Chapter 35
Radio Frequency Identification Technologies and Issues in Healthcare

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ABSTRACT

One of the most compelling cases for RFID-embedded technologies in the healthcare field has been made by documenting increased efficiency in supply chain performance measurements, which generally consist of financial and non-financial indicators. The chapter suggests that patient flows and safety are key measures of hospital operation efficiency. Process bottlenecks in hospitals can delay discharge times and lead to higher costs and lower quality of service, which in turn affects the overall performance and business of the hospital. Hospitals have struggled to control costs, and RFID-embedded technologies should allow management to prioritize their technology spending and reduce total cost of suppliers and operational expenses.

INTRODUCTION

Barcoding and RFID-Related Technologies in the Services Sector

Barcodes and related identification technologies have been used to control inventory and supply chain management (SCM) for some time, especially in retail and purchasing applications (Aldaihani & Darwish, 2013; Azadeh, Gholizadeh, & Jeihoonian, 2013; Bhamu, Khandelwal, & Sangwan, 2013). Barcoding equipment is fairly inexpensive and easy to use as compared to other AIDC technologies (Smith, 2011; Smith, Smith, & Baker, 2011; Smith & Rupp, 2013; Visich, Li, Khumawala, & Reyes, (2009; Wilson, 1995; Wyld, (2006). However, certain limitations create the need for a new approach to increase efficiency (Drejer & Riis, 2000; Dutta, Lee, & Whang, 2007; Fisher & Monahan, 2008; Fumi, Scarabotti, &

DOI: 10.4018/978-1-5225-7489-7.ch035

Schiraldi, 2013). Barcodes are only accurate if items are continuously scanned in and out as they move along the supply system. An employee must ensure an item is scanned at each stage, or entry and exit point. An example of this would be a delivery driver that scans packages as a truck is loaded and scans the package at the delivery point. If the package is not scanned, the action is not accurately recorded. Barcodes require an employee to physically inspect the item for scanning purposes to ensure inventory accuracy and determine the product's location, while Radio Frequency Identification (RFID) conveniently tracks products through radio waves, designed to improve operational efficiency.

RFID technologies helped Walmart to control its inventory and track product movements along its supply chain (Tarofdor, Marthandan, Mohan & Tarofdor, 2013). Furthermore, RFID has been used in the identification of stray pets, which is known as chipping and in transportation, in addition to sports. Experimentation with RFID in soccer may soon allow a visually impaired player to participate in the game by integration of computers and video cameras, along with an active RFID tag to signal to the player through a set of audio headphones (Zare, McMullen & McCune, 2014).

DISCUSSION

RFID in the Healthcare Industry

Anand and Wambaa (2013) performed a case study to evaluate how RFID can be applied in healthcare settings. The authors suggested that there are significant benefits for both patients and healthcare organizations in the application of such technology. Adoption in the healthcare industry is not widely spread because of the initial high cost associated with equipment and technology implementation. One argument against the investment emphasizes that the technology primarily focuses on tracking and implies that the costs outweigh the benefits (i.e., compared to the cheaper alternative of barcodes). However, Anand et al. compared the evidence collected from 39 hospitals and analyzed the costs and benefits of RFID implementation over the long run. Their findings indicated that RFID-embedded systems can save time and reduce waste.

Hence, RFID-related technologies can help reduce costs associated with the medical supply chain (e.g., pharmaceuticals and medical supplies) or in patient tracking and management. For example, high-valued supplies, such as blood can be equipped with RFID tags that can ensure that the right type of blood is being administered to the right patient (Winters, 2010). When associated with patient tracking, RFID can be used to track patient history as well as hospital admittance, transfer, and discharge. Advantages also include reducing redundant work and time consuming processes by making certain that the correct blood is drawn from storage. This allows healthcare providers to concentrate on patient care and service (Dominic, Goh, Wong, & Chen, 2010; Tarofdor, et al., 2013). RFID-related technologies can also reduce errors and waste by assuring that the accurate drug or medical product, ordered from the appropriate supplier is used at the proper time for the correct patient in the suitable dose.

RFID is an acceptable way to automate and improve the tracking of medical products and pharmaceuticals. Patients gain from RFID-related technology because of the reduction in errors when healthcare providers are prescribing or fitting medical products to them. As suggested by a number of researchers (Smith, 2012, 2013a, 2013b, 2013c; Ting, Kwok, Tsang, & Lee, 2009; van der Togt, Jan van Lieshout, Hensbroek, Beinat, Binnekade, & Bakker, 2008; Wickboldt & Piramuthu; Zang, & Fan, 2007), the experimentation of RFID in a variety of fields [i.e., sports, SCM, operations management,