Chapter 10

Pressures or Weapons?
Applying Information Technologies to Innovate Organizational Structures in the Information Age

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ABSTRACT

Innovating organizational structures by using information technologies (IT), this study introduced new IT-enabled structures, and presented how managers scan firms capabilities and design suitable structures in the information age. Another purpose of this chapter is to verify the role of IT-enabled structures in the multilevel study of innovation management. Findings based on hierarchical regression analyses revealed that IT-enabled structures are critical in the management of innovation. Furthermore, IT-enabled structures can explain the difference of both organizational innovation and individual creativity in organizations. It also can moderate the relationship between organizational innovation and individual creativity.

INTRODUCTION

Organizational structure describes the "blueprint for activities which includes, first of all, the table of organization: a listing of office, departments, positions, and programs" (Meyer and Rowan, 1977, pp.341-42). To emphasizing the importance of organizational structure design, Mintzberg (1979, p.2) stated the problem: "Every organized human activity … gives rise to two fundamental and opposing requirements: the division labor into various tasks to be performed and the coordination of these tasks to accomplish the activity. The structure of an organization can be defined simply as the sum total of the ways in

which it divided its labor into distinct tasks and then achieves coordination among them". Since large complex organizations in last century have become increasing heterodox nowadays, the new post-Bureaucratic forms of organizations, which are adaptive to the rapidly changing environment, should be introduced and discussed in the digital age (Arndt and Bigelow, 2000; Gordon and Gordon, 1996; Ku and Fan, 2009). Meanwhile, new and more flexible organizational structure is a core issue in the management of organizational change. Innovating organizational structures by using information technologies (IT), this study introduced new IT-enabled structures, and presented how managers scan firms capabilities and design suitable structures in the information age. Facing keen competition, organizations advance their structure to reduce outside pressures. Besides suggesting innovative structures, the second part of this research wish to verify the roles IT-enabled structures played in organizational innovation and individual creativity, or, in the innovation management of different levels.

IT-DESIGN VARIABLES AND IT-ENABLED ORGANIZATIONAL STRUCTURES

Structure, as the blueprint for activities, includes the table of organization covering departments, positions, and programs. Three affective contextual variables exist, including environment, technology, and size that allow organizations to generate different types of structures (Woodward, 1970; Chandler, 1962; Child, 1972). From this perspective, information technologies are not merely changes of organizational environment, but also are an important technology for a firm, particularly for information and e-business related industries. Managers can use information technologies to develop IT-enabled design variables that can help in designing suitable structures to manage strategy/environment fit. Lucas and Ba-

roudi (1994) and Boudreau et al. (1998) reported useful IT-enabled design variables for designing new structures to facilitate corporate coordination and inter-organizational communication among organizations. These variables include:

1. virtual components, which can create virtual departments via electronic data exchange and inter-organizational delivery system (For example, if some firms wish their parts suppliers to replace the inventory, they may ask the suppliers to offer parts on demand OR at the last minute by using electronic mail and express delivery);
2. electronic linking, by using electronic mail and telecommunication technologies;
3. technological leveling, which can refine the organizational hierarchy by using electronic communication tools;
4. mass customization technology;
5. internet, intranet, and extranet; and
6. technological matrixing, which forms matrix structures by electronic mail, fax, and telecommunication technologies.

Organizations must modify their structure continuously when the environment changes more rapidly than before. Facing keen competition, firms should maintain and improve competitive advantage by developing collaborative strategies such as joint venture, strategic alliance, and vertical integration (Hamel, 1991; Porter, 1987). Accordingly, some organizational activities must be separated and become the business of the collaborative partners, indicating changing of operational processes for both parties. From this perspective, organizations should adopt the appropriate competitive strategy and at least one modified structure to respond to these considerations. According to information technologies, organizations have addressed and implemented numerous innovative structures. Virtual organization recently has been identified as the most representative and innovative of these new structures in the informa-

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