

## Chapter 3

# Business Process Digitalization and New Product Development: An Empirical Study of Small and Medium-Sized Manufacturers

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### ABSTRACT

*Previous research has largely ignored how business process digitalization across the value chain enhances firm innovation. This chapter examines the relationship between the extensiveness of business process digitalization (BPD) and new product development (NPD) in a sample of 85 small U.S. manufacturers. Scores of extensiveness were derived from the number of adopted e-business practices regarding inter and intra-firm activities such as: customer and supplier services (computer-aided design and manufacturing), employee services (education/training), and industry scanning (technology sourcing). The authors found that (1) NPD is positively related to the extensive use of BPD, and (2) the relationship between NPD and the extensiveness of BPD is stronger in more mature firms than that in younger firms. The authors conclude that small and medium-sized enterprise (SME) production innovation strategies are positively associated with the strategic use of BPD and span spatial, temporal, organizational, and industry boundaries thus aiding SME global competitiveness.*

### INTRODUCTION

Over the past decades, the rapid developments of the Internet and the information technologies

have profoundly impacted every aspect of organizational and social activities. Many business organizations, including small and medium-sized enterprises (SMEs), have started to adopt business process digitalization (hereafter “BPD”) as a tool to gain market and operational efficiency (e.g.,

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BarNir, Gallagher & Auger, 2003; Bharadwaj & Soni, 2007; Johnston, Wade & McClean, 2007). Business process digitalization, in this study, is defined as an enterprise-wide information system based on the technological foundation of the Internet. To date, the majority of research on SME's BPD has focused on the antecedents of SMEs engaging in one or few specific types of e-business practice or process (Wymer & Regan, 2005). For example, scholars have examined factors at the organizational level (e.g., Burke, 2005; Dholakia & Kshetri, 2004; Nielson, Host & Mols, 2005; Xu, Rohatgi & Duan, 2007); the industrial level (e.g., Dholakia & Kshetri, 2004; Lee, 2004); and the institutional level (e.g., Kshetri, 2007) that influence the SME's decision to adopt BPD. Less in quantities, studies also have looked at the role of BPD in influencing SMEs' market and operational performance (e.g., Johnston et al., 2007; Merono-Cerdan & Soto-Acosta, 2006; Rajendran & Vivekanandan, 2008; Zhu, Kraemer, Xu & Dedrick, 2004).

While these studies provide good understanding of the antecedents and the financial consequences of BPD, how BPD affects SME's new product development is still unclear. As a key indicator of firm innovation, new product development is crucial to the survival and success of business and enterprise, including SMEs (Huang, Soutar & Brown, 2002). This study aims to understand how SMEs can enhance new product development through use of BPD. Building upon insights from the knowledge-based view (Conner, 1991; Grant, 1996; Kogut & Zander, 1992) and the organizational learning theory (Argyris & Schon, 1978; Cyert & March, 1963), the central thesis of this study is that the extensive use of BPD enhances the firm's knowledge-base resources and improves its organizational learning, therefore contributing to SME's new product development.

This study has several contributions. First, it complements current research on the consequences of SME e-business practices and processes. The existing studies on the impact of SME BPD have

largely focused on operational outcomes such as financial or market performance (e.g., Johnston et al., 2007; Servais, Madsen & Rasmussen, 2007). Our study enriches this research stream by looking at the impact of BPD on new product development, one of the important measures for firm competitiveness. Second, we attempt to conceptualize BPD as a strategic process employed by SMEs to leverage information technologies as rent seeking and value creation initiatives. We posit that BPD not only enhances operational effectiveness of the firm (Porter, 1991), but also is conducive to entrepreneurial decision-making and innovation (von Hippel, 2005). Third, the existing studies typically examine BPD independent of other possible moderating variables. The contingency theory (Donaldson, 2001) suggests that the impacts of BPD may vary, depending on certain types of organizational characteristics. We explored the potential moderating effects of organizational characteristics (firm age and type of products) on the effect of BPD on new product development.

## **THEORY AND HYPOTHESES**

### **The Knowledge-Based View**

Extending from the resource-based view of the firm (Barney, 1991; Wernerfelt, 1984), the knowledge-based view (Conner, 1991; Grant, 1996; Kogut & Zander, 1992) considers knowledge as the most strategically significant resource of the firm. Organizational knowledge is embedded and carried through multiple entities including organizational culture and identity, policies, routines, documents, systems, and employees (Nonaka, 1994). Because knowledge-based resources are heterogeneous and difficult to imitate and transfer across organizations, the knowledge bases and capabilities among firms are the major determinants of sustained competitive advantage and superior firm performance (Barney, 1991).

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