The first one is the way the United States and the EC, each in bilateral negotiations with Japan, have gradually succeeded in reducing the excessive restrictiveness (and discriminatory provisions) of Japanese conformity assessment, while improving the acceptance and increasing the awareness of international standardization in Japan. Since, clearly, neither the United States nor the EC could credibly argue for their own standards, the upshot was the recurring reference to world standards where possible.

The second, probably even more important development is the place and nature of the removal of technical barriers in the EC-1992 programme. Technical barriers are prominent, if not dominant, in the White Paper on '1992' (over 160 out of 290 proposals), not to mention the so-called 'new approach' to technical harmonization, which has greatly facilitated progress. The new approach refers to European standards which, in turn, have to be based on world standards where available and usable. There is no other big market in the world economy which has so manifestly obliged itself to adopt world standards. Already today, national standards in EC (and EFTA) countries are translations or adapted versions of world standards in around one-quarter to one-third of cases.

Furthermore, the strong European influence in ISO and IEC (the two general world standards bodies) ensures sustained dynamism in world standards writing.

The third development is what could almost be described as a crisis in the American standards system. Although it was prompted by the challenge of EC-1992, the debate in the United States turned out to have much wider ramifications. The neglect of certification and quality control has been seen by some experts as one of the reasons for declining competitiveness of United States industry in third markets. In the 1980s, as a consequence, the United States has rediscovered international standardization and is attempting to restructure its standards system so as to better cope with the commercial and legal requirements of world markets.

The present pilot study describes international standardization against this dynamic background. After carefully defining terminology, it first analyzes the (private and social) costs and benefits of standards and technical regulations, before describing in some detail the prevailing standards systems in the most important markets of the high-income developed world. In the definitions chapter the emphasis is on the relations between standards (which are, by definition, voluntary) and technical regulations. If regulation is reduced to its basic purpose, the role of standards can be greatly increased, thereby bringing down the costs of the former while greatly raising the potential benefits of the latter. In the absence of regulation standards form an essential technical and economic ingredient in a firm's (and country's) competitiveness, assisting efficiency in production and distribution, information flows and technology transfer. Conformity assessment (testing, certification) frequently applies to both regulations and standards, with de-facto compliance to standards also occurring for commercial reasons. Standardization involves costs (development expenses, adaption of current product and process specifications, potentially reduced competition and innovation), the burden of which is unevenly spread over time and among the respective market players.

This explains why standardization activities frequently encounter difficulties (if not failures) in one product market, whereas they are easily accepted as useful or inevitable for the proper functioning of the market in other cases. Realizing, in addition, the different levels of development in the world and the wide variations in preferences and engineering traditions, the conclusion is that global standards are not always optimal.

Or, alternatively, if global consensus is to be achieved, the standards will often comprise several 'options', will be incomplete or insufficiently precise, all properties which degrade the quality of the standard. When standards are 'non-co-operative' - hence, kept outside the consensual standards bodies - the 'sponsoring' and market-led adoption of standards amount to strategic industrial games with winners and temporary losers.

In the case of product markets subject to technical regulations, technical barriers to trade may range from being (merely) cost-increasing to de facto import bans. Such barriers may comprise both technical specifications and the conformity assessment required.

Vast complex standardization structures exist in industrialized countries which differ substantially in organization, scope, financing, legal framework and pervasiveness. The United States with a free market philosophy, is characterized by limited federal and governmental involvement, and reliance on a plethora of voluntary standardization bodies, none with formal federal government recognition. Co-ordinated action and the pursuance of long-term strategic objectives is already viewed (by some) as involving "government" too much. This attitude has also led to low participation in international standardization. Japan, in contrast, operates a centralized, strategically motivated system, as part of its long-term economic and industrial policy. Combined with high standards awareness and strict conformity assessment, effective trade barriers were first erected.

Opening up this system is possible but will take time. Western Europe's National Standards Bodies (NSBs) operate between these regulatory extremes.



Nevertheless, considerable differences remain, perpetuating substantial technical barriers to trade (TBTs). The study describes three prominent bodies in Western Europe: AFNOR (France), DIN (Germany) and BSI (United Kingdom). For completeness one should also present the domestic technical regulation in these countries, but this was considered unnecessary in the light of the increasing importance of EC regulation precisely in these fields. Creation of the EC internal market is based on the harmonization of essential technical requirements only, the mutual recognition of non-essential regulation, the promotion of European standardization, and the development of pan-European conformity assessment, backed up by the legal obligations of the EEC Treaty and the integrative rulings of the Court of Justice of the EC.

As a means for liberalizing trade, international standardization faces serious drawbacks, i.e. difficulties in consensus achievement and enforcement. It operates at the lowest common denominator level, usually limited to those standards which are the minimum needed for trade, e.g. definitions, test methods. These standards are devoid of detailed production specifications, and may require interpretation and refinement by NSBs, permitting TBT to arise and reducing technology transfer to developing countries. As such they provide only the base or foundation for national standards, rather than acting as an independent corpus of standards typically demanded by producers. This problem is greater for the non-electric standards in ISO than for electro-technical standards in IEC where a much longer tradition and severe compatibility and safety requirements have served to facilitate consensus in many cases. In broadcasting and telecom markets ingenious compromises next to sharp disagreements add up to a very uneven picture which is difficult to assess in a pilot study.

The recent stimuli for international standardization (see before) are, upon reflection, derived from more fundamental determinants. The study briefly analyzes these determinants. Greater demand for standards per se, generated by technological advances and consumer pressure, has spilled over into the international standards world, which is also affected by growing international trade and regional integration. International standardization bodies have witnessed increased activity, although, unfortunately, the slow development of standards persists (except in special cases such as information technology). Regional standardization (often operating in the framework of regional economic integration) provides timely and relevant interpretations of international standards, bypassing their (international standards') more serious limitations. Ground rules for the role of standardization systems, and their role in overcoming TBT are enshrined in the GATT Code on Technical Barriers to Trade. The Code is surely useful in combatting the worst technical barriers to trade. It has also stimulated international standardization. But, there are still shortcomings in respect to the actual removal of TBTs. Deficiencies in the Code include the failure to harmonize both technical regulations and standards. Also the direct obligations of the Code fall only on the national governments. A weak 'second level' obligation for national governments concerns the activities of other bodies (e.g. local government, voluntary standards organizations).

Attaining products of adequate and consistent quality would permit better access to developed countries' markets. Standardization is one means to promote quality. More ambitiously, buyers' confidence in the level and consistency of quality can be won by adhering to standardized quality assurance within industry. Increasingly NSBs are instrumental in spreading

quality awareness and promoting quality assurance. For developing countries, however, skill shortages and the lack of an industrial base result in very limited use of standards in industry. Many poor countries lack a basic standardization infrastructure including NSBs. A top down approach with government assistance encompassing all aspects of standardization (certification, metrology, etc.) is often desirable to instill standardization principles at the industry level. Regional co-operation may prove useful, in economizing on scarce resources, and in developing standards which reflect common abilities and needs. Initial attention, however, needs to focus on standardization infrastructure at the national level. Careful attention should be paid to the development of long-term standardization objectives as part of a national economic development plan.

The present study concludes with the identification of a number of policy issues and issues which would seem to require further study. The need for the latter is not surprising because technical standards have seldom been analyzed from an economic policy perspective, even though their primary function is to make markets function better.

The most important policy conclusion to emerge from this paper is that international standards, while having great potential to improve market access to developed countries, suffer from serious drawbacks such as the lack of product specifications, non-enforcement in numerous countries and excessively long periods to write them. Nevertheless, their role in industrial development should be boosted. There is a trend to refer more and more to world standards, a trend bolstered by important developments in the framework of EC-1992 (the 'new approach') and the negotiations on further improving the GATT Code. Bilateral assistance needs to be more in tune with the needs and abilities of developing countries. In addition to the possible mismatch of supply and need of technical assistance, there is a potential danger of competing, but partly incompatible, technical aid, linked to specific standards traditions of donor countries.

Finally, it is acknowledged that some scope exists for regional co-operation among developing countries subject to the condition of effective standardization structures at the national level, and close co-operation with regional integration bodies.

## 1. TECHNICAL STANDARDS: DEFINITIONS AND NATURE

In a report on standardization, it is crucial to reduce terminological confusion, and to clarify the nature of the relationship between key concepts used. At the risk of overburdening the uninitiated reader, this chapter will set out the modern perspective as rigorously as possible.

There are four essential concepts, based on technical specifications as employed in market transactions. Exhibit 1 provides a stylized summary.

Technical standards are **voluntarily agreed** codifications of form, functioning, quality, compatibility and/or exchangeability of methods, products, processes and services. The features distinguishing them from **technical regulations** consist of their **non-committing character** (in terms of public law) and the self-interest of all participants.

This definition is refined in the 1979 GATT Code (Agreement) on Technical Barriers to Trade, as '*a technical specification approved by a recognized standardizing body for repeated or continuous application, with which compliance is not mandatory*'. The recognition of the standards body provides guarantees against market power, or undesirable biases in the standard; in other words, the self-interest of all participants will only be acceptable if there is consensus on the social gain by all participants. This point is stressed in the wider definitions employed by ISO, the world standards organization, and the UN Economic Commission for Europe:

*'a technical specification or other document available to the public, drawn up with the co-operation and consensus or general approval of all interests affected by it based on the consolidated results of science, technology and experience, aimed at the promotion of optimum community benefits and approved by a body recognized on the national, regional or international level'.*

Technical regulations are specifications as to form, construction, performance (etc.) of products, services and sometimes even of processes and methods, included or referred to in **public law**, with the purpose of serving the public interest, in particular objectives of health, safety, environmental and consumer protection. The legal basis and the public interest constitute the properties that distinguish technical regulations from standards.

Technical conformity assessment comprises an array of arrangements such as technical inspection, testing, approval systems and certification, for the purpose of ensuring conformity to given standards or regulations. The evidence is usually found in testing reports. The quality of the assessment may itself be protected by accreditation of testing laboratories and certification bodies. For simplicity, products may carry and marketing may employ approval signs and conformity or certification marks.

Technical barriers to trade arise from the fact that technical standards, technical regulations, and/or technical conformity assessment may differ between two or more countries. The most important problems consist in purely technical aspects, raising costs for foreign suppliers (or importers), but, in the cases of standards and conformity assessment, there is also the issue of having 'access' to standard writing technical committees and to certification (e.g. to be accredited or to be recognized as 'equivalent').

## EXHIBIT 1

DEFINITIONS OF AGREED TECHNICAL SPECIFICATIONS

## TECHNICAL

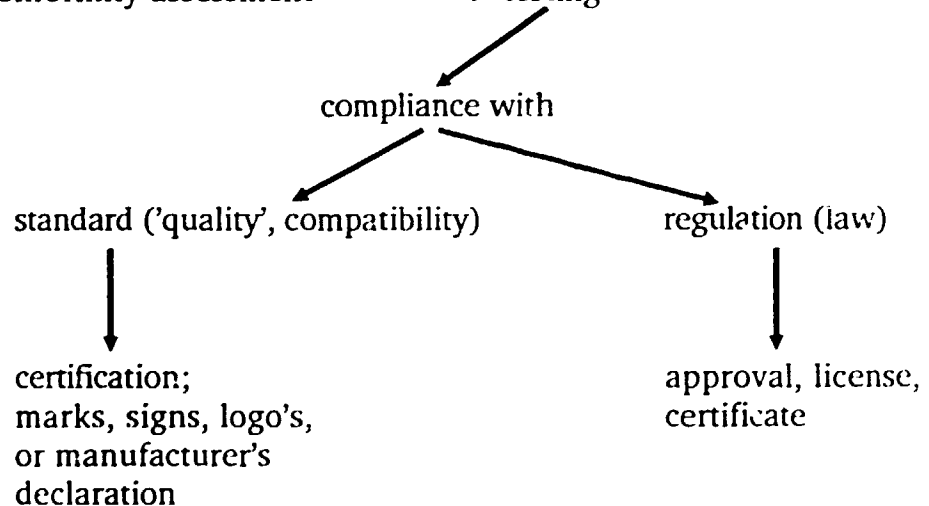
## o Standards

- voluntary
- consensual

## o Regulations

- mandatory
- via legislation
- public interest

## o Conformity assessment → testing



## o Barriers to trade

- cost raising divergences
- between two/more countries
- among standards, regulations,  
conform. assessments

Standards can be characterized, and hence classified in several ways. An often used distinction is that between design and performance standards, **the former being precise, detailed** and ideal for intra-company application whereas the **latter** is formulated with a view to specifically **desired results**, such as safety, durability etc. without providing the full (let alone, unique) technical solution. Of course, company standards are not voluntarily adopted by others and do not qualify as 'standards' for standards bodies. Thus, to adopt design standards for standards bodies will normally need extensive consultation and rewriting before consensus can be expected. This may impart some rigidity and might discourage innovative solutions. When design standards are used by authorities in the law, the likelihood of creating technical barriers to trade increases greatly. For all these reasons, preferences in the developed countries shift to performance standards.

Furthermore, standards are frequently named after their technical function. Here terminology is not always applied in a fully 'standardized' way, although most of the terms are straightforward: **basic standards** (e.g. a measurement standard), **terminology standards**, but also **product, service, testing, safety, health standards or even engineering standards** (for turnkey projects).

Finally, and at a slightly more abstract level, it is useful to distinguish four categories of standards dependent on their economic function (see also Exhibit 2):

- information standards are a prerequisite for technical communication and consistency in that they carefully describe dimensions, terminology, criteria, measurement units (under given tolerances) and other functional and conversion systems:
- variety reduction standards aim to reduce the (unnecessary) number and variety of components, parts, processes or services:
- compatibility standards are concerned with the compatibility of components, complementary products, processes, protocols or services or the interchangeability among (competitive) parts or products:
- quality standards define minimum requirements for reliability, durability, etc., of materials, processes, products or services, including aspects of safety, health and environmental protection.

The four categories of standards may be operational, in principle, at four levels: the industry, the country, a region of several countries and the world.

It is common practice to employ the word 'standard' also at the firm level, although clearly there is no voluntary agreement among various participants. Standards of an individual firm can achieve de facto adoption by users in the market as the 'dominant' standard (when compatibility requirements are overriding). These cases are relatively rare despite the fact that they get more scholarly attention from economists (e.g. Gabel, ed., 1987). In any event, they emerge from non-co-operative company strategies in the market and not from consensual efforts in standards bodies; therefore, they fall outside the scope of this pilot study. The adherence to a standard may have different legal and economic effects, dependent on whether

## EXHIBIT 2

TYPE OF STANDARDS, ACCORDING TO THEIR ECONOMIC FUNCTION \*

- o Information Standards
  - exact communication among engineers
  - examples:  
dimensions, terminology, measurement units, specifications of drawings, abbreviations, etc.
  
- o Variety Reduction Standards
  - reduce the unnecessary number/variety
  - examples:  
sizes of beds/matresses; car wheels/tires; units of lumber; screws; etc.
  
- o Compatibility Standards
  - interchangeability, interoperability, complementarity of (competitive) parts or products
  - examples:  
films and camera's; sockets & plugs; railway gauge; etc.
  
- o Quality standards
  - minimum of reliability, durability, performance
  - health, safety, non-polluting

\* a standard may fulfil two or three functions

'compliance' follows from mere tradition (in the United States, the metric system was 'adopted' in 1988, but never accepted), informal sectoral arrangements, decisions by standards institutes, the attraction of specific certification marks, market dominance of a firm's standard, dominance of export markets' standards, specialization agreements, joint ventures, the (international) hierarchical reach within a firm, references to standards in the law, technical regulations or approval systems imposing compulsory certification.

The relation between technical standards and technical regulation may vary as is shown in Exhibit 3. First, for numerous products countries or subcentral governments see no valid reason for regulation because no health, safety or environmental risk is involved and no objective of consumer protection is affected (e.g. pencils).

In such cases there may or may not be standards but there is no regulation. Second, when there is regulation, three alternative approaches present themselves with different implications for the role of technical standards:

- (a) Exhaustive regulation; the law may set both the objectives of health, safety, etc. as well as the full set of technical specifications, including the technical requirements for conformity assessment and the administrative ones for approval. This form of heavy-handed regulation is only justified when risks are very great. The approach obviates the writing of standards as defined above.

Frequently, one encounters this approach in sectors where health objectives are paramount such as agro-food and medicines. It explains why many national standards bodies have worked almost exclusively on safety rather than health issues: health related standards were obviated by regulatory activity.

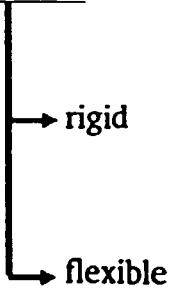
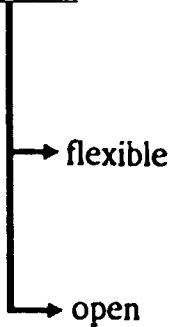
- (b) Optional regulation: the law may set both the objectives of health, safety, etc. as well as technical specifications, but may allow different 'options', declared to be instrumental to the objectives. This regulatory flexibility is especially important within federal systems having different local traditions as well as internationally where preferences or technical traditions may vary even more over a wider spectrum.

If the options are exhaustively specified in the law, however, there is still no role for standards. If specifications remain incomplete, this approach may incorporate features of the 'reference to standards' methods, explained below, so that standards have an important role to play.

- (c) Purpose-oriented legislation: the law sets the objectives of health, safety, etc. but refrains from listing the technical specifications. Instead, the law refers to existing standards as being compatible with these objectives. In an even more flexible form, the equivalence principle is introduced: reference is made to technical standards written by designated standards bodies but any other technical specifications from a firm (say, because of innovation) or technical standards set by other bodies (say, from other countries) may be considered 'equivalent'. Such products

## EXHIBIT 3

RELATIONS BETWEEN STANDARDS AND REGULATIONS

Nature of regulatory regime	Characteristics in the law	role of standards
exhaustive regulation	<ul style="list-style-type: none"> <li>- objectives</li> <li>- full technical specifications of singular solution</li> <li>- designated or public certification</li> </ul>	none
optional regulation 	<ul style="list-style-type: none"> <li>- objectives</li> <li>- specifications optional</li> <li>- designated or public certification</li> <li>o options exhaustively specified</li> <li>o options include reference to enumerated standards</li> </ul>	none  some strict mandates
purpose-oriented legislation 	<ul style="list-style-type: none"> <li>- objectives</li> <li>- reference to standards</li> <li>- designated certification</li> <li>o existing standards</li> <li>o designation specified</li> <li>o any complying standard; also company standards</li> <li>o certification designated or accredited</li> </ul>	significant  crucial
no regulation	---	varying from important to none



would be subject to conformity assessment by designated bodies whereby the decisive aspect is no longer the technical specification but the accordance with the health or safety objectives in the law.

This more sophisticated perspective on regulation not only provides greater flexibility for market participants but also shapes a desirable division of labour between the essence of the regulatory tasks of government, and the technical capabilities of standards bodies. As will be shown below, this is one of the more important routes to reduce the costs of technical regulation (without compromising health and safety objectives) in any national market. It applies with even greater force to the reduction of the costs of technical barriers to trade or their removal.

The relation between technical standards and conformity assessment is normally straightforward: as a rule, technical product standards will include a careful specification of conformity assessment tests (including sampling methods). This is done because users or consumers (or, in certain cases, the authorities) must be able to let laboratories verify whether or not a product conforms to a given standard. In the world of standardizers an ever wider acceptance of the strict test of the International Standards Organization (ISO), to which descriptions of conformity assessment should be subjected when writing them into a standard, can be observed. The ISO (1989, p. 13) writes:

*'The accuracy of the chosen test method shall be such as to allow unambiguous determination of whether the value of the characteristic to be assessed lies within the specified tolerance'.*

The inclusion of conformity assessment specifications into a standard does not imply any obligation to carry out any kind of test. This depends on the relation between technical standards and technical regulation (if any; see above) or on the wish of users to verify conformity. Conformity assessment should leave no doubt about the (proper) use of a standard in cases of contractual obligations or a supplier's claim in advertizing, offers or tenders.

Conformity assessment with respect to specific health and safety objectives in the law presents greater problems. The flexibility of the 'reference-to-standards' method derives precisely from the not-too-detailed specification of the objectives in the law. Designated certification bodies themselves will have to specify exactly a respectable test method - with degrees of tolerance indicated. By definition, this cannot be a general conformity assessment of products not using a referred standard, because such products may be different in every case. (In practice the options offered for key characteristics related to health or safety are very limited).

## 2. BENEFITS AND COSTS OF STANDARDS

### 2.1. Benefits of Standards

Almost all the private benefits of standards to producers and consumers, respectively, amount to social benefits as well. The fact that standards are frequently difficult to formulate, that consensus cannot be achieved or that standard proposals aren't even submitted is explained by the unequal distribution of benefits (which may influence competitive positions), or the impossibility for those incurring the costs of writing the standards to recoup the costs or appropriate the benefits. Therefore, the very considerable list of benefits which follows below does not in and by itself indicate the likelihood of standards being adopted (the following is adapted and extended from Pelkmans, 1987-b).

The benefits of standardization for the producer include cost savings, such as

- (1) **Reduction of average costs**, through better exploitation of scale economies. This applies especially to variety reduction and compatibility standards, subject to the condition of effective adherence;
- (2) **Cost reduction through the use of interchangeable parts**. This may be influenced by all four categories of standards but particularly by the combination of quality and compatibility standards;
- (3) **Cost reduction through simplification of production and construction processes**. This is the result of variety reduction standards, enabling large scale production of more complex but multifunctional (and/or compatible) components, reducing the number of components in the production process, etc.;
- (4) **Reduction of storage and of logistics costs in interfirm trade**;
- (5) **Reduction of liability insurance costs** (in case of potentially dangerous products or processes);
- (6) **Facilitating corporate strategies emphasizing quality control on a permanent basis**. This would require quality standards and quality assurance systems (of the firm, or via third party quality certification).

Firms may of course also benefit as users of economic goods subject to standards. The consumer of products and services may likewise benefit. Such economic advantages may include:

- (7) **Reduction in the costs of information** (with respect to the performance, quality, complementarity or compatibility of products or components). Uncertainty or misinformation will increase search costs, may hamper consumer or user acceptance, and occasionally be extremely costly. The costs of information can be further reduced by simple signs or marks conveying the quality of the product or its conformity to (particular) standards;
- (8) **Reduction in the cost of 'learning'** how to use a good (if certain key items of handling are standardized, goods become substitutable at lower cost levels of learning, e.g. changing films in cameras, typewriter key boards, changing tyres, using different programming languages);
- (9) **Network externalities**, as a result of compatibility standards. Network externalities, which can be important and even decisive for the

emergence of large networks, are positive external consumption benefits, in the sense that the utility derived by a consumer from the use of a product increases with the number of other consumers purchasing compatible products. Examples include the telephone network, value-added services and the television system;

- (10) The capturing of some of the 'rent', otherwise accruing to producers, when the introduction of standards shifts the **emphasis towards price competition**.

Eight out of these ten benefits usually translate into social benefits as well. No. 6 depends on a separate cost/benefit analysis and the nature of user preferences. No. 10 reshuffles a rent and does not necessarily raise a society's welfare. Nonetheless, the overall benefits of standards can be impressive.

## 2.2 Costs of standards

The costs of standardization depend on the level of operation chosen (i.e. industry, national, regional and world) and the method employed (i.e. truly voluntary, hierarchy, market dominance, reference to standards, detailed regulations, etc.). The private costs of standardization will largely fall on industry.

First of all, they **comprise the resources spent on the standardization process inside the firm, among firms and other interested parties** (where relevant, in co-operation with public agents).

Second, and frequently more important, **firms may expect to lose (temporarily?) market share in 'protected' markets and may incur adjustment costs with respect to production processes**. Third, **firms may hesitate to convey their unique technical knowledge**, necessary before standardization would become feasible. The latter two expected private costs may well prevent a standard from coming into being. In addition to these general categories of private costs, both the existing level of operation and existing methods may militate against additional standards. Historical reasons or an 'installed base' (e.g. lifts; sockets and plugs in a given electricity network) may act as powerful obstacles to wider standardization. So may inconsistencies among standardization methods or adherence practices and, above all, conflicts between (national) jurisdictions and wider standardization processes.

The social costs of standardization may consist of a **reduction of product variety, and reduced possibilities or incentives for product innovation or new types of services**. This may also imply a reduction of competition. Variety reduction is likely to go against consumer preferences as preference variety spectrums are usually very broad. In principle they are even unlimited. Therefore it should be up to the consumer whether he or she positively assesses the trade-off between cost reduction and variety-loss (example: most countries have only a few standard sizes of beds - and mattresses). Standardization traditions strongly emphasize the avoidance of unnecessary duplication or variety. Such judgements may be influenced - implicitly or consciously - by national market positions, cultural preferences or engineering traditions. Thus, variety reduction which creates no problem within a given country may act as a technical barrier to trade internationally. It may also explain why international product standards are difficult to achieve, and once adopted, may not acquire market acceptance.

Standard specifications as well as regular reviews should be such that incentives for innovation are not throttled. This applies as well to procedures of trade associations acting as standards bodies, at least if they allow discretion for restrictive business practices under the guise of standardization.

In certain markets standards of individual companies may be accepted by suppliers and users, even though standards bodies have not been involved. One observes in such cases that individual company standards assume strategic, competitive importance as so called 'de facto standards'. Examples include IBM standards for certain computers or LOTUS software for spreadsheets. Their strategic advantage is derived from compatibility requirements. In such an economic configuration, it is most likely that consensus standards can be written by recognized bodies.

### 2.3 Costs and Benefits of Technical Regulation

Technical regulations aim to **promote the public interest** by fostering product and process **safety**, human, animal and plant **health**, other forms of **environmental protection** and consumer protection. (In the case of information standards one should add minimal levels of legal security, accuracy and the quality of information in contracting needed for the proper functioning of markets). Accomplishing these objectives in the public interest points to the **benefits**. It is important to realize that the subjective level of welfare, pursued with these regulations, depends on deep-rooted preferences, coloured by local circumstances and history, on the state of technology and the level of development. In the long run these three determinants are not independent. What is considered a 'beneficial' move in OECD countries might be a regulatory burden in developing countries.

The **costs** of technical regulations and their harmonization, though elusive, may be high and at times prohibitive. There are at least four problems that easily lead costs to rise very quickly.

First, although in general terms the public goals are uncontroversial, they tend to be too ill-defined for purposes of an operational cost-benefit analysis. 'Safety levels' can never be high enough, if politicians do not bear the costs themselves.

Second, once the political level insists on regulation for the public interest, asymmetrical information problems (i.e. the regulators, let alone the legislators, are not as well informed about costs and options as the local industry, which asymmetry induces strategic behaviour) may cause the local industry to insert its interests, couched in technical specifications. A joint cost of the first two problems together is that access to that national market may become difficult. If compulsory conformity assessment is added, costs of imports may be further augmented. If certification is somehow influenced by local industry, markets might become fully insulated.

Third, one may ask serious questions about the harmonization of different national regulations. Of course, what should be decisive is agreement about the objectives of health and safety. However, the objectives being ill-defined, one tends to revert to the technical specifications (or to the standards referred to) in the regulations. This tends to lead to a shift in negotiations towards the technical experts, themselves usually responsible for the relevant national pieces of legislation. These experts in turn are

heavily dependent on local industry possessing more and better information. Industry having adjusted to local legislation and possibly enjoying the rents of de facto protection against imports, will perceive harmonization as a threat. Failing political pressure, technical harmonization of this kind will not work or becomes very costly.

Fourth, technical regulation is so detailed at times that its accumulation generates negative side effects. Fitting a window in a high-rise construction in Germany requires compliance with 39 DIN standards (by reference in law) and with another 31 rules and prescriptions about usage (for workers), originating from labour unions, sectoral bodies, the regional and federal government(s). The hidden costs of such cumulative regulation may well be much greater than society would be willing to pay for that level of safety, should it be properly informed. Moreover, the benefits of standardization (especially lower information costs) tend to get lost and import competition becomes very difficult.

#### 2.4 Removing Technical Barriers to Trade

The economic case for removing technical barriers should extend this cost/benefit analysis to larger markets, taking into account differential preferences of the countries involved and retaining flexibility for innovation.

In the first place **harmonization of technical regulations is frequently necessary for international trade** in all products subjected to restrictive regulation for the public interest. Harmonization does not have to lead to complete agreement in all detail; this is only necessary in some cases. However, if national laws are so restrictive as to allow only one technical specification, one has either to obtain specific agreement on a bilateral or regional basis or to adopt procedures for (mutual) recognition. In case the law employs reference to standards, and if these standards are different from or more precise than ISO-standards, the same applies. In addition, conformity assessment methods may have to be tackled as well which is bound to become extremely technical. Without harmonization of some kind, de facto import prohibitions may arise, or costly adaptations may be needed reducing the gains from trade. The costs of these adaptations not only consist of extra machines and performance tests, but also the reduction of economies of scale due to the interruption or multiplication of series production. It should be observed that, as trade based on economies of scale may well increase absolutely and relatively with the level of economic development, the costs of technical barriers may augment with secular economic growth. Conversely, for open economies the removal of technical barriers becomes a more and more pertinent condition for economic growth.

Second, and more generally, **many of the benefits of standardization may be reduced by technical barriers of one kind or another**. This is obvious for technical regulations as different technical regulations will raise costs and go against the cost-reducing impact of standards. It is also true for the voluntary standards, except that one has to be prudent not to confuse standards with aspects of commercial strategy of firms. Standards in country A may be based on different product developments than in country B, or on different engineering traditions. In such circumstances, components trade may be hampered but this need not be tantamount to a legal access barrier; rather it constitutes a (local) entry barrier to the market that may be overcome via a voluntary standardization process, via private specialization agreements,

long run private supply contracts or private direct investments. ISO or regional standards can reduce or remove such barriers. It is clear that in numerous cases a number of aspects of product and process technology can be standardized in such a way that international trade both inside and among firms is greatly facilitated. If components or final products are subject to vary large scale economies, standardization may even be vital for the development of a sufficiently by large export base in order to achieve and maintain competitiveness.

Third, corporate strategies may be profitably linked to standardization in several ways. Examples include the elimination of incompatibilities as early as possible in the product life cycle and the emphasis on quality standards recognizably used for products of the firm. This may prevent barriers from arising also among countries.

### 2.5 Are World Standards Optimal?

Does the economic case for the removal of technical barriers to trade amount to a case for common world standards? No, it does not; **global standards for all categories (e.g. information, compatibility, etc.) are not always justified.** It does establish the case for world information standards firmly, and for simplicity of conversion systems as long as different information standards continue to coexist for reasons of adjustment costs. But **variety reduction standards, compatibility standards and quality standards** may first of all differ among firms to an appreciable degree, for reasons of corporate strategies, uniqueness of technology or marketing. These forms of non-price competition should not be reduced unless there are good reasons. If such standards do exist but differ amongst countries, market access can be achieved by means other than world standards (see further). It is far from certain that the alternative means of market access are inferior to world standards for economic welfare. Moreover, **quality standards will tend to be linked to the level of development of a country or region (and its preferences!) as well as to comparative advantages worldwide; hence, there may be good economic reasons for them to differ rather widely.**

Variety reduction and compatibility standards may be, and are in fact narrowed down at ISO level, IEC level, CCITT level, CCIR level, etc., but this does not mean that market entry within a region may not be greatly facilitated by a further specification or narrowing down. In the case of compatibility standards, very precise protocols have to be established before genuine compatibility or inter-operability is accomplished (for example, communication at distance among different types of computers). Furthermore, it should not be forgotten that IEC and ISO standards are not uniformly adopted in ISO/IEC member countries, or that national bodies accept them formally without, however, adapting the certification or marks system (see chapter 4).

The reasoning in the case of technical regulations overlaps, but is not identical with that about standards. The public interest will be defined at national or federal level. The question therefore is whether objective and subjective levels of safety, health, environmental protection and consumer protection can be 'harmonized' in certain regions; or perhaps in some cases even at world level. It is obvious that such levels can differ greatly among the world's 150 odd countries and that global harmonization therefore is venally excluded on subjective grounds. Indeed, the GATT Code on Technical Barriers does not even strive for any harmonization. Given the different societal preferences, it might not even be socially desirable. Moreover,

objective reasons may cause regulation to differ due to climate and usage practices.

In regions of neighbouring or 'similar' countries where objective reasons and subjective preferences for certain specifications of the objectives of public interest may be similar, it may be worthwhile trying to harmonize. This is even more desirable when such a region or group is engaged in regional trade liberalization. In the long run mutual penetration, marketing and the demonstration effect may gradually bring about a broad convergence of tastes and a greater mutual confidence in one another's industrial performance and safety levels.

Therefore, in the limited range of tradeable products being subject to technical regulation, the case for regional harmonization or mutual recognition may be quite forceful.

The question then becomes whether independent jurisdictions and the 'sheltered' industries in them can agree on least-cost processes of harmonization, and accept broad principles of unhindered market access for products from that region (as long as the public interest objectives are demonstrably similar).

### 3. STANDARDIZATION PROCESSES IN DEVELOPED COUNTRIES

#### 3.1 The United States of America

##### 3.1.1 Introduction

Based on a free market philosophy, with little regulatory influence over industrial development, the United States has created a highly **decentralized standardization and certification system**. Voluntary standards bodies, of which there are approximately 600, are the core of the system. As a result no single set of official national standards exists. This reliance on voluntary standards has meant that **government regulation** and certification is infrequent and confined to certain specific areas, such as **food and defence**.

There is a lack of a co-ordinated approach to standardization, meaning that overall economic objectives (such as export promotion) have not been systematically pursued. With imports and exports forming a relatively low percentage of the United States' output until a few years ago, United States standardization bodies have developed uniquely American standards, with little reference or compatibility to international standards and those of other developed countries. Following the end of World War II, many United States standards were the de-facto global standards (e.g. in pressure vessels). Times have changed, and United States products no longer dominate world markets. Many countries have developed extensive standardization structures that have successfully challenged the prevalence of United States standards. In a world of growing international and regional economic integration, the United States is finding its traditional policy of isolation from international standardization costly as it leads to its exclusion from certain markets. Since 1987 the United States is attempting to improve its presence in the international standardization bodies, partly as a response to EC-1992 and the negotiations on the GATT Code (see e.g. Kruger, 1989). Currently, the United States "system" is under review to analyze how best it can adapt to the new realities of international trade. Hearings have been held by NIST and the Department of Commerce in April and by Congress in June 1990.

##### 3.1.2 The Role of the Government

Government regulation is divided between **federal and state legislation**, although the propensity to regulate has been low for both. **No clear delineation of responsibilities** exists, although federal law preempts state law in most cases of conflict, be it implicit or explicit. Congress can if it desires, explicitly forbid states to adopt parallel regulation. **Federal law** also operates through the '**dormant commerce clause**', which ensures that in the absence of federal regulation, states may not adopt regulations that unduly burden interstate trade, in order to prevent technical barriers to trade from arising. In practice however, the division between federal and state responsibilities is not clear. Congress prefers to leave some regulation to the state level for political reasons. States are fully entitled to regulate if a valid reason exists for a derogation, and if it adopts the least burdensome means of achieving the required objective. Some of the delineation is due to historical factors. Building codes and the regulation of banking and insurance are at the state level (and major Technical Barriers to Trade arise). Although many argue the benefits of unified regulations, local interests, which benefit from this situation, often



prevent change which would damage their interests. (For a survey of the remaining fragmentation of the internal United States market, see Pelkmans & Verheukelen, 1988).

In regulation both Federal and State governments **rely heavily on voluntary standards bodies**. Reference to standards and codes is often made. Various government departments are members of voluntary standards bodies, and participate with large delegations of technical experts. Some **federal agencies** do however have considerable **standards capabilities** (see Table 1) particularly the **Department of Defence (DoD)** and the **General Services Administration (GSA)** which deals with public procurement. The DoD is less willing to co-operate with voluntary bodies than the GSA. Several agencies assigned with health and safety concerns (e.g. the **Food and Drug Administration**) set regulations in various products. Certification in such cases is mandatory, often however through the use of third party independent testing and certification bodies. Occasionally a single testing institution is designated for certain tests, e.g. Underwriters Laboratories (= UL) are the sole testers for electrical safety equipment. An example of the overall reluctance to regulate on the part of government is seen in the Consumer Product Safety Act adopted only in 1972. It established the Consumer Product Safety Commission (CPSC), to enforce United States product safety laws. To do so, the CPSC has the power to issue rules, and impose fines for non-compliance. The act is weak and ineffective with little success in enforcement. **Consumers often rely on the risk of legal liability** for ensuring that products are safe, rather than on government regulation.

A final area of government involvement with standardization lies in the approach to **international standards**. Trade policy is under federal control, but it is only recently that standards have been recognized as a trade issue. The United States Government has little control over the standardization bodies. There is a small National Institute of Standards and Technology, (NIST) under the aegis of the Commerce Department. Even within the Government, there is no central organ. Four bodies oversee the GATT Standards Code: the office of United States Trade Representative (Trade Policy), the Department of Commerce (domestic policy, inquiry point and technical office for non-agricultural goods); the Department of State (foreign policy) and Department of Agriculture (Technical Office for Agricultural products). This lack of cohesion hinders a co-ordinated response to important events such as European standardization, the growth of standardization activities in developing countries, and the increased importance of international standardization.

### 3.1.3 Voluntary Standardization

Approximately 600 voluntary organizations are engaged in standards writing, although most standardization is concentrated in the largest organizations. Nevertheless a great deal of overlap in standards writing does occur, and being independent voluntary organizations, a great deal of competition also occurs between these bodies. The institutions vary in type; with their members drawn from a wide section of interested groups, from producers, consumers to experts. Considering the public good element of many standards, it has often been argued that reliance on voluntary standardization bodies is heavily biased against consumers and small enterprises, due to the costs of participation and the lack of information available to non-technical experts.

Table 1 -- Standards Development in the U.S.

	Number of Standards
<i>Government</i>	
Defense	37,000
Federal (GSA)	5,300
Other	8,000
-----	-----
(57 percent)	50,300
<i>Private Sector</i>	
Scientific & Professional	15,100
Trade Association	13,850
Standards Writing	9,750
-----	-----
(43 percent)	38,700
Total	89,000

Source: Robert Toth, R.B. Toth Associates, March 1989

Table 2 -- Developers of Industrial Standards

	No. of Standards
American Society for Testing and Materials	8,400
Society of Automotive Engineers	5,000
Aerospace Industries Assn.	3,000
American National Standards Institute	1,510
Association of American Railways	1,350
American Petroleum Institute	880
American Society of Mechanical Engineers	745
Underwriters Labs	600
Electronic Industries Assn.	580
Institute of Electrical and Electronics Engineers	530
American Railway Engineers Assn.	300
Technical Assn. of the Pulp & Paper Industry	290
National Fire Protection Assn.	275
Factory Mutual	110

Source: Robert Toth, R.B. Toth Associates, March 1989

Several anti-trust cases however have led to increasing vigilance on the part of standards bodies to ensure all parties have a fair say. It is useful to distinguish the different types of organizations involved.

(a) General Standards Writing Bodies

- American National Standards Institute (ANSI), see section 3.1.4.
- The American Society for Testing and Materials - ASTM  
ASTM develops standards on the characteristics and performance of material products, services and systems. It has a large number of institutional members (2500) and over 23,000 individual members. Committees and subcommittees are 'balanced' to ensure all groups have a fair say.

Of all the private standards bodies the ASTM is the largest and the most internationally recognized. This may change over time as ANSI's membership of ISO becomes widely recognized in the United States for general aspects of internationalization. ASTM standards on petroleum and plastics enjoy world wide recognition.

(b) Professional and Scientific Societies

These are groups of experts and specialists, usually engineers. The principal engineering societies are:

- Society of Automobile Engineers (SAE)
- American Society of Mechanical Engineers (ASME)
- Institute of Electrical and Electronic Engineers (IEEE)

Membership is dependent on professional experience and educational qualifications. Their involvement in standards activities varies, and often their role lies in providing expertise and participation on standardization boards of other standards bodies, although some do engage in standards writing (e.g. IEEE).

(c) Trade Associations

These are bodies representing sectoral industrial interests, e.g. American Home Appliance Manufacturers (AHAM), Electronics Industry Association (EIA). Often these bodies serve as clearinghouses for information about the industry and its products. It is clear, that particularly trade associations risk to write standards from a producers' point of view. Some of the anti-trust cases dealt with these types of bodies.

(d) Listing Bodies and Safety Code Organizations

These usually deal with safety and tests standards. Safety bodies include the National Fire Protection Association (NFPA), American Insurance Association (AIA), and Building Officials and Code Administrators International (BOCA). The NFPA has over 250 standards, and draws its members from government, industry and experts. NFPA standards enjoy considerable recognition and greatly influence building codes and certain materials standards.

Definitional, measurement and tests standards are developed by the IEEE (e.g. test method for the measurement of the noise level of rotating electrical machinery), which are technical and scientific problems. Standards of a more commercial nature are left to trade associations.

Testing bodies also write standards, normally in the field of tests. Two national testing bodies doing this are Underwriters Laboratories (UL) and Factory Mutual Engineering Standards (FM). In particular UL standards are important: given the high consumer awareness of UL testing and certification, compliance is often vital for ensuring access to the United States market.

#### 3.1.4 American National Standards Institute - ANSI

ANSI represents the umbrella organization of United States standardization bodies, being the main co-ordinator of activities among its members. ANSI is the official United States representative in ISO since 1987. Approximately 35 per cent of the 600 standardization bodies are members, as well as companies, government bodies, experts, universities and individuals. By co-ordinating work among its members, valuable resources in standard development are saved and (internal) TBTs are prevented from arising.

ANSI also identifies standards that need to be developed, and delegates responsibility to competent organization(s). It also provides technical and management assistance to relevant bodies, and operates guidelines for procedural aspects of efficient standards development.

ANSI develops American National Standards. Currently there are 8500 American National Standards. ANSI itself can decide to initiate the process on the suggestion of one of its members, by delegating responsibility to one of its members on the condition that certain procedures are followed. More often, it will adopt the standards developed by some of its members provided ANSI is satisfied that all relevant parties have been consulted and that consideration has been taken of their proposals. Standards developed by these accredited organizations are reviewed by ANSI's standards committee, before being accepted as American National Standards. Organizations generally develop standards on the basis of two procedures.

(a) Committee Procedures - standards committees made up of interested parties vote (majority or qualified) on draft standards and ANSI reviews membership of committees. Consideration is also given to requirements for "due process", appeals procedures, mandatory consideration of negative votes or comments, and for committee balance, before deciding whether a standard is fit to become an American National Standard.

(b) Canvass Procedures - in order to gain more global recognition for a standard developed by its internal procedure, a standards body may canvass interested parties.

Consideration is given to the weight attached to negative votes and comments, and over the inclusion of exactly who is on the canvass lists. ANSI has guidelines which set out its rules, should an organization wish their standards to become American National Standards.

ANSI has two other functions of note. It **represents United States interests in international standards bodies**, and acts as a source of information on standards of United States organizations and of ISO members.

### 3.1.5 Certification and Laboratory Accreditation

Certification is as fragmented as standards writing, with over 100 voluntary organizations and 60 federal programmes operating. This does not include State and local certification programmes. Most Federal programmes deal with health and safety (e.g. FDA) or aim to avoid retesting in the case of local public procurement. States often administer testing and certification programmes for the Federal agencies, (e.g. meat for the Dept. of Agriculture), but they also test for their own regulations (e.g. auto emissions in California). Most certification is either via self certification on the part of manufacturers, or through third party certification. These third party programmes are run by a variety of organizations including professional and technical societies, trade associations, consumer bodies, and principally independent testing and inspection bodies. We have already mentioned UL and Factory Mutual. UL has a distinctive mark, with very high consumer recognition, making it often a de-facto requirement for market access.

### 3.1.6 U.S. Participation in ISO and IEC

United States' participation in ISO and IEC has traditionally been modest although it is increasing somewhat. In 1966 the United States held 9 per cent of ISO secretariats, while in 1980 it held 12.5 per cent. This, however, places the United States fourth in ISO, behind France, the United Kingdom and West Germany, while ranking second in the IEC with 16 per cent of technical and subcommittee secretariats. One should distinguish between the quantity and quality of secretariats. ANSI, which is the United States representative, holds the secretariat in the information technology committee (JTCl) and other important high tech areas such as aerospace. This contrasts with the German dominance in the traditional industrial sector. Within ISO and IEC voting procedures, there is a heavy bias (18:1) in favour of Western Europe against the United States and naturally this is a contentious issue.

Aside from lack of participation there is also a lack of interest in the use of ISO and IEC standards. Of the 89,000 standards used in the United States only 1/ are directly adopted ISO standards, and none are directly adopted IEC standards (Kruger, 1989). By contrast, 43 per cent of Danish national standards are ISO and IEC standards, with 3/ per cent in France, 22 per cent in the Netherlands, 16 per cent British, and 5 per cent in the Federal Republic of Germany.

The situation varies between industries and between the interest expressed by ANSI's constituent members e.g. the American Petroleum Institute participates heavily in the ISO. Given the expense of participation, many companies prefer to rely on standards of the United States bodies. ANSI receives no stipend from the United States Government for participation, and this sets it alone with Switzerland in this regard. Individual government agencies do participate in United States delegations, and agencies have awarded grants to other bodies for their ISO participation.

A final aspect of United States' involvement or rather the lack of it, concerns its provision of aid to developing countries. United States aid is ad hoc and underfunded in comparison to the highly sophisticated translation, training and assistance programmes run by DIN, AFNOR and Japan (e.g. DIN has translated 5000 of its standards into Chinese, it provides technical assistance to engineers and helps implement standardization; it also receives

trainees regularly). United States assistance often amounts to short infrequent training courses and complete sets of ASTM standards. Part of the problem stems from the need developing countries have to adopt international standards, rather than just United States standards. Some attempts to review the United States position are currently underway as part of an overall review of the entire system.

### 3.1.7 Reform of the United States Standardization System

The United States fears of the emerging European standardization system, and rising concern over the cost of fragmentation of the domestic standardization structure, has led the National Institute for Standards and Technology (NIST) to propose a new structure, entitled, the Standards Council of the USA (SCUSA). It is proposed that this government body would take over several of the activities of ANSI's members, and extend into accrediting standards writing, testing and certification bodies. Its role would therefore be the co-ordination of public and private interests, and the development of national standards writing and conformity assessment programmes. It also aims to enhance United States' interests in international and regional standards bodies, and to co-ordinate and manage assistance to developing countries. This would mark a major shift in United States policy and is being strongly opposed by ANSI, based on arguments of free market forces.

## 3.2 Japan

### 3.2.1 The Nature of the Japanese Standardization System

Technical barriers to trade became increasingly recognized as the major impediment in world trade, following the reduction of tariff levels in the 1960s. The Japanese, with a different standardization system from most other OECD countries, were often viewed as the chief culprit in this respect. An examination of the Japanese Standardization System (JSS) will highlight the difficulties non-Japanese traders face in attempting to enter the Japanese market (see e.g. Lecraw, 1987). Some differences relate to language and cultural difficulties. Others, however, are more directly concerned with (1) the organization and execution of standardization activities, and (2) the properties of a system which originally assisted in developing the quality of Japanese products, while, at the same time, isolating the Japanese market from competing imports.

Centralization is the key characteristic of the JSS. The Government is involved at almost every level. Regulations concerning health, safety, and the environment are far more prevalent than in other developed economies. Reference within regulations is made to Japanese Industrial Standards (JIS) and these are developed within the Japanese Industrial Standards Committee (JISC), established by the Government, and falling under the direct responsibility of the Ministry of International Trade and Industry (MITI). Even though JIS are 'national' standards, they require the approval of relevant Ministries before being formally adopted as JIS. (This is not in keeping with the ISO definition of a standard). Such a centralized structure and control has permitted the **development of long run strategic objectives** and plans for standardization, generally adopted over a five year period. By focussing on key objectives, resources have been concentrated on important areas necessary for industrial development. Furthermore, these objectives take account of the national economic interest, and are not solely concerned with the commercial interests of individual private enterprises.

Several features of Japanese society and culture have reinforced this centralization tendency. Japanese society is founded on the principle of consensus. This has led to close co-operation between the government and industry. Hence industry as a whole has been able to secure a standardization system that suits its own requirements and traditions. It initially tended to exclude foreign interests from the standardization and especially the testing and certification process, inviting numerous claims of unfair practices (e.g. Lecraw, 1987). With **(internal) consensus being the guiding factor**, distrust has developed towards outsiders who suggest reforming the JSS or who request the recognition of technically equivalent but different standards. A network of contacts and liaisons has arisen between government, industry, and trade association representatives who deal with standardization, and they often reach consensus over technical issues in advance of the formal procedures. Consumer awareness of standards and certification marks is high, and this is also the case for industry purchasers and distributors. Market access is virtually excluded in many areas without compliance to appropriate JIS or other voluntary standards. Quality control awareness is extremely high, with managers and workers implementing detailed and complete quality assurance schemes, relying heavily on JIS to achieve the desired quality.

Following the rapid expansion of Japanese products into global markets, and the persistent trade balance surpluses, there has been bilateral pressure on Japan to open up its standardization system, to make it more transparent, to rely more on international standards, to allow foreign products to be tested for JIS, and to accept the results of laboratories outside Japan. Until the early 1980s there was no doubt that the JSS caused numerous TBTs, considering that ISO and IEC standards were rarely adopted, making many products incompatible with requirements on the Japanese market, and necessitating costly adaptations in product specifications. Testing and certification was difficult and costly to obtain. Testing requirements were often excessive, showing no proportionality to the safety/health factor involved. In 1980 Japan became a signatory to the GATT Code on Technical Barriers to Trade. As a consequence, a major reform programme for improving market access to Japan was undertaken in 1983.

### 3.2.2 The Japanese Standardization System

#### (a) Regulations / Legal Provisions

Technical regulations (which set mandatory specifications in health, safety and environment requirements) numbered 25 in 1987. Most of these laws cover a range of products, e.g. 63 products are covered in the Consumer Product Safety Law. Products covered include pressure cookers, roller skates and mountain climbing equipment.

Other examples of laws include the

- Electrical Appliance and Materials Control Law
- Pharmaceuticals Affairs Law

Table 3

## LIST OF COMMON PRODUCT MARKS IN JAPAN









Mark	Product	Meaning of purpose	Responsible body
J.I.S. Mark 	Majority of product machinery and equipment (except food)	Japan Industrial Standard, for products meeting required standards	M.I.T.I. J.I.S.C.
voluntary			
J.A.S. Mark 	Food products	Japan Agricultural Standards. Given to food products meeting standards required	M.A.F.F.
voluntary			
"T" Mark compulsory 	Electrical products Category "A"	These marks indicate the power and quality of electrical equipment in accordance with laws controlling such equipment	M.I.T.I.
	Category "B"		
 S-Mark	"S" Mark Certain automobile compulsory equipment	Safety Mark. Shows that safety standards from consumer laws have been observed	M.I.T.I. Product Safety Association
 Safety Goods Mark	"S.G." Mark Products for babies voluntary		
"S.T." Mark Toys voluntary			
"G" Mark voluntary 	The majority of consumer products	Good Design Mark. Label indicating quality and good design	M.I.T.I. Design Inspection Section
"Q" Mark voluntary 	Textile quality	Quality Mark	M.I.T.I.



Table 3 (cont'd)

## LIST OF COMMON PRODUCT MARKS IN JAPAN (continued)

"Kosho" Mark	Consumer products	Label guarantees that the product has been correctly described	Fair Trade Commission F.T.C.
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voluntary

"Harusho" Mark	Drinks	This label guarantees contents	
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voluntary

Special Nutritious Food	Dietary products	Guarantees dietary products	Local health authority, Ministry of Health
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compulsory

Source: (1980) Derived from NOREX-AFNOR "Normes, reglements et procedures d'homologation Japan"

Safety regulations require testing and certification. Products are usually divided into two classes:

- Class A: products likely to cause danger with poor quality or malfunction
- Class B: goods other than Class A.

Class A goods require government certification whereas Class B goods require only notification of compliance with the regulation. Class A goods, on receipt of government approval, are awarded an 'S' Mark for non-electrical goods and a 'T' Mark for electrical goods. Class B goods are also allowed to affix these marks (see Table 3 for list of certification marks). In relation to market access the division between what is Class A and B is crucial given the difficulties non-Japanese companies face(d) in receiving approval.

The second major piece of legislation related to standards is the Industrial Standard Law, which a) requires all government departments and agencies, both state and local, to purchase products to JIS specifications if those specifications exist; and b) requires that technical requirements in regulations must refer to JIS when they are established. Until 1980 only goods produced within Japan were eligible for certification to conformity with JIS. A further Act, the Export Inspection Act of 1957 initiated government testing of exports to ensure exports were of adequate quality. The goal was to prevent unnecessary price and quality debasement wars between Japanese exporters, and to create a positive image abroad of Japanese products. Standards were one means to ensure this quality.

#### (b) Japanese Industrial Standards - JIS

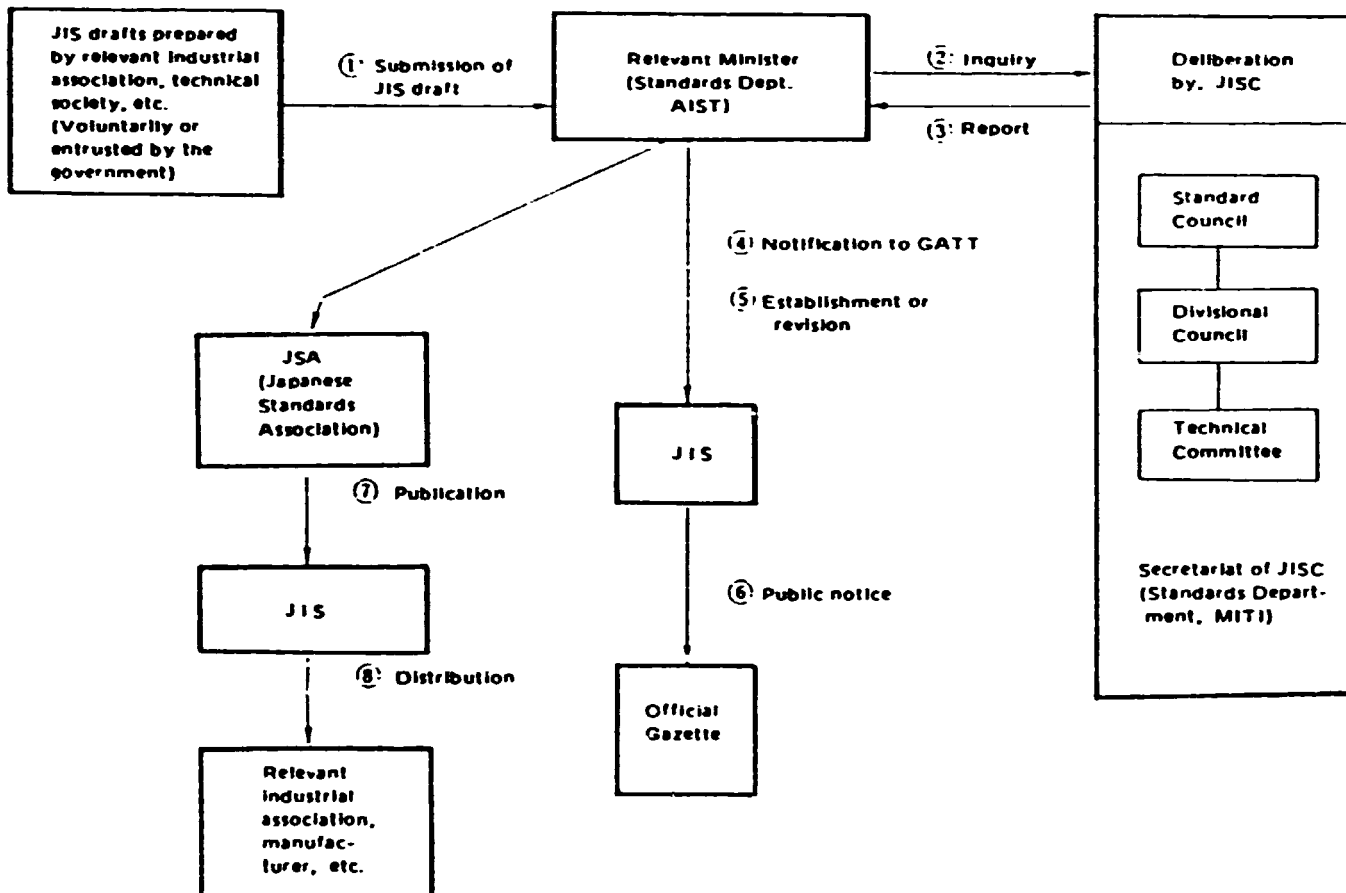
The Ministry of International Trade and Industry (MITI) directly controls the Japanese Industrial Standards Committee (JISC) whose role is to develop Japanese Industrial Standards (JIS). MITI is a large and complex organization, responsible for a range of activities covering international trade policy, industrial development, science, technology and R&D policy, and standards development. It is able to develop standards in such a way as to fit broad economic objectives, and to use JIS as part of industrial and trade policies. MITI has extensive connections with industry particularly the KEIDANREN (the Chamber of Commerce, the umbrella organization of Japanese industry), allowing industry to influence standardization policy.

JISC falls under MITI control although it has representatives from industrial, professional and consumer interests. Consumer interests have traditionally played a minimal role in Japan. Every five years a Long Range Plan of Industrial Standardization is developed by JISC which sets priorities in the following period.

Table 4 provides a schema of the development of a JIS. Mandates and proposals for JIS along with studies and technical reports are submitted via the relevant Ministry to JISC, which via internal procedures of Standards Controls and Technical Committees prepares a draft JIS. The Minister publishes the draft JIS to allow for comments, and JISC will modify it if necessary. The relevant Minister only accepts a JIS when he feels that the interests of all parties are adequately reflected. JIS are then promoted by the Japanese Standards Association (JSA). Table 5 indicates the steady growth in JIS since 1952. Note that JIS are revised every 3 years to ensure they reflect technological advances.

Table 4

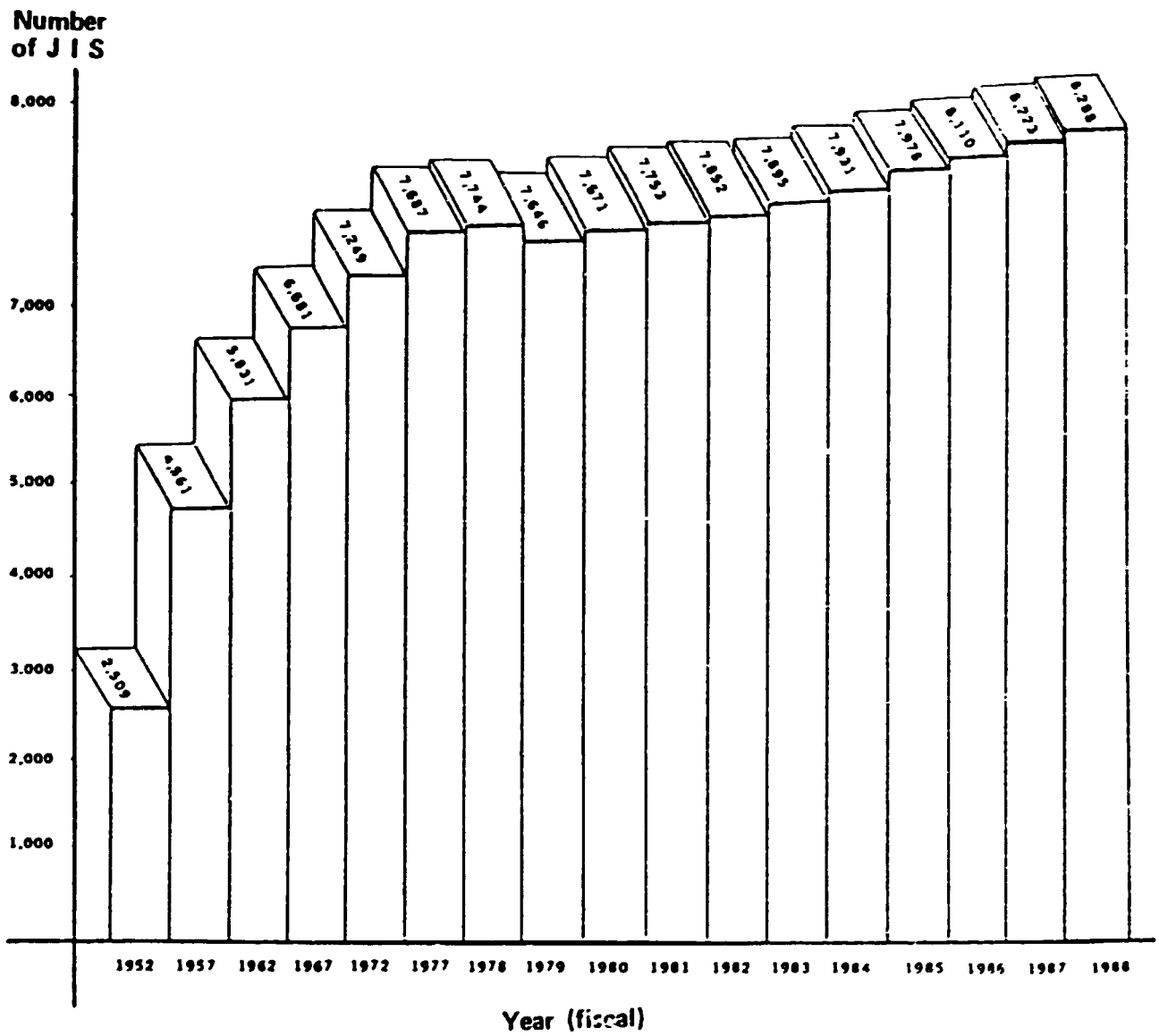
Flow Chart of Establishment and Revision of JIS



Source: (1989) Japanese Industrial Standards Committee "Industrial Standards in Japan"

Table 5

## Growth of JIS Standards



Source: (1989) Japanese Industrial Standards Committee  
 "Industrial Standards in Japan"

One factor in this system that distinguishes it from the 'European' model, is that JIS standards are very pragmatic: they are **often developed by the market leader**, and usually follow the **principle that a product is first developed and then it is standardized**. In Europe a more general approach is followed, where the product is standardized at a more abstract level. Although one cannot generalize too much about "the" European and Japanese approaches, the latter is likely to induce a more industrial-strategic or even business-strategic perspective.

(c) Conformity Assessment

Conformity assessment plays an important role in access to the Japanese markets. Compliance proved to be difficult or at times impossible in the past for several reasons:

- many of the tests for regulations on imports were beyond what was reasonably required to ensure that safety and health requirements were met (e.g.: bulbs from Holland were cut open to ensure they carried no plant diseases!)
- an **import agent was required** when attempting to acquire the 'S' and 'T' mark, to bear the legal responsibility for compliance with regulations.
- **until the 1983 reforms, all testing had to be undertaken in Japan**. The fact that standards were in Japanese and that there was lack of transparency in the entire system before the reforms led to difficulty in understanding exactly which standards were applicable.
- **'type' and 'model' approval is not commonly used in Japan**. Instead certification is based on characteristics (say size, capacity, voltage, cord length) that must fall within certain parameters. Therefore a product can substantially change provided the characteristics fall within the prescribed ranges. However, with model production, various models are often produced with numerous variations e.g. colour, cord length, and each model may require retesting. Lot testing was often imposed where each batch of imports had to be tested individually on arrival into Japan. **Some attempts at overcoming these obstacles have been made in the 1983 reforms, namely the acceptance of foreign test data, and some type/model approvals.**

Given the **high consumer awareness of JIS**, it is vital that products are able to obtain the appropriate conformity assessment, and to affix the JIS mark where appropriate. JIS marks can be affixed with the approval of the appropriate Ministry (usually MITI) and cover testing of the entire quality assurance system in addition to product performance. This requires detailed submissions of procedures and operations, as well as factory assessment. JIS marks can be obtained for foreign produced goods and foreign factories via

- inspection undertaken by Japanese government officials
- a recognized body or
- through a recognized specific foreign inspection body.

A recognized body is entitled to test for conformity to certain JIS, or to award approval to factories regarding JIS production processes. Of the 16459 products designated for JIS Marking only 11/ were not Japanese as of March 31st 1989.

Other voluntary certification marks of interest can be seen in Table 3, and these include:

- 'SG' mark issued by the Consumer Product Safety Association which is a voluntary scheme covering 55 products.
- The 'G' mark is awarded by the industrial Design Promotion Association, for products deemed to be of higher quality in production, function and design.

### 3.2.3 The Current State of the JSS

With the signing of the GATT Code on Technical Barriers to Trade, Japan committed itself to basing the requirements of technical regulations on international standards where appropriate, to ensuring equal treatment in testing and certification between domestic and foreign producers, to following transparent procedures throughout the whole standardization process, and to providing information and assistance regarding standards to all signatory parties. As a result reforms were introduced revising technical regulations, and altering the standardization system. The key changes were:

- (1) **self certification was expanded**, to cover goods previously requiring government certification. This was achieved for example in the Consumer Product Safety Law by reclassifying goods from Class A to Class B.
- (2) **Test data from a foreign test institution is acceptable**, provided the institute involved received a designation from the appropriate Ministry.
- (3) **Improved conformity to and usage of international standards.**
- (4) **Greater clarity, simplicity and transparency in the standardization system and certification procedures**, with improved information sources and the translation of JIS into English.

Still the question is raised by Japan's trading partners if these reforms have gone far enough to remove most TBTs. Given the centralized structure of the JSS, implementation of GATT Code could be achieved relatively straightforwardly. Currently the problem relates not to the organization of the JSS, but rather to its actual implementation and operation. Foreign producers still face problems, for example 'type' and 'model' approval requires six months production data which may not exist given the different specifications required for the Japanese market. Many of the complaints may well be the fault of the foreign producers, many of whom are unfamiliar with Japanese markets, e.g. they cannot speak Japanese or they are unused to Japanese customs and traditions.

A number of the differences in technical regulations are explained by special conditions: e.g. washing machines in Japan are often placed outside on balconies due to lack of space. This requires that the machines be more

compact, be capable of resisting outside weather conditions and hence require more stringent wiring and insulation. Nevertheless the fear (by foreign competitors) persists that Japan continues to use standards to insulate the Japanese market and as a strategic industrial policy. Changes in the JSS have emerged to some extent following pressure from the EC and United States, and after Japan had become a world leader in many industrial products. Furthermore, close linkages between industry, government, trade association and certification & testing bodies still persist and have led to suggestions of unfair practices in fields where strong commercial interests in Japan exist.

High Definition Television (HDTV) illustrates the interplay of national and international standards and strategic considerations.

Advances in micro-chip technology have resulted in great improvements in quality levels in the audio-visual field. To facilitate the development of new and improved products which embody these technological advances, standards have had to be revised, and in certain cases new standards have had to be created. Japan has developed a "MUSE" standard (1125 line/60 Hz) which is incompatible with the existing production, broadcasting and receiving equipment (TVs and videos). Japan has proposed this as a world standard at the CCIR (part of ITU) which started its consultation in May 1990. Japan is ahead of the rest of the world in three ways:

- it is the world leader in microchip technology
- it has an already accepted Japanese standard
- it has industrial sectors capable of producing all the products required from cameras, to broadcasting equipment to TVs and video, and is so in a position to capture markets along the whole product range.

Were the Japanese proposal to be adopted as a world standard, American and European competitors fear that it could capture a very large share of the global market, given its lead in these above areas. A possible European standard ("MAC") is seen as allowing viewers and broadcasters to move gradually to the new technology. (It is also, however, seen as creating a barrier to Japanese competition in Europe's most important consumer-electronics markets).<sup>1</sup>

Initially, Japanese plans were backed by the United States. However, the United States has lost almost all innovative capacity in consumer electronics to Japan (and Europe) and bases its preference on television programmes-production and its interest as a user. Accordingly, like Europe, the United States now prefer a system that enables conventional transmission and a gradual shift to HDTV. America's Federal Communications Commission (FCC) will decide on its own standards for the broadcast of HDTV signals by 1991. This system is, however, likely to differ from both Europe's and Japan's unless a single world standard acceptable to all parties involved can be found.

Europe is unhappy with the standard proposed by Japan for several reasons. When it was first confronted with HDTV studio standards proposals in 1986, it still lagged behind in technology. Meanwhile, the Europeans have

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<sup>1</sup> See The Economist, May 19, 1990.

caught up in the framework of the EUREKA programme. Secondly the Japanese standard has only two audio channels, and this reduces the scope for the use of different languages. Europe has a multitude of languages to cope with, which require translation/dubbing/or subtitles. Most important of all - as was pointed out before - is the fact that the Japanese standard is incompatible with the existing broadcasting networks and the TVs and videos that people already own (see Pellmans & Beuter, 1987). Developing countries are also affected since the proposed new European HDTV standard (1250 lines/50 HZ) being developed by the Europeans is compatible with the cheaper technology products (black & white) of developing countries. The final outcome of the ITU conference will have vast strategic implications in a multi billion dollar market. However, recent choices of technology by satellite TV companies in Europe are regarded as a setback for the MAC standard.

### 3.3 Western Europe - the principal standards bodies

Standardization in Western Europe is not only complex because it is a mixture of the predominantly private United States system and the predominantly publicly controlled Japanese regime, it is also taking place at two levels of decision-making (EC/EFTA and national). The most intricate, yet important and innovative reason for complexity, however, is that the entire 'system' is in a state of flux as the **emphasis shifts from national to regional standards**, with a **simultaneous reduction in regulation** to so-called 'essential requirements', delegating the technical specifications to the regional standards bodies, which are private and write voluntary standards.

In section 3.3, the three principal national standards bodies in Western Europe will be briefly discussed: AFNOR, BSI and DIN. Together they held - in 1989 - the secretarial positions of 130 technical committees of the European (non-electrical) standards body CEN, composed of all 18 EC and EFTA countries, out of a total of 172 TCs. In section 3.4, regional Western European standardization will be surveyed, with the focus on the general standards bodies CEN and CENELEC (i.e. specialized European bodies such as ETSI for telecom will not be described in any detail).

#### 3.3.1 L'Association Française de Normalisation - AFNOR

Standardization in France dates back to the French Revolution; metric measurement was established in France during this period. AFNOR (L'Association Française de Normalisation) an organization under private law but with a public function, is a large organization concerned with most aspects of standardization activity. It has established a considerable body of standards (14000 by end 1988) which are relatively prevalent throughout industry. Regulation falls under the auspices of relevant ministries, but reference to AFNOR's standards are made. Insurance companies generally require independent testing and product certification due to the legal liability which requires products to have satisfactory performance.

The French Government has over time increasingly recognized the importance of standardization, and has accordingly increased its legal and financial support, beginning in 1978 with the "Loi Scrivener". Subsequent legislation (especially in 1984) has enhanced the use of standards in France, through greater reliance on conformity assessment and the use of standards in public procurement projects. AFNOR acts as the co-ordinator of standardization activity, although at a national level, the Conseil Supérieur de la Normalisation is responsible for overall general policy. Some twenty



Bureau de Normalisation (BN) develop draft technical standards, and these BN have links with professional associations.

Of the 1134 French standards published in 1988, 551 originated in AFNOR, and 583 came from BN. AFNOR in co-operation with the Ministry of Industry, prepares a general programme for standardization annually. In addition the Ministry of Industry and other Ministries dealing with standards, can request standards to be developed.

As with other European NSBs the rising importance of regional and international standardization is affecting AFNOR's operations. 41 per cent and 9 per cent of AFNOR's standards were of international and European origin in 1987. The incorporation of these standards into French standards now occupies 10 - 15 per cent of AFNOR's engineers time. With an annual production of over 1000 standards, a vast organization operates, employing 440 AFNOR staff, supporting 2145 committees with the participation of 25,000 experts. In order to cope with greater responsibilities, increased support has come from the Ministry of Industry both financially and in terms of the promoting of standardization and conformity assessment in industry. This increased awareness on the part of the Government reflects the importance France attaches to the European market. AFNOR assumes responsibilities for 20 per cent of the CEN and CENELEC secretariats. Traditionally France has actively participated in international standardization. At one point, it held 25 per cent of ISO secretariats, although today the figure is 24 of 166 Technical Committees (15 per cent).

AFNOR's activities extend into the field of testing and certification, an area also included in the 1978 Loi Scrivener. Certification to NF Mark (Norme Française) traditionally concerned conformity to regulation. The 1978 reforms were an attempt to improve its application to voluntary standards. This has required close co-operation with several organizations dealing with testing and inspection notably the CTBA (Centre Technique du bois et de l'ameublement) and the LNE (Laboratoire National d'Essai). Currently, the NF Mark has 110 applications in the areas of health, agricultural and industrial equipment, building materials, and various domestic products. Ultimately 3000 organizations are allowed to affix the mark to 130,000 different products. Quality assurance schemes are not the immediate domain of AFNOR but are rather under the auspices of AFAQ (Association Française pour l'Assurance de la Qualité). Co-operation between AFNOR and AFAQ exists which will be influenced by the incorporation of quality assurance in European standards via the EN 45,000 series (ISO 9000 series).

AFNOR has four other **principal tasks**:

- (1) It represents **French interests in international standardization organizations**, e.g. ISO/CEN/CENELEC.
- (2) It **provides information on French standards** to industry, and to ISO members through ISONET. Furthermore it is actively involved in the preparation of data bases of European standardization activities. For example AFNOR is responsible for the Certificate programme with CEN/CENELEC, which is a data base on certification and testing bodies in Europe.

(3) It provides technical assistance to exporters through its NOREX organization, similar to those services of 'THE' in Britain.

(4) It provides assistance to developing countries, particularly ex colonies e.g. in Africa.

Further reforms in the French system have recently been announced. In January 1990 the French Government published an official policy document proposing several measures, following a strengths & weaknesses analysis of French standardization. One aim is to promote more rapid and wide-spread standards writing, inter alia, by means of an increase in the public budget for AFNOR and the introduction of tax credits for the expenses of companies on standardization. Another measure is a further **shift towards a private approach**: the Conseil Supérieur de la Normalisation will be abolished and its tasks shifted to the governing body of AFNOR (however, the quality directorate of the Industry Ministry seems to retain a veto in the AFNOR governing body). There will also be conditional subsidies for participation in European standards activities for at least three years.

France clearly feels that the 'new approach', and EC-1992 more generally, imparts a strategic character to regional and international standardization activities. The 'europeanization' and 'globalization' of companies in high-income countries, such as France, is seen to depend crucially on quality.

### 3.3.2 Deutsches Institut fuer Normung - DIN

There is no country in the world economy where standardization is so prominent as in the Federal Republic of Germany. Besides well-developed networks of standardizers in almost every conceivable subsector of industry, as well as numerous ones in the services, food, agriculture and forestry/wood - this is more or less comparable to BSI and AFNOR, though DIN is perhaps somewhat larger -, the German economy is traditionally more 'standards-orientated'. The awareness of standards is high, widespread and considered as an essential ingredient or piece of information for every engineer or technician. This creates a high and sustained demand for DIN standards which in turn enables a high supply and development potential of the Institute. These positive aspects, however, do make it more difficult for foreign suppliers to penetrate the German market with products based on non-DIN standards. Apart from problems of compatibility - which arise all over the world - and mandatory requirements in the law, with a reference to a DIN standard, there is the strong inclination of German engineers to base their assessment on rather specific standards in a technology tradition they are familiar with. Although such standards are voluntary, the relatively great attachment to them as well as their relatively high degree of specificity create invisible access barriers.

The rapidly increasing European Standardization, frequently weakening the degree of specificity and heightening the awareness of alternative but equally appropriate solutions, will undoubtedly help to facilitate access to the German market mainly in the medium run. On the other hand, DIN standards - being design standards - tend to qualify better (on average) as product standards for countries and suppliers which are technology followers, because they are precise and detailed. This property has acquired almost the status of an informal export promotion policy, since DIN has always been active in diffusing its stock of standards worldwide. In relying on DIN standards

industrializing countries may accelerate technology transfer in a pragmatic way, knowing that exports based on DIN standards will assume quality status relatively quickly. (This is, however, not to suggest that such would not be the case for JISC, AFNOR, BSI, other European or United States standards). In practice, even many industrial export products of EFTA countries, the smaller EC countries and, in some sectors, even Italy, are frequently based on DIN standards or national variations of them.

The nine stated principles governing the work of DIN overlap largely or wholly with implicit or explicit principles of other national standards bodies in CEN:

- (a) voluntarism
- (b) open, public character
- (c) participation by all who wish to contribute, including the state; the state has no special status
- (d) uniformity and avoidance of inconsistency
- (e) avoidance of political or other bias; standards are mere registrations
- (f) expressing the current state of technology
- (g) economic need; no standardization as an aim in itself
- (h) utility for society; no specific interests ought to be served
- (i) internationalization; avoidance of technical barriers.

DIN is an organization under private law working for the public interest. An Agreement between the Federal Republic and DIN in 1975 has confirmed that DIN (and, for electric and electronic standards, DKE) is the single, nationally recognized standards writing body in the Federal Republic of Germany. This recognition is conditioned on the process of standardization being consensual, with the broadest possible representation of various interests, including consumers and the state. The method of 'reference to standards' in technical legislation of the Federal Republic of Germany will be employed where possible and useful.

At the end of 1988 DIN had developed a stock of 20450 standards, 5900 of which were translated into English. In the last few years the annual supply of new or rewritten standards hovers around 1400 - 1500 a year, i.e. more than the entire stock of CEN/CENELEC standards at the moment and roughly double the annual output of ISO/IEC. The DIN secretariat employs close to 600 people but counting all participants in the 3/00 working groups, working within a total of 110 standard committees, one arrives at nearly 40000 people.

DIN is prominent inside Germany but also internationally. At the end of 1988 DIN/DKE held the secretariat of no fewer than 164 ISO/IEC committees (out of a total of 1001) and 72 CEN/CENELEC committees (out of a total of 201, i.e. over a third). Access to the complete stock of DIN standards is possible in more than 100 cities all over the world, two-third of which are located in developing countries.

The intensity of technical regulatory activity in Germany is high (and probably higher than in many other countries). DIN standards, as voluntary technical specifications, are part of a much larger stock of technical specifications combining mandatory federal and Lander ('state') ones, voluntary ones and references to (other) standards or parts of standards. It is estimated that Germany has some 120 regulatory agencies making technical specifications (both voluntary and mandatory), adding some 6000 new technical

specifications a year (!), whilst some 3000 are withdrawn or lose their validity annually; DIN assumes half of the net addition. Information on DIN standards and numerous other specifications is indispensable in Germany. The DITR (German Information Centre for Technical Specifications), run by DIN but subsidized by the government, is a well-equipped data-bank for this purpose. **DITR also serves as the information centre for Germany, as prescribed by the GATT Code on Technical Barriers.**

Recent DIN activity exhibits two trends: **high growth of output and internationalization.** For output growth one should not merely watch the growth of total stock of standards, as withdrawals and emerged standards reduce the stock at the same time that new standards are added. Rather one should observe the trend of standards-in-process increasing from 12000 in 1984 to 17000 in 1988. The internationalization can be read from the astounding growth of international standards-in-process activity, undertaken under DIN auspices. Work on national draft standards decreased from 10 500 in 1984 to 8400 in 1988, whereas international work (ISO/IEC and CEN/CENELEC) exploded from almost 1500 in 1984 to 8600 in 1988. Internationalization is now more important than national standardization: in terms of resources, DIN claims that, in 1988, a mere 40 per cent was devoted to national standardization, 30 per cent to ISO/IEC, 25 per cent to CEN/CENELEC and another 5 per cent to bilateral co-operation with other countries.

It is interesting to study the sectoral breakdown of the growth of standards-in-process (including the process of revision of existing standards). In 1988 the ratios of the process activity to the stock of existing DIN standards was 0.82 which shows the high rate of activity. Sectors like electric goods (0.20) as well as trucks and heavy vehicles (0.74) remain below the average but well-developed stocks for sectors such as machines (0.82) and construction (0.98) are now being overhauled, especially in the light of the '1992' programme. Very dynamic sectors in DIN are aircraft and parts (1.42), food (2.26, probably because food standards have been preempted by regulation and are now "catching up"; also the EC 1992 programme causes ripples here), information technology (2.54) and ergonomics (health and safety rules for the 'workplace' - a major plank in the 1992 programme - is probably the reason here).

Until very recently Germany traditionally aimed for quality via solid and respected standards. There are numerous certification marks which play an important role inside the German market (in 1988 no less than 360 certification programmes existed). It is much less clear whether these marks are also known outside Germany (this does not mean that their *raison-d'être*, namely the proof that the product is made according to a DIN standard or German technical regulation, is not important abroad). A special agency DGWK (German society for certification and marks, controlled 100 per cent by DIN) supervises these certification activities; certification based on international standards is included. It is only in the last few years that Germany has developed an interest in quality assurance systems based on the ISO 9000 series standards. The German Society for Certification of Quality Assurance Systems (DQS), with 40 per cent shares participation by DIN, offers certification of such systems in companies and factories. However, at the end of April 1989 only 11 certificates had been given out and 24 audits undertaken. DIN has a half share in the German Society for Product Information (DGPI) promoting information about products for consumers, including comparative tests of consumer goods.

The state's influence in DIN is limited but nevertheless manifold. The (federal) Ministry of Economic Affairs sponsors standards work in safety technology, environment, information diffusion and standards documentation as well as part of the CEN/CENELEC work of DIN. The (federal) Ministry of Defence sponsors standards for the navy, the air force and for electronics. The Länder (states) sponsor standards which can be used for regulation in fields where they are competent (e.g. construction; water supply and water pollution).

### 3.3.3 The British Standards Institute - BSI

BSI is an organization under private law, that has been given a public service function. It is the single nationally recognized standards writing body in the United Kingdom, and as such **required to develop standards on the basis of consensus, taking due regard of public and private interests.** Government assistance extends beyond financial support: it also comes in the form of recognition in law of BSI's role, and in the reference to BSI standards in the field of public procurement. Four discrete areas of activities dominate BSI's work; the development of standards, quality assurance, testing and inspection, and finally technical help to exporters. BSI also represents the United Kingdom in ISO and the IEC, and of course in CEN and CENELEC.

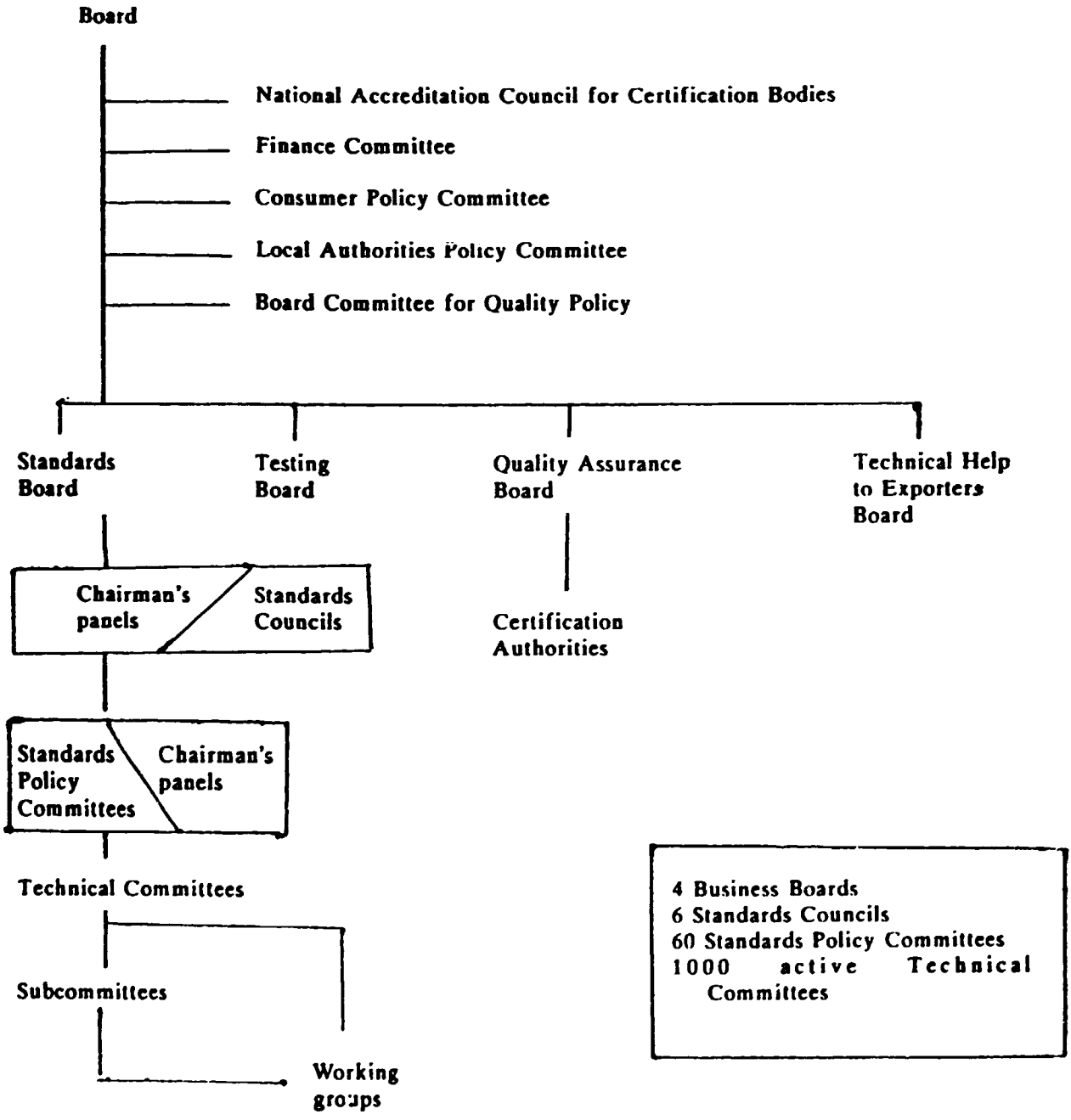
Following the 1982 White Paper entitled "Standards, Quality and International Competitiveness" (HMSO London, July 1982) a memorandum of understanding was reached between the British Government and BSI in which it was recognized that standards played an increasingly important role in achieving industrial competitiveness. Several initiatives emerged from this:

- (a) closer co-operation between the government and BSI, with co-ordination in the standards writing, co-ordination of their respective roles in international standardization activities, and the usage of BSI standards by public purchasing bodies, local authorities and nationalized industries.
- (b) legal support for standards via reference to standards in regulation, and through provisions based on reduced legal liability, where products comply with standards that have been "approved" or are deemed "to satisfy".
- (c) Much greater emphasis is being placed on certification, and accreditation of certification and testing bodies. More recently BS 5750 dealing with quality control has been developed and promoted.

Representatives from producer, professionals, consumer and trade union organizations are on the BSI board. In addition a representative from the relevant Ministry responsible for BSI also sits on the Board. As seen on Table 6, the board represents the highest executive organization of BSI, and is responsible for overall policy co-ordination. What is also visible from this schema is the division into four main areas of activities.

Table 6

**BSI COMMITTEE STRUCTURE**



Source: BSI

As regards standardization activities there are six standards councils, who delegate standards writing activities on a hierarchical basis to standards policy committees, technical committees, subcommittees and working groups. Draft standards are prepared within this BSI framework rather than left to trade associations. Furthermore, members are not charged for participation on the technical committees; rather membership fees finance BSI's activities. Usually once a draft standard has been prepared, BSI is not obliged to take formal submissions from other interested parties. **Therefore BSI does not go to the same length to achieve consensus as do other standardization bodies.** Both the numbers of standards, and the growth rates in the production of standards, have seen a rapid increase in recent years and there are currently approximately 10600 BSI standards. A virtuous circle appears to be in operation whereby the increase of standards is encouraging increased participation on the part of industry, which in turn leads to more standards being developed.

**BSI standards do not specify details down to the last item; rather as much room is left for product differentiation and innovation as is possible.** Standards are often published in book form, making available to engineers information and specifications covering all standards of relevance to a product, and covering many different performance and conditions scenarios. Therefore scope is left to the engineer to interpret the standards and apply them to individual products. Given this flexibility, conformity assessment goes beyond testing of mere product characteristics.

Two main pillars of conformity assessment exist:

- (I) product certification
  - (II) quality assurance
- (I) Companies can claim compliance with BSI standards with the only legal obligation being not to provide misleading information to consumers. However, two certification marks the Kitemark and the Safety Mark (which deals with safety aspects of BSI standards) mean that BSI can independently verify compliance with BSI standards. **BSI has a testing inspectorate (unlike its continental European counterparts)** which accounts for approximately 50 per cent of its staff. Services include product certification, import/export testing, and accredited testing for many international and national standards of other countries. In order to strengthen the confidence in certification schemes, and confidence in testing laboratories a National Testing Accreditation Scheme operates. Certification schemes and testing laboratories must fulfill certain criteria in order to gain accreditation. BSI runs the National Accreditation Council for Certification Bodies.
- (II) BSI is the home of quality assurance standard ISO 9000. Developed as BS 5750 the standard covers all aspects of a quality system from product design, production installation and servicing, detailing the requirements of a complete quality management system. It is incorporated into many product certification systems, and compliance with BS 5750 can lead to certification as a BSI registered firm.

Finally, several other certification schemes exist, namely the BSI registered stockist mark. In addition to running several CEN/CENELEC and international certification schemes (such as IECQ) two other smaller programmes exist, namely:

- Validation of Manufacturers Data - in cases where data issued on performance of products is critical for designers, specifiers or users.
- Call Routing Apparatus Maintenance - which is there to ensure telecommunications equipment is compatible and not harmful to the (national) telephone network.

The reforms undertaken after the 1982 White Paper arose from two factors:

- a recognition of the growing importance of standardization and conformity assessment activity
- a realization that standardization had not enough support and input from government, industry and consumers.

Application and usage of BSI standards is not so prevalent as those of DIN in Germany. Similarly consumer awareness of BSI standards and certification marks was "relatively" low. The promulgation of standards as far as industry was concerned lay with the Department of Trade and Industry and not solely with BSI itself. Nevertheless BSI forms part of the big three European standardizers, and BSI standards form a whole corpus of standards equivalent in range and scope to those of their mayor European counterparts. BSI has been participating heavily in CEN/CENELEC and ISO/IEC. Many firms in the United Kingdom are less reliant on European markets than those of their European counterparts. Given such a large existing base of standards, and a wide range of standardization activities, it is not surprising that some difficulty arises within the European standardization process:

In interviews held for the purpose of this pilot study, it was underlined that **BSI standards tend to be less specific than DIN or AFNOR standards**; this is the result of the broad treatment of all standards problems pertaining to a product in bookform with a range of possibilities left open for the engineer (see before). Again, safety philosophy differs, in that prevention is the favoured course. DIN favours escape routes for fire protection, while BSI favours fire prevention.

However, the fact that the 'new approach' leads to more use of standards rather than detailed regulations and the fact that these standards tend to be **performance standards** in order to accommodate different product specifications suits BSI in the sense that:

- (1) BSI favours deregulation.
- (2) it favours performance rather than product standards.
- (3) it has a centralized conformity assessment infrastructure which is useful in conducting international negotiations, and
- (4) with performance standards, quality assurance testing and certification, is more appropriate than exact type approval tests, and this is an area where BSI leads the world.

### 3.4 Western Europe: - Removing Technical Barriers and the Role of European Standards

#### 3.4.1 Conditions for Removal of Technical Barriers



Both the European Community and EFTA have launched attacks at technical barriers to intra-group trade ever since the late 1960's. They were not very successful although some limited results were achieved. The present report will not elaborate the history of intra-EFTA and intra-EC technical harmonization (for intra-EFTA, see Curzon-Price, 1974 and Tschäeni, 1988; for intra-EC, see Pelkmans & Vollebergh, 1986). The lessons from these attempts are most instructive for regional economic integration in other parts of the world (e.g. for ASEAN, see Pelkmans, 1987-b). The lessons depend on the ambition of the regional economic grouping but, for an effective removal, one has to be prepared to

- (1) 'harmonize' or approximate the main (national) technical regulations
- (2) accept mechanisms which enable a minimum degree of efficiency in decision-making (thus, technical barriers will not but exceptionally be removed if one insists on unanimity forever)
- (3) accept binding effects of such decisions and a neutral Court or other regional form of legal redress which is binding
- (4) avoid or even prohibit the reliance on unique technical specifications or (national) standards
- (5) boost the replacement of national by international standards, and the regional refinements or complements of them.

All five conditions present serious obstacles to almost any economic grouping in the world other than EC and EFTA. Even EFTA, being a mere free trade area, did not accept originally the last three conditions: it acted on 'approximation' in a few cases when it found that decision-making could be facilitated by 'mutual recognition' (e.g. pressure vessels). So, in effect EFTA did not put in place an adequate mechanism for a systematic removal of technical barriers, as it found it too ambitious for its aims.

The EC initially emphasized the first condition in an ambitious programme launched in 1968; the EEC Treaty prescribes binding effects, subject to EC Court of Justice review (condition 3). However, the execution of the programme was severely hampered by unanimity (condition 2 proved too much), an excessive insistence on uniformity down to details (condition 4 proved too much) and by the lack of reference to European or international standards. Neither was there a desire on the part of CEN and CENELEC to play an active role: they regarded it as their major task to co-ordinate European work at world level (ISO/IEC) and to prevent - except if there were incidental and compelling reasons - the creation of a third standards layer between the national and the world level. The 1973 'low voltage directive' changed this for CENELEC. For CEN the so called 'new approach' to technical harmonization of 1985 has finally connected it solidly to the removal of intra-EC technical barriers. At present the EC has fully accepted all five conditions, whereas EFTA accepts the last two ones without reservation, the first two ones with some reservations and the third one in a weak form (because EFTA has no Court). In practice, however, EFTA processes are dominated by the EC for two reasons: all EFTA countries trade much more with the EC than with one another; secondly, the great burst in activity of joint EC/EFTA standards bodies CEN and CENELEC stems from developments within the EC to complete the internal

market, despite being joint EC/EFTA bodies. Therefore, the following section will focus on the EC.

### 3.4.2 The Legal Foundation

Before the EEC Treaty was revised by the so called Single European Act (i.e. until 1 July 1987), **consumer, workplace and environmental protection** as well as other health and safety issues were all approached at EC level as giving rise to technical barriers to trade.

In terms of Community economic law, this means that the free movement of goods within the common market is reduced. There is a **general prohibition**, ex. Art. 30, EEC, for Member States to apply '*measures having equivalent effect*' to **quantitative restrictions**. In the 1974 Dassonville ruling the Court of Justice of the EC defined '*measures having equivalent effect*' to quantitative restrictions as "*all trading rules enacted by Member States which are capable of hindering, directly or indirectly, actually or potentially, intra-Community trade*". The definition is tantamount to what economists call cost-increasing barriers (Pelkmans & Winters, 1988, pp. 18-19).

This landmark ruling has laid the basis for an impressive **body of EC case-law**, improving the effective freedom of movements of goods in the Community. However, the general prohibition in Art. 30, EEC does not have an across-the-board deregulatory effect, because Art. 36, EEC, justifies **derogations**. The derogations refer, inter alia, to "*the protection of health and life of humans, animals or plants...*". **Technical barriers to trade can be justified** ex. Art. 36, EEC, if (national) technical regulations

- refer to **health and safety of consumers**
- refer to **health and safety of workers**
- aim to **protect the environment**.

More problematic are other aspects of consumer policy, arising from market power or asymmetric information. Art. 36, EEC, speaks about derogations "*on grounds of...public policy...*". It is not possible in the space available to provide a treatment doing full justice to the rich and subtle jurisprudence of the EC Court. In general, the **reduction of asymmetries of information is recognized as valid** by the Court, but the **means employed in national consumer protection legislation are to be proportional to the objective** (in addition, of course, they **must be non-discriminatory**). A classic way to eliminate technical barriers in this respect is to declare import bans (on pasta, beer or liqueur of different qualities; on butter packed in non-prescribed ways) to be an infringement of Community law - being 'disproportionate' to the objective - while labelling requirements are suggested as valid.

Case-law on Arts. 30 and 36 cannot remove all technical barriers. Art. 100, EEC, provides the basis for '**approximation**' of national regulations for the '**proper functioning of the common market**'. The word approximation does not suggest uniformity as the benchmark. Neither does Art. 100, EEC, mention or refer to objectives of environmental, consumer or social (health and safety) policies. **The purpose is clearly to remove technical or other barriers to intra-EC trade**. Therefore the question 'what' should be regulated in these areas could not be answered on the basis of a common 'doctrine' written in the Treaty. Attempts to define a 'Community doctrine' were made occasionally - especially in consumer protection - but never got anywhere in the Council. Both the traditional 'harmonization' approach (ex. art. 100,

EEC) used for EC legislation to remove technical barriers, and the common doctrine approach, ran up against unanimity requirements for Council decision-making.

### 3.4.3 The 'New Approach'

The new approach towards technical barriers consists of three elements:

- (a) preventing new technical barriers from arising, on the basis of the so-called 'mutual information directive' 83/189/EEC
- (b) recourse to the principle of 'reference to standards' in directives
- (c) a general **promotion of European** (as against national) **standardization** in various ways.

In Exhibit 4 the new approach (especially b) is schematically explained against the (essential) background of EC law.

#### Ad. (a) Preventing new technical barriers

The 'mutual information directive' presents the retardation of national regulation and standardization in order not to impede EC-wide harmonization. With respect to national draft regulations, in fact three possibilities for EC influence exist. The most far-reaching is a **standstill of one year**, on request of the Commission, in order to prepare a proposal for an EC directive so as to preempt any trade-impeding effect of the intended national regulation.

- Ad. (b) The 'new approach' is based on the method of 'reference to standards'. In a way, the method is already applied in the 'low voltage directive' (for a very large group of electric products). The essence of the 'new approach' developed in 1984 and 1985, is that the harmonization of technical regulations is being limited to the essential requirements of safety and health (for, according to Art. 36. EEC., they belong to the authority and responsibility of the Member States). Furthermore, the technical appendices will be dropped. Technical specifications will be made by authorized standardization institutes (CEN/CENELEC, perhaps others). Member States' governments are obliged to presume that the products manufactured in accordance with the European standards comply with the 'fundamental requirements' stipulated in the directive.

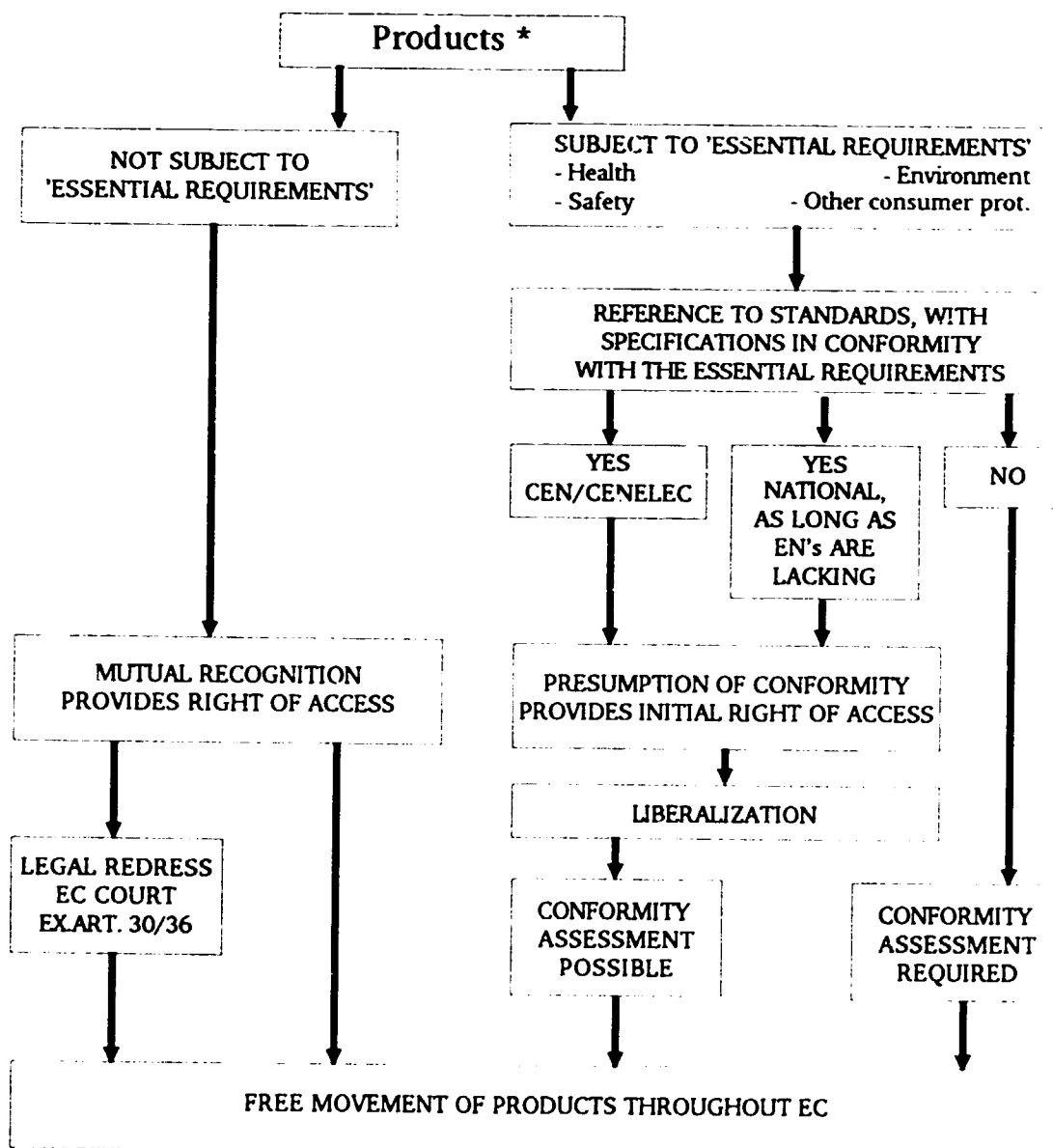
It is this presumption that guarantees business free market access. If producers choose not to manufacture in accordance with European standards - say, because of innovations - all they need is a certificate of conformity (with the essential requirements) from designated bodies. Eventually those certificates will have to be mutually recognized.

#### Ad. (c) Promotion of European standards

The third element of the new approach is the general and at times specific promotion of European standardization. The specific promotion is channeled via the successive mandates of the EC Commission to CEN, CENELEC and possibly other sectoral standardizing bodies in order to ensure that standardization processes take place in parallel with harmonization at Council level and are based on the same 'essential

Exhibit 4

## REMOVING TECHNICAL BARRIERS THE NEW EC APPROACH



\* LEGALLY MARKETED IN ONE MEMBER STATE,  
IRRESPECTIVE OF ORIGIN

Source : Adapted from AFNOR.

requirements'. The incentive that renders this promotion effective, is at the same time the central objective of the 'new approach', namely intra-EC market access. Finally, standardization is promoted in radically new ways in sectors where the product markets cannot really emerge if ex ante standardization has not been satisfactorily dealt with. This applies to compatibility standards for communications between computers, and for telecom equipment standards; possibly for biotechnology, too.

In Pelkmans (1987 - a) it is shown that the new approach tackles no fewer than seven out of the nine drawbacks of the 'old' approach. **Procedures are less time-consuming** and laborious, **uniformity merely relates to the 'essential requirements'**, **unanimity is replaced by qualified majority voting**, **harmonization of technical regulations** (at public level) **now benefits from** - and is no longer inconsistent with - **standardization** (at private level). **European standards are currently promoted so that reference can actually be made to European standards**, **implementation in the laws of the Member States is facilitated by the focus on essential requirements**, and . finally, the lack of political interest at Ministerial level is overcome by the concentration on health and safety objectives, by grouping many thousands of similar products together in terms of their health/safety/environmental properties. (e.g. the toys Directive, adopted in 1987, is estimated to apply to approx. 55,000 varieties of toys!)

Two drawbacks of the old approach initially received no attention: the **testing and certification issues and the so-called third countries problem**. (This paragraph draws from Pelkmans, 1990). There is more clarity on the latter today as it has become part of the debate on the "external dimension" of 1992. Its generally liberal flavour is determined by the fact that the regime in Exhibit 4 also applies to third countries' products, once entered into the EC. The EC has also begun to pay serious attention to a general **quality policy for testing and certification** on the basis of which specific **sectoral framework agreements** for mutual recognition can be worked out (EC, 1989). The aim is to realize a general legal framework for procedures **guaranteeing neutrality, and the absence of special interests so as to guarantee perfect 'repeatability'** (as the basis for mutual confidence). The intricacy of the certification approach is the consequence of the great variety in the range of goods to which it applies and the regulatory need for health/safety or mere quality control in each individual case. It should nevertheless be appreciated that the complexities of the current patchwork of national testing, inspection and certification are much greater and cause high and partly avoidable information and transaction costs and, sometimes, anti-competitive effects in local markets.

The so-called '**global**' approach is based on four stages of getting a product on to the market: design, production, marketing and sales/services; four alternative or complementary means of control: prototype approvals, quality assurance, product approvals and market surveillance, corresponding to the four stages mentioned; and three parties authorized or held to do the testing, inspection and/or certification: the manufacturer, third parties (such as designated certification institutes) or Member States' authorities. Dependent on the nature of the product, different 'modules' would apply. Thus a particular product might be subjected to prototype approvals at the design stage by the Member States' authorities, whereas quality assurance at the production stage would be the responsibility of the manufacturer (however,

under some certified quality assurance scheme, with occasional on-site inspection), while product approvals and market surveillance might be assigned to independent third party laboratories. This fairly heavy control system would of course only apply to those relatively few products in EEC Directives where requirements are strict for public reasons (e.g. gas appliances). Another product may be in another module and merely subject to product approvals by third parties and quality assurance by manufacturers.

Also, the link with the **product liability Directive**, in force since mid-1988, is not yet fully clear although one would expect this Directive to exert a positive influence on the propensity of producers to avoid low standards and seek respected certification, thereby raising average health and safety levels in the Community without too much centralization.

The inevitable emphasis on the removal of formal technical barriers to intra-EC trade should not lead one to ignore that the 'global approach' to conformity assessment has a non-mandatory track as well. For voluntary certification neither the EC nor EFTA nor the two jointly had any form of co-operation or even regular consultation and exchange. Hence the strong tendency to resort to national testing and certification causing a tremendous proliferation of certification marks, which in and by itself significantly reduces the informational value of conformity assessment for exports. Since there was (and still is) no way to be sure (or even properly and independently informed) about the comparability of test methods in the absence of European standards, adequate commercial positioning in other parts of the Euromarkets frequently 'required' local testing certification. The Community is promoting a meeting of minds in this field in a number of ways. Two stimuli are particularly noteworthy. The first one is the encouragement of the adoption of the ISO 9000 (standards) series for quality assurance in companies and for recognition or accreditation of certification bodies. The second one is the suggested founding of a European Organization for Testing and Certification (EOTC), initially sponsored by CEN and CENELEC. When this pilot study was finalized, early 1990, the EOTC was about to be founded.

#### 3.4.4 How West European Standards Bodies Work

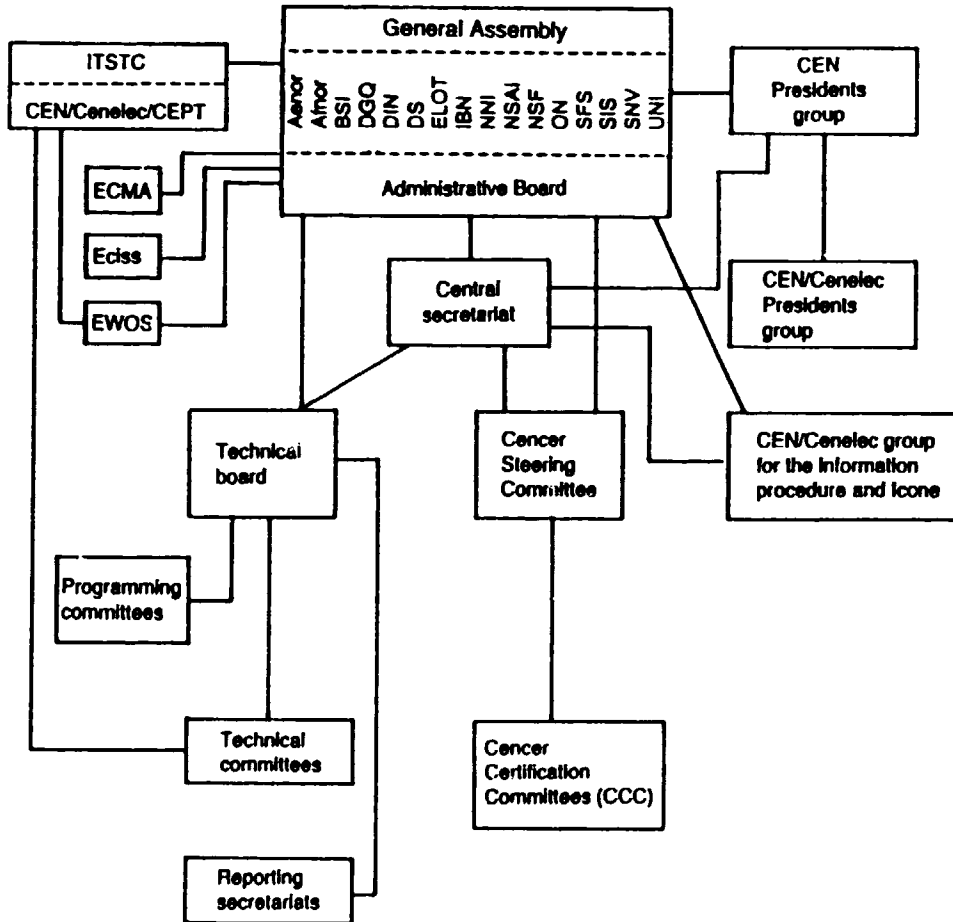
At present three recognized standards bodies exist at West European level: CEN (European Standards Committee - the abbreviation is in French), CENELEC (for electric and electronic products) and ETSI (the European Telecom Standards Institute). **Recognition is granted by both the EC and EFTA. By 1990 all EC and EFTA members had joined both CEN and CENELEC.** ETSI is not based on membership by national standards bodies - like CEN and CENELEC - but on PTTs as network holders (including switching stations), suppliers of telecom hardware and (big) users of terminal equipment, irrespective of country origin - i.e. American, Canadian and Japanese firms are in ETSI alongside EC - and EFTA - based firms).

CEN/CENELEC purposes today are twofold:

- draw up European standards to promote the competitiveness of European industry throughout the world
- to help establish the European internal market (see Nicolas & Repussard, 1988).

Exhibit 3

STRUCTURE OF CEN



**Notes:**  
 Any official CEN body can set up *ad hoc* groups (whether for technical work or horizontal work: internal regulations, computerization, etc.)  
 There are continuous contacts with Cenelec on the one hand and the Commission of the European Communities and EFTA on the other through the Central Secretariat and practically all the CEN bodies.

Source: Nicolas & Repussard, 1988

Drawing up European standards is done as much as possible by transposition of international ISO/IEC standards to the European level. Frequently however, these world standards can only serve as the basis for actual product standards, or more precisely defined requirements.

Since 1 January 1987 the new CEN/CENELEC rules - radically amended from the previous ones - came into force. Again, the instructive history contains food for thought for any regional organization wishing to build a corpus of regional standards. Exhibit 5 shows the structure of CEN as it is today (for CEPT one should now read ETSI). A few principal elements of the CEN structure are highlighted below; most of them apply mutatis mutandis to CENELEC.

(a) CEN has programme and technical committees where the real work takes place. The Technical Board establishes these committees, but otherwise they have a fair amount of autonomy. Their secretariats are held by representatives of national member bodies, and that is why, until the EC's new approach began, the CEN secretariat was very small indeed. If ISO/IEC and CEN/CENELEC work overlaps, and the ISO/IEC committees secretariat is with a CEN member body, it will also be assigned with the relevant CEN committee secretariat.

(b) **Until 1985 CEN had no long-run policy programme.** Annual programmes emerged following a 'bottom-up' approach with little or no attention to overall economic objectives. Since the '**new approach**' the role of European standards has greatly increased. In an agreement between CEN/CENELEC and the EC Commission, CEN has agreed to produce these standards at EC/EFTA level so as to enable the 'new approach' effectively to remove technical barriers. As a consequence, programme committees were established (2 in CEN and 4 in CENELEC). They take the 1992 White Paper and other EC initiatives into account and set priorities given the resources. These resources have been increased by a partial shift of national bodies' resources to CEN/CENELEC but even more so by a special subsidy for the Central (data) Unit for CEN/CENELEC under a special information directive of the EC as well as by EC "mandates" for standards writing, following the adoption of 'new approach' directives or for other policy reasons. The mandates carry a substantial budgetary contribution, on the condition that (1) standards conform with the 'essential requirements' (see Exhibit 4) and (2) mandates are completed within a reasonable deadline.

(c) CEN/CENELEC apply a 'standstill' agreement on national standards when work on European standards is in progress. The standstill does not automatically apply when an ENV (a European pre-standard) is at stake.

(d) The consensus philosophy, so deeply ingrained in the standardizing tradition is still present in CEN/CENELEC but efficiency and effectiveness is served by **qualified majority voting** when necessary. What this means is that overruled member bodies nevertheless have to adopt the new European standard and remove any conflicting national one.

(Note that this is in sharp contrast with the approach at world level - see chapter 4.)

(e) CEN/CENELEC promulgate three types of standards:

**EN** = European standard; must be implemented by all member bodies at national level; conflicting national standards must be withdrawn. If the first round of voting is negative the obligation to implement no longer holds.



However, a second round exclusively among the EC countries will be organized - if this round is positive, the obligation applies only to EC bodies plus those EFTA bodies which voted in favour.

**HD** - Harmonization document: counts as a European standard and must be implemented. However, in three respects HDs are weaker than ENs:

- A member body is free to maintain or issue a national standard (within the scope of the HD) provided it is equivalent in technical content.
- A-deviations may persist, if a national regulation forces a member body to disagree on a detail. Normally A-deviations are temporary - and once the national government changes the rules, the HD may become an EN as the A-deviation falls away.
- B-deviations allow for technical problems (e.g. with traditions or an installed base). They too are temporary.

The HDs were the favoured instrument of CENELEC to generate European standards under the low voltage directive, between 1973 and 1985. After 1985 many HDs have been changed into ENs.

**ENV** - European draft standard: in sectors where the rate of innovation is high, and health or safety is not or hardly at stake, speed is more important than consensus (as Nicolas & Repussard, op. cit. put it). ENVs exist for three years only, with two years extension possible. Thereafter they must be converted into ENs/HDs in the regular way.

#### 3.4.5 Why are European Standards Boosted?

At the moment there is a good deal of activity in the European standardization domain. Although a major boost in European standardization derives from the **reference-to-standards method** in the 'new approach', it is far from being the only reason for the current explosion in activity. The following other driving forces play a role as well:

- the European drive to achieve '**open standards**' in information technology; the OSI (open systems interconnection) system is developed at world level but there is no doubt that a major force behind progress is the strategic significance of open standards for the competitively weaker EC computer firms. The SPAG workshop, later followed by EWOS (European workshop for open systems, now co-operating closely with CEN/CENELEC) testify to this. The EC Commission has already provided some 80 IT mandates to sponsor this work even though this is not directly related to 'new approach' directives.
- the so-called '**mutual information directive**' EEC/83/189 not only attempts to stop new national regulations from creating new barriers, it also introduced an exhaustive standards reporting system, aimed to prevent new deviating standards from emerging. However, the CEN/CENELEC capacity is not sufficient to respond adequately to the tremendous flow of information (despite the augmented resources). Another data base (ICONE) has been set up to enable comparisons of national, European and international standards (within limits, of course). What is not yet clear is

how fully to exploit this wealth of data for market and programming purposes.

- Associated standardizing bodies may wish to see their standards fed through CEN/CENELEC so as to obtain EN status. The aerospace suppliers (AECMA) have chosen this route. Others, such as the steel standards group (ECISS) and the building products union (UEATC) have opted for less stringent forms of co-operation with CEN/CENELEC.
- ETSI was founded only in 1988. Again, their programme is not determined by the new approach but by the ISDN (Integrated System Digital Network) decision taken by the EC PTTs several years ago, as well as by the RACE research programme for a broad band telecom system in Europe in the second half of the 1990s. A few thousands of standards are awaited from ETSI, including crucial ones for the emergence of new markets such as the third generation of (cellular) mobile communication systems (e.g. car telephones) where Europe leads the applications.
- In the framework of '1992' a series of adapted existing, as well as new EC directives on public procurement contain explicit obligations to employ European standards in public tenders, also in sensitive sectors such as suppliers to utilities, public transport and telecom network holders. This has produced pressures on CEN/CENELEC to develop the relevant standards, a very major challenge indeed.

One could examine the current and future work of CEN/CENELEC by stipulating in detail the actual directives already adopted under the 'new approach' (toys, simple pressure vessels, machines, electromagnetic compatibility and building products) and those expected to be adopted in the years 1990/1992. However, it may here be noted that progress is rapid and the pace is expected to remain high. It is bound to alter the European standards landscape. Due to the kind of principles used, the legal background of the EEC Treaty and the rulings of the EC Court of Justice as well as the firm obligation to use international standards where possible, international standardization will also receive a great boost, in the interests of all trading nations.

## 4. INTERNATIONAL STANDARDIZATION

### 4.1 The nature of international standardization

During the 1980s international standardization witnessed an increase, in terms of interest on the part of major global actors, and in terms of the numbers of international standards adopted. Provided **international standards** are adopted by most countries, they offer **benefits** similar to standardization activity taking place at the national level, i.e. **scale and network economies, improved information for consumers and producers, improved product quality with better safety, health, and environmental protection, and technological transfer** which encourages rational co-operation in new technology .

International standardization has **additional objectives, namely the promotion of international trade, promoting economic integration, and improving global co-operation in research and development** particularly in high technology areas.

However, several factors operate that complicate international standardization, and make it different in scope and operation from standardization at the national level.

#### 4.1.1 Limitations of International Standardization

One can identify five **constraining factors** to the development of world standards (see also section 2.5):

(1) Societies differ in the state of their economic development and in their cultural values. As countries develop, greater emphasis is placed on safety, health and environmental concerns, and hence higher standards are demanded, to satisfy the higher quality and performance being demanded from products. Therefore standards will become increasingly ambitious to match technological advances. Conflicts can therefore arise due to different safety and health values of countries, and also over the appropriate technological level for international standards. This is compounded by differences in consumer tastes between countries as well as climate disparities. Standards embody part of the different social/political fabric of a country. Cultural values and various philosophies lead to divergent attitudes and expectations concerning products and their performance.

(2) Governments are typically concerned with the welfare of their own citizens, and not with global welfare per se. Therefore negotiations occur between national delegations and the emerging standards often reflect the interests of the dominant national negotiating teams, rather than the optimal global standard. Producers in national economies (often with protected national markets) will favour or oppose international standardization, depending on their interests, and they may unduly influence the national negotiating positions, given that Governments, fearful of industrial decline, will overaccount for the wishes of industry. This problem can arise when countries have a large capital stock based on already existing standards, it being extremely costly to make the adjustment, should an alternative international standard be adopted.

(3) As previously discussed, it is not always easy to draw a clear distinction between mandatory standards (regulations) and voluntary standards.

International standards lack the official recognition of national standards. Often an international standard must be incorporated as a national standard to obtain such recognition, and induce legal effects (in contracts, etc.). Additionally, international standards are published in English, French, German and Russian only, and in certain countries, contract law only recognizes the official national language. Finally international trade lacks the legal benefits accorded by national competition and anti-trust law to domestic trade. International trade is therefore beset with technical barriers to trade, and international negotiations and agreements are required to impose obligations for removing these TBTs. Enforcement of international standards adoption is a vital concern. It is extremely easy for countries to bypass the use of international standards, even with the obligation in the GATT Standards Code to use them in national regulations. Differing technical regulations on the grounds of health, safety, defence and the environment are easy to construe, and difficult to remove. International agreements on standards rarely extend to the level of harmonization of technical regulations, or the mutual recognition of them (or of standards), and so are limited in their effect.

(4) Standards represent only part of the standardization infrastructure that industry needs to produce quality products. Metrological facilities, testing and inspection bodies, certification and accreditation programmes are also required. The benefits of international standards depend on the effectiveness of their implementation. Conformity assessment at the international level is extremely limited, and depends largely on the resources available at the national level, as well as goodwill towards the adaption and assessment of international standards. Even if international standards are adopted at the national level, TBTs can arise at the conformity assessment level. Therefore conformity assessment recognized at the international level is also required.

(5) A final point is that the infrastructure for the development of international standards suffers from procedural and resource constraints. Reaching consensus agreement among 100 countries is very costly in terms of travel, time invested by industry participants and experts expenses, whilst language barriers are a real problem. A telling example is provided by the ISO 9000 series covering quality assessment schemes. The initial translation from English into German was undertaken by the Federal Republic of Germany. However, the other German speaking countries claimed the translation represented an interpretation (albeit a mild one) of the standard. Hence four different German versions (Federal Republic of Germany, German Democratic Republic, Austrian, Swiss) now exist. In small countries there is an additional problem of finding appropriate technical experts, who also can speak the required language.

#### 4.1.2 Nature and Scope of International Standards

The international standards which are actually written at world level therefore have special characteristics as their nature and scope is constrained by the factors described before.

(a) The writing of international standards is an extremely **slow process** due to the necessary search for consensus. In the IEC, the time scale can be exemplified as follows:

- Basic Electrotechnical Standards - 12 years
- Consumer Goods/Measurement/Safety - 8 years
- Information Technology (until recently) - 5 years.

Technological advances often render product standards outdated. The delays in standards writing at world level limit international standards almost entirely to basic standards definitions, tests and procedures, which don't deteriorate in value over time.

(b) The need to achieve consensus among vastly different countries tends to reduce the scope of international standards to those providing the very **minimum specifications** required for conducting international trade. These include **information standards** (terminology, definitions, measurements units) and **variety reduction standards** (which reduce the number of components, parts and process. e.g. container sizes). Also **test methods** and procedures are often agreed upon, since these are essential in assessing the above listed standards. Agreement is relatively easy here, as economic interests aren't so pronounced. However, with respect to compatibility and quality standards, a different picture emerges.

Compatibility standards are much more exact and specific, and directly relate to the specifications of products. Hence individual producers are very much concerned with these types of standards. Indeed, the search for compatibility among producers and suppliers can fail, it can be selective or it can be industry-wide and international. The choice among these alternatives is subject to different cost/benefit ratios or may even be viewed as strategic by individual firms. Given the various interests of producers spread over many countries and industrial sectors, agreement is very difficult to achieve. **Compatibility standards** are therefore more likely to be found in the **field of components** rather than for complicated and complete products.

**Quality standards** also can have a very direct impact on product specifications. Quality standards tend to be performance oriented however, allowing flexibility in the product design and specification. The problem of achieving consensus means that international standards often embody a wide spectrum of specifications to cover most countries needs, abilities and preferences, or in the cases where agreement is impossible, a number of alternative (sometimes not compatible) options enumerated in the same standard.

Over time, as an international standards base develops, less attention will need to be given to basic information and definitional issues. There may be a concentration on compatibility and quality standards but this critically depends on the greater role and recognition of international standards in the OECD markets. The usefulness of international standards in promoting international trade and economic integration, and as a means of improving information to consumers and producers, is still limited today. International standards need to be interpreted either by the engineers at the company level, or by the national standardization body if they are to have a significant impact on product specifications and performance. **Individual interpretations can considerably alter the nature of the standard, leading to the creation of technical barriers to trade even where world standards do exist.**

From a developing countries' perspective the restricted nature and scope of international standards form a key **problem**, for 3 reasons.

- (A) Adapting to different interpretations of international standards is more costly and more difficult for developing countries, and can lead to their exclusion from markets of developed countries.
- (B) The lack of technical expertise in their NSBs, and in companies, makes it extremely difficult for them to interpret the international standard in a meaningful way. The implicit technology transfer thus remains limited. Producers in developing countries need to be told exactly what a product specification should be, in as much detail as possible.
- (C) It is part of the industrial and competitive strategies of companies from developed countries to pursue product differentiation in order to maintain their competitive advantage. **Developing countries should try engage more in international product standards writing as a tool to help them gain market access in developed countries.** Production of well defined products would facilitate growth in low cost developing countries.

As already noted, vast difference exists, between what should be standardized at the international level from the point of view of world economic welfare and what can be standardized at the international level. The answer to these questions depends upon the costs and benefits involved with international standardization i.e. gains from international trade, cost reduction from co-operation versus the loss of product differentiation reducing consumers choice, the costs of adapting to international standards, and the effects of competition and innovation. The present paper does not pretend to provide more than a cursory glance at such cost-benefit analysis.

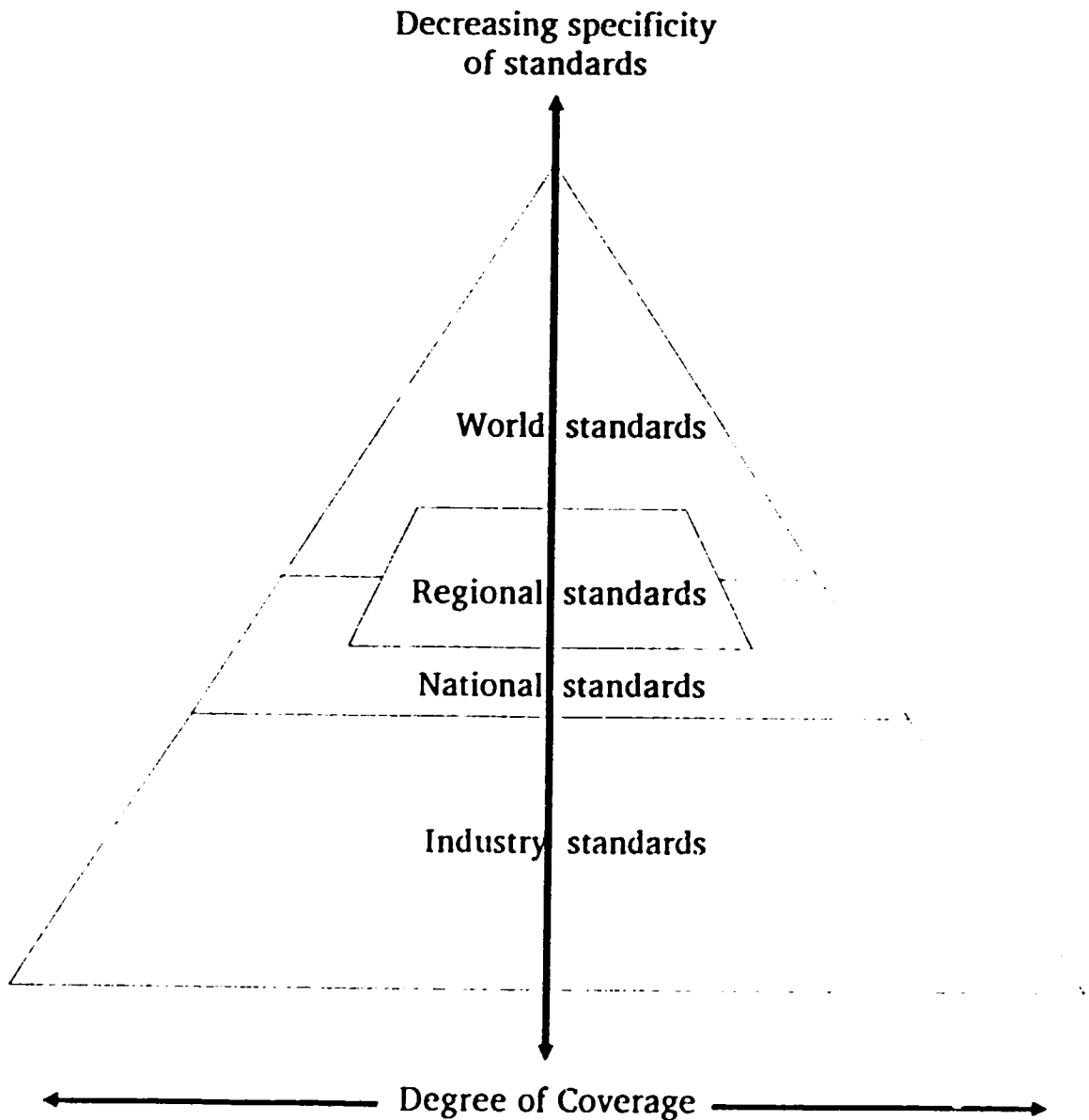
The nature and scope of international standards depend on their place in the total of standards activity in the world. Exhibit 6 shows a simplified hierarchical view of standardization. Different levels have different tasks and ambitions. Each tier serves the tier below, i.e. industry standards are more specific than national standards, but nevertheless are based upon national standards. To achieve the optimal economic return from standardization it is essential that

- (a) standardization occurs at the lowest tier possible at which it is economically efficient to do so;
- (b) standards at lower tiers are based on standards from higher echelons, so that there is no conflict between them.

Generally it is efficient for international standards to cover definitions, terms etc. but not many specific product characteristics. As noted, however, this is not necessarily appropriate for a world with countries in different stages of industrial development.

Exhibit 6

## STANDARDIZATION : LAYERS AND SCOPE



#### 4.2 Pressures to increase international standardization

Behind the moves to **make more use of international standards** lies the **trend of increasing international trade**, which has witnessed persistently higher growth rates than those of global output. Standards are as international as the markets they serve. As tariff barriers fell, this became increasingly apparent. More open economies (e.g. European economies) tend to favour international standards, and the growing international trade of other trading blocs (i.e. Japan, United States, and developing countries) is leading them into greater participation in international standardization. Aside from this long run trend of economic interdependence, **four types of pressures to increase international standardization** will be discussed:

##### (a) Technological Change

With the advent of large scale allocation of resources to R & D, scientific knowledge and technological capabilities no longer develop on the basis of irregular advances, but rather increase continuously.

Companies have devoted increasing resources to product innovation and development, and R & D policy has become a vital component of the competitive strategy of firms.

The impact on standardization is multidimensional:

- **products are becoming increasingly complex and contain more and more simple components or, alternatively, more complex components.** This increases the need for quality, safety and compatibility standards. Furthermore as greater resources are needed to develop complex products, global markets are required to recoup development costs, thus increasing the need for international standards.
- **standards need to be developed more quickly**, and to be subject to periodic review to ensure no technology lag occurs. This has led to fast track methods for standards development at the international level. Standards will also need to be developed at a **much earlier stage of development** in a product's life cycle, often in the pre-commercial stage. With continuously evolving technology, **performance rather than design standards** become more appropriate, as they better avoid lag and do not stifle innovation. Standardization may facilitate compatibility of products at a later stage of product development, and improve efficiency in the allocation of R & D resources.

International standardization will have to react to these pressures particularly in its organization and structure. The distinction between electrotechnical and other industrial standards is becoming less clear. For instance, in information technology, both telecommunications and computer industries are key actors. As a consequence, three international bodies, namely the ISO, IEC and ITU traditionally develop standards in their respective fields. In response to the blurring of demarcation lines, a joint committee called JTCI has been established, in an attempt to stop old organizational structures from blocking standardization in new fields.



International standardization will have to be speeded up as well. In JTCl a fast track method for standards adoption exists. However, this mostly involves co-opting standards with several specification options. Standardization bodies may also consider closer co-operation with government bodies, financing R & D programmes in order to ensure that public and consumer interests are accounted for.

(b) Consumer Power

Consumer representation was traditionally limited due to lack of organizations representing their interests, and the lack of expertise and information with consumers on technical matters. Over time, consumer groups have developed, and they now exert some influence on standards particularly in the **health, safety and environment** fields, with increasing demands for higher product quality. Governments have increasingly turned to regulation to satisfy consumer demands and hence TBT have increased. Consumers are represented on most NSBs particularly in Europe. In the United States, consumers have successfully pressed for anti-trust cases, whereas in Japan consumer groups are not influential but rely on the government and quality assurance schemes to protect their interests. In ISO, a council committee on consumer policy exists called COPOLCO, which provides guidelines for consumer policy at the national level, and represents consumer interests at world level.

**Developing countries are affected as the demands for higher quality may render some production technologies out-dated.** Consumers demand for higher quality may require greater use of **international standards** in order to avoid TBTs from arising. This may **benefit developing countries** in several ways:

- international standards may become more specific, to ensure a higher level of safety and health
- the use of one international standard as opposed to many national standards and regulations will reduce the costs of producing goods to different specifications
- conformity assessment particularly through quality assurance will be increased, and perhaps an international system will develop.

At the same time there is a danger that consumer demands from OECD countries become a (technological) burden on exporters of developing countries. One should not exaggerate such dangers and acknowledge at least two important qualifications:

- Many of their industrial exports come from MNCs,
- Many developing countries operate export inspection schemes anyway (especially in food and raw materials), to ensure that their exports are of adequate quality.

(c) Regional Standardization

Regional Standardization activity, especially that in Europe has major consequences for international standardization. The key issue is whether it promotes or impedes the development and usage of international standards.

Experience in Europe shows that the impact is likely to be positive on account of several factors.

- regional standardization is developing standards used by several countries in areas hitherto only undertaken at the national level. If this process is pushed up to the international level, then the scope and coverage of 'international' standards increases via a web of regional and bilateral agreements. Even without ISO/IEC, they will simplify trade greatly.
- regional standards can be based on international standards as is the case with CEN and CENELEC. At least for that region, it creates an even interpretation of international standards, and ensures that markets are effectively opened to international trade (to the extent that international standards are sufficient to accomplish this).
- if regional standardization organizations are transparent in their operations, allowing comments from outside interested parties, showing no discrimination in access to conformity assessment, and abiding by the GATT Standards Code, then market access to non member producers is not impeded.
- finally regional standardization may prompt third countries to reconsider their traditional attitude of ignoring world standards. This has, for instance, been a consequence of recent European moves.

Regional standardization does, however, present some dangers:

- regional agreements on standards can lead to bloc voting in international organizations. CEN members can outvote the United States or Japan 18-1. This is sensitive in high tech strategic areas, and in areas where new international standards are being created.
- resources in terms of finance and expert participation are diverted away from international to regional standardization. ISO participation of some CEN delegations (most notably smaller European countries e.g. Belgium) have fallen markedly. On the other hand this represents somewhat of an opportunity to redress the current voting imbalance in favour of Western Europe.

(d) Interests of the Global Trading Powers

Recently, international standards are being looked at more favourably by key economic groupings for both political and economic reasons. The United States traditionally had a low export ratio. In redressing their import surplus they have increasingly found themselves excluded from certain markets. International standards may help overcome this imbalance. A more important impetus, however, is the impact of regional standardization in Europe.

Japan is sensitive to claims of lack of market access, and the use of international standards is a convenient means of highlighting the 'openness' of their markets. In part, the increased use of international standards

reflects the confidence of their industry with respect to international competition.

Western Europe has always been active in the international standards field. Nowadays the use of international standards is a useful means to dispel fears and criticism concerning their regional standardization activities. Developing Countries view international standards as a means of unlocking global markets. For the least developed countries international standards represent a corpus of standards required to form the base of a national standards system.

#### 4.3 The Organization of International Standardization

In order to allow for free trade and economic integration in a world of nation states with different technical regulations and standards, a variety of organizations and structures have developed, each with its distinct approach to these problems. Implementation and assessment of internationally agreed standards has proved as difficult if not more so than agreeing on the standards.

Three approaches have been tried to remove TBT:

- International Standardization bodies: ISO/IEC/ITU
- Regional Standardization
- GATT Code on Technical Barriers to Trade.

##### 4.3.1 International Standardization Bodies

International standardization first began in industries that had global or international markets, and where compatibility was required. The International Telecommunication Union dates back to 1865. Other activities of a global nature such as the Codex Alimentarius Committee (established by WHO and FAO) began in the first half of this century.

In 1906 the International Electrotechnical Commission (IEC) was established to deal with issues of measurement, definition and interchangeability. However, it was only in 1947 (following an earlier attempt in 1926) that the International Organization for Standardization (ISO) was founded. The ISO and IEC account for approximately 85 per cent of published international standards. However, much of the detailed technical drafts and studies are undertaken in other specific international organizations. These organizations such as the International Organization for Legal Metrology (OIML) have liaison status with the ISO. They participate in the presentation and drafting of international standards, or the ISO adopts their standards as international standards directly.

Table 7 provides a list of the principal international standardization bodies, although in practice over 450 international organizations have liaison status with ISO technical committees or subcommittees.

##### (a) The International Organization for Standardization - ISO

ISO member is, for every country, the body most representative of standardization activity in that country. Therefore only one body from each country is allowed to participate and they differ in terms of size, number of personnel, budget, legal status etc. Members (of which there were 73 in

Table 7

DOCUMENTS LISTED IN THE ISO KWIC INDEX OF INTERNATIONAL STANDARDS

<u>Organizations</u>	<u>Documents</u>
ISO International Organization for Standardization	5692
IEC International Electrotechnical Commission	1571
CAC Codex Alimentarius Commission	275
CCITT International Telegraph and Telephone Consultative Committee	224
IDF International Dairy Federation	114
UIC International Union Railways	110
OIML International Organization for Legal Metrology	81
CEE International Commission for Conformity Certification and Electrical Equipment	62
IAEA International Atomic Energy Agency	53
IMO International Maritime Organization	45
CIE International Commission on Illumination	43
ILO International Labour Organization	35
WIPO World Intellectual Property Organization	29
ICRU International Commission on Radiation Units and Measurements	28
ICRPC International Commission on Radiological Protection	27
ICAO International Civil Aviation Organization	22
BISFA International Bureau for the Standardization of Man-made fibres	14
UNESCO United Nations Educational, Scientific and Cultural Organization	14
CCIR International Radio Consultative Committee	13
CISPR International Special Committee on Radio Interference	11
IIR International Institute of Refrigeration	11
IFLA International Federation of Library Associations and Institutions	7
BIPM International Bureau of Weights and Measures	4
IWO International Vine and Wine Office	3
IATA International Air Transport Association	2
IOOC International Olive Oil Council	1
OIE International Office of Epizootics	1
CCC Customs Co-operation Council	1
WHO World Health Organization	1
<hr/>	<hr/>
TOTAL 29 international standardizing bodies.	8494 Documents

Source: (1989) Lawrence D. Eicher "Global Standardisation, World Trade and GATT"

January 1989) are entitled to equal participation on any technical committee, are eligible for council membership, and have seats in the ISO General Assembly. Additionally there are correspondent members (18 by January 1989), who are usually developing countries with no NSB. Normally they have the right to observe proceedings and to remain fully informed. As previously noted 450 other international bodies have liaison status with ISO: they include regional standardization bodies. While the ISO General Assembly is the ultimate legislative body of ISO, it is the Council which administers operations. It consists of the President, Vice President, Treasurer and eighteen elected member bodies (although normally the largest NSBs are guaranteed a place).

#### The Council

- decides on the technical structure of ISO
- accepts the publication of international standards
- appoints the chairmen of technical committees
- appoints members of the executive and technical boards

The Executive Board advises the Council on matters of policy, structure, administration and finance. The Technical Board advises the Council on all matters pertaining to the organization, planning, development of technical work. It reviews and monitors the activities of TCs (technical committees) and influences the allocation of secretariats and chairmen. The technical committee is advised by 11 technical advisory groups (TAGs) on matters of basic, sectoral and cross sectoral co-ordination, and coherent planning. Some examples of TAGs are: chemical and physical test methods and methods of analysis, metals, metrology, safety.

Several committees (open to all members) exist concerning basic issues relating to all standardization activity. (See Tables 8 and 8A).

It has been noted that many of the standards developed relate to definitions, basic metrological standards and tests procedures. Detailed product specification are relatively few in ISO and, if present, normally in the form of performance criteria. In IEC, as noted before, severe compatibility and safety requirements are stronger incentives to obtain consensus on product standards. While these are to some extent initial generalizations and would need a detailed survey of ISO standards to substantiate them, an example taken from an ISO handbook may illustrate this point.

The actual number of ISO standards has accumulated slowly over the years, and they currently number 7107 (ISO Momento 1989). Growth in the number of international standards (ISO and IEC) can be seen on Table 10 with approximately 400 international standards being published annually. At this moment therefore the number of international standards is approaching the volume of (national) standards observed in many countries, although it lags somewhat behind the numbers in France and Germany.

Table 8. ISO Secretariats held by developing countries

	TC	SC	WG	Total
Brazil	5	2	2	4
India		16	4	25
China			1	3
Columbia			1	1
Papua-New Guinea			1	1
Malaysia			2	2
Tanzania		1		1
Turkey		3		3
Total	5	24	11	40
As a % of total for all ISO	3.01 %	3.87 %	0.69 %	1.68 %

Source: ISO Memento 1989

TC = Technical Committee  
SC = Sub-Committee  
WG = Working Group

Table 8A. ISO Secretariats held by the major developed countries

	TC	SC	WG	Total
AFNOR	24	101	226	351
ANSI	17	64	210	291
BSI	23	88	289	400
DIN	27	113	297	437
JISC	3	10	27	40
Total	94	376	1049	1519
Total (ISO)	166	619	1588	2373

Source: ISO Memento 1989

TC = Technical Committee  
SC = Sub Committee  
WG = Working Group

Table 9. Paper, board and pulp: indications of ISO standards

	No. of standards
Part 1 Terminology	3
Part 2 Testing and Determination of properties	
2.1. Sampling and preparation of specimens for tests	1
2.2. Determination of Mass	2
2.3. Physical Properties, general	1
2.4. Optical properties	2
2.5. Composition	12
Part 3 Paper and Board including corrugated fibre-board: properties and test	
3.1. Sampling and conditioning of samples	6
3.2. Physical properties, general	8
3.3. Strength Properties	1
3.4. Folding and bending	5
3.5. Surface properties	4
3.6. Performance and Absorption	9
3.7. Optical Properties	2
3.8. Composition	4
Part 4 Paper products - Specifications	16

Source: ISO Handbook No. 23, Paper, board and pulp, 1984

Table 10. The Number of ISO and IEC Standards

1984	7751
1985	8275
1986	8726
1987	9279
1988	9500

Source: BSI Annual Report 1989, ISO Memento 1989.

ISO is also active in providing information. Producers wishing to export need appropriate and timely information on foreign requirements relevant to their product: technical regulations, standards, certification, testing, packaging and labelling requirements. Information is normally available from NSBs, trade associations, GATT enquiry points and via the ISONET system. For developing countries, problems include the lack of knowledge of foreign markets, the cost of information searches, and the lack

of telecommunications equipment. ISONET was established by the INFCO Committee of ISO in recognition of the problems exporters face. With increasing use of standards, and growing economic integration combined with technological advances, the traditional concentration on national markets and standards could no longer be maintained.

ISONET is a decentralized information system where ISO members agree to supply any other ISONET member with information on standards, technical regulations, certification systems and any other related information. In order to account for different capabilities of members three classes of membership exist:

- (1) Minimum Services - can handle enquiries on standards and regulations and has a list of standards published in the country (54 members)
- (2) and (3) require the ability to produce bibliographic descriptions of all standards in accordance with the ISONET Manual and Thesaurus (8 members).

Part of the work involved with ISONET has been the development of an ISONET Manual which describes standards, to enable simple storage, retrieval and interpretation. A major obstacle was the development of an ISONET thesaurus: agreement has not been reached leaving two separate documents being used.

(b) The International Electrotechnical Commission - IEC

Several factors facilitate international standardization in electrical and electronic engineering. First, trade in this sector occurs to a large degree at the global level, and producers and consumers alike have incentives to use international standards. Second, interchangeability and interworking is required at a very detailed and specific level if components and products are to be compatible with each other and the existing electrical infrastructure. Hence the establishment of IEC over eighty years ago. As safety is important, consumer pressure often leads to government regulation, and industry has favoured standardization to help achieve consistent product quality and maintain open markets.

The fact that electrical and electronics industries were (and continue to be) rapidly evolving technologically caused international standardization, needed to ensure compatibility, at a late stage in the product life cycle.

As a result the IEC standards are more complete and more effectively implemented than those of the ISO. Note that a similar analogy exists between CEN and CENELEC. Nevertheless some differences persist in standards due to costs of adapting the installed (electricity) base, e.g. plugs come in many varieties and sockets from one country may not match the plug in another.

Although consisting of only 42 countries, IEC members account for 80 per cent of the world's population and 95 per cent of the world's electrical energy production. Members are drawn from the principal bodies at the national level. Each member is represented at the Council, which elects a 12 man Committee of Action which directs the technical work. Several advisory committees assist the committee in general areas of IEC's work.



There are the: - Advisory Committee on Electromagnetic Compatibility  
 - Advisory Committee on Electronics and Telecommunications  
 - Advisory Committee on Safety

As with the ISO, technical work is delegated by the Council to technical committees and subcommittees, with some TCs mandates being horizontal e.g. TC 1 Terminology whereas others cover a family of products such as TC 2 Rotating machinery. Again testing procedures account for a significant number of standards. As shown on Table 10, the number of IEC standards has been growing steadily.

One area where the IEC has gone beyond the ISO is certification. Two schemes are operated:

(1) **IEC System for Conformity Testing to Standards of Safety Equipment (IECEE)**

National Certification bodies are entitled to test for conformity to IEC Safety Standards covering various products, e.g. electronic entertainment equipment, cables and cords, low voltage switchgear and control gear and electromedical equipment. Reciprocal recognition of test results ensures that tests are not repeated, and the whole IECEE system is administered by the Committee of Certification Bodies, and the Committee of Testing Laboratories.

(2) **IEC Quality Assessment for Electronic Components (IECQ)**

Again this involves the mutual recognition of test results from accredited testing laboratories, and covers conformity to all IEC standards concerned, from basic to detailed specifications. The system is administered by the IECQ Inspector Co-ordination Commission and the Certification Management Committee. For developing countries e.g. India, it is important that their testing and certification capabilities are able to assess for IEC standards, and that other participant countries have confidence in the operations. A distinction is drawn between 'detail specifications' peculiar to a specific component, and 'blank detail specifications' which looks at general technical criteria and electrical characteristics needed to assess the quality of a component. Components included in the scheme are integrated circuits, cathode ray tubes, resistors, switches etc.

Twenty three countries are signatories (as of September 1989) including China, India, South Korea. Mexico and Taiwan are also members under surveillance from the United States.

(c) The International Telecommunications Union - ITU

With 112 members and a date of origin in 1865, the ITU is one of the oldest and most globally representative bodies dealing with standardization. All areas of telecommunications are covered by four permanent organs:

- General Secretariat
- International Frequency and Registration Board (IFRB)
- International Radio Consultative Committee (CCIR)
- International Telegraph and Telephone Consultative Committee (CCITT)

Standards activity falls to the CCIR and CCITT where mandates include the studying of technical operating in telecommunications and broadcasting and

tariff questions in telegraphy and telephone. Recommendations and reports are produced, which are not international standards themselves, but rather provide a basis for international standardization in the world and regional administrative conferences. These conference decide upon Administrative Regulations, and include Radio Regulations, Telephone and Telegraph Regulations, e.g. HDTV, was discussed in May 1990 at the CCIR Conference.

The recent prominence of CCITT has to do with its role in compatibility standards for information technology utilizing telecommunications networks to transport value-added services. Since about a decade this work has been pursued in the framework of (OSI) open standards development and has been embraced by the new JTC 1 (together with ISO and IEC).

The work within the CCIR and CCITT will greatly influence the activities of other international bodies such as the IEC and ISO. Co-ordination is steadily increasing and more and more work is being jointly undertaken.

#### 4.3.2. Regional Standardization

Regional standardization goes beyond the scope of international standardization bodies such as the ISO in several respects. As noted before it is easier for nations of close geographical proximity, which tend to have similar levels of economic development and similar socio/political philosophies, to agree on most issues pertaining to health, safety and the environment. Regional economic integration requires more specific product standards, often in areas not developed by the ISO/IEC. Therefore regional standardization usually involves agreement on the harmonization of regulations and attempts to harmonize standards particularly those found in public procurement contracts as well as those needed for 'reference to standards' methods. In the EC this involves the harmonization of 'essential requirements' of safety, etc. and the mutual recognition of products legally marketed in one country (see Chapter 3).

#### 4.3.3. The GATT Agreement on Technical Barriers to Trade (The GATT Standards Code)

Following the Kennedy Round negotiations in GATT during the 1960s, it became increasingly clear that technical regulations and standards and conformity assessment activities amounted to technical barriers to trade, and that an international agreement covering these barriers was required. Studies and negotiations continued during the 1970s and **the GATT standards code was adopted in 1980**. The code is under review in the Uruguay round negotiations. The code has 39 signatories including the EEC and an additional 35 observer governments. Several other international organizations are observers (see Table 11).

Being legally being an international agreement, the Code is somewhat constrained by the typical problems associated with the implementation of international agreements. **Enforcement problems only show up after complaints, and such complaints inevitably refer to broad principles only, with dispute settlement expected to be bilateral.** Over a period of ten years, only two cases have been formally dealt with by panels under the Code. In order to accommodate as many parties and interests as possible, the wording of such agreements is often not precise.

The code only applies to national governments and does not extend to local or regional governments, or non governmental bodies, including most NSBs. Before looking at the success of the Code and its effects on international standardization, a brief description of the Code itself is desirable.

(A) What the Code Involves

The Code recognizes the right of national governments to enact regulations in the pursuance of health, safety, environmental and other public objectives (e.g. defence). However regulations and standards should not unnecessarily impede international trade and international standards should be used if they exist and are appropriate. Note that this obligation covers only those regulations set by the national authorities. A second level of obligation exists whereby the national government is to make 'best endeavors' to ensure that local/regional governments and non governmental bodies comply with the Code. However, the code is weak and vague on this crucial issue, since no attempt is made to ascertain exactly what reasonable measures a national government should take, nor is there any definition of available instruments at the disposal of national authorities. Hence the Code falls far short of obligations under the Treaty of Rome, i.e. **there is no obligation to harmonize regulations**, nor to mutually recognize these (subject to conditions), **nor to harmonize standards**.

Parties are required to notify any technical regulations that differ from international standards. A waiting period exists during which comments may be forwarded. **National treatment must be accorded to imports with respect to conformity assessment**, i.e. they should not be treated in any disadvantageous fashion. An inquiry point must be established to furnish all reasonable requests for information on all aspects of standardization activity. A **dispute procedure** exists where parties can air and settle complaints. **Developing countries** are given **special status** to allow for their specific economic and technical conditions. A three yearly review procedure exists, to make amendments to the text of the code, and to ensure that the code operates to the mutual economic advantage of all parties, while maintaining a fair balance of rights and obligations.

The code falls far short of removing all TBTs. It is an attempt between governments to **develop international rules** for the establishment and operations of standardization and conformity assessment activities.

It is not an attempt to harmonize standards (let alone regulations) internationally, although it does aim to promote the use of international standards. Signatories have the benefit of being able via the right to comment, to make an input into standardization activities of other countries. They also gain from the right to receive information and the protection accorded by the dispute procedure.

(B) Problems with the Code

Four problems will be discussed:

(a) The main omission of the code is the **lack of any obligation to harmonize technical standards**. In effect the two tier level of obligation bypasses much if not most standardization activity, since the **obligations at the non-governmental level are not binding**. Agreement on this issue is

Table 11

COMPOSITION OF THE COMMITTEE ON TECHNICAL BARRIERS TO TRADE

Chairman: Mr. E. Contestabile (Switzerland) until January 1989  
Mrs. C. Guarda (Chile) from January 1989

Vice-Chairman: Ms. L. Leger (Canada) until January 1989  
Mr. P. van de Locht (Netherlands) from January 1989

Signatories

Argentina <sup>1</sup>	Korea, Rep. of
Austria	Luxembourg
Belgium	Mexico
Brazil	Netherlands
Canada	New Zealand
Chile	Norway
Czechoslovakia	Pakistan
Denmark	Philippines
Egypt	Portugal
European Economic Community	Romania
Finland	Rwanda <sup>1</sup>
France	Singapore
Germany, Federal Republic of	Spain
Greece	Sweden
Hong Kong	Switzerland
Hungary	Tunisia
India	United Kingdom
Ireland	United States
Italy	Yugoslavia
Japan	

Observers1. Governments:

Australia	Gabon	Poland
Bangladesh	Ghana	Senegal
Bulgaria	Indonesia	Sri Lanka
China, People's Republic of	Israel	Tanzania
Colombia	Malaysia	Thailand
Côte d'Ivoire	Malta	Trinidad and Tobago
Cuba	Nicaragua	Turkey
Ecuador	Nigeria	Zaire
	Peru	

2. International Organizations

IMF, UNCTAD, ITC(UNCTAD/GATT), ISO, IEC, FAO/WHO Codex Alimentarius Commission, I.O.E.

<sup>1</sup>Signed (acceptance pending)

Source: (1989) GATT "Tenth Annual Review of the Implementation and Operation of the Agreement".

difficult because of what has been termed reciprocity. A country with a centralized standardization structure and large scale government involvement is capable of implementing the full scope of the code. However, the opposite is the case in the United States, whose decentralized private standardization bodies fall beyond the strict purview of the Code. Hence Japan would be making more "sacrifices" than the United States if the code were strictly implemented. Much of the problem is political. Central governments such as in the United States are loath to intervene in competencies in areas supposedly the domain of private institutions or State legislatures.

A second issue of contention is that regional standardization (as in Europe) is currently moving standardization from the national to the regional level. The United States wishes to see the obligations on national governments extended to regional standardization, i.e. that regional standards should not create unnecessary obstacles to trade. A code of conduct for regional organizations has been proposed by the United States in the current negotiations. Furthermore they have called for greater transparency in the operations of regional bodies.

(b) Failure on the part of foreign exporters to meet national regulations implies outright prohibition from national markets. Certification as embodied in the Code also operates at the lowest common denominator base. The code embodies the principle of national treatment as far as conditions, methods and administrative procedures are concerned. This however only provides the very minimum for the opening of markets. **What is further required is the mutual recognition of test results** undertaken by foreign laboratories, in testing for national standards, a considerably more difficult problem to solve.

A distinction must be drawn between access (i.e. national treatment) and membership which allows member bodies to test for conformity assessment to the standards of another country, and also to have a say in the formulation of rules. Participation includes the right to test but not to have a say in rule determination. **Currently testing and certification procedures represent the most serious TBT that enterprises face.** Testing and certification will remain a problem as long as standards remain different, since different tests will need to be conducted.

(c) Despite the existence of detailed **dispute procedures** in the Code (Article 14) it has seldom been used. In part this is due to self compliance by the parties concerned, as well as bilateral negotiations between conflicting parties. The emphasis is on conciliation rather than direct GATT involvement.

To date only one case has gone through (with one other pending). Disputes are referred to a Committee which identifies whether the case is technical or commercial in nature (or both). Retaliation on the part of the aggrieved party is allowed. The effectiveness of the procedure depends upon the willingness of governments to use it, and on whether or not the infringement relates to central government, i.e. it doesn't apply directly to non-national government bodies. The fact that little use has been made of the procedure inevitably leads one to question its worth.

(d) **Processes and Production Methods (PPMs) do not fall under the auspices of the Code.** This is largely due to the fact that PPMs dominate standardization in agricultural products. Confusion exists within the Code

itself, as Art. 1.1. refers to both industrial and agricultural products, but the definition of technical specification does not include PPMs. The triennial review in 1983 allowed the use of the dispute procedure in cases where parties felt that PPMs were being used to circumvent obligations.

Proposals for the proper inclusion of PPMs in the Code are currently under discussion. However, the issues involved are complex, with many questions remaining unanswered such as how to monitor production in different countries, and how to assess the equivalence of alternative production processes.

Given the importance of agriculture to developing countries, this is a key area of interest for them in the current negotiations. Furthermore, the inclusion of PPMs in the code would assist developing countries exports, since by using a recognized production method, market access would be assured, and this would help remove some of the technical difficulties developing countries face in meeting performance standards requirements, i.e. technical transfer is facilitated by the use of a recognized production technique.

(C) The main benefits of the Code are:

- the removal of clear TBT particularly in the structural organization of a standardization system (e.g. the old Japanese system). However, less success has been achieved at the practical implementation level, e.g. conformity assessment.
- it provides a forum for negotiations, and has acted as a catalyst for bilateral negotiations on specific problems. Hence much of the negotiations have taken place outside the strict GATT framework.
- it provides a foundation for the use and development of international standards. However, this is a real gain only if international standards are used and if they can be developed with appropriate speed and specificity.
- the operation of the GATT enquiry points improves the information available concerning national standardization systems.

(D) Developing countries and the GATT Code

Provisions under two separate articles are made for developing countries. Article 11 encourages technical assistance to be given, in the preparation of technical regulations, the establishment of NSBs, the establishment of testing, metrology, certification and quality assurance bodies, and assistance for participation in regional and international certification systems.

Article 12 is a derogation, similar to those found in other GATT Codes, which permits developing countries to develop standards aimed at preserving indigenous technology and production methods and processes, compatible with their development needs. Hence, the obligation to use international standards is less strict.

The question arises as to how beneficial these articles are, particularly Article 12. Note that the Code makes no attempt to define or list developing countries. It is questionable whether being allowed to deviate from international standards is beneficial, since international

standards are usually basic ones or test methods etc. necessary for building up a national standards system and equally necessary (though not sufficient) to ensure access to world markets. Furthermore, it can be argued that developing countries would forego possible technology transfer embodied in international standards. It is beneficial if developing countries are able to develop product standards that reflect the technology and inputs available (say low skilled labour) and which reflect the needs and preferences of local consumers. All this depends on their standards writing and enforcement ability. In the long run standards should be upgraded to international levels.

Eighteen of the more advanced developing countries have signed the Code. The **overall benefits to developing countries** are:

- **it encourages the use of international standards.** This reduces the number of product specification varieties, making for easier access to larger markets. With the growing use of international standards, there will be an increasing need to develop product standards at the international level, a point developing countries have stressed for some time. In addition it will make **conformity assessment** including tests for quality assurance easier, via the **mutual recognition of test results**.
- **increased transparency in the standards system** improves the information available both in terms of costs and quality. The requirement of having an inquiry point might, however, impose a financial burden on the least developed countries.
- developing countries would gain substantially if PPMs were effectively included in the Code considering the importance agriculture plays in their economies. This would extend also to industrial products, as developing countries may find production process standards easier to apply than performance orientated ones.

## 5. HOW QUALITY STANDARDS INFLUENCE MARKETS

### Selected Questions

Developing countries compete first of all on price, except in certain commodities where availability gives rise to special advantages. **Quality is nevertheless a pervasive question for virtually all exports of LDCs.** Raw materials need to be homogeneous or contain minimum percentages of 'pure' substance; the reliability of this quality element of the exports as well as the continuity of supply at that quality level are also quality aspects for developing countries (and developed countries) exports, and are absolutely vital for user companies. Indeed, one reason for vertical integration in such sectors is precisely found in the various aspects of quality control. If vertical integration between the exploitation of (say) mines, exports and the value-added producers cannot be achieved, the industrial users will require extensive, contractual safeguards for quality control. Inevitably, this will lead to a direct impact on exploitation, including the means of production, the distributional and transport system and permanent inspection assurances.

In foodstuffs, feedstocks and industrial products, technical regulation in developed countries as well as private contractual obligations to achieve certain quality levels, form compelling reasons to **raise quality in developing countries through standardization and other means.** One can also observe a few interesting examples of quality as a competitive weapon in the supply of international services (e.g. air transport by South-East Asian carriers).

Technical regulations with respect to safety, health and environmental protection as well as informational consumer protection, are not limited to complex products with hi-tech contents with a relatively important share for skilled labour input. They exist for many simple goods where developing countries are prominent exporters e.g. toys, textiles and clothing, and sporting goods. Especially where multinationals do not control the exports from developing countries or when indigenous producers wish to initiate exports, a well-thought-out policy of quality promotion will be indispensable for the conquest of developed countries markets. The following elements would need consideration:

- adequate information on technical regulations in the target market, via GATT inquiry points, bilateral contacts between standards institutes or via commercial channels;
- adequate information about the conformity assessment requirements in the target market, including the possibility of mutual recognition of testing and certification agencies in the importing and exporting country;
- (re-)organization of production, input procurement, process technology and control, fault minimization, training of personnel and possibly even the introduction of some kind of quality assurance systems at managerial level, as well as throughout the company. There are many degrees of quality assurance and it would take a special report to digress and assess them. With respect to technical regulations for typical export products of developing countries, compliance with specific technical safety aspects of a product will usually suffice (e.g. flammability regulations for textiles & clothing constrain the kind of materials used). It is more demanding, however, if the sector



regularly launches new products or new forms, such as in the toys industry. Not only does it require firm and up-to-date knowledge about the regulations already at the design stage, but it also presumes a smooth and recognized certification procedure. For instance, Hong Kong as a major toys exporter is currently negotiating a mutual recognition agreement between the EC and Hong Kong with respect to certification in Hong Kong, in response to the 'new approach' directive on toys and the CEN standards adopted in its wake. The advantages in the rapidly changing, fashion-driven toys industry to obtain market access via certification at home before entering the EC market are self-evident; at the same time the safety requirements, especially the CEN standards providing somewhat greater specification, will have to be utilized in an industry with many small suppliers and a high rate of presentational or intrinsic product innovation at the (small) firm level.

Achieving quality levels in the absence of technical regulations in OECD countries is on the whole a private interest of every individual supplier in every developing country. A sustained policy of promoting standards is probably the best compromise, as this emphasizes the voluntary nature of joining efforts on defining state-of-the-(local)-art technology for product performance and processes, while nevertheless serving the developmental purposes of the country.

There is a fairly **strong tendency in developing countries to make quality standards compulsory**. This may not be the most appropriate way in many instances because:

- it may squeeze out products for which there is genuine demand;
- it may be a disproportionate measure to protect consumers, especially adequate labelling or certain certification marks could fulfill the same function;
- one may wish to promote more stringent requirements for exports than for the home market, given different preferences in the light of income levels and tradition. However, export firms may press for export quality levels in the home market too, which will provide them with a competitive advantage over local firms with lower costs and lower quality goods.

Several developing countries are convinced that the 'country' needs a quality label in OECD and other markets. With modern information, distribution and communication, however, there are signs that a brand name for a country would appear to be an inappropriate route to export promotion and development. Obtaining JIS, DIN (or, in the years ahead, a CE-mark) or UL recognition in certification, or acquiring reputable certification marks from major export markets is an ambitious but perhaps more effective route towards quality, without detracting from the product variety and demand structures at home.

## 6. REGIONAL STANDARDS FOR DEVELOPING COUNTRIES

### 6.1 The nature of standardization in developing countries

At a very basic level the incentives for standardization activity in developed and developing countries are the same, i.e. economies of scale in production, information benefits to producers and consumers, improved product quality, technological transfer and efficiency in R & D and product development, and better safety, health and environmental protection.

However, given the divergent levels of economic, industrial and technical development, and considering the widely divergent social and cultural capabilities between the developed and developing world, one must carefully consider the role of standardization, its structure, objectives, organization and its range of activities in developing countries. Table 12 gives a brief overview of the different characteristics of standardization activity faced by NSBs of developed and developing countries. **Standardization represents only a part of the economic 'infrastructure' of a country**, that can promote economic development. Careful integration with overall development plans is required for it to play an effective contribution in economic development. Key questions on economic policy need to be known before deciding upon the exact role of standardization.

Should industrial development focus on export-led growth or should one concentrate on import substitution with the protection of domestic production? If trade is to be promoted, which regions should it concentrate on: interregional, with developed countries, etc.? In which sectors should economic development be concentrated? Decisions on these basic economic policy objectives need to be taken before any coherent standardization policy can be formulated. Therefore developing countries should adopt a long run standardization policy that is consummate with their overall long run vision of economic development.

The lack of an adequate industrial base in developing countries, with shortages of skilled personnel implies that standards are few in number and sometimes non-existent. An industry that can establish and promote standards does not exist. In contrast to developed countries it is the standards bodies that must develop industry, rather than industry developing the standards. Industrial production cannot begin, unless the knowledge of how to manufacture exists. **Standardization is certainly one, potentially important way of transferring knowledge.** Standards frequently contain the detailed specific information and know-how required to organize production, and to ensure output of products with consistent quality, capable of satisfying market demands, while aiming at a certain level of health, safety and environmental protection. This is evident as standards contain information covering a spectrum of knowledge, from basic definitions and metrology, to materials, dimensions, production processes, quality control, testing and inspections. Manufacturers from developed countries often regard standards as a source of best practice methods, or as a means to guarantee market access, as standards are often stipulated in contracts or demanded by users. For manufacturers from a developing country, standards are much more a source of technological and production information which they otherwise wouldn't easily have access to.

Table 12

**Standardization in developing and industrialized countries — a comparison**

In very general terms, some of the differences between standardization in developing and industrialized countries can be summarized as follows.

Factors	Developing countries	Industrial countries
Literacy	Low	High
Form of organization of standards body	Governmental (with few exceptions)	Often private institutions
Stage of advancement of NSB*	Relatively early	Well established
Staff of NSB	Rather new (with exceptions)	Trained - coordinated
Character of standards	Voluntary or compulsory, depending on field and to be decided for every standard	Voluntary in "Western countries; compulsory in "Eastern" countries (with exceptions)
Number of industries in each sector	One or a few	Many
Existing trade organizations	Few	Many
Ways of implementing standards	Not very developed	Many
Labelling of products	Often misleading and embellished	Improving
Existing certification systems (within trade organizations, etc.)	None (or few)	Some
Pressure by interested parties on NSB personnel	A real burden in some countries	Suppressed

\* National standards body.

Source: (1982) ISO Development Manual Number 2  
"Operation of a Certification System"

It is these features, the lack of an adequate industrial base and lack of skilled personnel that distinguish standardization activity in developed and developing countries. **Standardization in developing countries** must follow a 'top down' approach, where the NSB develops and encourages standards activities in order to secure the development of an industrial base. As such it is much more an integral part of industrial policy and hence should be under some degree of government control. This implies that the NSB will have to offer a complete range of services, from the development of standards, i.e. technical assistance to producers, metrology and calibration services, conformity assessment and quality control. Furthermore it will need to provide information on technical regulations and standards in export markets. **International standards in particular have more relevance to the producer in developing countries, as he may rely on these standards to provide him with the information to produce goods of adequate quality.** Often standards are not used at all, with unfortunate consequences for the 'exportability' of products.

A standard to be of worth must be useable, and hence NSBs need to promulgate standards that not only ensure market access, but also reflect the technological capabilities of domestic producers. Without standards, product quality cannot normally be expected to be sufficient to guarantee market access. By quality we mean conformance to market requirements in accordance with buyers/consumers needs, tastes, preferences and economic conditions. Standards are one means by which this quality can be obtained. Given the technological constraints on developing countries standards used will need to be:

- simple, clear and preferably design rather than performance standards. Performance standards require engineers to interpret requirements and then to design products that are in conformity. Model or design requirements specify in greater detail the dimensions and features required, and therefore there is less need for interpretation and skilled personnel. Performance standards also require expensive testing equipment, given that tests cannot be so easily standardized, i.e. they have to be adapted to test for different products.
- if possible one standard should be used, given the costs and engineering difficulties developing countries have in adapting to various specifications. The standard should also:
  - be in the language of the standard user
  - guarantee access to vital export markets
  - cover conformity assessment and quality controls.

Such a policy of promoting simple detailed product specification standards fits the development model witnessed in some of the Newly Industrialized Countries. By concentrating production in labour-intensive, low technology industries (simple processed manufactured goods with simple standards), these countries exploited their comparative advantage. Over time, with increased industrial experience and foreign export earnings, industry was able to diversify, and acquire new technology. Foreign direct investment (implying adequate standards knowledge and access to export markets) also assisted in promoting industrial development. Standardization activity in this semi-developed state needs to become less rigid in terms of strict product specification, to allow flexibility for innovations in design.

A disparity may arise in standards needs at this point. Exporters may require standards of adequate quality to ensure market access. Producers for the domestic market may require less demanding standards.

Standardization has several other benefits apart from those previously outlined for developing countries:

- it allows for trade between developing countries, of similar stages of economic development. By promoting interregional trade it develops the industrial base allowing scale economies implying larger, more efficient production units. It can improve the division of labour in the two regions and can save on hard currency imports.
- standards help in the acquisition of technology from developed countries required for industrial development, reducing the danger of dependence on one country for supplies. They may eventually be instrumental in reducing the acquisition of complementary goods or replacements.

## 6.2 The African Regional Organization for Standardization - ARSO

Since its inception in 1977 ARSO has advanced to a state of development where it is capable of offering practically an entire range of standardization services, ranging from standards writing, to metrological services, certification and laboratory accreditation, and finally training and technical assistance to its members, including an information network of ISO/IEC standards as well as the standards of its members. Membership is open to any member country of the United Nations Economic Commission for Africa, and currently 23 countries are members. ARSO's broad objectives are to be found in the Lagos Plan of Action for the Economic Development of Africa and can be summarized as including:

- **facilitation of intra-African trade via the removal technical barriers to trade**
- **assistance in the development of National Standards Bodies in member countries, and to co-ordinate standards development**
- **assistance to African countries in acquiring the appropriate imports and technology required for industrial development.**

To achieve these broad objectives ARSO has several key fields of activity, not least influenced by the limited industrial base of member countries, the lack of skilled personnel, and the underdeveloped (sometimes non-existent) state of NSBs. A principal activity of ARSO is technical assistance to NSBs. This comes in many forms, but help is available in establishing and organizing an NSB, the establishment and running of certification quality assurance and export inspection schemes, and the creation of information bases on standards. Conferences and training seminars on issues such as metrology are organized, and technical experts are sponsored to visit and assist NSBs. Regional Organizations such as ARSO can play a valuable role in this development and role, given the benefits that can be gained from shared experiences, and from the considerable cost savings resulting from pooled resources and co-ordinated actions. Therefore ARSO's primary role is to develop competent standardization bodies and

infrastructures that are capable of promoting industrial and economic development.

ARSO's second principal task is the preparation of African Regional Standards (ARS). Regional standards are beneficial for a number of reasons as they:

- reduce technical barriers to trade, and so promote intra African trade
- yield great cost savings (economies) in the development of standards
- suit the technological capabilities of African countries, and are in line with the factor endowments of member countries, i.e. there is an abundance of low skilled labour and a lack of skilled labour and capital
- help to regulate imports, by removing technological dependence on one country and ensure they fit the technological capabilities of African States
- finally, co-ordinated action at the regional level tends to facilitate co-operation in the international bodies such as the ISO/IEC, thereby increasing their ability to influence the course of events in key areas.

By November 1989, 600 African regional standards (ARS) and Draft Africa Regional Standards have been developed (see Table 13) in sectors of crucial significance to African industrial development as set out in the Lagos Plan. These nine technical Committees and 20 Sub-Committees are heavily concentrated in:

- Basic and General Standards
- Agriculture and Food Products
- Building and Civil Engineering
- Mechanical Engineering and Metallurgy.

Further emphasis is placed upon transport and communication in the region. The development of ARSO follows three routes:

- the harmonization of national standards
- the adoption of international or other standards
- the formulation of new standards.

In order to ensure the effective application and usage of ARSO standards, ARSO has signed Memoranda of understanding with other regional and sub-regional blocs. These are Economic Community of Central African States (ECCAS), Economic Community of West African States (ECOWAS), and the Preferential Trade Area for Eastern and Southern African States (PTA). In principle ARSO standards are to be regarded as 'community standards', although co-operation is at various stages between the different organizations. ARSO and ECOWAS undertook a joint study in 1986 and a memorandum of understanding was drawn up to implement the recommendations. A memorandum of understanding has not yet been signed with ECCAS, although according to the 1988 Draft Annual Report of ARSO, it is expected that it will be concluded soon.

Table 13

## AFRICAN REGIONAL STANDARDS, STRUCTURE AND QUANTITY

<u>Field/Technical Committee</u>	<u>ARS published</u>	<u>DARS Under Processing</u>	<u>DARS Elaborated</u>	<u>Total ARS+DARS</u>
Basic and General Standards (ARSO/TC 1)	43	32	18	93
Agriculture and Food Products (ARSO/TC 2)	33	74	-	107
Building and Civil Engineering (ARSO/TC 3)	3	90	-	93
Mechanical Engineering and Metallurgy (ARSO/TC 4)	4	47	57	108
Chemistry and Chemical Engineering (ARSO/TC 5)	7	43	21	71
Electrotechnology (ARSO/TC 6)	-	32	-	32
Textiles (ARSO/TC 7)	24	38	-	62
Transport and Communi- cations (ARSO/TC 8)	6	14	-	20
Environmental Protection and Pollution Control (ARSO/TC 9)	-	14	-	14
Total	120	384	96	600

Source: (1989): ARSO Draft Annual Report for the Year Ending December 1988.

As regards the PTA, a sub committee on Standardization and Quality Control in 1988 prepared a status report on standardization activities in member countries, in order to draw up a plan of action. ARSO was negotiating a Memorandum of understanding based on this report, but difficulties arose in the PTA co-operation, due to lack of standardization infrastructures at the national level and lack of progress in their development.

Finally, SADCC established to foster economic development of its members and to lessen dependence on South Africa, set up a SADCC Export Group on Standardization and Quality Control. Again the emphasis is on the development of a basic standardization infrastructure in member countries.

ARSO is also established in the field of metrology, certification and laboratory accreditation schemes. A major programme of assistance (with funding from UNDP) began in 1988 with the aim of promoting metrological activities, the sharing of metrological equipment and expertise, and the operation of courses and seminars, which should lead to uniform practices. Proposals have been prepared by ARSO for the certification of products to African Standards and for the accreditation of testing laboratories.

A further major area of ARSO activity lies in the field of information, where considerable resources have been spent on computerization of ARSO documentation and information. Guides have been prepared to assist ARSO members on the organization and operation of standardization, metrology and conformity assessment activities. Finally ARSO undertakes the important task of co-ordinating activity at the international level. ARSO has liaison status with ISO, and maintains relationships with assistance bodies such as NSBs from developed countries and United Nations organizations. In the light of the problems witnessed in the other regional organizations, and considering the lack of development of standardization activity at the national level in Africa, ARSO's achievements are remarkable.

### 6.3 The Arab Organization for Standardization and Metrology - ASMO

Standardization activity in Arab countries is a relatively new phenomenon, and this is reflected in the underdeveloped state of many NSBs, who often fail to provide adequate metrology, certification and quality assurance programmes. Exports are primarily oil related, and there is a de facto reliance on other internationally established standards (in these industrial sectors, e.g. ASTM, BSI). Regional standardization activity dates back to 1968 when ASMO was established as a specialized agency of the League of Arab States, with the objectives of

- assisting Arab countries in establishing NSBs and metrology facilities
- co-ordinating standards particularly in the areas of definitions, technical drawing, and methods of inspection
- improving the information flow concerning regulations, standards, tests and metrology between countries
- developing unified Arab standards pertaining to raw materials, products and equipment, and codes of practices. It also aims to develop and register marks of conformity to these standards



- co-ordinating and assisting in training and research, and co-ordinating the activities of members within ISO.

Membership stood at eighteen in 1988 which consists of only the official representatives of member countries. Membership included, Algeria, Bahrain, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Emirates, Yemen Arab Republic, P.D.R. of Yemen.

The bulk of AMSO's work relates to training, information and co-ordination. However, by 1988 over 1000 Arab standards had been published, which concentrated on the unification of technical terms and quality control methods. Product specifications were developed in food, clothing, textiles, building products, oil, minerals and electrical products. However, by 1987 65 per cent of ASMO standards amounted to complete adoptions of ISO, IEC, OIML and Codex Alimentarius standards.

Certification activities only extend to the stamping of precious metals, and there is also a system for the correlation of test results among Arab petroleum laboratories. One important area of ASMO's work is the translation of ISO, IEC and other standards into Arabic. A second area where ASMO has had a role is the development of standards for the preparation of certain foodstuffs in line with Islamic traditions.

ASMO role has in practice, however, been limited, in part due to the lack of organization at the national level, and also due to the character of the League of Arab States. Essentially a political organization, debates among members have focused only to a minor extent on issues of economic co-operation. Economic integration occurs within the framework of the Gulf Co-operation Council (GCC) which was established in 1981 and consists of six members, Saudi Arabia, Kuwait, Qatar, Oman, Bahrain, and the United Arab Emirates.

In 1984 the standardization and metrology organization of the GCC was established. Members are allocated responsibilities, depending on their material and human resources, although in effect the Saudi Arabian Standards Organization (SASO) dominates proceedings. At present there is an overlap of responsibilities between the GCC and ASMO in standardization. By 1986, fifty standards had been circulated by the GCC and 450 Saudi Arabian standards already existed, while several thousands were in draft or planning stages at SASO. Concern has been raised particularly by the United States over the mandatory nature of Saudi Arabian Standards, and their potential to become GCC standards (see Kruger, 1989). Since 1988 imports are required to have a SASO certificate of conformity, with the potential to create TBTs. Two further co-operation councils have been established within the Arab region. These are the Arab Co-operation Council consisting of Egypt, Iraq, Jordan and North Yemen, and the Maghreb Arab Union, consisting of Morocco, Tunisia, Mauritania, Algeria and Libya, and it is possible that these co-operation councils will follow the GCC's route in standardization.

#### 6.4 The PAN American Technical Standards Commission - COPANT

COPANT is in fact the oldest of the regional standards bodies, having been established in 1956. By 1989 membership amounted to 21, divided between active and adherent members. Active members included Brazil, Panama, Venezuela, Mexico, Dominican Republic, Central America (ICAITI), Columbia,

Ecuador, Chile, Costa Rica, Paraguay, Trinidad and Tobago, and Uruguay. Spain, France and Portugal are "adherent" members. Its main objective has been to co-ordinate all standardization activities in member countries via the

- **co-ordination of activities in international standards bodies**, by attempting to secure harmonized policies and technical positions for negotiations
- exchange of **information** between members, and co-operation in training and certification
- the **development of Pan American standards** covering terminology, test methods and product specifications. By 1987 there were 1542 standards and a certification mark exists, and issues involved in its usage and currently being studied.

It is likely that the bulk of these standards are direct transcriptions of ISO, IEC, OIML or Codex Alimentarius standards, or are Spanish translations of other internationally recognized standards. **The emphasis is on the adoption and usage of ISO/IEC standards rather than the independent development of regional Pan American Standards.**

COPANT maintains links for the co-ordination of standards activities with various regional organizations. These include the Latin American Free Trade Association (ALADI) the Organization of American States (OAS), the Board of the Cartagena Agreement (JAC) and finally the Amazon Pact (PA).

Within COPANT's structure, several committees have been established to look at conformity assessment and quality control. Currently COPANT is reviewing the possibility of establishing a laboratory accreditation scheme. COPANT's role has been limited by the underdeveloped state of NSBs, and the political instability in the region. Standards require long term planning and commitment to be effective in promoting long run industrial development, and political instability spills over into long term industrial and standards policy.

#### 6.5 The Pacific Area Standards Congress - PASC

A final regional organization of note is PASC whose members include both developed and developing countries. PASC is not involved in **standards development**. It is an organization with no formal structure, with the objectives of providing a forum for discussion and co-operation on standardization activities. **Currently there are eighteen members including the United States, Japan, Canada, Australia and also China, South Korea, Malaysia, Singapore and the Philippines.**

PASC has explicitly stated that it will not become involved in standards writing. Its main role is the promotion of ISO and IEC participation, and the enhancement of discussion on various topics relating to international standardization. Meetings are held every two years, with one country being nominated as a host. PASC has been successful in encouraging certain Asian countries to take more active role in international standardization.

## 7. INTERNATIONAL ISSUES IN STANDARDIZATION: Considerations for developing countries

The emphasis in standards bodies, whether national, regional or at world level, is to some extent excessively on procedures and methods. This also applies to the execution of the GATT Code on Technical Barriers. **Yet, the overriding purpose of standardization is not to achieve consensus or to adhere to given procedures as such, but to make markets function better.** Standards may help the proper functioning of markets at the supply and demand sides. Related economic policy objectives may also be served by standards and conformity assessments, and by the removal of technical barriers, such as the promotion of industrial development, the diffusion or transfer of technology, the liberalization of trade, etc.

Analysis of the present and potential role of standards would seem to require such a broader, economic policy based perspective. From the present report, a number of issues may be identified for which further study is desirable. In general, there is a need to make more detailed cost/benefit analysis of technical regulations and standards, whether at national, regional or world level. This would involve an elaboration of the issues outlined in Chapter 2 of this study and it might be expected to be of assistance to policy makers in their understanding of technical legislation and market led substitutes for purposes of the development of trade.

It would also be important to have empirical economic studies made of the costs of technical barriers to trade in sectors of relevance to developing countries. In the few instances where empirical analyses of technical barriers have been made, it has turned out to be a rather tedious time-consuming exercise which needs to be conducted at fairly high levels of disaggregation. Therefore the terms of reference for such studies need to be carefully drafted. The results would provide badly needed insights into the nature and magnitude of the costs of these barriers, about which very little is known empirically.

Another issue of importance for developing countries would be the question of performance versus design standards, especially in the light of the gradual shift towards performance standards in OECD countries.

As international standards generally tend to have a less specific character, there is an obvious interest in those standards from developed countries that systematically build on ISO/IEC standards. Currently this is relatively rarely done in the cases of Japanese and United States standards, although this position is likely to change over time. Particularly with EC-1992 strengthening European standardization, and the strong response to these events in the United States, developing countries may hope to piggyback on these developments and gain easier market access. It would therefore be of value to undertake a special study of how European standardization is actually influencing international standards, through boosting the role of ISO/IEC standards, a favourable outcome for developing countries' access to EC/EFTA markets in the light of regional European standardization.

The 'new approach' of the EC has led, in general, to much greater flexibility in technical specifications. In addition the EC Court of Justice rulings for cases where no health, safety or environmental objectives are involved prescribe mutual recognition among EC Member States. This implies that third countries can freely choose the national regulatory regime of their

liking for entry into the Community (and, in the future, for most cases, EFTA too). As against these main liberal tenets of the EC regime with respect to technical barriers, the rewrite of the EEC Treaty (called the Single European Act) specifically calls for a high level of (health, safety, etc.) protection. Furthermore, and quite apart from EC-1992, there is a secular tendency in Europe and elsewhere to be more demanding in health and safety matters (see chapter 4 of this study).

Thus, besides its favourable effects for developing countries, as set out in Chapter 4 of this study, there is a danger that EC-1992 is inducing a trend towards higher quality standards as well as more stringent technical regulations, which might prove difficult to meet for developing countries exporters. Even if the European standard is not the highest possible, it may still be a demanding one for developing countries. Apart from anecdotal evidence, no analysis is available to confirm or confute this. To do so, an empirical study would be needed that systematically explored the expected impact of EC-1992 on the strictness of technical requirements and on higher quality standards. If empirical trends of greater stringency and higher limits are indeed confirmed, further work should concentrate on whether, dependent on the sectors, developing countries have indeed difficulties in meeting these demands.

As can be seen, therefore, a number of issues in standards need further examination as far as the developing countries are concerned. There are at the same time certain policy areas where initial conclusions can be drawn, for action on the part of developing countries and the international community.

With respect to ISO and IEC, more attention should be paid to the utility of international standards for developing countries. For instance it may well be that an excessive dilution of standards occurs at the ISO level, caused partly by voting patterns of developing countries which is against their own interests, as it further reduces the attraction of ISO standards in the target export markets of developing countries. It might therefore be advisable to shift emphasis away from standards writing in developing countries to the actual use of international standards. The existing structure of standards does to some extent offer certain opportunities to developing countries. The fact that in many product sectors, no ISO standards are prepared by developed countries provides opportunities for developing countries to promote the formulation of international standards which would help them to produce at consistent and recognized quality levels, thereby enhancing South/South trade and possibly other segments in the global market.

The utility of international standards as a means of technology upgrading in developing countries appears extremely limited at the moment, except in connexion with export industries. International standards are of course transposed into national or regional standards in the developing world, but interest in buying ISO/IEC standards directly is very low in almost every country of the world. Apparently, their function lies more in general training purposes or as background information for a few testing institutes. Hence there is virtually no direct impact on industrial development for developing countries.

Technical co-operation can help redress some of these fundamental weaknesses with respect to ISO and to a lesser extent IEC standards. In general, the potential contribution of international standards to industrial development needs careful assessment if ISO/IEC standards are to play a wider

substantive role . However, aid to developing countries for the purposes of standardization should respond to the needs of the country and its capacity effectively to absorb the aid. Assistance that is limited to the supply of copies of ISO/IEC or other internationally recognized standards can bring few benefits if these standards are stored incorrectly, if they are not updated, or if individual manufacturers in developing countries find access and interpretation difficult.

With respect to GATT, there is a good case for developing countries joining the GATT Code as soon as possible, taking account of their resources. In the case of the least developed countries there are arguments for external finance for the required enquiry points. Up to now, only about 20 developing countries signed the Code. The effectiveness of the GATT Code can be greatly improved, although, as was pointed out in Chapter 4, the inherent limitations of global agreements should not be lost sight of. The potential benefits for developing countries appear considerable, given the special and differentiated treatment which is accorded to developing countries.

In improvements to the GATT Code itself, special attention should be paid to Process and Production Methods (PPMs), as they have particularly powerful implications for developing countries.

Better use of international standards and signing of the GATT Code, could be part of an overall strategy within individual developing countries, to promote more systematic standardization and product quality as a means of industrial development. One step towards this would be comparison of country experiences in selected OECD and developing countries. This could be combined with a wider view of industrial development, to formulate an analytical perspective and practical application of such standards strategies for individual countries' cases. Plans for institutional and technical measures could be drawn up in the context of strategic industrial strategy formations with special attention paid to the role of foreign direct investment into the country, and exports from the country.

Regional standardization activities in developing countries can in principle save scarce resources in the writing of appropriate standards. However, the various regional organizations are still relatively weak, or else have not moved beyond serving as training services and organizing conferences, with the possible exception of ARSO. There is also a tendency of overlapping bodies, and proliferation of organizational levels. These aspects may be a manifestation of the general difficulties of economic integration processes among developing countries. Therefore it is desirable, before advocating the potential benefits of regional standards, to spell out clearly the rather demanding conditions under which regional standards bodies can substitute for national standards writing. Such potential benefits include:

- saving of scarce technical, human, and financial resources
- co-ordination of positions in ISO
- cheaper and broader information bases
- greater availability of experts

Desirable pre-conditions for promoting regional bodies would ideally include the prior establishment of well functioning national standards bodies and effective linkages with regional trading blocs or other forms of economic co-operation.

As has been noted in this study, co-operation between developed and developing countries represents an important opportunity for the extended use of standards to improve the contribution of industry to overall economic development. There is a need for an analytical overview of what is the present level and concentration in such co-operation. This suggests that a survey of the bilateral co-operation agreements, and informal arrangements between the principal standards bodies in OECD countries and individual developing countries would be desirable. Although this co-operation is much to be recommended, it may also have the unfortunate consequences of competing bodies, promulgating their own standards. This could be conceived as a covert attempt to capture developing countries' markets. Such an analysis might lead, for instance, to recommendations on co-ordination in ISO's Development Committee (DEVCO).

On the part of developing countries more systematic efforts should be made to inform their industries and exporters about the technical standards, regulation and conformity assessment in developed countries or other export markets. Although this may be a rather obvious point, it may well be neglected in practice, even though it is absolutely essential for an export development strategy. The question of allocating responsibility for the task, whether it should be done by the NSB or the body responsible for export promotion, will depend on their relative strengths and their closeness to the manufacturing sector.

On the information question in general, there is a tendency towards a proliferation of data banks to facilitate access to and comparison of standards. Examples would include ISONET at world level, and ICONE and INFOPRO at EC/EFTA level, as well as numerous national data bases which contain international data. The PERINORM database, available on CD-ROM, and containing information on DIN, BSI and AFNOR standards is another relevant form of information diffusion. Gradually this leads to easier access and better knowledge about standards. At the same time, however, there are reasons not to welcome this proliferation too uncritically. One needs to question the ability of such data bases to satisfy the needs of the users, without further consideration of the ways in which they are used and the need for assistance in associated areas.

Finally, with respect to quality control, its role in export development for developing countries needs to be assessed. This would assist policy makers in determining the appropriate mechanisms for encouraging its use. Traditionally, the concentration is still on quality control as a management issue at the firm level, to the neglect of the national policy aspects. Standardization of quality control systems has manifested itself in the ISO 9000 series. The role and economic significance of these standards in promoting quality in developing countries need to be carefully examined.

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**GLOSSARY**

AECMA	= Aerospace Standards Committee (EC)
AFAQ	= French Quality Assurance Association
AFNOR	= French National Standards Institute
AHAM	= American Home Appliance Manufacturers
AIrA	= American Insurance Association
ALADI	= Latin American Free Trade Association
ANSI	= American National Standards Institute
ARSO	= African Regional Standardization Organization
ASME	= American Society of Mechanical Engineers
ASMO	= Arab Organization for Standards and Metrology
ASTM	= American Society for Testing and Materials
BOCA	= Building Officials and Code Administrators International (United States)
BS	= British Standard
BSI	= British Standards Institute
CCIR	= Broadcasting Standards Committee of ITU
CCITT	= ITU Committee for telecom and IT standards
CE-mark	= Mark affixed on products complying with EC technical regulation
CEE	= International Commission for Conformity Certification and Electrical Equipment
CEN	= (EC/EFTA) Committee for European Standardization (non-electrical)
CENELEC	= (EC/EFTA) Committee for European electro-technical Standardization
CEPT	= Committee of European Postal and Telecom Administrations
COPANT	= Pan American Technical Standards Committee
COPOLCO	= ISO Consumer Policy Committee
CPSC	= Consumer Product Safety Commission (United States)

CTBA	= Wood and Furniture Testing Agency (France)
DGPI	= German Society for Product Information
DGWK	= German Society for Certification and Marks
DIN	= German Standards Institute
DITR	= German Information Center for Technical Specifications
DKE	= Electro-technical Standards Committee (Germany)
DOD	= Department of Defence (United States)
DQS	= German Society for Certification of Quality Assurance Systems
EC	= European Community
ECCAS	= Economic Community of Central African States
ECISS	= EC steel Standards Committee
ECOWAS	= Economic Community of West African States
EFTA	= European Free Trade Association
EIA	= Electronics Industry Association (United States)
EN	= European Standard
ENV	= European Draft Standard
EOTC	= European Organization for Testing and Certification
ETSI	= European Telecom Standards Institute
EWOS	= European Workshop for Open Standards
FDA	= Food and Drug Administration (United States)
FM	= Factory Mutual Engineering Standards (United States)
GATT	= General Agreement on Tariffs and Trade
G-mark	= Good Design mark (Japanese)
GCC	= Gulf Co-operation Council
GSA	= General Service Administration (United States)
HD	= Harmonization Document (of CEN/CENELEC)
HDTV	= High Definition TV
HZ	= Herz

ICONE	- Data base of European and National (EC) Standards
IEC	= International Electrotechnical Committee
IECEE	= IEC system for Conformity Testing to Standards of Safety Equipment
IECQ	= IEC Quality Assessment System for Electronic Components
IEEE	= Institute of Electrical and Electronic Engineers (United States)
IFRB	= International Frequency and Registration Board (of ITU)
ISO	= International Standards Organization
ISONET	= Information Network for ISO Standards
ISDN	= Integrated Systems Digital Network
ITU	= International Telecommunications Union
JAC	= Board of the Cartagena Agreement
JAS mark	= Japanese Agricultural Standards mark
JIS (mark)	= Japanese Industrial Standard (mark)
JISC	= Japanese Industrial Standards Committee
JSA	= Japanese Standards Association
JSS	= Japanese Standards System
JTC 1	= Joint Technical Committee no. 1 (of ISO, IEC and ITU)
LNE	= National Testing Laboratory (France)
MITI	= Ministry of International Trade and Industry (Japan)
NF	= French Standard
NIST	= National Institute of Standards and Technology (United States)
NOREX	= Technical Standards Service for Exporters (France)
NSB	= National Standards Bodies
OAS	= Organization of American States
OIML	= International Organization for Legal Metrology
OSI	= Open Systems Interconnected

PASC	= Pacific Area Standards Congress
PPM	= Processes and Production Methods
RACE	= Research in Advanced Telecommunications for Europe
SADCC	= Southern African Development Co-ordination Committee
SASO	= Saudi Arabian Standards Organization
SCUSA	= Standards Council of the USA (proposed)
S-mark	= Safety Mark. for products complying with Japanese law
SQUALPI	= Quality Directorate of the French Ministry of Industry
TAG	= Technical Advisory Group (in ISO)
TBT	= Technical Barrier to Trade
TC	= Technical Committee
T-mark	= Mark indicating compliance with Japanese law on electrical apparatus (power; quality)
UEATC	= Building Products Union of the EC