Chapter 13
RFID Technology in Business and Valuation Methods

In Lee
Western Illinois University, USA

ABSTRACT
Radio Frequency Identification (RFID) became one of the major disruptive innovations that have attracted the attention of researchers and practitioners around the world. Recognizing the business value of RFID, firms are rapidly adopting RFID technology in a wide range of industries including hospitals, logistics, manufacturing, and retailing. Since the adoption of RFID largely depends on the perceived potential benefits and the investment costs, firms need to carefully assess every intangible and tangible benefits and costs to make sure the adoption is financially, operationally, and strategically justifiable. This chapter provides a literature review on RFID applications in business and valuation methods for RFID and presents an analytical evaluation model for RFID investment for manufacturing and retail organizations. Finally, this chapter concludes with the implications of the chapter for academics and practitioners.

INTRODUCTION
Radio Frequency Identification (RFID) technology is one of the major disruptive innovations in the twenty-first century and continues to evolve and grow over time. In various industries, RFID technology shows great potentials for cost reduction, business process redesign, supply chain improvement, and on-site customer support. Recently, RFID technology has been touted as the foundational enabling technologies for the realization of the Internet of Things (IoT). IoT is based on uniquely identifiable objects and the Internet technologies. Devices on the IoT have identifiable and create, collect, share store data in an Internet-like structure. For supply chain management, the IoT may use sensors to track RFID tags attached to objects moving through supply chains, thus improving inventory management and information flow while reducing transportation costs. The market for RFID hardware, software, and infrastructure has been strong and will remain strong with the growth of pervasive computing and the IoT.

Due to the ability to track movements of goods in a supply chain, RFID has given unprecedented visibility to the supply chain and has been able to
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save labor cost, improve supply chain coordination, reduce inventory and increase product availability (Lee & Özer, 2007). RFID promises to transform supply chain management by providing detailed information on the flow of products throughout the value chain (Whitaker et al., 2007). Furthermore, RFID is considered as a strategic value information technology which brings new value propositions, creates new markets, and builds competitiveness in various industries (Christensen et al, 2004; Krotov & Junglas, 2008; Tajima, 2007). Therefore, understanding the value of the RFID will be critical to the timely adoption of RFID, as the technology advances at a stupendous speed.

RFID technology management is the process of evaluating RFID technology, developing RFID systems, and managing RFID infrastructure to achieve business goals. In the evaluation stage of RFID technology, managers identify potential business process redesign opportunities or business improvement opportunities, explore different RFID technology options, assess their cost-benefit, and choose the best technology. To assess their cost-benefit, certain metrics need to be developed including quantifiable and unquantifiable benefits and costs of each RFID technology option. Despite the popularity of RFID technology and a large body of research on RFID benefits, there is still a lack of comprehensive approach to the evaluation process which combines identification, forecasting, and assessment of RFIT technology (Baars et al., 2009).

As RFID projects often compete with other IT projects for scarce resources, the fundamental questions for the RFID adoption are whether RFID technology can create a value, how its value can be measured, and how the RFID technology will be implemented. Evidence indicates that electronic integration with RFID without business process redesign is not sufficient to deliver promised logistics services (Lai et al., 2008). Wal-Mart has implemented RFID aggressively, but faced its own implementation issues including technical problems and suppliers’ pushback. It would be very challenging for a company to measure the benefits when there is no previous experience in similar technology investments.

Despite the need for a useful evaluation method in the industries, RFID valuation methods have not been fully operationalized, and developing a strong business case has been challenging for managers. Traditionally, accounting and financial project evaluation methods have been widely used to assess the value of projects. Return on investment, net present value, and payback period methods are classic in project evaluations. However, these traditional accounting and financial methods have played a limited role in justifying the RFID investment opportunities, because many benefits are hard to quantify and usually realized in the future.

In light of the ongoing debate on the valuation of RFID investment in the academia and industries, this chapter provides an overview of RFID applications in different industries and previous evaluation studies, presents an RFID investment evaluation model, and discusses a future direction for researchers and practitioners. Our chapter proceeds with literature review in Section 2, the evaluation model in Section 3, and the conclusion in Section 4.

LITERATURE REVIEW

The global industry for RFID technology has been growing steadily and is expected to expand fast for some time in the future. The dwindling prices of RFID tags are a driver for widespread adoption of item level tagging. Currently, the United States has the largest market worldwide, followed by Europe. Although developed markets such as US and Europe continue to remain the largest revenue generators for RFID manufacturers and software developers for some time, future growth in the market will be primarily driven by major Asian countries such as China and South Korea.
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