Chapter 7

Strategic Framework for Developing a Process Model for Maximising the Potential of Radio Frequency Identification (RFID) Technology Integration in Hospitals

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ABSTRACT

Radio Frequency Identification is a radical technology that is being experimented in hospitals commonly for tracking high value equipment, in order to maximize the efficiency of processes. RFID deployment and integration is mostly vendor and business driven, and hence its potential is not maximized. In this chapter, we propose a strategic framework to develop a process model, that will assist in maximizing the potential of RFID in hospitals.

INTRODUCTION

Radio Frequency Identification or RFID is a broad term that is used for classifying technologies that use radio waves to automatically recognize objects and people (Greene, 2005). This radical concept came into existence in 1940s (Landt, 2001), when it was first used in World War II by British aircrafts to identify friendly airplanes returning from their missions. RFD has the ability to track signals and store data, which helped its commercialisation through RFID tags -- small silicon microchips, which may be as small as a half a millimetre square, attached to antennae and can be placed anywhere (Taghaboni-Dutta, Velthouse, 2006). RFID tags are able to store unique serial numbers and other
information, which can be read by readers a few or hundreds of meters away.

For the manufacturing industry, RFID was an evolution from bar coding technologies. While bar coding required line of sight, requiring a scanner to see the code - so as to read it, RFID systems did not require the line of sight (Greene, 2005). RFID improved the efficiency of the supply chain management simply by its ability to track goods from the factory to retail stores. Fisher and Monahan (2008) contend that RFID systems draw upon their successful utilisation in manufacturing and retail environments – for more efficient management of resources in organisations; and they drew upon their military applications to offer potential for heightened identification functions.

Hospitals globally began to realise the benefits of adopting RFID into their operations, to enhance efficiency and provide better services, in the last decade (Cavoukian, 2008; Cangialosi, Monaly, Yang, 2007). RFID systems has been trialled to track medical equipment and supplies more efficiently, enabling the authenticity and administration of drugs, and improving patient safety via the use of RFID bracelets. Hospitals are interested particularly in tracking high value equipment, and frequently used equipment, to optimise their utilisation in emergency settings such as surgeries (Nagy et al., 2006).

The rationale for RFID adoption was quite simple. In the dynamic world today, hospitals are finding it increasingly complex to provide care to an adequate standard, due to resource constraints (Hoskins, 2006). Surgical procedures are delayed due to missing high end critical equipment or regularly used assets, as well as clinician time spent on tracking them. In an emergency, it is not uncommon to find doctors and nurses hunting for an IV stand or defibrillator, although the hospital may have numerous supplies. Large hospitals spend significantly on stocking equipment that is used frequently. Yet, medical staff spend hours searching for patient care assets, including medical devices (such as infusion pumps, portable x-ray machines and patient monitoring devices), as well as other mobile assets such as wheelchairs, laptops, stretchers and gurneys.

Poor utilisation and slow device cycle times cause many high-value assets to go underutilised while these 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.

Relatively inexpensive RFID technology is perceived to optimise utilisation and support appropriate allocation of scarce material resources. Current seminal research into drivers for RFID in hospitals (Nagy et al. 2006; Chen, et al., 2008) indicated that the use of RFID tags may lead to reduction in clinical errors, reduced costs and increased efficiencies. 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