Factors Affecting RFID Adoption: 
An Exploratory Study

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ABSTRACT

In marketing, a customer purchases a product while a consumer uses the product; which means that an adopter of an innovation behaves like a consumer of a new product. But surprisingly no initiative has been made to relate/integrate an adopter with a consumer. This article has done this. Technological, organizational, environmental factors as well as “expectations” from using the technology are important for the acceptance and continued use of a technological innovation. This paper integrates the effect of innovation characteristics along with the expectation on RFID adoption, in the context of Australian livestock industry. To do this, this study first presents a theoretical analysis then presents the outcomes from eight interviews which were conducted among livestock farms in Australia. Finally, it proposes a research framework while proposing eleven propositions related to RFID adoption. Contribution-wise, policy makers may compare their experience with this study, evaluate the past, and find the future direction.

Keywords: Adoption, Environment, Expectation, Organization, Radio Frequency Identification (RFID), Technology

1. INTRODUCTION

Radio Frequency Identification (RFID) technology has been being used in numerous applications around the world, from animal identification to weapon tracking to fault monitoring in train tracks (Moon & Ngai, 2008). Many industries adopted this technology particularly to achieve information efficiencies. Its adoption is sometimes mandatory whereas for many applications it is voluntary; though a pure voluntary environment is hard to find. The absolute pressure from Wal-Mart to its suppliers is the revolutionary example of the mandatory RFID-adoption. As the consequence, the supply chain partners of Wal-Mart first adopted RFID and then adjusted their perceptions and usage decisions in later stages. Similarly, the International Civil Aviation Organization (ICAO) has mandated for every traveler to have an RFID-enabled electronic passport (e-Passport) by April 2014.¹ The most common application of RFID is the access card issued by organizations to employees which is the only way to access into the premises and avail the (customized) resources. In this instance, employees have no choice at all on RFID adoption or RFID-use but to accept it regardless of their perceptions.

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As a voluntary choice, many countries issued RFID cards as the payment method for public transport commuters which can also be used in vending machines, toll payment, and even as a debit card in selected stores. It is an example of purely voluntary adoption through some sorts of incentives and exclusive benefits. However, to offer an integrated system for citizens, many countries introduced RFID-enabled compulsory national identity (ID) cards which can voluntarily be used as a means of availing other facilities including toll payment, driver’s license, and voter ID. This is somewhat a mixed environment consisting initial mandatory adoption and voluntary diffusion in a later stage. Similarly, the initial adoption of RFID-based animal identification and management system in Australia was mandatory (for cattle) and was left voluntary for other animals’. Therefore, the cattle farmers have no choice but to adopt RFID for their cattle identification whereas they can choose whether to adopt RFID to identify other animals (e.g., sheep, pig etc.) and/or to use RFID for automatic farm management operations.

In marketing, a customer purchase a product while a consumer uses the product. In behavioral science, the adopting-body introduces an innovation and the adopters practically use the innovation. Sometimes a customer can be a consumer too as an adopter may introduce an innovation him/herself. This means that, the adopting-body of an innovation (introducer) may behave like a customer of a new product and an adopter may behave like a consumer (user). Throughout this paper thus, thereafter, user and adopter will be used in an interchangeable meaning.

Next, adopting an innovation customers and/or consumers expect some benefits from using the product while they may possess some perceptions about its features. Sometimes, customer expectation may differ from consumer perception. For example, an employee purchased a computer and gave it to the employee with the expectation of increasing efficiency of the employee; but the employee may perceive that the computer was given as recognition. The difference here, between perception and expectation, is very fundamental. Perceptions are the idea or understanding about a product concerning how it behaves or will behave. Perceptions are based on the user’s personal, organizational, social, and environmental status. Perceptions can be right or wrong within a varied scale. The success of a product, therefore, varies with the degree of accuracy of the perception. Consider the example of ‘complexity’ which is used as one of the common perceived technological characteristics of an innovation. Complexity is the degree to which a system is perceived as relatively difficult to understand and to use (Rogers, 1995). With a same level of actual complexity, the experience and thus the level of satisfaction of three different users will be different: the user who perceives that the new system would be very complex; the user who perceives that the system will be very easy; and the other user who perceives that the system would be moderately complicated. Along with the perceptions about a product every user expects something useful from the product. Expectation is, thus, a very inherent though sometimes remain as an implicit characteristic of any product or service or innovation. Unlike perceptions, expectations are not perceived rather are 'looked for'. Expectations can be defined as the prospective user’s desired outcomes, which may include subjective as well as objective measures, from using a product/system. These are the things what the user hopes for and expects from. Expectations can be generated from product information and user’s knowledge and cognitive behavior. In a similar manner of differing perceptions, dissatisfaction may arise because of unrealistic expectations.

Perceived usefulness is defined as the prospective user’s subjective probability that using a specific application system will increase his/her job performance within an organizational context (Davis, Bagozzi, & Warshaw, 1989). But in adopting an expensive innovation like RFID, people cannot rely on subjective probability rather demands or asks something with a combination of subjective judgments and objective calculations. For example, Australian livestock farmers expect that RFID system will
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