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As global competition by Solution Companies intensifies, leading businesses are increasingly adopting an emerging management discipline as part of their business strategy.

The discipline is called process standardization, and the effective management of it can open new markets, increase sales, reduce trade barriers, and ensure a company's competitiveness and profitability. Many successful companies have used this same discipline to their own advantage for some time, and to ensure a strong leadership position in the global marketplace, all global business leaders need to do the same. Contrary to the view of standardization as only a technical topic, it is a critical business issue with implications for market access, antitrust, product liability, patent policy and protection, new product development, the environment, and even our very quality of business life. In a period of otherwise shrinking corporate staff, many major global companies have set up offices of business process standardization.

Our lives depend on standards that we take for granted, which like the air we breath, are everywhere, from the products we use, the food we eat, how we communicate, work, play, travel, and go about our business. Increasingly, standards have become the tongue of international trade, and the underlying basis for competition among the world's regions, nations, and corporations large and small. The strategic value of standards, and the participation of global businesses in their development through the private sector voluntary standards process, is fundamental to the well being of our way of life today and will be well into the next century.

Many forces have combined in recent years to accelerate the trend to standards and to put standards issues front and center in the global agenda. Domestically, those forces include the proliferation of technology in every domain of life, deregulation, the dramatic political shift in the Congress away from government solutions to those of the private sector, and a heightened concern over product quality and occupational safety and health issues in the workplace.

Forces on the international front include intense global competition, the rise of regional trading blocks such as the European Union, the accelerated development of under industrialized regions from Central Europe to Asia to South America, worldwide concern with environmental issues, and the increased pace and impact of international trade and treaty agreements from NAFTA to the World Trade Organization. Combined, these developments have propelled the issue of standards to center stage.

"As NCR looks to the solutions future, standards will become even more important," NCR must understand that standardization is a strategic business issue that has a direct impact on new product development and delivery of solutions to become competitive. There is a direct relationship between leadership in standards and leadership in technology.

Standards Defined

A simple definition of the word standard is a recognized unit of comparison by which the correctness of others can be determined, a set of characteristics or quantities that describes features of a product, process, or service.

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As a consumer, buying products that conform to standards makes it easier to comparison shop for features, functions, and price. This conformance not only sharpens competition, but provides a basis on which true differentiation can occur in features and functions that are valued by the customer and not in those areas that the customer does not see, appreciate, or that adds no value to the product's use. More businesses need to focus on customer value analysis. Compatibility standards are especially important, and while they exist such as for stereo equipment interconnection consumer confidence increases, which translates into increased revenues.

Reform Efforts

Health care reform is one example where the U.S. is poised for significant government regulatory and procurement changes. There is bipartisan and unanimous support in the area of health care administration, including the need to reduce and simplify paperwork. The development of standards related to computer based patient records are one key component. Another area undergoing dramatic regulatory reform is telecommunications.

Discussions about the global information infrastructure often lose sight of the fact that we already have a national information infrastructure in the broadcast, cable, and phone systems and in a variety of wired and non-wired networks. These link businesses and people in many applications. The issue is the lack of standards that can interconnect these infrastructures and help improve their level of service.

Not surprisingly, the U.S. federal government is the largest creator and user of standards over 52,000 of them. The private sector in America has some 43,000 standards. That's a total of 95,000 standards, which do not include the much larger number of de facto industry standards such as IBM compatible PCs that are established not through formal procedures but through widespread acceptance in the free market.

In a meeting I attended in August, 1997 the Office of Management and Budget stated it is looking towards the private sector for standards wherever possible. This "dual use" strategy reduces cost, increases the number of supply sources, helps the defense industry convert to commercial market needs, and provides for a more flexible defense industrial capacity.

Best Practices

American standards have helped promote best practices for much of this century. One recent example: In 1992 Hurricane Andrew ravaged south Florida and Louisiana, damaging or destroying 18,000 mobile homes. While building codes provide for wind load standards, those standards did not apply to mobile homes, which posed a major public safety issue. As a result, the American Society of Civil Engineers developed a series of standards subsequently adopted by the U.S. Department of Housing and Urban Development which sets the standards for mobile homes so that mobile homes built and sold after July 1994 must resist winds of up to 100 miles per hour in 26 counties in hurricane prone sections of five states and Puerto Rico.

It is the competitive role of standards that have sparked the interest of global businesses. Standards broaden the potential market for goods and services while at the same time providing

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a basis on which to differentiate products, through cost, time-to-market, quality, and performance.

World Trade, Government, and the Private Sector

In voting into law the National Competitiveness Act of 1993, the U.S. Congress stated that "strong and effective U.S. leadership and participation in international standards organizations are key to the long term competitiveness of U.S. products in global markets," and called on the federal government to "actively participate in treaty standards organizations and assist private sector U.S. member bodies of non treaty international standards organizations in both the development and advancement of technical and policy positions."

Last year the U.S. exported approximately \$700 billion worth of goods and services worldwide. Twelve million American jobs are directly related to exports, and expanding trade is critical to our economy. The three largest regional markets for U.S. exports are Europe, the Pacific Rim, and Latin America. Together these exports annually total \$300 billion, \$200 billion of which is with the European Union. Standards are fundamental to that trade.

It is no longer sufficient that a product have a large market, be of good quality, and be reasonably priced. Before anything can be traded, it must have market access. It's been estimated that an additional \$20 to \$40 billion could be produced by the U.S. if we could overcome all international technical barriers to trade many of which exist only for the protection of domestic markets and which have been proliferating. Most of these barriers result from disparities in standards and conformity assessment between the U.S. and its trading partners.

The intellectual basis for worldwide economic cooperation, open markets, and world trade was laid at Bretton Woods in 1944 the concepts of the International Monetary Fund and the World Bank were developed there but that spirit is largely gone today. During the years of negotiations for the World Trade Agreement, rampant nationalism and regionalism were obvious. Today we face a more global market where governments and trading blocks can distort the playing field and through standards erect trade barriers that thwart the intent of treaty agreements.

Consider this recent comment by Dr. Hermann Franz, chairman of Siemens' supervisory board: "Europe must set standards worldwide just as it did in the past. We must take care not to allow other countries and regions to set international standards and thereby preempt the markets for themselves. European standardization is a tool for creating competitive advantage. and should come to dominate the contents of international standards."

Conformance and Quality

Companies trading in the world solutions market must be prepared to satisfy two conditions to enter global solutions competition: assurance that the products or services conform to the standards of the receiving market, and proof of a quality management system for products, services, and operations. U.S. standards systems have been recognized by our trading partners in NAFTA, the European Union, the Market of the Americas, and the Asia Pacific Economic Cooperation if we are to achieve the goal of "one product, tested once, sold world

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wide." The U.S. does not want to be on the receiving end of a surprise again as it was with ISO 9000 where European forces drove the agenda.

The strategic value of standards to NCR is beyond doubt, and the pace of development of international standards is accelerating. What isn't clear is whether we, or someone else, will get the economic advantage. Active participation by NCR in the standards process in a strategic sense is critical to ensuring that we secure an solution company advantage.

U.S. Voluntary Standards and Conformity Assessment

Voluntary standards open standards developed by consensus and due process in the private sector provide an essential framework (some would argue they should provide only a minimal framework), leaving the maximum possible room for innovation by which companies can add value, differentiate themselves, and compete. Standards enable innovation, remove barriers, and facilitate the flow of information, products, and services between customers and suppliers.

While there is no single international or national process for developing standards, those that arise from a formal, coordinated, consensus based and open process by interested parties commonly called voluntary consensus standards are at the heart of the U.S. system. Marketplace standards do not always ensure a level playing field. Proprietary solutions to market needs often do not lead to an optimal economic benefit for the overall economy. Because standardization requires gathering data and making compromises among the needs of diverse stakeholders, cooperation by all parties is required. When this due process is followed, the standards that result provide economic benefit including compatibility and economy of scale to the many, rather than the few.

Standards Developers

In the U.S., there are more than 400 private standards developers. Standards development organizations (SDOs) are the core of the decentralized voluntary standards development process in the U.S. Most of those that operate by open consensus and due process in their respective subject matter domains are accredited by the American National Standards Institute (ANSI).

One of the largest standards development organizations is ASTM, the American Society for Testing and Materials, with nearly 10,000 standards recognized and used the world over. These cover fields from metals, medical services, and building construction to environmental management, plastics, and petroleum. Another, well recognized SDO is Underwriters Laboratories (UL), which provides product safety certification programs to determine that products meet nationally recognized safety standards. Others include the Society of Automotive Engineers (SAE) whose best known standards include motor oil viscosity ratings SAE 10W30 and 10W40 and the National Fire Protection Association (NFPA) whose performance standards for sprinkler systems are used worldwide.

Conformity Assessment

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Conformity assessment is the term used to describe steps taken by both manufacturers and independent third parties to assess conformance to standards. A manufacturer's declaration of conformity is one method of achieving this. This is favored by many larger companies with sophisticated and well established internal testing and quality assurance systems and for whom an independent third party review seems unnecessary and expensive at best. The other approach is a third party assessment based on a determination that a product conforms to a particular standard. This assessment often functions as a seal of approval that can increase buyers' confidence that the product actually conforms to a claimed standard. Third party assessment can take the form of product testing (by an independent laboratory), certification (against some standard), or registration (e.g., ISO 9000 by a quality systems registrar).

Third party conformity assessment has been growing in the U.S. It is estimated that there are some 5,500 independent, for profit testing laboratories alone, double the amount from ten years ago. Certification is a form of third party conformity assessment usually a certification mark that stipulates a product performs to specified requirements. Underwriters Laboratories (UL) and the American Dental Association are good examples of certifiers, on electrical devices and toothpaste respectively. For many consumers, these "listings" and marks provide reassurance that the product they are buying is either healthy, safe, or both, and conforms to the accepted standard.

The biggest growth in the conformance business has come with the rapid proliferation of registration for quality management systems, which has for some time been promoted by the European Union. The International Organization for Standardization (ISO) 9000 quality system standards are perhaps the best known. In the eight years since its introduction, the number of ISO 9000 registered U.S. firms has grown to 3,500. The cost of such registration which begins with the initial registration and continues with a periodic follow up audit is high. The standards require manufacturers to document their production processes and develop means to improve them but they are no guarantee of quality products. Rather, the focus is on the process of delivering a product of consistent quality whatever that quality is.

The real problem with quality system registration is its spiraling cost and redundancy. This places a serious burden on U.S. suppliers, who are increasingly required by either the government or other manufacturers or both to have their quality systems registered by third parties. Because multinational mutual recognition agreements are not yet in place, there are costly, duplicative, and multiple registrations. ANSI is leading U.S. negotiations on both a bilateral and multilateral basis to achieve a one time registration that will be accepted on global basis.

Companies who successfully propose their technology as the basis for an industry accepted standard avoid being relegated to an otherwise proprietary and smaller niche market, are ahead on the competitive learning curve for that technology, and may also benefit from royalties from other users. Says ANSI's Mazza: "The message to American industry is to get involved. When you're not at the table, you can't participate effectively, and you'll have little or no chance at proposing your own technology as the basis of a national or international standard. It costs relatively little to contribute to the voluntary standards process, and the rewards can be enormous."

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Environmental Management

Another major standards development effort with profound consequences for industry worldwide is the proposed ISO 14000 Environmental Management Systems standards. In 1991, the U.N. asked the ISO to develop a management process to help safeguard the environment and to enact global standards for environmental management systems and evaluations tools, from auditing to labeling to life cycle assessment.

The business case was simple: a growing worldwide desire by nations and people for better risk management and improvement in how we manage the environment. A truly international effort, such as this, would also preempt potentially conflicting and even more costly national or regional regulations and standards, which were already beginning to emerge.

Since 1993 the ISO 14000 technical committee, and dozens of subcommittees and their working groups, have met hundreds of times to discuss and develop a framework to address environmental issues. The U.S., which has 400 people involved, is represented by ANSI. Unlike the development of ISO 9000 when much of American industry was asleep at the switch America has been actively involved at the table from day one. Says Joe Cascio, who chairs the U.S. Technical Advisory Group for ISO 14000 and is IBM's program director for environmental health and safety standardization: "Had U.S. industry not been so proactive this time around, we might not have precluded the desire on the part of some Europeans from implementing a performance, vs. a process standard, which would have effectively instituted European regulations and technologies for specific levels of emissions and pollution that could have been in conflict with our own national interests. In essence, it would have created an effective trade barrier."

Like ISO 9000, ISO 14000 is a series of process management standards, not performance or quality standards. Neither are concerned with product quality itself which is the concern of the manufacturer and its customers but rather with the consistency of quality. ISO 9000 certification, for example, is a guarantee that manufacturers are consistent in the process that they follow. This means written process procedures, consistently executed, that are both communicated to and understood by employees and customers alike.

Many in American industry, if they are aware of ISO 14000 at all, are concerned about its costs. These include not just the cost of initial compliance and registration, but the ongoing costs of maintaining that certification (or registration by a third party). If the experience of ISO 9000 is any indicator, ISO 14000 will indeed be very expensive, though many experts calculate the cost at only half of the expense of ISO 9000 registration. For large companies, that translates into anywhere from \$100,000 to \$1 million per plant.

Consider, however, the alternative: trade restrictive and regionally unique performance standards vs. prescriptive standards and fragmented, uneven compliance and enforcement mechanisms that besides being a management headache of the first order could triple the cost of implementation. When seen against the backdrop of ISO 9000 when U.S. industry was largely absent from the table, the ISO 14000 process has worked comparatively well for us.

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Smart companies will get involved to ensure that this remains the case, and will anticipate the impact of and prepare themselves for these environmental management standards. The Environmental Protection Agency sees ISO 14000 as a vehicle for joint industry government efforts in finding effective voluntary approaches in achieving compliance. The most innovative among us will also find creative ways to use ISO 14000 compliance to demonstrate to customers that when it comes to the environment and safety they are well-managed and good corporate citizens. As we approach the end of the millennium, businesses will find that being "green" is just good business.

Strategic Standardization and Enlightened Self Interest

One of the most successful American exports has been software, and Japan has been a crown jewel for us in that regard \$2.7 billion in 1994 alone. Until last month, there was widespread concern that Japan's Ministry of International Trade and Industry (MITI) would require that foreign made software be certified by the unique standards of the Japan Accreditation Board (JAB). Because they alone can perform the conformity assessment tests and certify that products meet their standard, the reasoning went, the Japanese are in a position to gain access to our software expertise.

Fortunately, this concern has been allayed. The U.S. led by the private and public representatives of ANSI has successfully concluded an agreement on the role of international standards and established a common set of principles and procedures to guide the development of conformity assessment approaches for software sales in Japan.

In wireless digital communications, the Europeans pulled ahead with their Group Special Mobile (GSM) standard. Until recently, U.S. cellular companies were still quibbling over competing digital standards. While not the only reason Europe is ahead they don't have the drag of the huge U.S. analog infrastructure with the geometric growth curve of digital cellular customers in Europe (a 10 to 1 ratio over the U.S.), the GSM standard has dominated the wireless world. Because U.S. industry could not develop a consensus position, European providers were poised for a windfall. Now, however, U.S. manufacturers are playing a leading role in the next level of frequency bands, which will help gain a stronger global position for U.S. products.

Examples such as these underscore the importance that standards can play as technical barriers to trade by no means unique to Japan and Europe and serve as a clarion call that the price of free and open world markets requires more than government negotiated trade agreements. For American business, it requires the commitment and active participation in the U.S. voluntary standards system the best in the world business helping business out of enlightened self-interest.

The most enlightened corporations have established strategic standardization programs to ensure that a standards policy is an integral part of their corporate and business strategy, and not just among large corporations. "As a medium size company, we simply had to get involved in the process of trying to influence the writing of standards, and of understanding what the issues really are," explains J. Hans Kluge, chairman of Automatic Switch Co. "If you are not involved in standards or standards setting, you will be left outside and the competition will run away with your business." William J. O'Neill, executive vice president and chief financial officer

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of Polaroid states: "Strategic standardization is a fundamental dimension of our corporate strategy without which we could not grow our global market share." We might add that in the wealth of nations today, there are only two kinds of organizations: those who have embraced the global standards process, and those that will.