Chapter 11
Inventory Management, Shrinkage Concerns, and Related Corrective RFID Strategies

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ABSTRACT

RFID-based solutions are essential inventory management tools, supplying more information than the standard barcode that help eliminate the potential for inventory stock-outs and reducing theft-based inventory shrinkage. A relatively detailed discussion of these techniques is included in this chapter by addressing some of the many concerns of inventory shrinkage. As is evident from the empirical section of this chapter, although RFID may be perceived as a cutting-edge business solution, RFID systems and its implementations still prove to be a difficult process to implement and achieve. Many companies have avoided the idea of introducing RFID systems, possibly due to being overwhelmed with the new technologies. However, its impacts on reducing inventory shrinkage are fairly clear and decisive.

RFID-RELATED TECHNOLOGIES IN OPERATIONS AND INVENTORY MANAGEMENT

Exploring the Growth of RFID-Related Technologies

There have been numerous investigations to investigate the benefits of radio frequency identification (RFID), especially in retail and operational situations. A number of more traditional studies have focused on the effects that RFID has on supply chain performance, especially inventory management. This chapter inspects some of this literature and empirically tests perceptions of inventory management on its effectiveness, especially in regardless to inventory shrinkage controls. In general, a plethora of literature has been written on the general overview of automatic identification and data capture technologies (AIDC), especially RFID-based solutions, and how such technologies can be applied within supply chains,
the benefits that it brings to firms, managerial guidelines around using it, and how to implement them (Devaraj, Fan, & Kohli, 2002; Dutta, Lee, & Whang, 2007; Zang & Fan, 2007). There have been recent writings made on its effects in the area of finance, inventory, and manufacturing (Aldaihani & Darwish, 2013; Azadeh, Gholizadeh, & Jeihoonian, 2013; Bhamu, Khandelwal, & Sangwan, 2013; Fumi, Scarabotti, & Schiraldi, 2013; Ketikidis, Hayes, Lazuras, Gunasekaran, & Koh, 2013; Mateen & More, 2013; Park & Min, 2013).

In particular, Visich et al. (2009) focused on the review and classification of existing quantitative empirical evidence that has was gathered for RFID on supply chain performance. The evidence was separated out into two sections, which included processes and effects. The processes were further broken out into operational and managerial, while the effects were broken out into automation-related, informational, and transformational. The focus of the study was to identify which process and effect RFID impacts and which it does not.

Operational processes, as it relates to the RFID applications generally include labor cost reductions, improved reliability and efficiency, and reduced throughput and inventory costs. Management processes typically include administrative decisions, process control, reporting, and routine. Automation-related effects are related to the value that comes from making a process more efficient. Informational effects are those that are due to the ability of the technology to gather, store, process, and distribute information. Transformational effects are those that create innovation or transformation through technology.

Visich et al. (2009) only focused on metrics that were based on actual results that were reported from a pilot study or through actual implementation (i.e. empirically tested). To make the study more focused, they omitted cases where multiple metrics were employed. These omitted metrics included estimated benefits or benefits that were masked to protect confidentiality, results from unidentified companies (unless the results were significant), results that were difficult to separate due to phased implementations of information management systems and RFID, and aggregated evidence from multi-year implementations across all of a company’s facilities. By inspecting the data via a process-oriented framework (i.e. immediate and on-going operational benefits from enterprise resource planning implementations), they found that the empirical evidence reflected that the major effects from implementing RFID within supply chain management were automation-related effects. These effects were on operational processes via inventory control and efficiency improvements. This is followed by informational effects on managerial processes via improved decision quality, production control, and effectiveness of retail sales. The evidence for informational and transformational effects on operational processes was very limited. Similarly, the evidence showed that there were no automation-related or transformational effects for managerial processes. The empirical evidence showed that the major effects of RFID on supply chain performance are automation-related effects on operational processes and informational effects on managerial processes.

Supply Chain and Inventory Management Applications

There are many case studies of the benefits to SCM and inventory control brought forth through the implementation of RFID tags across a variety of industries, in order to identify the key benefits of implementing the program in highly differentiated industries. Such research generally has its major goal to develop a working model that may be useful to the process of identifying key benefits of RFID implementation across industries. RFID-related technology domestic sales exceeded US$7 billion in 2008 and are expected to continue increasing for the foreseeable future (Mehrjerdi, 2011). As such, many firms are looking to implement the technology to their advantage by reducing inven-