

Chapter 5.11

An Empirical Study of Factors Affecting RFID's Adoption in Taiwan

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ABSTRACT

RFID technologies represent a common standard for data storage and retrieval that could improve collaboration and data sharing between non-competing organizations. With the advent of RFID (radio frequency identification), organizations have the opportunity to rethink how their organization will be. Unlike companies in the United States and Europe which are mandated by large retailers or government departments, most Taiwan companies are investing in RFID without pressure. The article explores the factor affecting radio frequency identification adoption applica-

tions in Taiwan. Its objective is to summarize the ways in which organizations are thinking about their possible uses in a wide variety of companies and industries. An empirical investigation (n=134) found seven factors affecting RFID adoption within Taiwan. They are operation efficiency, manufacturing efficiency and supply chain efficiency, organization context, investment cost, market environment, and technology characteristic. By providing insight into these important factors, this article can help further understanding of their role in the adoption and use of RFID. The theoretical and practical implications of these results are discussed.

INTRODUCTION

RFID (radio frequency identification) is an automatic identification and data capture technology that has been around for decades and could be evolved from World War II. It is a promising and already rapidly emerging technology and gained attention in recent years as a means of enhancing data handling processes, which offers greater precision, flexibility, and potential cost savings and has attracted the interest of businesses and public entities (Davis & Luehlfiging, 2004; Roberts, 2006).

Keen and Mackintosh (2001) assert RFID technologies as part of "universal infrastructure" that will support mobile commerce. The applications of RFID are wide-ranging and include radio tracking of wild and agricultural animals (Kern, 1999), manufacturing and distribution of physical goods such as automobiles and transmission assembly (Mintchell, 2002), shipping and port operations (D'Amico, 2002; Dornheim, 2002), and pharmaceutical packaging (Forcinio, 2002), among others. Also, RFID systems are used for building access control, like "smart cards" for identification at doors (Finkenzeller, 2003) and "Easy-Pass" for toll motorways and bridges, like EASYCARD, the first 'touch and go' IC card for mass transport in Taiwan (Taipei Rapid Transit Corporation Annual Report, 2003).

Another survey from the RFID case studies in the IDTechEx knowledgebase categorized into 13 different application areas. The applications areas including airlines and airports, animals and farming, financial and security, healthcare, land and sea logistics, laundry, leisure, libraries and archiving, manufacturing, military, other, passenger transport and retail/CPG (IDTechEx, 2005).

Announcements made in 2003 by Wal-Mart Corporation, UK-based retailer Tesco, and the U.S. Department of Defense (DoD) indicating that they will require suppliers to put passive RFID tags on equipment at the pallet, case, and part level by

2005 promise to make these marketing estimates a reality (Application Development Trends, 2003; ABI Research, 2003). Up to today, the expected rapid industry adoption of RFID has, however, not taken place. It was not until now that Wal-Mart is still working hard with its suppliers to expand RFID tagging requirements. According to Wal-Mart, "By January, 500 more of its 3,900 stores will be using RFID technology to track the goods entering their premises, bringing the total number of stores using RFID technology to 1,000" (Swedberg, 2006).

According to IDTechEx's research, global market for RFID including tags, systems, and services is \$1.94 billion in 2005 but it will be driven by demand and new laws to \$24.50 billion in 2015 (Peter & Raghu, 2005). In 2006, almost three times the volume of RFID tags will be sold than over the previous 60 years since their invention. This exponential growth will continue and, by 2015, the value of sales of RFID tags will have increased by 13 times over the figure for 2005. In addition, IDTechEx assert that the market for RFID interrogators is analyzed—reaching \$1.14 billion in 2008 for EPC interrogators and \$0.75 billion in the same year for other interrogators, such as Near Field Communication interrogators. Forecasts by territorial region show that by 2010, 48% of RFID tags by numbers will be sold in East Asia, followed by 32% to North America.

East Asia, including Taiwan, all has a track record of quickly adopting and improving upon technology to create high performance business capabilities. With the advent of radio frequency identification technology, East Asia has an opportunity to make improvements in retailing and manufacturing.

After the trend moved toward e-readiness, the Taiwanese government has made a joint effort with the private sectors for the implementation and application of enterprises' mobilization in recent years. The Taiwanese government had launching of a new industrial promotion project in 2005, which was intended to make the imple-

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