Chapter 36
Factors Affecting Willingness of Industries to Adopt Radio Frequency Identification (RFID)

Amarpreet S. Kohli
University of Southern Maine, USA

Cheng Peng
University of Southern Maine, USA

ABSTRACT

This research examined the willingness of businesses and industries to adopt RFID. It was postulated that motivation to adopt RFID is influenced by the technological context, organizational factors, and perceived benefits of using RFID. Data was collected from Council of Supply Chain Management Professionals members using a 19-question web-based survey. Relative advantage that firms can achieve and the perceived benefits in improving product quality and information sharing along with better traceability in the supply chain were significant predictors of RFID adoption. Within the technological contexts, the visible obstacles of RFID adoption through quality of transmission and reliability, understanding of overly high investment costs, and importance of the privacy concerns were all significant. The IT readiness of a firm was also a significant predictor of RFID adoption in the organizational factor, however the size of an organization was not at all linked to the RFID adoption decisions. The results point to a number of important conclusions that are informative for various business and industries that might be contemplating to adopt RFID technology in their operations.

INTRODUCTION

In our interconnected global environment, many businesses (i.e. Walmart, Carrefour, Tesco, Metro, and Target) and industries (i.e. aerospace, automotive, defense, health care, life sciences, life stock farming, logistics industry, and retail industry) are applying advantages of Radio Frequency Identification (RFID) to improve operational efficiencies and gain competitive advantage (Lau & Sirichoti, 2012). It has been

recognized as one of the 10 greatest contributory technologies of the 21st century in the business world (Mehrjerdi, 2011).

RFID readers are radio frequency transmitters and receivers that are controlled by a micro or digital signal processor, which communicates with the tags (Attaran, 2007). The wireless technology utilizes transmitted radio signals to tag, recognize, track, and trace the movement of an item automatically across the supply chain using a scanner (Moon & Ngai, 2008). It allows for real-time processing of large volumes of multiple data sets at the same time that helps improve efficiencies of operations. RFID technology impacts all echelons of the supply chain, and has been shown to reduce information gaps, especially in retailing and logistics, through processing of data and real-time visibility across the supply chain (Angeles, 2009). Use of such Auto-ID technologies has shown to improve effectiveness of the entire supply chain tracking systems (Kelepouris, McFarlane, & Giannikas, 2012).

Despite extensive research on the technological characteristics and expected benefits of RFID, the specific contextual and agency-based drivers that encourage RFID adoption along with technological advances have not been studied in depth (Wang et al., 2010). The focus of our research is on the perceived benefits of using RFID and how organizational factors interplay with the technology context in current market environments. The paper is organized in the following manner. The first section reviews prior literature on the benefits, challenges, and drivers that motivate firms to adopt RFID. Next, we propose a theoretical framework and postulate that willingness to adopt RFID is influenced by the technological context, organizational factors, and perceived benefits of using RFID. Then, the research design and data collection procedures are described, followed by results. Finally, we discuss the results and present conclusions.

LITERATURE REVIEW

Benefits

Strategic (competitive factors), tactic (visibility along the Supply Chain), and operational (assets and efficiencies) benefits have been identified with RFID adoption across the supply chain (Pedroso et al., 2009). Potential benefits identified from prior research studies are: improved inventory management and visibility, reduced costs for logistical operations, improved customer service, improved security, improved efficiency of business operations, automatic non- line-of-sight scanning, labor reduction due to increased automation, enhanced visibility of supply chain, improved asset tracking and inventory management, item level tracking, traceable warranties and targeted product recall, improved reliability, quality control and regulation, improved utilization of resources, durability, and the capacity to hold more information were some of the reasons (Leimeister et al., 2009, Lim & Koh, 2009; Osyk et al., 2012; Mehrjerdi, 2011b; Prater et al., 2005; Visich et al., 2009). Al Kattan and Al Khudairi (2010) also documented, using simulation models in SCM systems, that regardless of demand distribution pattern and customer order rate using RFID technology adoption improved inventory control.

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