Chapter 12

An Analysis of the Diffusion of RFID in the UK Logistics Sector Using a Technology-Acceptance Perspective

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ABSTRACT

In this chapter, the authors explore the factors affecting the UK logistics service providers’ intention to use RFID technology from the theoretical perspective of a Technology-Acceptance Model (TAM). The survey data analysis shows that perceived usability of RFID has a significant relationship with the levels of adoption of the technology, but perceived privacy issues and perceived security issues do not have such a significant relationship. Using further moderation analysis, the authors find that the relationship between usability and adoption becomes stronger if there is a high level of support for RFID projects within an organisation. The study points to the need to improve the appreciation and support in an organisation for RFID projects. For example, top management should be well informed so as to provide good support, while employees should be motivated to back the use of RFID in their operations. An appropriate level of the required infrastructure will also help increase the usability and hence the adoption of RFID in UK logistics.

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INTRODUCTION

We live in an era in which businesses collaborate with supply chain partners located in different parts of the world. To achieve competitive advantage companies are adopting new technologies in every operation, such as production, logistics and distribution. As all chapters in this volume highlight, radio frequency identification (RFID) is an important technology available to modern businesses to streamline their operations (Roberts, 2006). This new technology provides business solutions for business-to-business supply chain partners (Curtin et al., 2007; Sweeney, 2005). Although the literature is abound with a list of several advantages of RFID, this technology has not penetrated enough in the logistics sector in the UK (Ramanathan et al., 2012). Hence, the main purpose of this study is to explore factors affecting logistics service providers’ intention to use RFID technology. We have used the basic tenets of Technology Acceptance Model (TAM) as our theoretical underpinning for this purpose. Specifically, we have explored how the underlying concepts of TAM, namely perceived usefulness, perceived ease of use, perceived privacy issues and perceived security issues, are related to the intention by UK logistics companies to adopt RFID. In addition, we have explored the roles of internal support environment in affecting this relationship. To our knowledge, very few studies have explored the use of TAM for the case of UK logistics, and there are no studies that extended TAM to include the influences of internal support environment, with the exception of Ramanathan et al. (2013) who explored the role of external (government) support. Finally, we use a relatively less used tool in operations management literature, namely the partial least squares structural equation modelling, for our analysis. These are the three contributions of our study.

Rest of this chapter is organised as follows. The next section provides a brief literature survey. Since much of RFID literature has been reviewed in a related chapter (Ramanathan et al., 2014) in this book, we do not repeat RFID literature but focus on TAM studies. Section 3 develops our conceptual framework and the hypotheses. Our data collection, which is closely related to those reported in Ramanathan et al. (2014), and analysis are briefly discussed in Section 4. Our results are discussed in detail in Section 5. Conclusions are presented in the last section of this chapter.

LITERATURE SURVEY

Since a detailed exposition of the RFID literature has been presented in another chapter (Ramanathan et al., 2014) in this book, we do not repeat this literature here. Instead, we focus on the theoretical framework used in this chapter, namely the Technology Assessment Model (TAM).

TAM was originally proposed by Davis (1989). The basic assumption of the TAM is that actual use of an innovation depends on the intention to make use of the technology, and that intention depends on individual attitudes toward using the technology and its perceived usefulness (Muller-Seitz et al., 2009). The attitude toward using the technology arises from the perceived usefulness and the perceived ease of use. Many researchers have utilized and validated TAM for use with numerous technological environments. According to Hossain & Prybutok (2008), some studies suggested that TAM successfully predicts an individual’s acceptance of various corporate information technologies. Furthermore, TAM may hold across technologies, people, settings and times. Recently, it has been applied to the introduction of healthcare information systems (Pai & Huang, 2011), RFID technology acceptance at US universities (Hossain & Prybutok, 2008), and RFID technology acceptance in the German electronic retail sector (Muller-Seitz et al., 2009). The research model of these studies were based on TAM and have used the revised TAM proposed by Davis et al. (1989), which include perceived...
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