Chapter 10
Managing Responsible Standardization of Smart Infrastructures and Applications

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ABSTRACT

Interoperability standards are a sine-qua-non for smart applications and the underlying smart communication infrastructure. This chapter looks at two issues that are associated with the standardization of such smart systems and the ramifications they may have for standardization management. These issues include, on the one hand, the necessary multi-disciplinarity of standards setting and the resulting diversity of stakeholders to be involved. On the other hand, they also include the need to standardize responsibly (i.e., to appreciate that various societal aspects also need to be taken seriously and to be integrated into the process). The complexity of proper standardization management will increase because of these needs.

BACKGROUND

Smart Systems

Smart systems are a fairly recent trend that is increasingly gathering momentum. Thanks to the convergence of Information and Communication Technologies (ICT) and 'traditional' technologies smart applications possess advanced control and amenability functions previously available only in the virtual world. Prominent examples include the Smart Grid, Smart Manufacturing, Intelligent Transport Systems, Smart Homes and Smart Cities. To offer the user 'smart' applications, these systems require a communication infrastructure which, in turn, will typically be based on the Internet of Things (IoT), and Cyber Physical Systems (CPSs). Forecasts indicate anything between 20 and 50 billion IoT devices for the year 2020 .

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Interoperability is the key requirement for all smart systems. To achieve interoperability between an extremely broad spectrum of devices and applications, internationally agreed standards are indispensible. For individual smart systems, these standards have been, and are still being, developed by different groups of stakeholders in different Standards Setting Organisations (SSOs). Taken together, these standards will eventually enable the technical development of smart systems towards true ubiquity.

Today, the 'ubiquity' (anywhere, anytime, any device) of the Internet refers only to its accessibility. In contrast, the IoT's billions of sensors of will collect data and make them available for users of smart applications. A considerable part of this data will be personal or private. Moreover, the results of the analysis of this massive amount of data may have major economic, ecological and other ramifications and directly impact citizens and businesses alike. Accordingly, potentially severe policy and ethical issues need to be addressed in the context of smart systems and their underlying standardization processes. Perhaps most prominently, these must include security and privacy aspects of both data and communication.

That is, for policy and, specifically, ethical issues to play a role already during smart systems standards development initiatives, overarching 'Responsible Standardisation' (RS) guidelines are needed at European and/or the global level. They would ensure that standardisation initiatives take into account internationally agreed non-technical (specifically ethical) aspects to be associated with a certain technology.

Standardisation of smart systems has started only comparably recently, with its focus still largely on the communication infrastructure. Giving the complexity of smart systems, their broad variety of stakeholders and the resulting multi-disciplinarity of both the systems design and the underlying standardisation process it should still be possible to introduce RS in the field. However, the sooner action will be taken the better.

Looking specifically at Research and Innovation (R&I) and Responsible Standardisation (RS) in smart technologies yields the model depicted in Figure 1. It shows that R&I on the one hand trigger standardisation in the field, mostly through their need for interoperability. On the other hand they also generate the need to consider ethical aspects to cover security and privacy issues and to adequately address the fact that smart technologies will eventually be truly all-embracing. Taken together, this yields the need for a responsible standardisation of smart technologies.

Standardisation Management

Basically, corporate standardisation management is the grand total of a firm's activities that aim at deploying standards and at influencing the standards setting process, typically in the firm's best interest. Figure 2 shows a very simple model.

Figure 1. The need for responsible standardisation