

The Strategic Value of Standards Education¹

Standards are a Bridge to the Future

User Needs:

consumers,
companies,
industries,
government,
testing &
certification .



Technology:

ideas,
concepts,
values,
perspectives,
methods,
products &
services

**Standards form a bridge between technology and users.
Whoever controls the bridge controls the future.**

Introduction

In recent years, important changes have occurred within the academic communities of several nations affecting their perspectives on the strategic value of standards education. For decades, standards development and education programs on the process of international standardization were managed exclusively by private corporations and government agencies.² Since 2000, however, the study and analysis of standards and the process of international standardization have emerged as significant areas of study within the academic communities of several nations.³ The purpose of this discussion is to examine factors causing this change and to speculate on potential changes regarding standards education in the future.

¹ Presented by Donald E. Purcell, Chairman, The Center for Global Standards Analysis, to the United States National Committee, International Electrotechnical Commission (August 10, 2006). This presentation was developed with contributions from Karen Hutchison, Executive Director, International Society of Weighing and Measurement, and John Kenny, Chief Executive Officer, InfoTech Strategies. For comments: email donpurcell@strategicstandards.com.

² See *A Standards Education Survey*, published by The Center for Global Standards Analysis ("Center") (2003); and *A Survey of United States Engineering Schools concerning Standards Education*, published by the Center (2004).

³ See Reports to the Center on *South Korea International Conference for Standards Education* (2003), *China Information Technology Conference* (2005), and Japan's *International Conference on Standards Education* (2006).

Changing National Perspectives on the Value of Standards

In recent years, several nations have altered dramatically their perspectives on the strategic value of standards. Statements of national policy in China, Germany, the United Kingdom and the United States, for example, now emphasize the critical effect standards have on a national economy. China, in particular, has wholeheartedly embraced the need for active involvement in standards development. Indeed, the conference program from the May 2005 national Information Technology industry conference in Beijing clearly articulates China's intentions in this area:⁴

At present, the technology standard has become the source of core competitive edge for the industrial development. To some extent, technology standard is a kind of development order and rule. Whoever controls the power of standard making and has its technology as the leading standard, commands the initiative of the market. Technology standard has become an important means of global economic competition, directly influence the competitiveness of an industry, a region or a country. Therefore, as for the Chinese enterprises, possessing the successful standard is a strategic choice to seize the leadership of the future industrial development. (emphasis added)

Like China, the German National Standards policy states that "standards control markets,"⁵ and the United Kingdom National Standardization framework states that "standards influence everything we do."⁶ Even the recently revised United States Standards Strategy states:

The international language of commerce is standards. Adherence to agreed upon product or service specifications underpins international commerce, enabling trillions of dollars of good to flow across borders, regardless of the spoken language of any business parties. The common acceptance of standards is fundamental to the success of robust, fair and free trade. Without standards, it would be difficult to image the tremendous volume and complexity of international trade.⁷ (emphasis added)

Standards have a profound influence on international trade and the development of individual national economies. In 2005, the United States Congress estimated that product standards directly affect more than \$7 trillion (US) in international trade.⁸ It is, therefore, critically important that every nation, which depends on international trade for its economic

⁴ See Report to the Center on *China Information Technology Conference* at 2.

⁵ See Opening Statement of Wolfgang Clement, Federal Minister of Economy and Labor, German National Standards Strategy (2004).

⁶ See Foreword, United Kingdom Standardization Framework (2003).

⁷ See statement of Donald L. Evans, Secretary of Commerce, from *Standards & Competitiveness: Coordinating for Results* (2004) on the importance of standards. See also statement of W. Edwards Deming in *Out of Crisis* (1986, Massachusetts Institute of Technology): "If you control an industry's standards, you control that industry lock, stock and ledger."

⁸ See Opening Statement, U.S. House of Representatives Subcommittee on Environment, Technology and Standards, United States Congress, concerning hearings on *China, Europe and the Use of Standards as Trade Barriers: How Should the United States Respond?* (May 11, 2005).

well-being, successfully manage the development of international standards to facilitate development of its national economy.

Some of the most telling statements on the value of standards can be found on the International Electrotechnical Commission (“IEC”)⁹ website. It contains a comprehensive list of statements from manufacturers all over the world who shared their views on the significance of participating in IEC standardization programs and the business value of standards.¹⁰ The statements below are typical of what the world says about the IEC’s standards work:

- *ABB ARAB* Chairman Kamal Gad says that 100% of his company’s products are built to IEC International Standards and he points out that they are essential to *ABB ARAB*’s manufacturing process. “Without IEC standards, we cannot work,” he says. Gad says that the use of standards, particularly those from the IEC, played a crucial role in helping it to become market leader. He says, the value of IEC standards to the company is equivalent to its revenues: 300 million Egyptian pounds. (*ABB Corporation*, an Egyptian manufacturer)
- Participating in IEC standardization helps *Corning* to shape technology directions and make the right choices. Nowadays the world has become such a global market that companies like *Corning* and others have to be in this 'trading bazaar' of specifications, data and test methods to reach some consensus, without which it is impossible to go forward. Consensus is today the only way of doing business in all parts of the world. And for *Corning* this dialogue is extremely important. Having international standards in place that reflect the technology the company is working on is critical to our success. Having internationally agreed-upon measurement methods and sets of parameters through the IEC helps us bring products to the marketplace more rapidly, helps the marketplace to accept them more readily and overall produces faster growth. (*Corning Corporation*, a United States manufacturer)
- It "would be a catastrophe" if *Imetec* were not involved directly in helping to develop standards because they would be operating without knowledge of the future. He explains that to develop new products is expensive and difficult, and to design and build them to existing standards is not enough. "We must be sure that the product under development will be in compliance not with today's standard, but with tomorrow's standard. If *Imetec* develops a new product without knowing what the IEC is doing, a few months or a year or two later a new standard could potentially render this new product obsolete. So, whenever *Imetec* starts to develop a product, *Imetec* will design not just to existing standards, but to all documents concerning the

⁹ The International Electrotechnical Commission is the leading international standards development organization for electrical, electronic and laser technologies.

¹⁰ See <http://www.iec.ch/benefits/worldsays/#top>

work in progress of any standard being prepared that will affect the new product. (Imetec corporation, an Italian manufacturer).

- The biggest advantage to *Lucent* from being involved with the IEC comes from the 'I' in the 'IEC'. Industry has changed fundamentally in the past five years. From a technical point of view, systems and products really have to have global applicability. I don't think there exists any longer in the world the model where a domestic manufacturer of telecom equipment has a special relationship with a government-sponsored telecom service provider. So we have to move away from having different countries setting unique requirements on broad issues that impact lots of products to having one international standard that covers one key attribute and one set of recognized tests that demonstrate compliance with that standard. The major value that we find in the IEC is the ability to produce standards for issues like RF emissions or for electrical safety that can be universally applied and that wind up in government regulations that can be referenced by all countries. (Lucent Technologies, a United States manufacturer).
- When it comes to product development, IEC gives *Rockwell Automation* one set of conditions against which the company's designers can concentrate their efforts. When looking at the cost and time it takes to get a significant product to market, he says some products can cost hundreds of millions of dollars in capital equipment to get into manufacturing. If you didn't have a standard base from which you could say "before you do anything else, design to that," you'd probably double your time to market and you'd probably miss requirements half the time. (Rockwell Automation, a United States manufacturer).
- Participating in all the IEC technical committees directly related to our business sectors is a strategic decision," says Guido Gürtler, *Siemens'* general manager, corporate standardization and regulation. Among the benefits is getting early knowledge of the content of future standards that will have to be used in product design or manufacture. And at the end of the process, products need to go through conformity assessment or testing against the standards before delivery. Gürtler says it is in the best interests of *Siemens* and all other major players to engage as many participants as possible in standardization, particularly small and medium-sized enterprises because they represent the suppliers whose products account for as much as half of *Siemens'* annual turnover. More and more, IEC standards are part of the criteria established to determine potential partnerships ... because we have a compatibility-related responsibility towards our customers. (Siemens Corporation, a German manufacturer).

Recent Changes in Academic Perspectives

Academic institutions in several countries have fundamentally changed their views of the need for standards education programs focusing on international standards. For example, South Korea established a university program in 2004 on the significance of international standards that now involves more than 47 universities and 7,000 engineering students. In Europe, the European Union has created a joint venture that involves two European universities and six universities in Asia and intends to offer a graduate level course on the significance of international standards. The course will be based on internet technology and is expected to be offered to interested graduate students in 2007.¹¹ In the United States, the national Accreditation Board for Engineering and Technology (“ABET”) established the study of engineering standards as an education requirement for all engineering schools in the United States beginning in 2000.¹²

In addition, the following countries are actively engaged in the development of a national standards education program: Canada, China, Germany, Holland, and Japan. South Korea and the United States are making significant efforts to expand their respective standards education programs.

Further efforts at promoting international standards education have come from the International Electrotechnical Commission (“IEC”) which, in 2005, distributed a lecture on the “The Strategic Value of International Standards” to its Members worldwide. In 2006, IEC also launched a worldwide research paper competition on consideration of the economic, business and social impact of the development and use of International Standards for end-users at any level of business activity. Winners of the IEC competition will be announced and presented with a financial prize in London in December 2006.

Realities of Global Governance¹³

To appreciate the critical importance of international standards, consider the following example: seeking to change the strategic landscape at the global level, China announced in January 2004 that it would create its own standard for encryption software and require companies to co-produce their goods with Chinese companies, while at the same time China targets the world market for these products. The plans were reported in *The New York Times* article, “China Poses Trade Worry as It Gains in Technology,” January 13, 2004. The story quotes Phillip J. Bond, Undersecretary of Commerce for Technology Policy, as stating: “Standards have become the new [international] battleground.”

¹¹ See report to the Center on Japan’s International Conference concerning standards education at 3.

¹² ABET is the national nonprofit corporation that accredits all engineering schools in the United States. Note that since 1999 the *Strategic Standards* course at the School of Engineering, Catholic University of America, is the only semester length course devoted exclusively to an analysis of international technology standards in the United States.

¹³ This example is taken from an article on *Strategic Standard Setting on the Global Stage* by Donald E. Purcell, Chairman, The Center for Global Standards Analysis, published in the American Society of Association Executives Journal (2005).

In the article, association executives expressed significant concerns with China's strategic intentions. Bruce P. Mehlman, executive director, Computer Systems Policy Project, commented, "Will [China] take a more global, market-based approach, or will it try to change the rules and disadvantage others?" Ann Rollins, director of technology and trade policy, The Information Technology Industry Council, remarked, "Having a different standard from the rest of the world fractures the market, the implications of this are dangerous going forward."

China announced in April 2004 that it would indefinitely postpone its plan to impose its own standard because of significant protests from the United States and other nations. This issue may be off the front burner for the moment, but it is highly likely that we haven't heard the last of it.

Investments in Standards Education

The national economy of every nation depends upon its ability to develop and maintain an effective international standardization system best suited to its needs. Given that standards are the essential building blocks by which every nation develops and maintains a competitive, national economy, the challenge is to identify international standards education programs which meet the specific needs of a particular country in their private, public and academic sectors.

For decades, private corporations, government departments and agencies have carried the burden of standards education by preparing their best and brightest employees to work in the complex field of international standardization. There is no question that the international standards education programs offered by private corporations and government departments must be continued and expanded wherever possible. But in today's fast paced and highly competitive world, are these efforts enough? A key question we now must address is whether nations need to make significant investments in creating academic opportunities for their best and brightest students to study the complex field of international standardization.

IEEE estimates that 500,000 standards exist in the world today that form the technology foundation of the global marketplace.¹⁴ Maintaining these standards costs approximately \$1.5 billion (US). Now imagine a world in which the global marketplace will be significantly transformed by technological advancement in the next few years, requiring the revision of many of our existing standards and potentially affecting trillions of dollars (US) in international trade. Imagine further that some nations may have to significantly restructure their national standardization system in order to remain competitive in a new global marketplace.

Whether to invest in education programs focusing on international standardization systems depends upon a nation's view of its economic survival. If a nation's economic future is at risk, is it worth investing in educating that country's best and brightest students to be effective future representatives in global technology negotiations which will determine the nation's economic future? If global standards are a nation's bridge to a brighter future, then nations need to recognize that it is in their best interests to prepare their best and brightest students to be the best bridge builders possible.

¹⁴ See <http://standards.ieee.org/>