Standards Management in the Twenty-First Century: Architectural Challenges and Management Opportunities

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ABSTRACT

The history of modern standards development provides support for the argument that the process of standardization has evolved in response to crises and opportunities. In the information and communication technologies (ICT) sector, many new groups have become involved in standards setting. In a period of rapid change, standards development in these areas has focused primarily on the provision of functionality. That is, there are few overarching roadmaps for development and issues such as security and interoperability are of less concern for many of the new standards developers. In addition, new oversight structures have emerged that appear to be more responsive to the particular needs of developers in the ICT arena. It may be important for nation states to consider assisting in roadmap development in the ICT arena to insure security and privacy issues are addressed such that these increasingly essential systems are less vulnerable.

KEYWORDS

Consortia, Cybersecurity, Information Technology, Standardization, Standards Management, Trade Barriers

INTRODUCTION

While standards for communication (languages) and commerce (money) have been with us for more than two millennia, modern standardization can be posited as beginning with government control of weights, measures and monetary standards written into constitutions. This is the tradition of governmental control of instruments deemed essential to commerce. Another wave of standardization can be posited to begin with the industrial revolution. Unlike money, weights and measures, scientific and technical standards were called for and became, to a large extent, the purview of professional societies and increasingly industry.

The position in this paper is that standards and standardization are generally not managed centrally and that important processes and procedures evolve from the community. The paper examines of standards development in the US highlighting government and industrial approaches and the forces that impacted the process. The paper further explores more recent developments in the information and communication technologies (ICT) sector highlighting pressures and forces on ICT standards and standardization and asks if there is a need for more management of ICT standards development. Some suggestions are made for management activities that might be evolving to enhance ICT standards development in particular related to security and privacy of digital information.
While the paper focuses on ICT standards and the environment in the United States, some of the analyses may be pertinent to other national situations and to regional and global standards given the generally global nature of ICT standards. The extent to which the observations apply to manufacturing, quality, or service standards is less clear.

Many would like to believe that standards are managed in a coherent and logical way. Indeed, some management and coordination efforts, such as semiconductor development (Schaller, 2004) and cloud computing standards (NIST, 2011) have met with success. Many other standards arise, at least in the ICT arena, as the result of needs that are far less planned. A good example might be email. While the IMAP and POP protocols supported by MIME and other standards provide for reasonably competent email today, the origins in RFC 196, 221, and 278 are much simpler:

A mail box, as we see it, is simply a sequential file to which messages and documents are appended, separated by an appropriate site dependent code. (RFC 196, 1971.)

The development of an internet email standard was not as much managed as it was evolved. For an interesting history of the evolution of internet mail, see Partridge (2008). X.400, an ITU OSI application level standard, was a more comprehensive and coherent from the start. Indeed, it could have been used as a model for internet email. However, under the IETF, pieces were added or revised as needs arose. (A search for “mail” in Standards track RFC’s yields 237 documents and clearly does not include everything!)

Nations are concerned with commerce and they try to cope with the myriad forces which impact commerce both internally and externally. Standards are one of the forces that impact commerce and different countries work with standards in different ways at different times to impact commerce. The US, often held up as an example of industry-led standardization, highlights some of the relationships between government and industry (OTA, 1992). Developments in the ICT arena provide an example of the forces impacting standardization in a period of rapid change (Lyytinen & King, 2006). These and other reviews inform a view of how the management process for standardization might be improved (consider as one example Pedersen, Fomin, & de Vries, 2009).

AN HISTORICAL PERSPECTIVE: FOCUS ON THE UNITED STATES

The US Constitution gave the US federal government the sole and exclusive right of fixing the standards of weights and measures. Presidents Washington, Jefferson, Adams and Madison all emphasized the importance of government action on standards such and weights and measures, but Congress demurred, leaving it to the states. Government efforts were restricted to maps and currency. For more than a century, the minimal role the government played in standards setting was relegated to the states.

Standards did emerge in the US, but they tended to emerge out of specific business needs. A few examples help to set the stage. In order to schedule trains, railroads needed some form of standard time. In the US, industry adopted these standards in 1870 (two time zones) and 1883 (four zones). The times set were based on an agreement between the railroads and the Allegheny Observatory of the University of Pittsburgh. The US government did not adopt standard time until 50 years later, in 1912. The QWERTY keyboard is another famous example of a standard. Put simply, it arose from the market dominance of the Remington typewriter (No. 2) introduced in 1878 based on the 1867 Sholes and Glidden typewriter. The key placement was constructed to minimize key jams by separating letters frequently typed together, thus slowing down typing speed, but preventing time consuming key
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