TECHNICAL BARRIERS TO TRADE

How Ignoring Science When Developing Standards and
Technical Regulations Affects Trade
Between the United States and the European Union

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"On my honor as a student, on this assignment I have neither given nor received unauthorized aid as defined by the Honor Guidelines for Papers in STS Courses."

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I. Executive Summary

Standards are the principal non-tariff barrier to trade in markets around the world, according to the US Department of Commerce. When these standards fail to use sound science as their basis, they are more likely to interfere with free trade.

In the United States there is no government organization that creates standards. Instead, industry creates the vast majority of US standards. In Europe, on the other hand, the national standard bodies of European Union members develop the necessary standards. A single organization, the European Committee for Standardization, is in charge of overseeing their activity. There is a growing trend in standard creation to include the private sector.

This paper considers the precautionary principle and risk assessments as methods of evaluating standards policy. The precautionary principle provides an argument to prohibit an industrial activity or product, thought to cause harm, from entering a market; even without scientific evidence to prove it is harmful. Risk assessment, on the other hand, is a science heavy process with a defined structure.

The European Union favors the precautionary principle. This paper, on the other hand, supports the use of risk assessments because they are more likely to have a sound science base.

Three cases presented in this paper provide the argument against arbitrary standards: hormone treated cattle, construction standards and mobile phone standards. Hormone treated beef consumption does not pose a health threat; thus the ban on US beef exports to the EU should be lifted. Construction standards should be performance-based; and, in the case of the telecommunication industry, the use of a single standard is best for rapid industry growth.

II. Introduction to Technical Barriers to Trade (TBT)

Poultry producers in the US use a low-concentration chlorine wash as an antimicrobial treatment to reduce pathogen levels. Meanwhile, the European Union has banned US poultry due to health concerns because of the chlorine wash treatment even though there are not enough scientific facts to suggest that the chlorine treatment has any detrimental effects on consumers (Kogan, September 2003). Furthermore, European Union Member States have not completely complied with the ban on the use of chlorinated water for bathing poultry. Inconsistencies, such as this one, in regulations act as trade barriers. Each country has the right to set its own regulations to ensure the health and environmental well being of its citizens; but in certain cases these regulations are just an excuse for protectionist behavior.

After the signing of the General Agreement of Tariffs and Trade in 1947, one of the working groups concluded that technical barriers to trade were the largest impediment faced by the exporting industries. In the 1979 Tokyo round of the General Agreement of Tariffs and Trade, thirty two Countries signed the Agreement on Technical Barriers to Trade (Understanding the World Trade Organization, 2003). The purpose of the Technical Barriers to Trade agreement is to eliminate unnecessary impediments to trade disguised in the form of standards, testing or certification. A similar agreement regulated sanitary and phytosanitary barriers to trade.

Manufacturers and industry have to know what the standards (usually voluntary) and technical regulations (mandatory) are in order to remain competitive. If these laws don’t use sound science as their basis, they are more likely to constitute an obstacle to trade and violate the Technical Barriers to Trade and Sanitary and Phytosanitary Agreements.

III. How standards Work

In order to better understand how standards can affect trade, it is important to understand how standards work and how they are developed.

Standards are classified into performance based and design based standards. Performance based standards refer to the final product specifications and/or output. For example, the limit on parts per million of carbon dioxide an internal combustion engine is allowed to produce and still comply with environmental standards. Design based standards, on the other hand, dictate how the product must be produced or manufactured for the final product to comply with the regulations. For example, design standards could dictate whether an automobile chassis, in order to comply with crash safety standards, should be welded together instead of casting it in one piece.

The standardization process can produce mandatory standards; although most standards are usually voluntary. In addition, standards can be institutional, which means defined by a committee and formally adopted, versus de facto standards, which are not defined by a committee and usually consist of a design that has gained a considerable section of the market.

IV. Who develops standards and how

In most countries, industry groups are in charge of introducing standards. In others, the only standardizing entity is a government body. This section discuses the standards development process in the US vs. in Europe and gives some insight on international standardization bodies.

Standardization in the United States

Standards development in the US occurs in a much decentralized way, segmented according to industry groups. Of the 450 independent standard development organizations, about one fifth of them develop close to 80 percent of US standards (American National Standards Institute, n.d.).

Demand is the driving force for standard development in the US. Generally, standards emerge one-by-one in response to a specific government or industry concern. For the past 100 years the government has supported standard development, but with no central organization to regulate the process. This means that the government does not operate or directly finance a specific body.

The American National Standards Institute is a nonprofit, private sector, organization with approximately one thousand members that include companies, government agencies, institutions, trade and commercial organizations, among others. American National Standards Institute does not develop standards itself; rather it coordinates efforts, publishes standards and provides grounds for more standards development. The American National Standards Institute acts as the United States member to the International Organization for Standardization and many other international bodies that deal with standards. As a member of these organizations, American National Standards Institute represents the United States in discussions that involve trade policy from time to time (American National Standards Institute, n.d.).

The National Institute of Standards and Technology has the role of coordinating technical standards and conformity assessment activities between the United States government and the private sector for the sake of simplicity and to reduce duplication. National Institute of Standards and Technology works together with American National Standards Institute in order to increase US presence and to add weight to the decision making process of international activities (National Institute of Standards and Technology, 2001).

Standardization in Europe

The European Committee for Standardization was founded in 1961 and it is composed of the standardizing bodies of the member countries of the European Economic Community. The European Committee for Standardization develops voluntary technical standards coordinating efforts with other standardization bodies, such as International Organization for Standardization, to avoid duplicating efforts.

The policy making bodies and technical committees of the European Committee for Standardization are composed of delegations of the national standardizing bodies of the countries. The delegations are constructed of both industry groups and government agencies. The standards developed by the European Committee for Standardization are implemented as a voluntary agreement between all parties. The European Committee for Standardization works to improve technical coherence between nations, helping them implement standards at a national level, and remove conflicting standards (European Committee for Standardization, 2005).

Standards developed by the European Committee for Standardization and its member bodies are not mandatory, but the products manufactured according to those standards are awarded a ‘presumption of conformity’ to the legal requirements. Complying with the rules allows the product to bear the mark CE (See figure 1) which grants access to the European market (National Institute of Standards and Technology, Technology Administration and US Department of Commerce, June 2003). European organizations similar to the European Committee for Standardization have the task of writing the necessary technical specifications.

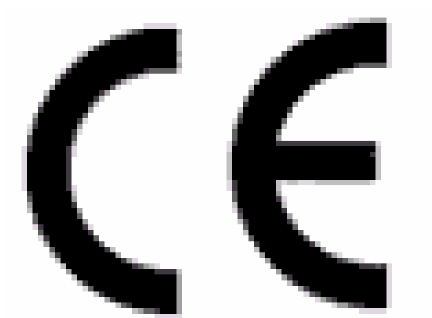

Figure 1. CE mark grants presumption of conformity to European legal requirements. (CE Marking, 2006)

International Standardization

In the international ambit, the most well known and most important bodies in charge of defining and distributing (not enforcing) standards are:

- **The International Organization for Standardization** Est. 1947 and currently overseeing 185 technical committees.
- **The International Electrotechnical Commission** Est. 1906 with 88 committees dealing mostly with electrotechnical issues.
- **The International Telecommunication Union**.

There are also other organizations that develop standards that are used globally (Kogan, May 2003). These organizations, among others, target specific sector necessities, such as material standards, boiler pressures, aviation standards, specifications for piping and fuels, among others (National Institute of Standards and Technology, 2001). A list of these organizations may be found in Appendix I.

V. Evaluation Methods

Standards and regulations can act as trade barriers under disguise. This is why Sanitary and Phytosanitary, and Technical Barriers to Trade agreements require regulations based on science and formulated through consensus at the international level. If such standards do not exist, the best thing to do is to use a science based risk assessment. In addition, the European Union heavily relies on the precautionary principle in the decision making process (Kogan, September 2003).

Precautionary principle

The precautionary principle proposed by the European Union to the World Trade Organization is a non-science based regulatory philosophy. The government can limit or completely ban a certain process, technique or formulation from the market if presumed to pose an unacceptable hazard.

The precautionary principle violates Sanitary and Phytosanitary and Technical Barriers to Trade agreements because it does not judge products on their physical or performance characteristics but rather on potential outcome. A country can exclude an industrial activity or product, thought to cause harm, even without enough scientific evidence to prove it is harmful. This poorly defined premise hinders trade and technological development (Kogan, September 2003).

Risk assessment and the use of science

In general the risk assessment team begins the process by consulting to experts and risk managers to determine the scope of the risk assessment. Once the experts help determine the scope, the team develops a flow diagram to delineate the steps of the process. Then, using the flow diagram, the risk assessment team conducts scientific research and collects published data. Next, team members weigh the collected data based on importance and use it to construct mathematical models. Finally, the team uses the mathematical models to evaluate the risk associated with the product/process. Unlike the precautionary principle, risk assessment is science heavy and has a defined structure.

Qualitative evaluations are more common than quantitative evaluations. Quantitative risk assessments are very time consuming and a minimum of data showing harmful effects can be linked to the precautionary principle. Qualitative risk assessments are more valuable because usually not enough data is available for a quantitative assessment. That is because most companies are worried about lawsuits or competitors so they will not share that information (Kogan, April 2004).

VI. Exemplary Cases

Beef Hormones

The Food and Drug Administration has approved certain steroid hormones for use at very low concentrations to improve weight gain in beef cattle. These stronger, more feedefficient cattle deliver a more flavorful and tender product at lower cost (Foreign Agricultural Services, February 1999). But since 1985 the European Union has banned all hormone-treated cattle product through the imposition of a number of Sanitary and Phytosanitary restrictions. The European Union, not surprisingly, used the precautionary principle to justify this ban (Kogan, September 2003).

The Food and Drug Administration has collected and analyzed data on the use of hormones to promote cattle growth and their effect on health since the 1950s and has not found any ill effect on human health. The World Trade Organization Appellate Body agrees that such measures lack scientific justification in the EU-Hormones case (World Trade Organization Appellate Body, 1998). Several international bodies have studied the issue and arrived at the same conclusion (Parish, 1999). Furthermore, the European Union's own scientists have not found negative effects on public health if applied in the right dosage and using appropriate methods (Parish, 1999).

Foods contain different amounts of hormones; for instance, one egg contains the same amount of hormones as do 6Kg of beef from hormone-treated cattle. The European Union beef industry is based on bulls, while in the United States the beef industry uses steers (castrated bulls). Therefore, cattle in Europe have more hormones than their hormone-treated American counterpart (Foreign Agricultural Services, February 1999).

US beef was banned from the EU based on a May 1999 report of the Scientific Committee on Veterinarian Measures Relating to Public Health, the EU argues that there is not enough information for a quantitative risk assessment on the consumption of beef from hormone-treated cattle. This statement reflects the habit of EU trade policy of applying the precautionary principle in the broadest way possible.

With 456 million people and an annual beef consumption of 6.45 million metric tons of beef (Foreign Agricultural Services, February 1999) the European market has great potential for American exports. These exports will only take place when the European Union lifts the unnecessary ban on US hormone-treated beef.

Construction Regulations

Citing particular standards when developing building regulation can help simplify the language of the regulation and delegate the more technical aspects to technical experts or private groups. The organizations in charge should develop the above mentioned standards in a manner that further promotes international trade. This involves using performance-based standards as opposed to design based standards.

"Performance-based regulations specify outcomes rather than specific solutions" (Bukowski, 2002). By specifying the outcome, performance-based regulations encourage creativity and flexibility and are more likely to be based on science. When the standards are not fit to accept innovative methods or materials there is a technical approval guide to ensure that these requirements are met. In the US, the body in charge of these technical approvals is the Evaluation Services Organizations together with the developer of the model code, in the UK it is the British Board of Agreement. In the interest of trade and international coherence, these organizations should base their conclusions on sound science.

The Federation of American Scientists has an ambitious project, joint with industry, to provide affordable housing using cutting edge technology pre-fabricated panels. Two of the project's most valuable contributions are: facilitating collaboration between science and industry and evaluating the ability of these technologies to meet regulations (FAS Kelly Henry, April 2005).

The involvement of such a prestigious association such as the Federation of American Scientists is crucial in narrowing the regulatory gap between countries who could benefit from the technology and the developers of this technology. This is a fundamental step in the right direction towards facilitating commerce between countries. Some of the potential targets are

Turkey, Afghanistan, Barbados, South Africa (FAS, April 2005) and Ecuador (Alison Tramba conversation, July 2005).

Even though it provides considerable advantages in most cases, science is not the ultimate solution. Some regulations make the most sense because of other reasons such as culture, politics, or geography. It would be very hard, if not impossible, to homogenize the fire safety standards of Italy, Great Britain and the United States just because of the primary construction materials. In Italy it is assumed that the construction material is marble, in Great Britain it is stone, and in the United States the most common is wood (Bukowski, 2002).

The mobile phone industry in the US and the EU

The mobile phone industry has grown exponentially in recent years, from 11 million subscribers in 1990 to over one billion in 2002 (WTO Report 2005). This growth has been strongly related to the creation of wireless telecommunication standards. These standards took separate paths in the United States and in Europe.

First generation, analog cell phones (roughly 1980 to 1990)

The Federal Communications Committee mandated the adoption of the Advanced Mobile Phone Service standard for analog phones in the US to prevent one provider from achieving monopoly. By 1993 over half the world's cellular system used this technology. Alternatively, in Europe, standards across countries conflicted and thus did work with each other. This situation impeded cell phone use between countries and the development of economies of scale. Because of this, the cell phone usage in Europe remained considerably lower than in the US (World Trade Organization, 2005).

Second generation digital cell phones (roughly 1991 to 2000)

Once again the US and the EU took different paths when deciding on national standards. The Federal Communications Commission in the US determined that the market should decide which one of the several possible standards would dominate the market. The

European Telecommunications Standards Institute, on the other hand, chose the Global System for Mobile Communications for the entire continent. The adoption of the Global System for Mobile Communications for all Europe fueled the increase in European cell phone usage from 4 percent in 1992 to over 90 percent in 1998 (World Trade Organization, 2005). In the United States various systems competed, including first-generation technologies, and by 1998 only 30 percent of subscribers were using digital phones. Eventually, cell phone carriers in the United States adopted the Global System for Mobile Communications, and, by 2003, twenty percent of US systems used the new technology (World Trade Organization, 2005).

Third Generation, 3G (since 2000)

The International Telecommunications Union determined the necessity of a single worldwide standard for the third generation in 2000. Two technologies were competing to become the next third generation worldwide standard, the Universal Mobile Telecommunication System and the Codex Division Multiplexing Access. Both technologies had powerful advocates, and the dispute resulted in delays in the introduction of the third generation technology, which was only recently introduced in late 2004 (World Trade Organization, 2005).

It is clear from the above discussion that the unification of standards in the fast changing high tech industry is vital for the consumer to obtain the best product (or service) and also for industries to compete more fairly. Unification of standards is important but the timeliness is also crucial to maximize the benefit of introducing a new technology. The cell phone technology distribution worldwide by 2003, greatly favors the Global System for Mobile Communications technology as a percentage of total market share (Figure 2) even though the other systems have been in the market for many years already.

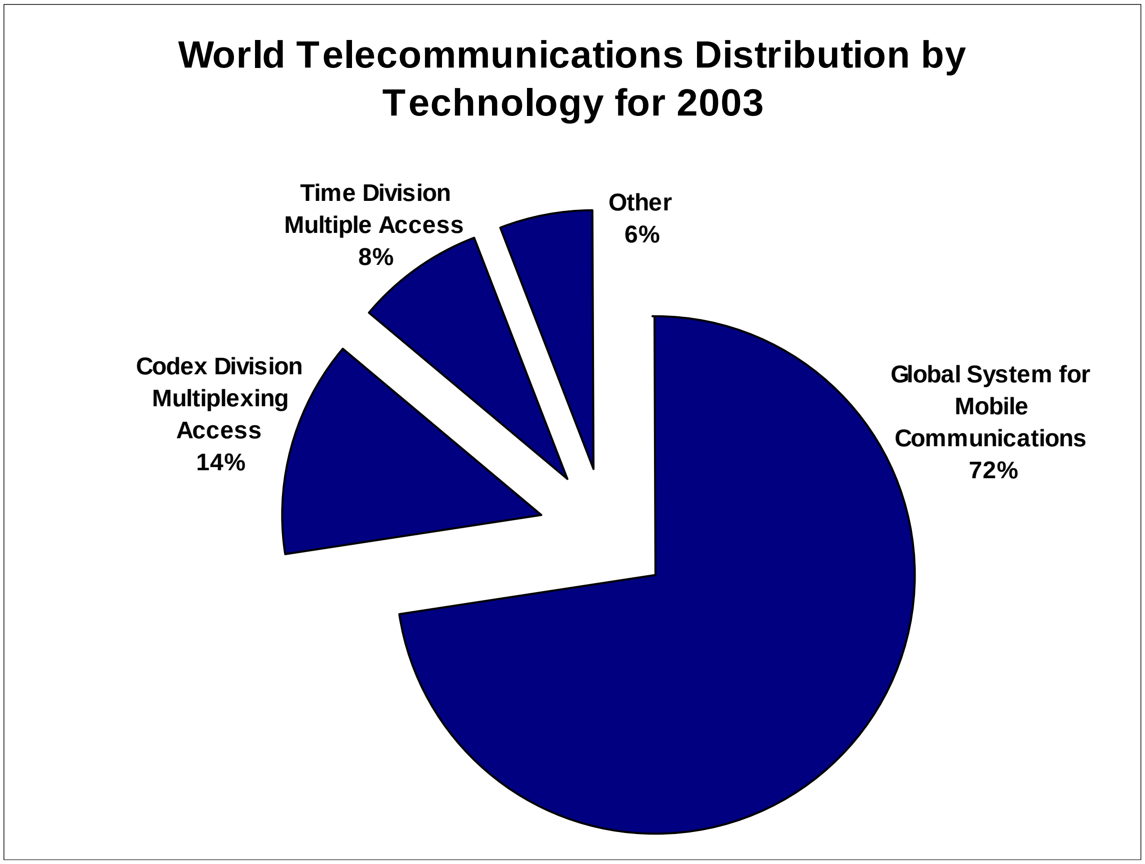

Figure 2.Distribution of World Telecommunication Technology (Data from World Trade Organization, Report 2005). This shows how a single standard introduced in a timely fashion dramatically increased the usage of cell phones world wide.

VII. Conclusions

Contrary to previous practices, today there is greater participation from industry in standard setting. Most industrialized countries rely heavily on the private sector to develop congruent standards even though they usually focus on their specific concerns instead of the welfare of society as a whole. Such behavior tends to separate standardization itself from actual regulations since standards are usually voluntary. Standards also must be compatible with international norms; and the best way to achieve the desired level of compatibility is to develop science-based standards.

Worldwide standards are evolving towards a science-based performance-based regulatory system, but there are still other methods for standard-setting. Consumer choice can often be more influential than scientific evidence for encouraging new government restrictions, as exemplified in the case of beef from hormone treated cattle. Cultural differences and traditional practices often outshine science as well in this aspect.

Technical regulations (this includes standards) are critical factors for global competitiveness in the manufacturing sector. They can hinder access to markets or they can facilitate trade. One of the most avid users of these sorts of barriers to trade is the European Union when it comes to American goods.

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IX. Appendix I

List of international organizations that develop standards

- The International Organization for Standardization
- The International Electrotechnical Commission
- The International Telecommunication Union.
- ASTM (American Society of Testing and Materials) International
- ASME (American Society of Mechanical Engineers)
- American Petroleum Institute (API)
- SAE Society of Automotive Engineers
- The UN has a specialized agency called the International Telecommunications Union (ITU) that is in charge of developing standards, guidelines and policy for telecommunications technology.
- The Codex Alimentarius created in 1963 by the UN Food and Agricultural Organization (FAO) and the WHO develops food standard, guidelines, etc. fair practices in food trade.
- International Civil Aviation Organization (ICAO)
- International Maritime Organization(IMO)
- Organization for Economic Cooperation and Development provides technical background to the agricultural sector.
- International Bureau of Weights and Measures (BIPM)