Chapter 9
Effects of Reciprocal Investments and Relational Interaction in Deploying RFID Supply Chain Systems

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ABSTRACT

In this paper, the author looks at the perceived ability of information technology (IT) infrastructure integration and supply chain process integration. In order to moderate the relationship between business process specificity and domain knowledge specificity, the study focuses on two dependent variables; reciprocal investments and relational interaction using the moderated regression procedure. Results show that IT infrastructure integration moderates the relationship between business process specificity and relational interaction, as well as domain knowledge specificity and relational interaction.

INTRODUCTION

This study looks at the perceived ability of two variables, information technology(IT) infrastructure integration and supply chain process integration, to moderate the relationship between the independent variables, business process specificity and domain knowledge specificity and two dependent variables, reciprocal investments and relational interaction in anticipated radio frequency identification (RFID) system deployment initiatives in the supply chain.

Though not yet at the expected speedy rate of diffusion, RFID system implementation initiatives are still a major consideration in improving supply chains across industries. It has been a number of years now since landmark mandates have been issued by institutions like the U.S. Department of Defense, U.S. Federal Food and Drug Administration, and the global retailer Wal-Mart and others like Target, Tesco, Metro Stores, among others, for their trading partners to use RFID at the case and pallet levels (Lee, Feng, & Ying, 2009; Barratt & Choi, 2007; Songini, 2007).

DOI: 10.4018/978-1-4666-1761-2.ch009

Firms worldwide continue to experiment with its use and although the signs are encouraging and positive in exceptional cases such as in Wal-Mart's, more firms tread the path cautiously and are still mainly driven by "hub" firms who require their trading partners use it, even if only on a tentative basis. University of Arkansas' RFID Research Center has reported that RFID-enabled inventory systems in the Wal-Mart test stores improved inventory count accuracy by 13 percent, thus reducing the need to hold unnecessary inventory (Blanchard, 2008). In an earlier set of findings, the Center reported that the initial 16 percent reduction in out-of-stock instances was reassessed only to show an actual 30 percent reduction for items selling 0.1 to 15 units daily. The percentage is even higher at 62 percent for faster moving items selling at 7 to 15 units daily (Manufacturing Business Technology, 2006). For the most part, however, firms still hesitate to use RFID because the touted benefits and possible implementation problems are not yet clear or definitive from both the industrial and academic research perspectives (Zhou, 2009).

More research studies have been conducted since, that give us an indication of more important things to consider when implementing RFID in the supply chain. This study closes up specifically on RFID as it relates to the concepts of IT infrastructure integration, supply chain process integration, business process specificity, domain knowledge specificity, reciprocal investments, and relational interaction. The following are selected studies that help highlight the salience of these concepts in RFID implementation within the supply chain.

Kim et al. (2008) found, in their study of 70 American and 87 Korean retailers, that the IT infrastructure supporting RFID is critical in improving inventory management, store operations, and demand management, and boosting business strategic performance. The American retailers specifically valued the hardware/software applications needed for inventory management, whereas the Korean retailers valued parts of the IT infrastructure that supported efficient store operations and demand management. For inventory management, both groups of retailers recognized the importance of data system automation in enabling interfirm sharing of accurate data pertinent to inventory control, real-time inventory, reduced shrinkage, visibility of orders, etc. Cannon et al. (2008), however, argue that the presence of an IT infrastructure alone does not guarantee that it will add to the firm's competitiveness. In order to extract maximum value from RFID, there has to be "high IT embeddedness" or an environment that more fully integrates IT into the firm's critical decision making (Powell & Dent-Micalieff, 1997; Chatfield & Yetton, 2000) and making asset-specific investments with an electronic trading partner.

Suggested IT infrastructure support for RFID in current technology environments has been described in numerous studies. The more recent ones include the following. Chang, Cheng, and Lin (2007) describe the web services-enabled architecture for an RFID environment. Jankowska, Kurbel, and Schreber (2007), on the other hand, introduced the architecture for agent-based mobile supply chains using RFID and other mobile technologies that links supply chain planning and execution. Lee and Park (2008), working along the same lines, also provide a dynamic tracing task model for an RFID-based SCM architecture intended to enhance the traceability range beyond simple distribution channels.

Streamlining business processes to align with the requirements of RFID initiatives is needed for supply chain process integration among trading partners. Sabbaghi and Vaidyanathan (2008) consider RFID to be critical in the following four business processes in the supply chain: demand management, order fulfillment, manufacturing flow management, and return management. Mobile and ubiquitous commerce add reach and complexity to extended supply chains that include the