

Chapter 10

Radio Frequency Identification Technology as an Analytical Lens and Solution in Hospitals: A Novel Approach in BPR/BPM

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ABSTRACT

Radio Frequency Identification—an object recognition technology—has been explored by hospitals worldwide in the past decade for inventory management. As this technology became accepted with successful pilots, integrating the technology with other applications within hospitals gained momentum. For this purpose, however, it is necessary to revise existing processes that are impacted by RFID. The standard approach in business process management is to redesign the existing processes to plug-in the technology and implement the new process with the technology. In this chapter, the authors provide a novel perspective in Business Process Redesign and Management that RFID may not only be a technology solution, but also an analytical lens to review the existing processes within hospitals such that existing inconsistencies may be revealed and an opportunity presented to address them.

INTRODUCTION

Radio Frequency Identification (RFID) is commonly defined as wireless technology for automatic identification of objects or people, in which a reader emits a series of commands to extract data/information from tags (Maillart et al. 2010). It is an object recognition technology that uses radio

waves (Greene, 2005) automatically. This avant-garde concept was initially trialled by the British in World War II to identify friendly airplanes returning from their missions (Landt, 2001). The ability of this technology to track signals and store data helped in its commercialisation through RFID tags or small silicon microchips, as small as half a millimetre square attached to antennae and could

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be placed anywhere (Taghaboni-Dutta, Velthouse, 2006). These tags are able to store unique serial numbers and other information, which can be read by readers a few or hundreds of meters away.

It was in the last decade that hospitals realised the benefits of integrating RFID into their operations, to enhance efficiency and provide better quality of care (Cavoukian, 2008; Cangialosi, Monaly, Yang, 2007). In particular, hospitals became interested in tracking high value and frequently used equipment to optimize their utilization in emergency settings such as surgeries (Nagy et al. 2006). Conversely, resource constraints in hospitals are increasingly rendering it difficult to provide care to an adequate standard (Hoskins 2006). Frequently, surgical procedures are delayed due to missing high-end critical equipment or regularly used assets such as IV stands or defibrillators. Majority of the large hospitals globally seem to have spent significantly on stocking inventories of such equipment. Nevertheless, medical staff spends hours searching for wheelchairs, stretchers, gurneys etc, sacrificing the time with patients, particularly in surgeries (Hoskins 2006). High value assets are often underutilized, due to slow device cycle times while hospitals continue to overspend on rental assets (Nagy et al. 2006). In such an environment, relatively inexpensive RFID technology is perceived as a solution for resource optimization and to support appropriate allocation of scarce material resources.

Specifically, poor exploitation of resources and slow device cycle times cause many high-value assets to go underutilised while hospitals continue to overspend on new and rental assets (Hoskins, 2006). Meanwhile, nurses sacrifice time with patients (especially in surgeries) to seek equipment they need and maintenance staff lose productive hours searching for specific items that need maintenance. As a result, the efficiency of processes in the hospitals reduce, costs and complexities continue to rise (Hoskins, 2006, Nagy et al., 2006). Managing the processes efficiently,

enhancing quality of care and controlling costs are seen as the rationale for adopting RFID systems.

Pivotal research into drivers for RFID in hospitals have consistently indicated that RFID tags may lead to reduction in clinical errors, reduced costs and increased efficiencies (Nagy et al. 2006; Chen et al. 2008). Fisher and Monahan (2008) concur that due to its many dimensional uses, RFID is rapidly becoming the standard for hospitals to track inventory, identify patients, and manage personnel. Many hospitals have initiated the use of RFID tags on wristbands (or bracelets) which store data and can be scanned with a reader to identify a patient, and what surgical procedure is required (Hancox, 2006; Cangialosi et al., 2007). For example, RFID tags embedded in patient bracelets can help medical staff identify patients before surgery and before administering medications or blood transfusions – reducing possible clinical errors. RFID systems have been implemented such that patient movements can be traced through hospital services. Medical staff is often given RFID tags on their badges in order to collect data on workflow to find inefficiencies in current operations of the hospital. These systems are particularly useful in emergency settings where there is high patient volume, and heightened risk of medical error. Conversely, tracking equipment takes less time, leaving practitioners to spend more time with the patients (McCarthy, 2004).

Hospitals can lower expenses on rental equipment and over supply inventories, with the implementation of RFID systems often known as *indoor positioning systems* (Fisher, 2006). Current research (Fisher and Monahan, 2008) is in concurrence that due to its many dimensional uses, RFID is rapidly becoming the standard for hospitals to track inventory, identify patients, and manage personnel. The potential of RFID has been explored for asset tracking and process enhancements in hospitals, worldwide. The technology has been accepted in such environments, as it is relatively inexpensive and, in principle, uncomplicated to

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