

Mandatory and Voluntary Adoption of RFID



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INTRODUCTION

Because of its distinct features Radio Frequency Identification (RFID) technology has a tremendous potential to offer benefits to individuals and organizations, and that makes the Information System (IS) architects to innovate newer and useful applications of RFID every day. RFID has already been used in hundreds of applications around the world (for a brief list see studies including Jian & Wu, 2013; Wyld, 2006). It is one of the most effective technologies which identifies an object automatically and uniquely, and can store enormous amount of data for many years which can later be retrieved as information as required (Hossain & Quaddus, 2011; Hossain & Quaddus, 2013). To achieve organizational efficiency, many organizations have implemented RFID and made it mandatory for the employees - most popularly as an access control mechanism and to track valuable assets (Hossain & Quaddus, 2013). Meanwhile, with different motivations, many nations have developed and implemented RFID-based automated systems in various public services. In national applications, the adoption of RFID is sometimes mandatory for the citizens; whereas, to choose the level of adoption usually is voluntary. In both organizational and national contexts, though the initial adoption decision is taken at organization/agency-level, the success of RFID is mainly dependent on individual's perceptions toward this technology and, more importantly, on the intention of the individuals to use RFID.

Here, *mandatory use environment* for RFID is defined as one in which the users have no choice but require to use RFID technology, in a form of application(s), in order to create/maintain his/her personal/business position into a society/industry (adapted from Brown, Massey, Montoya-Weiss, & Burkman, 2002). Conversely, *voluntary environment* is defined as one in which the users enjoy the liberty deciding whether to accept (or not to accept) an RFID application. Scholars demonstrate that as the adoption of RFID technology is moving from mandatory to voluntary, firms are looking for tools, frameworks, and methodologies to enable them to evaluate the real impact of RFID technology on their business processes (Linda & Samuel, 2007; Wen, Zailani, & Fernando, 2009), which underscores the necessity of studying the individual-level adoption of RFID under the light of compulsion as well voluntary initiative. *Individual*, in this study, is considered as an *independent* individual (e.g., a citizen) - not an employee of an organization, for instance. In general, perceptions of an employee are shaped by the organizational objectives and strategies. In most of the times, the employee does not enjoy significant personal-preference or perception toward the adoption (appears as like working in a mandatory environment); using a particular reporting system, for example, is often a job requirement rather than a personal choice. On the contrary, an independent individual (e.g., citizen) develops his/her own perception and may reserve the choice whether to adopt a system, and also to decide the level of usage.

THE RESEARCH SETTING

For individuals, RFID technology has been used in numerous applications around the world, from automatic toll payment to automatic tracking (mostly used for patients and (suspected) criminals) and automatic tracing (Wyld, 2006). Among those, national identity cards (National-ID) and electronic passports (e-passport) are the main applications that governments are more interested in because in recent times governments are more serious combating terrorism activities and crimes (Hossain, 2009). Compared to other alternatives, RFID is comparatively cheap, hideable, and ease to deploy and thus make the tracking more efficient (Finkenzeller, 2006). In addition, an emerging tendency among the nations has been observed using RFID technology in public services such as for banking, keeping health record and hospital admission, rationing services, etc. Sometimes, the adoption of those services is an option (i.e., voluntary) - users may decide whether to or not to adopt RFID. But for many applications the use is mandatory. In a mandatory environment, users have no choice but to adopt. For voluntary applications, for example, users may choose either an automatic toll payment system (passing through the toll gate without stopping) or a payment counter to pay highway toll. However, in modern era, things are more complicated than are perceived: an 'option' can be made as a 'requirement' with a degree of freedom to choose the level of usage. Consider the following example. Malaysia is trying to integrate at least eight public services into a single RFID card and already have implemented a few of those (Hossain, 2009). A Malaysian citizen may not be convinced enough to take that RFID card as a method of toll payment but as a legal requirement and as a proof of citizenship, s/he must have to carry one. Consequently, it is a bit complex world of adoption; the users are in a mixed environment: consisting both mandatory and voluntary adoption. To the best of the authors' knowledge, no research has been performed dealing with the adoption of an innovation in both

mandatory as well as voluntary environment in a single framework. This current research closes this research gap.

To facilitate the identification of its citizen, Malaysia was the first country to introduce RFID-based identity in 2001 (Hossain, 2009). Several other regions/countries including Hong Kong, Estonia, Finland, Belgium, Portugal, Spain, China, and Albania issued RFID-based national-ID to its citizen (Hossain, 2009; Paul, 2005). However, this whole initiative might be unsuccessful if the user intends not to use this technology. For instance, deploying RFID in supermarket-products is an organizational or industry-wide decision but if the customers refuse to shop in those supermarkets then the industry/organization will have no choice but to discontinue RFID deployment. For example, Wal*Mart cancelled its RFID-enabled 'smart shelf' trial in USA because of the "barbs" from the consumer privacy groups (Gilbert & Shim, 2003). Therefore, studying the usage intention and subsequent behavioral factors of the individuals toward using RFID services is of much importance which is not discussed in literature with due importance. But, the importance of such study is obvious from the above discussion. Most of the individual-level RFID adoption studies (Chen, Wu, Su, & Yang, 2008; Hossain & Prybutok, 2008; Müller-Seitz, Dautzenberg, Creusen, & Stromereder, 2009) have concentrated on the *privacy* and *security* issues of the customers, not their complete behavioral approaches. The other motivation of this current study is to develop a 'complete' framework.

LITERATURE REVIEW

It has been a real challenge for organizations to understand the attitude on accepting and using an innovation because the success of an innovation largely depends on its initial acceptance and, then, continued use - by the users (Bhattacharjee, 2001; Davis, 1989; Pikkarainen, Pikkarainen, Karjaluoto, & Pahlila, 2004; Succi & Walter, 1999; Venkatesh & Davis, 1996). If the users become

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