Chapter V
The Role of Individuals and Social Capital in POSIX Standardization

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ABSTRACT

While standards are issued by organizations, individuals do the actual work, with significant collaboration required to agree on a common standard. This article explores the role of individuals in standards setting as well as the way these individuals are connected to one another through trusting networks and common values. This issue is studied in the context of the IEEE POSIX set of standards, for which the author was actively involved for more than 15 years. This case study demonstrates that the goals and influence of individual participants are not just that of their respective employers but may follow the individual through changes of employment. It also highlights changes in the relative importance of individual and corporate influence in UNIX-related standardization over time. Better understanding of the interaction between individuals and organizations in the context of social capital and standardization can provide both a foundation for related research and more productive participation in these types of forums.

INTRODUCTION

Standards development organizations (SDOs) provide a forum for interaction among individuals, firms, governments, and other stakeholders. These are an example of cooperative technical organizations (Rosenkopf, Metinu & George, 2001; Rosenkopf & Tushman, 1998) that bring together boundary-spanning individuals (Dokko & Rosenkopf, 2004; Tushman, 1977). This context should increase innovation for the firms involved (Rao & Drazin, 2002; Tushman, 1977), facilitate the creation of alliances (Rosenkopf, Metiu, & George, 2001), and promote a technological bandwagon (Wade, 1995). These forums also are breeding grounds for social capital (Adler & Kwon, 2002; Coleman, 1988; Portes, 1998; Putnum, 2000). There are a number of perspectives on social capital; this article adopts Putnum's (2000) definition: "Individuals connected to one another through trusting networks and common values" (p. 312).

This article will explore the roles of individuals and social capital in standards development using a case-study approach. The article will also look at the effects of the transition from individual to corporate engagement in the activities. The case considers POSIX standardization. The POSIX standards activity focuses on network externalities, specifically the applications programming interface spanning multiple vendors. This is a critical control point for operating systems and, therefore, for the heart and soul of the computer industry (West & Dedrick, 2000). The impact of the activity approaches the $100 billion mark (Hurd & Isaak, 2005; Unter, 1996) and created a foundation for the Linux system (Linux International, 2005), the most recent front on a continuing battle for de facto operating system standards control.

POSIX was a volunteer consensus standardization activity (Isaak, 1998; National Technology Transfer and Advancement Act, 1995; OMB, 1998) as opposed to a single vendor-controlled standard. It had roots in a UNIX industry association initially called /usr/group, now called Uniforum, IEEE (Institute of Electrical and Electronic Engineers), and more recently the Open Group (a merger of two consortia: X/Open and the Open Software Foundation (OSF)). Uniforum and IEEE both operated with individual memberships, so any number of participants from a single company or other organization could join and vote; the Open Group was a corporate consortium with limited membership but coordinated with IEEE to provide a forum where any interested party could vote or comment. The results were forwarded for adoption as international standards by ISO/IEC JTC1, where voting is done by national standardization bodies. Over time, POSIX standardization was less about individual discretion and more about corporate interests. The X/Open corporate consortium eventually supplanted the individual-centered IEEE process.

The POSIX API evolution is documented in both concurrent publications (Cargill, 1994, 1997; Jespersen, 1995; PASC, 2005; Walli, 1995) and retrospective publications (Isaak, 2005; Takahashi & Tojo, 1993). The history spans from the initial concepts of the early 1980s, although there was dramatic growth into the 1990s, finally settling into a mature maintained state at the end of that decade (Table 1). This also parallels the growth of the DOS (later Windows) proprietary platform standards. Findings from the literature are complemented with the author's own observations. The author served as chair of the IEEE POSIX work for 15 years, convener of the ISO working group for a similar period, the Digital Equipment Corp. (DEC) member of the X/Open Board of Directors, and part of the U.S. Delegation to the ISO/IEC JTC1 Technical Advisory Group on Applications Portability (see Table 2).

The case analysis provides insight on the role of individuals and the development of social capital in the various stages of development of this set of standards.

FORMATION: INDIVIDUAL INITIATIVE

Individuals, primarily from small companies, were the driving force behind the early UNIX standards work. This expanded on the anti-establishment alignment that was a strong thread in the UNIX community in the 1980s[1]. The driving force of these individuals was to establish a technology bandwagon, as suggested by Wade (1995), with a specific focus on the minicomputer market, a step above the PC capabilities of that era. The existence of two primary versions (Version 7 and BSD) as well as a few "compatible" systems created a need to agree on standard interfaces. Microprocessor technology had reached the point where it could support a viable standard operating environment that might move control from the then dominate mid-range players (IBM, DEC, etc.) to a new standard.