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 
how improved the efficiency of the supply chain man-
agement 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 ben-
etits 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 have 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 main-
tenance 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 control-
ing costs are seen as the rationale for adopting 
RFID systems.

Relatively inexpensive RFID technology is 
perceived to optimise utilisation and support ap-
propriate 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