



# HOW STANDARDS CAN ADVANCE SCIENCE, TECHNOLOGY AND INNOVATION

**A**doption of innovative technologies can improve many aspects of social and economic development—from pest-resistant crops to food processing; from child health to treatment of diseases; from environmental protection to energy efficiency; and from access to electrical grids to more affordable communication and transportation systems.

Innovation can be transformative for developing countries, especially if they are able to adopt the science and technology achievements of industrialized nations to their own national conditions. Standards are a means through which technologies,

processes, and economic functions can be spread throughout the world, bringing the benefits of greater efficiency, lower costs, and improved competitiveness to developing economies. By participating in standards development activities and using relevant international standards, where they exist, developing country governments can gain insight into how other countries foster innovation.

Science and technology regulation, based on standards developed by consensus and approved by a recognized body, can encourage home-grown innovation, knowledge sharing, efficient use of resources, and the proliferation of

state-of-the-art technologies. However, regulations that fail to meet international standards or new standards that restrict competition, are non-transparent, or impede imports can prevent access to the most effective and innovative technologies.

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## THE POTENTIAL OF STANDARDS FOR DEVELOPING COUNTRIES

### **CASE STUDY:** INTELLIGENT TRANSPORTATION IN BRAZIL

Managing transportation networks in cities to prevent gridlock, pollution, and road fatalities is becoming a pressing development challenge.

A consortium of US stakeholders, including transport engineers, electrical equipment manufacturers, and telecommunications engineers has developed standards for intelligent transportation systems. The National Transportation Communications for ITS Protocol (NTCIP) is a family of standards that provides both rules and the vocabulary necessary to allow electronic traffic control equipment from different manufacturers to operate with each other as a system. The NTCIP is the first set of standards for the transportation industry that allows traffic control systems to be built using a “mix and match” approach with equipment from different manufacturers.

Brazil has adopted the suite of standards, and it is being rolled out to help develop the transportation communication infrastructure to prepare for the World Cup and Olympics. Their adoption of the suite of transport system standards will improve the fuel efficiency of vehicles in the system by reducing unanticipated bottlenecks. It also will improve public safety by making signaling more reliable and will lower the overall cost of investment in the system because of product interoperability.

*Source: AASHTO, ITE, NEMA*

**A**doption of consensus standards can play a key role in how developing countries access and take advantage of science and technological innovation.

### **PROMOTING INTEROPERABILITY AND INVESTMENT**

A key element of modern technology is interoperability—the ability of particular types of technologies (e.g., computers, information systems, mobile devices, or industrial equipment) to work together with other products manufactured by different firms in different countries. Products, processes, and services in many cases must be used in combination, but are developed in parallel and by unrelated entities. Incompatibility poses problems, but might not be discovered early in the R&D process. Standards that ensure different technologies can operate in concert would reduce costs to consumers by fostering competition in the marketplace; the alternative, a monopoly provider of products and associated services, would be expected to elevate consumer prices and reduce choices.

Adopting technical standards that are interoperable can also encourage investment. Developing country governments considering investment in electricity generation, for example, need to ensure that operating systems for generators are interoperable with the systems managing electricity distribution. Consensus international standards can help developing countries ensure their investments in technologies will be compatible with existing and future technologies.



## **TRANSLATING TECHNOLOGICAL INNOVATION FOR DIFFERENT LEVELS OF DEVELOPMENT**

By participating in consultative standards setting processes, developing country stakeholders help ensure that international standards are relevant to their needs. This is critical: ensuring that standards that emerge from international bodies accomplish development objectives is a key to facilitating both innovation and development. Standards developed in this way can reduce the costs of implementing improved technologies for developing countries while still providing the developmental benefits of superior technologies.

## **AVOIDING THE HIDDEN COSTS OF DIVERGENT STANDARDS**

Many governments in developing countries use technical standards as a type of industrial policy. While the intent behind such policies is to create investment in value-added industries in higher technology fields, the consequences are usually the reverse. Setting standards that depart from accepted, consensus approaches adopted elsewhere can potentially cut a developing economy off from access to the latest, most effective technologies.







## OPPORTUNITIES TO ENGAGE

**D**ecisions regarding major capital investments in public goods are among the most important choices governments in developing economies make. Donors can usefully facilitate improvements in the return on these capital investments by developing countries by ensuring that host country investments in telecommunications, transport infrastructure, and electricity integrate consensus international standards.

Potential interventions to support this goal include:

- Increase access to innovative technologies by working with governments to ensure national regulations promote competition and do not discriminate against products from specific countries, thereby enabling entrepreneurs and researchers to have access to the most advanced and effective technologies.
- Build local capacity to oversee investment in R&D and innovation by encouraging national bodies to participate in international standards-setting processes; governments will be better able to assess the relative value of investments in innovative technologies critical to development.
- Enhance domestic standards-setting capacity to ensure technology standards reflect relevant international standards and are based on sound science to prevent regulation that unintentionally impedes access to proven innovations.

### **CASE STUDY:** HIGH EFFICIENCY ELECTRIC MOTORS

With a worldwide focus on reducing energy consumption and emissions, standards for electric motors have been a priority for industry and regulators. A decade ago, experts in the motor industry collaborated to assess and rank efficiency rates of different motors. The experts developed the IE1, IE2, and IE3 system of standards and harmonized an efficiency testing protocol to assess performance. Today, countries around the world use this standard to categorize motors and to assess efficiency. Part of the reason for the wide adoption of the standard is that it has allowed countries at different levels of development to adopt different levels of the standard based on their specific context.

Developing countries that require IE standard-rated motors are now able to reduce the cost and environmental damage that using noncompliant motors would have incurred. In addition, by using the standard, regulators at energy ministries in developing countries have been able to regulate with confidence, knowing that the standard represents state-of-the-art international expertise on electric motor efficiency. *Source: National Electrical Manufactures Association*

For more information on USAID assistance related to standards please visit [standardsalliance.ansi.org](http://standardsalliance.ansi.org) or contact us at [SA@usaid.gov](mailto:SA@usaid.gov)