Moderated Multiple Regression of Absorptive Capacity Attributes and Deployment Outcomes: The Importance of RFID IT Infrastructure Integration and Supply Chain Process Integration

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ABSTRACT

In this study, the author examines organizations’ perceptions of the importance of absorptive capacity attributes in the deployment of radio frequency identification (RFID) in a supply chain and their relationships with operational efficiency and market knowledge creation as moderated by information technology infrastructure integration and supply chain process integration. Data was collected using a survey questionnaire administered online to members of the Council of Supply Chain Management Professionals (CSCMP). Four proposed hypotheses were partially supported in this study. Both variables, IT infrastructure integration and supply chain process integration, moderate the relationships between three predictor variables, business process modularity, standard electronic business interfaces, and breadth of information exchange and the two dependent variables examined in this study, operational efficiency and market knowledge creation to a considerable extent. This study has clear implications for how decision makers affecting their firm’s supply chains should make a business case for robust IT elements that support both IT infrastructure integration and supply chain process integration.

Keywords: Interenterprise Systems, IT Infrastructure Integration, Radio Frequency Identification (RFID), Supply Chain Management, Supply Chain Process Integration

INTRODUCTION

Radio frequency identification (RFID) studies conducted in the last couple of years indicate the reluctance of firms to implement it due to a variety of reasons: scepticism concerning the ability of RFID to deliver cost savings or positive return on investment in the near future; lack of knowledge about RFID implementation; inability to make a business case supporting RFID;
concern over the level of financial resources required for RFID implementation; and lack of clarity about the protection and security of the information that needs to be embedded in the RFID tags (Dos Santos & Smith, 2008; Reyes et al., 2007; Godon, Visich, & Li, 2007; Vijayaraman & Osyk, 2006). On the more positive side, RFID studies on the use of the tags for inventory management have also been coming out demonstrating potential and actual benefits in terms of operational efficiencies and reduction in losses due to shrinkage or theft (Lee, Cheng, & Leung, 2009; Rekik, Sahin, & Dallery, 2009; De Kok, Van Donselaar, & Van Woensel, 2008; Szmerekovsky & Zhang, 2008; Moon & Ngai, 2008). Practical guidelines on RFID implementation have also surfaced to help firms seriously considering it plan ahead and create a business case for an earnest initiative (Angeles, 2005; Reyes et al., 2007).

This study approaches RFID implementation from a different angle, focusing on the organizational learning aspects of its deployment, thus, contributing a new exploration into the technology’s future prospects within the firm. Organizational learning within the supply chain context using RFID-enabled systems is of great interest nowadays when mandates for RFID used are being issued by powerful channel masters (i.e., hub firms). RFID initiatives are interenterprise-wide system applications that require mutual buy in and learning experiences between and among value chain participants. As trading partners seek to pursue initiatives of this scale, they would be embarking in knowledge gaining experiences, with the “conscripted” trading partners following the lead of and learning from the hub firm introducing the use of RFID such as the case of Wal-Mart in order to gain operational efficiency and/or market knowledge creation. This study uses the concepts of absorptive capacity and the dynamic capabilities perspective (DCP) to frame this major current challenge to supply chains implementing RFID. Thus, this study looks at firms’ perceptions of the importance of absorptive capacity attributes in the deployment of RFID in a supply chain context and their relationships with two RFID system outcomes—operational efficiency and market knowledge creation. More importantly, this study investigates the ability of information technology infrastructure integration and supply chain process integration to moderate the relationships between the absorptive capacity attributes and these RFID deployment outcomes.

Zahra and George (2002) define “absorptive capacity” as “…a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability. (2002, p. 186)” Within the context of the RFID supply chain, a firm’s ability to value, assimilate, and apply knowledge received from external sources such as suppliers, customers, competitors, and alliance partners can boost its future chances of gaining new knowledge and sensitivity to the significance of new information emerging in the marketplace (Cohen & Levinthal, 1990; Lindsay & Norman, 1977). The absorptive capacity capability involves the use of valued organizational resources such as socially complex routines to support an “information architecture” (Knudsen & Madsen, 2002) that enables the transfer of knowledge and facilitate communication among parties involved and a large and active network of internal and external relationships, supported by cross-functional interfaces (Collis, 1994; Hall, 1992; Cohen & Levinthal, 1990).

The dynamic capabilities perspective, on the other hand, refers to the capability of firms to renew its competencies in terms of organizational resources needed to align themselves with environmental business demands (Teece, Pisano, & Shuen, 1997; Eisenhardt & Martin, 2000). Firms with this capability continually build, adapt, and reconfigure both internal and external resources to meet challenges such as keeping up with rapid technological changes and unpredictable customer demands. Cultivating competitive advantage depends, to a great extent, on the firm’s ability to convert knowledge into key capabilities in responding to environmental demands.
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