

Chapter X

Open Source and Software Development Innovation

INTRODUCTION

It is beyond question how ubiquitous and powerful computing has become for commerce, communication, and culture. As the articles addressed in this chapter make clear, the development of software poses challenges to those with commercial concerns—those that build software and those that use it—as well as specific situations in which management and innovation theory is responsive also to non-proprietary software development. We begin with two articles by Boehm, arguably the most prominent voice in software engineering today. The first, with Ross (1989), introduces advances in theory to aid software project management, and the second (1991) takes a close look at risk management as it pertains to software development projects. Fichman and Kemerer (1997) present their research findings related to knowledge management in software process innovation management environments, while Nambisan and Wilemon (2000) explain the mutually advantageous bodies of knowledge that the realms of software development and new product development hold for one another. Fajar and Sproull (2000) consider software development management from a knowledge and team management perspective, and their findings have affinities with Farris et al.'s (2003) introduction of the Web of Innovation, which facilitates an organization's e-knowledge management systems and their application to new product development.

The growth of the open source software movement is the subject of this chapter's five concluding articles. While we suggest readers take note of E. Raymond's *The*

Cathedral and the Bazaar (1999) for a thorough and authoritative recounting of the players and development of this highly prolific and out-of-the-ordinary approach to software development, the articles addressed in the second part of this chapter have particular relevance to software's place in the wider scope of technology innovation management. Lerner and Tirole (2002) ask and answer, from an economic perspective, a question that those unfamiliar with software development's history or scope of work might well pose: why would a talented computer programmer give her time, effort, and knowledge away for free? Their answers are relevant to von Hippel and von Krogh's (2003) article on the open source movement's reshaping of the private investment and the collective action models of innovation. Lakhani and von Hippel (2003) dig a little deeper into the rationale of programmers who invest themselves in attending to what some may view as the tedious tasks of software development, and join the others in seeking clues as to how open source commands the time and attention of so many skilled programmers. von Krogh, Spaeth, and Lakhani (2003) develop four theoretical constructs that can assist proprietary firms engaged in software development projects understand how to recruit and maintain a cohort of seasoned programmers by mirroring the mentoring culture that proliferates through the open source movement. The chapter concludes with an overview of West's (2003) article offering sound research directions, based on the experience of IBM, Sun Microsystems, and Apple, for organizations seeking to meld proprietary and open source methodologies and management styles with established theories of appropriability and adoption as they pertain to software development.

Management Theory and Software Development

Boehm and Ross (1989) present a new project management theory for a relatively new industry, software development, in response to what they describe as a proliferation of "various alphabetical management theories": Theory W: Make Everyone a Winner. Theory W has two underlying principles: "plan the flight and fly the plan," and "identify and manage your risks." Boehm and Ross's project in this article is to situate their theory in what was then, and is even more so today, an expansive, intensive, and critical industry, software development, but address this industry from a project manager's point of view. "The skillful integration of software technology, economics, and human relations in the specific context of a software project is not an easy task. The software project is a highly people-intensive effort that spans a very lengthy period, with fundamental implications on the work and performance of many different classes of people" (p. 902).

The project manager is responsible to several different constituencies, some of whom have different, and at times, competing agendas. Given the mix of goals, perspectives, desires, and timetables, there are bound to be "project management

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