# Chapter 3.6
# Realizing the Promise of RFID:
## Insights from Early Adopters and the Future Potential

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## ABSTRACT

This chapter touches on some basics on RFID and covers business opportunities as well as some of the relevant challenges to be faced. Although it is a new technology, standard obstacles of organizational and technological barriers still have to be overcome and mediums crossed that were previously not traversed as on warehouse and distribution center floors yield for challenging environments from a business process as well as a technological adoption perspective. It provides a combined outlook sprinkled with key lessons from early adopters and service providers close to some of the emerging trends and implementations happening in the field. A range of benefits will evolve with the adoption of RFID within an organization and especially across the entire supply network. For now, the value is only slowing coming into focus. Various industry segments, like pharmaceutical and military applications, will provide a smoother supply chain trail for others to follow.

## INTRODUCTION

Radio frequency identification (RFID) refers to a set of technologies that use radio waves to identify and transmit information from tagged objects. While there are several mechanisms to identify objects using RFID (http://archive.epcglobalinc.org/new_media/brochures/Technology_Guide.pdf), an important approach is to store a serial number that identifies a product, along with other product information, on a microchip that is attached to an antenna. The chip and the antenna together constitute an RFID transponder or an RFID tag. The antenna enables the chip to transmit identification information to a reader.

Microchip-based RFID tags first started appearing in the late 1980s, with initial applications in areas such as access systems for office buildings and toll roads (http://archive.epcglobalinc.org/privacy_hearing.asp ).

RFID technologies range from very-short-range passive RFID and short-range passive RFID to active-beacon, two-way active, and real-time locating systems (RTLS; http://www.savi.com/rfid.shtml). Low-frequency (30 KHz to 500 KHz) systems have a short reading range and are commonly used in asset tracking and security access implementations. High-frequency (850 MHz to 950 MHz, and 2.4 GHz to 2.5 GHz) systems offer long read ranges (greater than 90 feet) and high reading speeds. The range of frequencies and their general distance ranges are noted in Figure 1.

## BUSINESS OPPORTUNITIES

The opportunities from leveraging RFID technologies are varied and span a gamut of application areas. For example, in retail settings, radio tagging can help to reduce theft and loss, more easily locate items, provide suppliers with better information on real-time demand for products, and improve the speed of product distribution. While conventional bar codes need to be passed in front (line of sight) of a scanner, RFID tags can be read remotely by a device up to 20 yards away, reducing the time and labor needed to recognize and process objects. RFID tags can also be encoded with data in addition to the basic identification. Some of the areas in which RFID tagging is expected to improve supply chain performance include the following.

*Forecasting Information:* RFID tagging has significant implications for the generation of better forecasts. Downstream data can be accurately assembled and processed for use in driving multitier forecasting processes (Lapide, 2004). Such data can include warehouse inventories and withdrawals and inventory replenishments, as well as product consumption. Retailers such as Wal-Mart, which are pushing RFID technologies, are promising their suppliers information on products as they arrive and leave their warehouses, stores, and store stockrooms, in addition to the point-of-sale data.

*On-Shelf Availability:* Past research indicates significant incidences of out-of-stock (OOS) issues in retail settings. While a considerable proportion of the problem occurs due to inadequate order processing, studies suggest a significant fraction of OOS occurs when products are actually in the store. According to a study conducted by Andersen Consulting, 53% of OOS situations are based on inefficiencies in the store ordering process. Another 8% of OOS situations happen while the necessary supplies are in the backdoor inventory, but have not been shelved. Large retailers, such as U.K. supermarket chain Tesco, have begun using

*Figure 1. Source: http://www.electrocom.com.au/rfid_frequencytable.htm*