TECHNICAL REPORT

ISO/TR 37150

Smart community infrastructures — Review of existing activities relevant to metrics

Infrastructures communautaires intelligentes — Revue des activités existantes applicables à la métrique

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Introduction

Community infrastructures – energy, water, transportation, waste, information and communications technology (ICT), etc. – support the operations and activities of communities and have a significant impact on economic and social development. They are a means towards ensuring the delivery of goods and services that promote economic prosperity and growth, and contribute to the quality of life. Insufficient, inadequate community infrastructures can create obstacles to achieving a change in the distribution of relative incomes through the growth process to favour the poor (pro-poor growth). Furthermore, the demand for community infrastructures, as scalable and integrable products, will continue to expand significantly in the decades ahead, driven by major factors of change, such as population growth and urbanization.

It has long been argued that human activity is surpassing the capacity of the Earth. Community infrastructures developing in line with global population growth sometimes have less desirable consequences to sustainability. This is because the imperative for further infrastructure (i.e. accelerated population growth) conflicts with a path to sustainability. As a result, there is a need for community infrastructures to play a role in sustainable development to balance economic, social and environmental aspects and to meet the needs of communities more effectively and efficiently.

This indicates an urgent need to develop and implement more effective and efficient technological solutions in terms of environmental impact, economic efficiency and quality of life. Such solutions are often referred to as "smart." A number of plans and projects to build "smart cities" are currently underway. In addition, there are increases in international trade for community infrastructure products and services.

In planning and procuring community infrastructures to contribute to sustainable development, a wide range of evaluation concepts and metrics are available or under consideration. Some of these evaluation methods are not publicly available. Though they are helpful, their complexity, redundancy and lack of transparency make it difficult for public and private buyers (e.g. governments, city planners, investors, operators of community infrastructures) to evaluate multiple proposals or plans consistently and fairly, thereby increasing the burden of decision making. Different concepts and metrics are creating uncertainty in which infrastructure vendors have difficulty in developing new technology without an appropriate International Standard.

The purpose of standardization in the field of smart community infrastructures is to promote the international trade of community infrastructure products and services and disseminate information about leading-edge technologies to improve sustainability in communities by establishing harmonized product standards to evaluate their technical performances contributing to sustainability of communities. The users and associated benefits of these metrics are illustrated in Figure 1.

In this Technical Report, the concept of smartness is addressed in terms of performance relevant to technologically implementable solutions, in accordance with sustainable development and resilience of communities as defined in ISO/TC 268.

This Technical Report reviews existing activities relevant to metrics for "smart" community infrastructures and provides directions for further standardization. This Technical Report discusses metrics which is designed to help buyers to evaluate technical performances of community infrastructure products and services for procurement and, through the development of future technical standards in this area, may additionally be used in real-time monitoring for the operation of an existing community infrastructure. The users and associated benefits of these metrics are illustrated in Figure 1.

It is expected that this Technical Report will be useful to the following individuals/groups:

— national and local governments;

— regional organizations;

— community planners;

— developers;

— community infrastructure operators (e.g in the field of energy, water, waste, transportation, ICT);

— community infrastructure vendors (e.g. constructors, engineering firms, system integrators or component manufacturers);

— non-governmental organizations (e.g.. consumer groups).

This Technical Report uses a model of the community functions in Table 1 and reviews activities relevant to metrics for community infrastructures.

Table 1 — Layers of a community

Layers		Examples of functions
Community services	Contribution	Education, healthcare, safety and security, tourism, etc.
Community facilities		Residences, commercial buildings, office buildings, factories, hospitals, schools, recreation facilities, etc.
Community infrastructures		Energy, water, transportation, waste, ICT, etc.
NOTE "Water" includes sewage and wastewater as well as drinking water.		

As illustrated in Table 1:

— Functions of community infrastructures are fundamental to support the other two layers;

— Products and services of community infrastructures are more technology-oriented, more internationally-tradable than those in other layers and therefore appropriate for international standardization.

NOTE 1   This compilation of existing activities is indicative only.

This Technical Report is intended to be used in the following ways:

— as a reference document

— to analyze the commonalities and gaps in existing activities relevant to metrics on smart community infrastructures

— to review the value of deploying smart community infrastructures

— as a basis for future standardization

— to assist stakeholders to have a better understanding of state-of-the-art smart community infrastructures around the world

NOTE 2   The environmental, social and economic subsystems of the global system interact and are interdependent. They are often referred to with phrases such as the three dimensions or pillars of sustainability. [SOURCE: ISO/DGuide 82:2013 3.1].

NOTE 3   OECD states that a pace and pattern of economic growth that helps poor women and men to participate in, contribute to and benefit from it is in short pro poor growth.
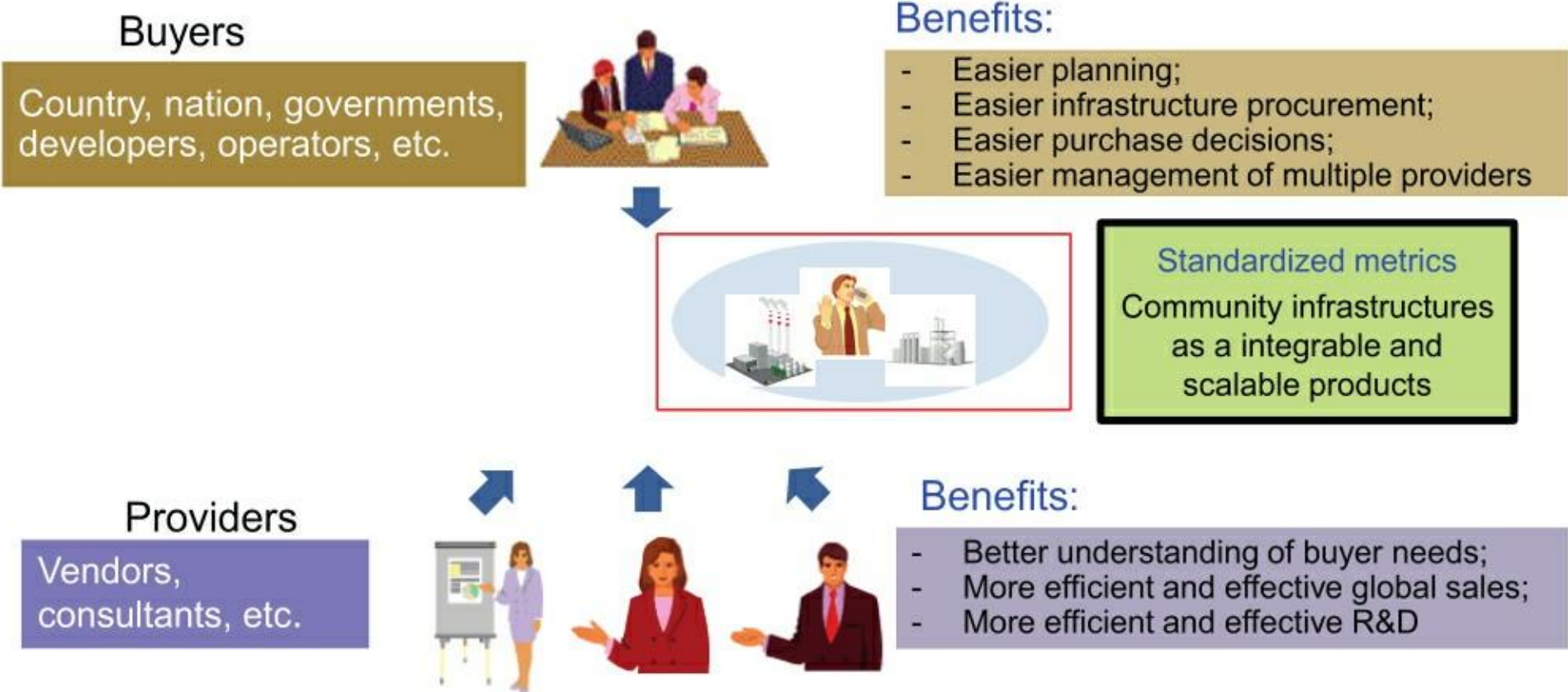
Figure 1 — Users of the metrics and associated benefits