



## **Chapter III**

# **Inventory Productivity Impacts of IT-Enabled Supply Chain Coordination in Manufacturing Environments**

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*This chapter describes an empirical analysis of the mediating effects of supply chain coordination strategy and manufacturing IT infrastructure on the relationship between business complexity and inventory turnover. Business complexity describes the diversity and volatility associated with a firm's product markets. To cope with this complexity, firms deploy inventory buffers. This deployment should decrease inventory turnover. An extensive manufacturing IT infrastructure can increase a firm's "sense and respond" capability, reducing the need for buffers, and can thereby improve inventory turnover. As this technology enables enhanced coordination, and as firms' efforts to reduce buffers within their own organizational boundaries earn diminishing marginal returns, firms attempt to optimize performance across*

*organizational boundaries within the supply chain, i.e., adopt a cooperative supply chain coordination strategy. This supply chain coordination should improve inventory turnover.*

## INTRODUCTION

### Problem Definition

#### *Background and Relevance*

The fundamental questions of whether and how information technology (IT) contributes to firm performance have been answered in different ways. Thus, IT Value research findings have been equivocal, with some studies finding negative performance impacts (Berndt & Morrison, 1995; Johansen, Karmarkar, Nanda, & Seidmann, 1996), some finding no overall effect (Barua, Kriebel, & Mukhopadhyay, 1995; Dos Santos, Peffers, & Mauer, 1993; Loveman, 1994; Strassman, 1985; Strassman, 1990), and some finding positive impacts (Brynjolfsson & Hitt, 1996; Brynjolfsson & Yang, 1997; Hitt & Brynjolfsson, 1996; Mukhopadhyay, Kekre, & Kalathur, 1995).

To reconcile these findings, several studies suggest that contextual factors associated with the firm and its environment mediate IT's performance effects (c.f., Banker, Kauffman, & Morey, 1990; Brynjolfsson & Yang, 1997; Scott-Morton, 1991; Venkatraman, 1991; Weill, 1992). Brynjolfsson and Hitt find that "firm effects" accounted for roughly half the productivity benefits attributed to IT. That is, firm capabilities (e.g., managerial expertise in matching business strategy with market context) may leverage investments in IT to enable sustained competitive advantage. They (Brynjolfsson & Hitt, 1995) suggest, "...an interesting extension would be to identify common characteristics of the highly productive firms and thereby examine some of the conventional wisdom regarding management best-practice" (p.12).

This chapter explores how business complexity, supply chain coordination strategy and manufacturing IT infrastructure interact to impact inventory turnover. Business complexity describes the degree of difficulty associated with a firm's supplier- and customer-facing processes due to volatility and diversity of its product-market. Manufacturing IT infrastructure describes the extent of IT deployment for manufacturing planning and control (MPC) functions. Coordination strategy describes the firm's attempts to coordinate processes across firm boundaries to optimize the entire supply chain's performance. Inventory turnover describes the firm's ratio of outputs to inputs.

Business complexity has become a crucial consideration, as global competi-

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