Chapter 4
Technology Innovation Adoption and Diffusion:
A Contrast of Perspectives

Michael Workman
Florida Institute of Technology, USA

ABSTRACT

The literature on technology innovation adoption and diffusion is vast. In this chapter, we organize and summarize some of the major perspectives from this body of literature, contrasting various theoretical perspectives on how innovations are adopted and shaped by organizational processes and structure. We first introduce the technology acceptance model, and innovation diffusion theory; and then we categorize viewpoints about organizational innovativeness. Drawing from this framework, for our case study background we introduce adaptive structuration theory, redefining some of its conceptual relationships in "structuration agency theory," putting primacy on the actions of agents and the means by which they operate through and around institutional structures. We then present a case study example of an expert decision support system, and we conclude with a discussion of implications for managers and entrepreneurs.

INTRODUCTION

An innovation is defined as the act of changing the established order, or introducing something new (Webster's Dictionary, 1978). Thus there are two sides to the innovation coin, the diffusion of them, and the production of them. One aspect these two sides of the coin share in common is some measure of risk-taking behavior, but the creation of innovations tends to be an individualized thought put into action, whereas the diffusion of them tends to be the result of a set of institutionalized and collective socialized actions, although sometimes initiated by a "champion" (Lake, 2009).

In this chapter, we will concentrate on the adoption and diffusion of technological innovations within organizations. We will first briefly introduce innovation research situated in the field of management science and briefly discuss how it has evolved relative to our topic. In the sections that follow, we

DOI: 10.4018/978-1-61520-609-4.ch004

will review two seminal streams of innovation adoption theory by introducing the technology acceptance model (Davis, 1989) and diffusion of innovations theory (Rogers, 1983). We will then categorize and summarize the major theoretical perspectives on how innovations develop from, or are shaped by, organizational processes and structures –referred to as organizational innovativeness (Chakravarthy, 1997). We will then present a brief case study to illustrate adoption and diffusion theory and structuration with an expert decision support system in an organization, and conclude with a discussion of implications.

The study of innovations has its basis in management science. Some of the most frequently cited examples are novel approaches or inventions such as Henry Ford's mass production of the automobile, or Eli Whitney's approach to the mass assembly of rifles, or his cotton gin, or about Thomas Edison and the invention the light bulb, or Alexander Graham Bell and the telephone; but the development of innovations occur with much less fanfare and more frequently than we might expect, with many failing to gain enough traction to be adopted or diffuse in organizations.

Management science has evolved from its early roots in the 19th-Century scientific management era to embrace the notion that an organization adapts and structures itself according to its business environment and needs, and that human actions emerge from, and business conditions grow out of, dynamic organizational systems (Sine, Mitsuhashi & Kirsch, 2006). This evolution in managerial thinking began in the 1970s and gave rise to "systems theory." As part of that renaissance, in the 1980s and early 90s, socio-technical systems theory (Trist, 1971) began to make its way into management practice in which both the technical and socio-cultural aspects of organizational systems were considered to be interdependent (Manz & Stewart, 1997). Socio-technical systems:

"...reflects the goal of integrating the social requirements of people doing the work with the technical requirements needed to keep the work systems viable with regard to their environments. These are considered interdependent because arrangements that are optimal for one may not be optimal for the other. Also tradeoffs are typical, and thus there is a need for both dual focus and joint optimization" (Fox, 1995, p. 92).

Although dual focus and joint optimization were imagined to be an ideal, socio-technical systems-driven practices initially ran counter to the entrenched mechanistic ones (Burns & Stalker, 1961) and was met with much resistance (Quinn, 1992). While process engineers, total quality management proponents, and members of process standards bodies fought to maintain their control over processes and developments throughout the 1980s and 1990s by means of certifications that tested conformance to a given standard with a presumed single correct solution, many organizations began concentrating instead on innovation through diversity of inputs in reaction. According to Hamel and Prahalad, (1993), there was a growing rejection of the notion that through benchmarking and standardization, everyone should have a race down identical paths where no one wins.

Consequently, creativity was touted as the means to achieve innovativeness. Creativity is by definition variation or deviation from the norm (Daft & Lengel, 1986); and since it often evolves out of crises (Kuhn, 1996), the phrase *necessity is the mother of invention* was an appropriate cliché. Thus newer organizational models came to operate less from a systematic perspective and more from a systemic one. In other words, while it was well recognized that standardization and striving toward some well-defined end using some well-defined means were crucial in certain areas and aspects within an organization, by and large, this forced convergence was too constraining to enable, let alone encourage, innovation (Stacy, 1992).