

Standards and Standards Organizations in the International Free Trade Regime

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With the evolution of an international free trade regime in telecommunications the economic significance of technical standards has been broadly acknowledged. But their evaluation has remained somewhat diffuse due to the ambivalent nature of standards that can facilitate as well as impede international trade. Focussing on the World Trade Organization (WTO) this article examines the role of technical standards and the principles according to which standards and standardization organizations are assessed. The WTO's view is extremely formal and restricted and remarkably mismatched with the contemporary hybrid international standards regime.

Introduction¹

Standardization is usually regarded as a highly technical matter that is charged to specialized experts. It is extremely difficult to access by business managers who at the same time increasingly stress the strategic significance of standards. Likewise political actors have become aware that standards affect a country's economic welfare and that they can be used as instruments of trade policy to facilitate as well as to hamper cross border trade.

Focusing on telecommunications, which for decades was highly regulated but is now being transformed into an international free trade regime, this article examines the role of standards and standardization organizations in this regime. After a brief look at the landscape of standardization organizations, which has developed into a hybrid standards regime, I ana-

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lyze how the World Trade Organization (WTO) approaches standards and standards organizations on the background of its free trade goal. This section includes a critical assessment of the WTO policy in this area. In the conclusion I will highlight incompatibilities of the WTO view of standards and standards organizations with the landscape of these organizations and the role standards can play in international trade.²

Towards a hybrid standards regime

In the last two decades committee standardization, i.e. the process of negotiating standards and the respective institutional settings, in telecommunications and information technology have changed considerably. These changes have been described and explained elsewhere and need not be discussed in detail in this article (Werle, 1999; 2001a). They can be summarized as follows:

- from regulation to coordination
- from a predominantly technical to a business approach
- from national to regional and international standardization
- from intergovernmental and other official organizations to private forums and consortiums of standardization.

The growing significance of private standard-setting which indicates a shift from official to informal standardization can be regarded as the most important aspect of transformation. In the 1990s many private consortiums and forums were created, while others extended their domains. In telecommunications, the Asynchronous Transfer Mode (ATM) Forum and the Frame Relay Forum are two examples. Others are related to the Integrated Services Digital Network (ISDN). The biggest consortium in the area of information technology with over 800 members is the Object Management Group (OMG), which develops software specifications. Estimations of the number of private standards organizations vary. At the end of the 1990s a survey of the Information Society Standardization System (CEN/ISSS, 1999) identified over 140 consortiums and forums which claim to be open standardization organizations. Most significant has been Internet standardization which takes place almost completely detached from any official standards development. Internet standards are adopted by the Internet Engineering Task Force (IETF), which is open to anyone interested in participation. But also the World Wide Web Consortium (W3C), which was established outside the IETF and has more than 500 member organizations, develops Internet standards.

Although more and more private organizations such as business and trade associations, professional organizations and industry consortiums and forums are involved in one way or another in standard-setting the official standards organizations, such as the International Standardization Organization (ISO), the International Electrotechnical Commission (IEC) or the International Telecommunication Union (ITU) have most visibly shaped

the landscape's institutional structure (Schmidt and Werle, 1998). Its prevailing features are included in Diagram 1. Many of these features, however, are shared by the private organizations.

Diagram 1
Prevailing institutional features of standards organizations

1. Participation is within certain membership rules open to those who are "substantially interested."
2. The work is committee-based, cooperative and consensus-oriented. It follows formalized rules and procedures.
3. Organizations and working procedures are impartial, unsponsored and politically independent ("due process"). The organizations are non-profit organizations.
4. The work is based on technological knowledge and follows the principle of parsimony of standards. It is not remunerated (voluntary) and conceived of as superior to market selection of standards.
5. Standards are non-mandatory and public goods. However, they are not necessarily provided to the public completely free of charge (but on equal terms).

These institutional similarities have facilitated the evolution of a complex web of official and unofficial standards organizations which relies on self-coordination. The status of the standards which are produced in this regime is often ambivalent or unclear. Firms and users may not make a difference as to by which organization a standard was adopted if they regard a standard as beneficial. In international agreements and contracts, however, the tendency prevails to refer to "official" standards and therefore the hybrid character of the institutional landscape of standardization is regarded as a source of uncertainty or confusion.

Standards in the regime of the World Trade Organization (WTO)

For more than a century the world telecommunications system was dominated by national monopolies and rigidly regulated international relations in this industry. But the regime has undergone dramatic changes. A free trade regime is evolving in an area in which the term competition was unknown concerning the operation of networks and the provision of (telephone) services at the national and the international level. Central elements of the new international order emerged in the context of the General Agreement on Tariffs and Trade (GATT) and the WTO. This regime aims at removing barriers to trade in goods as well as in services and it also uses standards as an instrument of liberalization.

The following examination is focused on those elements of the WTO telecommunications regime which refer to technical standards and regulations. The WTO draws its distinction of standards and regulations from the ISO. The ISO uses the term technical standard if compliance is voluntary and it talks of technical regulation if compliance is mandatory. It should be

noted that the ISO accepts as standards only those "documents" which are adopted by "consensus" and approved by a "recognized body."³ This definition excludes *de facto* standards and—more important in this context—all documents which were adopted by unofficial bodies.

Trade agreements referring to standards and regulations and principles of their development and adoption

The central agreements referring to standards, regulations and standardization are included in Diagram 2. They relate to services but also to goods such as telecommunications equipment and terminals. Given the growing overlap of communication and information technology one could add to the list the Information Technology Agreement (ITA) from December 1996 (Blouin, 2000). This agreement eliminates all tariffs on information technology equipment including many telecommunications items but it does not embrace any specific measures regarding non-tariff barriers to trade such as standards.⁴ The Agreement On Technical Barriers To Trade (ATBT) on the other hand, which is included in Diagram 2, is not exclusively geared to telecommunications. It deals with standards and other potential trade barriers in general but lays down relevant principles of standardization which apply to telecommunications, too. The same holds for the Agreement on Government Procurement which stipulates rules concerning governments' purchasing behavior in general (Evenett and Hoekman, 2000).

Diagram 2
Main sources of standards related elements of the WTO
telecommunications regime

- General Agreement On Trade In Services (GATS) including an Annex On Telecommunications (entered into force 1995)
- Agreement On Basic Telecommunications (ABT) including the (regulatory) Reference Paper (entered into force 1998)
- Agreement On Government Procurement (including services) (AGP) (entered into force 1996)
- Agreement On Technical Barriers To Trade (ATBT) including a Code Of Good Practice For The Preparation, Adoption And Application Of Standards (Annex 3) (entered into force 1995)

Starting with the General Agreement On Trade In Services (GATS) we find references to technical standards in Part II (General Obligations and Disciplines). Article VI (Domestic Regulation) stipulates *inter alia* that technical standards "do not constitute unnecessary barriers to trade in services." In determining whether standards conform with this stipulation "account shall be taken of international standards of relevant international organizations." In a footnote it is explained that these relevant organizations are "international bodies whose membership is open to the relevant bodies of at least all members of the WTO."

In an Annex On Telecommunications the GATS elaborates on certain aspects of the general agreement pertaining to this industry. It specifies, for instance, the general transparency requirement of GATS Article III. According to this specification each Member is to ensure the public availability of definitions of technical interfaces with public networks and services to facilitate access and it is to provide information on bodies responsible for the preparation and adoption of standards affecting such access and use. But the Annex also provides that in order to prevent harm to networks and services Members are allowed to impose "conditions necessary to protect the technical integrity of public networks or services" which may include "a requirement to use specified technical interfaces, including interface protocols, for inter-connection" and also "type approval of terminal or other equipment which interfaces with the network." Again the "importance of international standards for global compatibility and inter-operability" is stressed. The ITU and the ISO are explicitly referred to as organizations which adopt and promote the relevant standards.

The Agreement On Basic Telecommunications (ABT) is regarded to be a substantive step further towards opening markets. A major accomplishment is the ABT Reference Paper which provides a regulatory framework for telecommunications. It includes competitive technical safeguards and rules to ensure interconnection. *Inter alia*, "major suppliers" are to be prevented from "not making available to other service suppliers on a timely basis technical information about essential facilities." Interconnection is to be ensured "at any technically feasible point in the network," and it is to be provided in a timely fashion "sufficiently unbundled" and on transparent terms, including transparency regarding technical standards and specifications.

The Agreement On Government Procurement (AGP) does not explicitly address telecommunications but covers all areas of public procurement of goods and services. Standards are referred to in Article VI which requires that "technical specifications shall not be prepared, adopted or applied with a view to, or with the effect of, creating unnecessary obstacles to international trade." Procuring government agencies shall prescribe these specifications "in terms of performance rather than design or descriptive characteristics," and the specifications are to "be based on international standards, where such exist; otherwise on national technical regulations or recognized national standards."

Finally the *Agreement On Technical Barriers To Trade (ATBT)* focuses on products and not on services. But it is highly instructive because it *lays out the WTO's general understanding of technical regulations and standards*, suggests how to proceed if standards diverge and provides a Code Of Good Practice For The Preparation, Adoption And Application Of Standards (Annex 3 to the ATBT). Annex 1 includes the definitions of the central terms used in the ATBT. In line with the terminology of the ISO Annex 1 distinguishes between technical regulations which are mandatory and standards which are voluntary. It reiterates that standards are documents approved by a "recognized body." Such a body can be national, regional or interna-

tional in scope. The ATBT calls only those bodies regional or international bodies which are open the "relevant bodies" of the Members in the respective territories. This practice creates difficulties as to how private consortiums and forums have to be treated because the majority of their members are business organizations or individuals. Many of these private standards organizations may formally be open to the "relevant bodies" of the WTO member states. Yet this would have to be checked in every single case. Thus, without further examination only official organizations such as the ISO, the ITU or at the national level the British Standards Institution (BSI), the Deutsches Institut für Normung (DIN) or the Association Française de Normalisation (AFNOR) can unequivocally be called recognized bodies.

Similar to the wording in the AGP, Article 2 of the ATBT which refers to technical (mandatory) *regulations* stipulates Members to ensure that the regulations do not create unnecessary obstacles to international trade.⁵ This does not rule out that Members take measures to ensure the quality of their exports or to protect the environment and human, animal and plant health unless these measures constitute disguised restrictions to international trade. Whenever in the Members' view regulations are required they shall be based on international standards if they exist and are considered appropriate. Transparency principles oblige Members to notify others if they adopt specific technical regulations which are not in accordance with international standards. If regulations differ from country to country Members are to take them to international standards organizations and try to *harmonize* them. Members are also to consider accepting (*recognizing*) regulations of other Members as equivalent.

Article 4 focuses on the preparation, adoption and application of (voluntary) *standards*. It contains no substantive rules but rather refers Members to the Code of Good Practice in Annex 3. Members are to ensure acceptance and compliance with that code by "government standardizing bodies" but also by "non-governmental bodies" within their territories and by "regional bodies" in which Members or their standardizing bodies participate. Likewise, all standardizing bodies complying with the code shall be acknowledged as also complying with the principles of the ATBT.

Virtually all standardization organizations are invited by the WTO to declare acceptance of the Code of Good Practice. If they do so or withdraw from this code they shall notify the ISO/IEC Information Center which promptly conveys a copy of this notification to the WTO secretariat.⁶ The Information Center publishes a directory of the organizations which have declared acceptance and, if available, their work programs every year. The list in Diagram 3 includes significant substantive rules of the Code of Good Practice concerning the practice of standards organizations.

As of December 2000, 131 standards bodies from 91 countries were officially recognized. The majority are formally non-governmental organizations, but they have a national base and are officially accredited in one way or another. They definitely do not belong to the large group of private "supranational" consortiums and forums which are active in standard-setting in information and communication technology.

Diagram 3

Selected rules of the Code of Good Practice for the Preparation, Adoption and Application of Standards (Annex to the Agreement on Technical Barriers to Trade)

- No standards shall be adopted which create “unnecessary obstacles to international trade.”
- If appropriate international standards exist they shall be used as a basis for the standards the respective body wants to develop.
- A delegation of each body which adopted a standard regarding a specific subject matter shall participate in an international standardizing body which prepares a standard in that subject matter “with a view to harmonizing standards.”
- Duplication or overlap of the work of one standards body with the work of another body in the same national territory or with the work of “relevant international or regional standardizing bodies” shall be avoided (avoidance of jurisdictional conflicts).
- Wherever appropriate, standards shall specify product requirements “in terms of performance rather than design characteristics.”
- The work of the standardizing bodies shall be transparent and open to participation of “interested parties.” After adoption standards shall be promptly published.

The major part of the ATBT deals extensively with rules and procedures to assess conformity with technical regulations and standards. They shall not be examined here.⁷ The final articles of the ATBT contain institutional provisions regarding dispute settlements according to the GATT Dispute Settlement Understanding and the establishment of a *Committee on Technical Barriers to Trade*. This committee is composed of representatives from each of the Members and is charged with examining the implementation and operation of the ATBT and providing a report every three years.

The committee’s first triennial review was published at the end of 1997.⁸ After the committee had “reiterated the importance of the prevention and elimination of technical barriers to trade” it concluded that “the status of implementation [of the ATBT] was not satisfactory.” This statement is *inter alia* substantiated with regard to technical regulations as well as to standards. The committee emphasized that promulgation of national regulations should be avoided where they were not necessary, that regulation should not be more trade restrictive than necessary, that coordination between governmental regulatory authorities, trade officials and national standardizing bodies was essential, and that generally “good regulatory practice” was “a priority for members to facilitate trade.” Spoken frankly rather than in the diplomatic terms of an international organization, the committee criticizes that an overload of binding national technical regulations severely hampers international trade. Concerning standards the committee reiterated the importance of international standards. They should be used as the

basis for technical regulations if regulations are regarded as necessary. The committee also asked for "closer cooperation between the WTO and relevant international standardizing bodies." With regard to the Code of Good Practice the committee considered its status of implementation as "not satisfactory." The proliferation of standards adopted by bodies which did not follow the disciplines of the code "could have a potentially adverse impact on trade, even if they were voluntary." International standardization should be preferred over national and regional activities to avoid duplication and overlap of work and the adoption of different standards to achieve similar objectives. Finally the committee emphasized the importance to take "trade needs" into account along with technical progress what suggests that still in many standards organizations technical rather than trade concerns prevail.

In November 2000 the second triennial review was published.⁹ While it notes that some progress has been made concerning the implementation of the rules of the ATBT it also illustrates several deficits. Interestingly some problems shifted from the area of standard setting to that of assessing the conformity of products and services with standards and regulations. The committee expresses "growing concern with respect to the restrictive effect on trade of multiple testing and conformity assessment procedures." In a short section on technical regulations the committee again pleads for a reduction of the regulatory burden through minimizing the use of mandatory regulations and utilizing voluntary international standards. Finally the committee notes that "a diversity of bodies" were involved in international standardization and that not all of them had "procedures for soliciting input from a wide range of interests" with potentially adverse trade effects of standards adopted by these bodies. This problem motivated the committee to specify "principles for the development of international standards" in an appendix (Annex 4) to the report. These principles are virtually identical with what has been identified as the prevailing institutional features of standards organizations in Diagram 1 above. They include transparency, openness, impartiality and consensus, and they are shared, as I have argued, by the official but also many private standardization organizations.¹⁰

Assessment of the role of standards as instruments of trade policy

The WTO regards standards as crucial factors affecting international trade. They can facilitate market access of foreign suppliers but also hinder international provision of services if e.g. different national standards of telecommunications networks impede cross border interconnection.¹¹ The international trade regime includes institutional provisions and standardization rules which aim at avoiding detrimental and promoting supporting effects of standards on trade. The provisions and rules of the WTO regime are assessed from two angles: one relates to their feasibility and practicability and the other concerns their basic principles and underlying assumptions. Only a few critical provisions and rules are examined here.

1. The first rule (*one standard rule*) is akin to what is called the principle of parsimony of standards in Diagram 1 which has been identified as an institutional feature of standardization shared by most standards organizations. This principle relates to international trade rules according to which standards and regulations shall be international or based on *international standards*. If regulations or standards differ from country to country they shall be *harmonized*.

The principle of parsimony of standards can be regarded as one *raison d'être* of committee standardization. Actors have an interest in coordinating their activities in order to reduce inefficient variety. From the point of view of the trade regime variety reduction facilitates competitive international trade. This reduction can be achieved by adopting genuinely new standards, if possible in an organization with a global scope, or by trying to reduce the number of existing functionally equivalent standards through negotiations on harmonization.

It is an undisputed point that having only one standard increases efficiency because economies of scale and other benefits of a standard can be exploited. On the other hand, there is often a tradeoff between standards benefits and variety benefits (Farrell and Saloner, 1986; Metcalfe and Miles, 1994; Brunsson and Jacobsson, 2000, pp. 138-150). In general standards do not completely exclude but set limits on variety. These limits may be too rigid in an industry such as information and communication technology where the speed of innovations is high. As a consequence, harmonization of existing standards, in particular, may not be adequate because it means a reduction of variety on the basis of the technological *status-quo*. This may impede rather than stimulate technological innovation in an area in which even switching from an established less efficient voluntary standard to a new more efficient standard is difficult to accomplish (Leibenstein, 1984; David, 1985).

*Harmonization is perceived by the WTO as a precondition rather than an effect of free trade.*¹² In the United States we find many instances in which competition of standards in the market with the potential result that the most efficient standard will prevail is preferred to committee selection (cf. NRC, 1995; also Liebowitz and Margolis, 1999). According to this market selection approach some degree of "harmonization" emerges as the spontaneous result of opening trade.¹³ In the case of voluntary standards—due to network externalities—the standard of the largest market is likely to diffuse into neighboring markets (Werle, 1997). Also with regulations market processes may produce harmonization. It has been argued that this process leads to convergence on the lowest common denominator, e.g. the lowest safety standard of the countries involved, respectively to a race to the bottom, e.g. towards ever lower safety standards. However, we have no *a priori* reason to expect that such a result is the most efficient outcome of competition of regulations (Casella, 1996).

Arguably, free trade is most efficient when standards differences among regions or countries can be exploited by industry (cf. Bhagwati and Hudec,

1996). Concerning competition we find many instances in which competition among firms using the same standard (competition within a standard) is less vigorous than competition among firms using different standards (competition between standards). The latter has often been likened to a battle of systems. These arguments suggest that concerning harmonization and parsimony of standards viable alternatives exist to the WTO rules.

2. The second rule grants national authorities the right to adopt as regulations standards concerning *essential requirements* in order to ensure e.g. environment and health protection or the technical integrity of telecommunications systems.

This rule allows for standards diversity between countries and regions. If the regulations are restricted to require conformance with essential requirement provisions, efforts towards harmonization can be confined to them. Other elements of a regulation or a standard can remain unaffected which facilitates international competition of standards and regulations. If harmonization of essential requirement provisions cannot be achieved the costs of adaptation to this regulation remain comparatively low as long as the provisions are really restricted to what appears to be indispensable. In this case international trade and competition are not ruled out. In the GATS Annex On Telecommunications the "dual role" of telecommunications as a distinct part of the service economy and as a transport infrastructure is emphasized. Arguably essential requirement regulations if they relate to technical systems integrity can be restricted to the transport infrastructure, i.e. the networks and connected services, in particular to bottlenecks and "essential facilities" in this area, and leave the vast majority of other services unregulated. This disaggregated approach to technical regulation provides much room for self-coordination through standards and also for competitive network operation and service provision (cf. Knieps, 2000).¹⁴

3. The third rule provides a *definition of the term standard*. After this definition which is borrowed from the ISO/ IEC only documents approved by a *recognized body* on the basis of *consensus* qualify as standards.

The definition of standards excludes technical specifications that have evolved in markets as *de-facto* standards and have never been approved by any committee. But it also excludes specifications which have been adopted by private consortiums and forums even though these organizations are generally committed to the consensus principle. The problem is that virtually none of these international private units enjoys the status of a recognized organization. Thus, from the angle of the WTO regime the standards issued by these organizations are unofficial or private standards. Their use—even their inclusion in more encompassing regulations—is not automatically qualified as being in conformance with free trade principles. Many voluntary standards which are crucial for the global functioning of telecommunications networks and services were issued by private organiza-

tions. Internet standards developed by the Internet Engineering Task Force (IETF) or by the World Wide Web Consortium (W3C) provide the currently most prominent examples. Concerning the substantive quality of standards we will rarely find significant differences between official and unofficial standards. Often it is contingent on business strategy or simply a matter of historical accident if a standard is adopted by an official or a private standards organization (cf. Lehr, 1996; Werle, 2001a). But the narrow definition of official standards in the WTO regime excludes most standards developed by private organizations although these private entities exist in abundance as has been indicated above. Apparently they have no interest in being recognized even though many of them comply with the ATBT's Code of Good Practice and its specifications by the Committee on Technical Barriers to Trade.

The WTO agreements in the area of telecommunications mention only the ISO, the IEC and the ITU as recognized international standards bodies. These and some other official organizations with regional significance have set up liaisons with some of the most visible consortiums and forums and convinced them to feed some of their standards into the adoption process of the official organizations where they are usually approved without intensive further negotiations. Thus their standards achieve the status of official standards (cf. Rada, 2000). These tendencies notwithstanding, the intergovernmental WTO setting appears to have problems dealing appropriately with hybrid international regimes such as the standards regime in which governmental and private elements are blended (cf. Willetts, 2000). It should be added that even more severe problems are likely to arise if the WTO is confronted with technologies and standards developed in the loosely coupled organizational context ("Bazaar") of "Open Source" (cf. Raymond, 1999). The WTO in effect stabilizes the position of official organizations—just the group of standards entities whose working procedures have been challenged as being too slow, as ignoring trade needs, and as being dependent on and influenced by governments' and other political actors' industrial policy concerns. Despite the structural affinity of the WTO and the official international standards organizations they have not yet managed to set up encompassing collaborative relations. Given all these unresolved issues it comes as no surprise that the Committee on Technical Barriers to Trade concluded in the first triennial review that the status of implementation of free trade rules in the area of standards, regulations and other potential barriers to trade was not satisfactory, and reiterated in the second review that the issue of implementation was "of an ongoing nature."

Conclusion

Mandated technical regulations as well as voluntary standards are regarded necessary to facilitate the interoperation of components of networks, the interconnection of networks and the provision of services in technically heterogeneous environments but also to protect the technical integ-

rity of networks and services. Developed to fulfill specific functions they may differ from country to country or region to region. This can, deliberately or not, have the effect to impede market entry and international trade. That is why standards are addressed in free trade provisions.

Most internationally significant standards are voluntary. They are adopted by officially recognized standards organizations as well as by private consortiums and forums. With respect to their substantive quality and their market diffusion no significant difference can be observed between the standards developed in either type of organization. Moreover, the organizations share many institutional features which should prevent us to generally privilege one type of organization over the other. Even though some differences still exist standard-setting is no longer understood as solely technical problem solving. Industrial policy considerations and more so business strategic concerns have moved to the forefront. Also in this sense we can speak of a hybrid landscape of international standardization.

The international trade regime in telecommunications as it is shaped by the WTO widely ignores this fact. Where standards are referred to they only enjoy legitimacy if they have been adopted by recognized standards organizations. At the international level only the ITU, the ISO and the IEC are recognized entities. But they issue no more than a fraction of relevant standards in communication and information technology. Most Internet standards, for instance, are adopted by the Internet Engineering Task Force or the World Wide Web Consortium. Therefore they do not qualify as international standards on which regulations or other standards are to be based.

The WTO's restricted understanding of standards is complemented by a view of the role of standards in trade policy which is not uncontested either. From the WTO's vantage point standards shall be used as instruments of pro-competitive trade policy while national governments tend to use them in an anti-competitive way. Therefore the WTO stipulates divergent national standards to be aligned to only one (international) standard in negotiations aiming at harmonization. The ideal state would be to have "one standard, accepted everywhere." In dynamic industries such as telecommunications, however, the co-existence of a variety of standards induces innovation and often boosts competition. Insisting on one single standard may eventually lead to economic disadvantages rather than benefits. Moreover, if standards are regarded as emerging conventions rather than instruments of trade policy we have good reasons to suggest opening of markets to competition without harmonizing standards. In open markets it is contingent on competitive processes and related self coordination through voluntary standards rather than administrative or diplomatic deliberation if at the end harmonized standards emerge.

Notes

1. For valuable comments I am indebted to two anonymous reviewers.
2. For a more encompassing examination of changes in standardization and the international trade regime including the European Union's internal market regime see Werle, 2001b.

3. See: <http://www.wssn.net/WSSN/gen_inf.htm#Whatistd>.
4. The issue that standards can be barriers to trade is addressed in the so-called ITA II multilateral talks on regulatory reform (Wilson, 1997).
5. Altogether some 30 individual legal texts of the WTO agreement, including the ones examined here, oblige the Members to ensure that technical regulations and standards do not create unnecessary obstacles to trade.
6. This is one of the few instances of practical cooperation of WTO and international standards organization.
7. As a potential barrier to trade conformity assessment and the related certification procedures including the accreditation of test centers or laboratories raise issues which are in principle similar to those in standardization.
8. <http://www.wto.org/english/tratop_e/tbt_e/tbt5.htm>.
9. To be found at <http://docsonline.wto.org/GEN_highLight...> Document number 00-4811.
10. With respect to the other principles stressed by the committee (coherence, effectiveness and relevance of standards) the official organizations are frequently outperformed by the private ones.
11. It is, however, extremely difficult to measure trade impediments by specific trade barriers such as standards (cf. Warren and Findlay, 2000).
12. This view is shared by the Trans-Atlantic Business Dialogue (Stern, 1996).
13. Opening of markets in the presence of diverging standards can be achieved through mutual recognition agreements. However, in a multilateral trade system these agreements are extremely difficult to accomplish. We do find, however, many instances of bilateral mutual recognition agreements between countries and between regions (cf. Nicolaïdis, 1996; Beviglia Zampetti, 2000).
14. For a similar argument concerning harmonization of essential requirement standards in the EU see Blankart and Knieps, 1995.

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