An integrated model of the adoption of radio frequency identification technology in the hotel industry

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Abstract: Radio frequency identification (RFID) represents a brand new technology that promises to improve process efficiency in hospitality settings. The technology-organisation-environment (TOE) framework and technology acceptance model (TAM) are applied to gain insights into influences on the adoption intention of RFID in the hotel industry. By adopting the TOE framework and TAM as a theoretical base, this descriptive-survey study used questionnaire to collect data in 92 different hotels in Iran. The proposed research model is tested against using structural equation modelling (SEM). The results showed that TOE framework and TAM have positive effects on intentions to use RFID. Our results support the proposed conceptualisation and shed significant and useful insights on the key factors associated with hotels' adoption of RFID.

Keywords: hotels; radio frequency identification; RFID; TOE framework; technology acceptance model; TAM; technology adoption.

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1 Introduction

One of the most important factors contributing to the increase of efficiency in the hotel industry is using different technologies (Xiang et al., 2015). Radio frequency identification or RFID is considered one of the most influential technical innovations in production and service industries at the present time. Its increasing use in organisations and its applications has introduced it as one of the strongest and most recognised innovations in recent decades (Yazdi et al., 2013). Due to the importance of application of modern technologies in order to gain competitive advantage, organisations need to use these practical technologies such as RFID in order to survive. RFID is a common term used to describe a combination of hardware and radio frequency identifying software, transmitting specific characteristics from a seamless object using radio waves without the interference of a user (Sheng et al., 2010). Currently, various service industries and organisations are using RFID technology and others are in its implementation phase. Since implementation of RFID technology is costly, it is very important that it is done correctly and is vastly accepted by the users, because users’ not embracing it results in no or limited use of this technology which in turn results in lack of economic justification for its use (Salimifard et al., 2014).

On the other side, due to the costs of implementation and application of relevant requirements, the analysis process is of great importance and the best procedures must be chosen after considering all relevant aspects. Furthermore, suitable designs for related components of current work processes leads the organisation to the greatest levels of efficiency and effectiveness in using this technology (Modrak and Moskvich, 2012).
There are a number of experimental studies in RFID field focused on the factors influencing its acceptance and effects in different industries (Chong et al., 2015; Ramanathan et al., 2015). Most of the knowledge regarding RFID adoption is developed in manufacturing (Chen et al., 2013; Guo et al., 2015), while there is little knowledge in the hotel industry (Ozturk and Hancer, 2014). There have not been many studies in developing countries determining if these factors are important in the acceptance of this technology in the hotel industry. In addition to the increasing commercial applications of RFID in manufacturing, we can see a rising trend in its acceptance in service industries (Chen, 2012; Rosenbaum, 2014) and therefore, companies are looking for tools, frameworks and procedures enabling them to determine RFID’s actual effects on their business procedures (Tsai and Tang, 2012). This makes it crucial for this technology’s acceptance to be studied in service industries and specifically in the hotel industry. Hence, this study is designed to determine the influencing factors in RFID acceptance in the hotel industry.

In the following section, we focus on the theoretical framework and development of hypotheses followed by presentation of the research model and hypotheses. Then the research and analysis of experimental data is presented and finally, theoretical and practical implications are discussed and summarised.

2 Theoretical framework and hypothesis development

Although RFID adoption has been studied from a variety of perspectives, the understanding of RFID adoption, particularly in the hotel industry, is still limited. From a technology adoption perspective, our study defines RFID adoption as a decision made by an organisation to adopt RFID for use in its hotel industry. Based on the literature review, an adoption model tailored for RFID technology in hotel is developed and shown in Figure 1. The model consists of five determinants that are hypothesised to have direct and indirect effects on a hotel’s adoption of RFID technology.

**Figure 1** Proposed research model
Based on the underlying assumptions of the technology acceptance model (TAM) and TOE framework (Figure 1), five acceptance predictors ‘perceived ease of use’, ‘perceived usefulness’, ‘technological context’, ‘organisational context’ and ‘environmental context’ can be formulated.

2.1 Hypotheses about TAM

TAM is an adaptation of TRA introduced by Davis (1989) and specifically aims to predict user acceptance of information technology (IT) and demonstrate the behaviour of individuals in IT acceptance. TAM hypothesises that IT adoption has two perceived attributes that influence user acceptance, namely ‘perceived usefulness’ and ‘perceived ease of use’ (Davis, 1989; Davis et al., 1989). Perceived usefulness is ‘the degree to which a person believes that using a particular system would improve his or her job performance’ and perceived ease of use is ‘the degree to which a person believes that using a particular system would be free of effort’ [Davis, (1989), p.320]. These two attributes affect a user’s attitude towards using the information system and a user’s attitude directly relates to a user’s intention which will, in turn, determine the system usage of the technology.

Based on the TAM, we formulated the following research hypotheses. As TAM is used as the base models, we need to test the following TAM hypotheses in the context of hotel industry adoption. Hypotheses 1, 2, 3, 4, and 5 are proposed based on TAM as discussed in Section 2.

H1 Perceived usefulness positively influences attitudes towards the use of RFID.
H2 Perceived usefulness positively influences the intention to acceptance of RFID.
H3 Perceived ease of use positively influences attitudes towards the acceptance of RFID.
H4 Perceived ease of use positively influences the perceived usefulness of RFID.
H5 Attitude positively influences the intention to accept RFID.

2.2 Hypotheses about TOE framework

2.2.1 Technological context

Rogers (1983) identified five key features of technology as preliminary measures to make a decision; Relative advantage, compatibility, complexity, trialability, and observability. Many researches have been made on the diffusion of innovations such as the research done by Tornatzky and Klein (1982). They found that only relative advantage, compatibility, and complexity are always associated with innovation acceptance. Grover (1993), Lee and Kim (2007) and Pool et al. (2015) directly involved the availability and visibility of concepts derived from research models. Hence, the key technological characteristics, i.e., relative advantage, complexity, and compatibility are included in this model. Considering the abovementioned criteria, the following hypothesis is proposed:

H6 Technological context positively influences attitudes towards the acceptance of RFID.
2.2.2 Organisational context

Organisational context is related to the resources and the characteristics of the firm, such as top management support and technology competence.

Top management support is a significant factor in the acceptance of new technologies and it has been positively and closely related to acceptance (Tsai et al., 2010). Top management has an excellent management perspective, fulcrum, and a commitment to create a positive environment for technology adoption (Lee and Kim, 2007). Top management support is strongly critical for RFID technology acceptance, because they make adequate provision, process reengineering and user coordination. (Wang et al., 2010; Wu and Subramaniam, 2011).

Technological competence consists mainly of an infrastructure of IT and IT professionals (Zhu et al., 2006). IT infrastructure is fitted with the technologies and network operation systems that provide infrastructure on which RFID application notes could be built. IT professionals prefer to keep their knowledge and skills closely related to IT applications for RFID. This is while technological advancement of RFID systems is still relatively new to many organisations (Ngai et al., 2007). RFID applications do require new IT knowledge, new IT components and existing information systems (Chao et al., 2007). Therefore, hotels with higher technological competence and IT knowledge are in a better place to adopt RFID as expected. Given these considerations, management support and technology competency leads to the following hypothesis:

H7 Organisational context positively influences attitudes towards the acceptance of RFID.

2.2.3 Environmental context

According to the TOE framework, constructs related to environmental context are competitive pressure, trading partner pressure and information intensity.

Competitive pressure has been identified as a determinant of IT acceptance (Zhu et al., 2006; Pool et al., 2015). As market competition increases, enterprises may need to take competitive advantage through acceptance of new and modern technology. By the RFID acceptance, enterprises may get some benefits from the best available resolution, greater efficiency operation and more highly accurate data collection (Chao et al., 2007).

Trading partner pressure measures the impact of dominant players on technology adoption decisions. Gibbs and Kraemer (2004) remarked that pressure from trade partners may be a facilitator of innovation acceptance. It is no surprise that the demands of powerful partners, those who make a major portion of the sale or the interests of large enterprises, are important factors in the acceptance of new technology. When a company’s key customers or suppliers adopt an innovation, the company may concur to accept the innovation in order to represent itself as a business partner (To and Ngai, 2006). Several major buyers and retailers might take advantage of potential benefits of RFID technology as a way to track the chain of available physical inventory. This causes some of them pressuring business partners into its acceptance (Curtin et al., 2007).

Information intensity refers to the degree of information that is present in the product or service of an organisation (Thong, 1999; Wang et al., 2010). Smart, connected products often have more complicated usage and information. Such products can take advantage of the benefits of using an IT strategy (Porter & Millar, 1985). Also,
environmental enterprises seem more likely to adopt a new technology than the enterprises that don’t take much information on the environment into account. Hence many products in the workplace may be a sign of acceptance of an innovation. RFID system, compared to the barcode system, can collect, keep and store more information, immediately read and accept the latest developments (Ngai et al., 2012). So, considering the abovementioned points about environmental factors (competitive pressure and trading partner pressure and information intensity), the following hypothesis is proposed:

H7 Environmental context has a significant effect on attitude toward RFID acceptance.

H8 Environmental context positively influences attitudes towards the acceptance of RFID.

3 Research methodology

Present study can be regarded as an applied study where its main goal is studying the factors affecting RFID technology adoption in the hotel industry. Identifying these factors and finding out about the quality of relationship between them plays an important role in planning and devising management strategies in hospitality. Hence, the present study is descriptive-correlational in nature.

The participants of this study were technology decision-makers of 120 hotels across 12 provinces in Iran. Decision-makers received a package containing the questionnaires and the cover letter. The cover letter reassured the recipients that individual responses would remain confidential. After the distribution of the questionnaires, decision-makers of 92 of the abovementioned hotels completed it (n = 126); out of which, 111 accurate questionnaires were used for data analysis.

The questionnaire was designed after a review of the literature and previous empirical studies related to the acceptance of RFID and consulting with the experts of the field. Main data collecting instrument of this study was a five-point Likert scale.

Khazaei Pool et al. (2015) questionnaire was employed to measure the technological context, and Chong and Chan (2012) and Wang et al. (2010) questionnaire was used to measure the organisational–environmental context. Also, the variables of perceived usefulness, perceived ease of use, attitudes and intention to use RFID technology were measured by Ozturk (2010) research (see Table 1).

After the questionnaires were collected, data were analysed using structural equation modelling (SEM) by two statistical software, SPSS18 and Smart-PLS. The PLS algorithm allows each indicator to vary with how much it contributes to the composite score of the latent variable, instead of assuming equal weight for all indicators of a scale (Chin et al., 2003). This study used PLS rather than other SEM methods (i.e., LISREL, AMOS, etc.), because the PLS approach places minimal restrictions on sample size and residual distribution (Hur et al., 2011; Phang et al., 2006).

The content validity of the questionnaire was confirmed based on the opinion of experts on IT adoption and hotel management. After a number of revisions and a pilot study, the final version of the questionnaire was prepared to use. Also, the reliability of the questionnaire was tested using the Cronbach’s alpha.
Cronbach’s alpha and the composite reliability test revealed that all constructs indicated a value above the threshold (0.6 for both Cronbach’s alpha and CR, adopted by Bagozzi and Yi, 1988) (see Table 1). To test for convergent validity, CR, and AVE (average variance extracted) were examined. It is acceptable if CR exceeds 0.7, and AVE greater than 0.5 (Gefen et al., 2000; Hur et al., 2011).

**Table 1**  
Reliability and validity analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>α</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology context</td>
<td>RFID provides accurate information for decision making in a timely manner.</td>
<td>0.87</td>
<td>0.90</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>RFID offers efficient way for managing services.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>RFID helps quick data capture and analysis.</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>RFID is compatible with existing IT infrastructure.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RFID is compatible with our business processes and operations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>It is easy to integrate RFID system with our existing systems (e.g., ERP, CRM, SCM).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>My hotel believes RFID development isn’t a complicated process.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RFID is more cost effective than other types of technologies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation context</td>
<td>Top management actively participates in establishing a vision and formulating strategies for utilising RFID.</td>
<td>0.81</td>
<td>0.83</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>Top management communicates its support for the use of RFID.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Top management is likely to take risk involves in implementing RFID.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Top management is likely to be interested in adopting the RFID applications in order to gain competitive advantage.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The capital of my hotel is high compared to the hotel industry.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The revenue of my hotel is high compared to the hotel industry.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The number of employees of my hotel is high compared to the hotel industry.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The number of employees at my hotel is high compared to the hotel industry.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The technology infrastructure of my hotel is available for supporting RFID-related applications.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>My hotel is dedicated to ensuring that employees are familiar with RFID-related technology.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>My hotel contains a high level of RFID-related knowledge.</td>
<td></td>
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</tr>
</tbody>
</table>
Table 1  Reliability and validity analysis (continued)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>α</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment context</td>
<td>The service in my industry generally requires a lot of information to sell.</td>
<td>0.86</td>
<td>0.89</td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>The service in my industry is complicated or complex to understand or use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The ordering of services in my industry by customers is generally a complex process.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>My hotel experienced competitive pressure to implement RFID.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>My hotel would have experienced a competitive disadvantage if RFID had not been adopted.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The major trading partners of my hotel encouraged implementation of RFID.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The major trading partners of my hotel recommended implementation of RFID.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The major trading partners of my hotel requested implementation of RFID.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived usefulness</td>
<td>RFID technology saves me time.</td>
<td>0.78</td>
<td>0.86</td>
<td>0.61</td>
</tr>
<tr>
<td></td>
<td>The technology systems would be difficult to perform without RFID technology.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RFID enhances the effectiveness of the technology systems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall, RFID technology is useful.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived ease of use</td>
<td>RFID technology will not make me confused.</td>
<td>0.74</td>
<td>0.84</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>It is not cumbersome to use RFID technology.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>My interaction with RFID will be easy to understand.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RFID technology is easy to use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>Adopting RFID technology is (would be) a good idea.</td>
<td>0.77</td>
<td>0.85</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>In my experience companies that use RFID technologies benefit financially.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I have a positive attitude toward using RFID technology.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>My opinion, at this moment, about adopting RFID technology is favourable.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>Given the chance I intend to use RFID technologies.</td>
<td>0.72</td>
<td>0.82</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>Given the chance I predict that I should use RFID technologies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Given the chance I plan to use RFID technologies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>My organisation intends to adopt RFID technology in the future.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In general, a value for Cronbach’s alpha greater than 0.7 shows good reliability, while satisfying CR and AVE criteria. The results in Table 1 reveal that all constructs in this study fulfilled discriminant validity.
4 Findings

The proposed model and hypotheses were analysed using partial least square (PLS), which allows researchers to simultaneously assess measurement model parameters and structural path coefficients. After first examining and verifying the validity of the model, regression coefficients, t statistics are used to test the hypotheses. The results are given in Figure 2.

To test the significance of the hypotheses, two partial indices of $t$ and $P$ are used. Based on a significance level of 0.05, the t test must be more than 1.96. Below this value, the relevant parameter in the model is not considered important; a value of less than 0.05 for $P$ indicates hypotheses supported at a significance level of 0.95.

The outcomes summarised in Table 2 show results from bootstrapping performed to test for statistical significance of each path coefficients ($\beta$ via t-tests.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Path</th>
<th>$\beta$</th>
<th>$t$</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>PU $\rightarrow$ Attitude</td>
<td>0.33*</td>
<td>3.53</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>PU $\rightarrow$ Intention</td>
<td>0.36*</td>
<td>9.91</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>PE $\rightarrow$ Attitude</td>
<td>0.23*</td>
<td>3.18</td>
<td>Supported</td>
</tr>
<tr>
<td>H4</td>
<td>PE $\rightarrow$ PU</td>
<td>0.92*</td>
<td>34.95</td>
<td>Supported</td>
</tr>
<tr>
<td>H5</td>
<td>Attitude $\rightarrow$ Intention</td>
<td>0.57*</td>
<td>16.65</td>
<td>Supported</td>
</tr>
<tr>
<td>H6</td>
<td>Technology $\rightarrow$ Attitude</td>
<td>0.58*</td>
<td>11.04</td>
<td>Supported</td>
</tr>
<tr>
<td>H7</td>
<td>Organisation $\rightarrow$ Attitude</td>
<td>0.14*</td>
<td>5.77</td>
<td>Supported</td>
</tr>
<tr>
<td>H8</td>
<td>Environment $\rightarrow$ Attitude</td>
<td>0.37*</td>
<td>9.46</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Note: *$p < 0.01$.

Table 2 and Figure 2 show the results of the relations test between variables. For the first hypothesis, the effect of perceived usefulness on attitude toward the use of RFID technology is examined. Regression coefficient for the first hypothesis at the significance level ($p < 0.01$) was 0.33. Therefore, the hypothesis is supported and we can conclude with the reliability of 0.99 that perceived usefulness has an impact on attitude toward the use of RFID technology. This result is consistent with the results of studies conducted by Lee (2009), Muller-Seitz et al. (2009), Ozturk (2010), Al-Gahtani (2011), and Akturan and Tezcan (2012).

Results of the analysis of the second hypothesis which is the impact of perceived usefulness on intention to use RFID technology show a regression coefficient of 0.36 in a significance level of $p < 0.01$ which means the hypothesis is supported. Therefore, we can conclude with certainty of 0.99 that perceived usefulness has an impact on intention to use RFID technology. This result is consistent with the results of other similar researches conducted in this field such as those of Aboelmaged (2010), Oghazi et al. (2012) and Giovanis et al. (2012).

As is shown in Table 2 and Figure 2 our third hypothesis which is the impact of perceived ease of use on attitude towards the acceptance of RFID has a regression coefficient of 0.23 in a significance level of $p < 0.01$ which means the hypothesis is supported. Therefore, we can conclude with certainty of 0.99 that ease of use has an
impact on attitude towards the acceptance of RFID. This result is consistent with the results of other similar researches conducted in this field such as those of Aboelmaged (2010), Lee (2009), Oghazi et al. (2012) and Morosan (2012).

Results of the analysis of our fourth hypothesis which is the impact of Perceived ease of use on perceived usefulness of RFID technology show a regression coefficient of 0.92 in a significance level of \( p < 0.01 \) which means the hypothesis is supported. Therefore, we can conclude with certainty of 0.99 that perceived ease of use has an impact on perceived usefulness of RFID technology. This result is consistent with the results of other similar researches conducted in this field such as those of Aboelmaged (2010), Lee (2009), Son et al. (2012) and Kesharwani and Bisht (2012).

For the fifth hypothesis, the impact of Attitude on intention to accept RFID technology is examined. The regression coefficient for this hypothesis was 0.57 in a significance level of \( p < 0.001 \) and a t-value of 16.65 which means the hypothesis is supported. Therefore, we can conclude with certainty of 0.99 that Attitude has an impact on intention to accept RFID technology. This result is consistent with the results of other similar researches such as those of Chen (2007), Lee (2009), Aboelmaged (2010), Ozturk (2010) and Oghazi et al. (2012).

Results of the analysis of our sixth hypothesis which is the impact of technological context on attitudes towards the acceptance of RFID show a regression coefficient of 0.58 in a significance level of \( p < 0.01 \) which means the hypothesis is supported. Therefore, we can conclude with certainty of 0.99 that technological context has an impact on attitudes towards the acceptance of RFID technology. This result is consistent with the results of other similar researches conducted in this field such as those of Chang and Vera’s (2011), Khazaei Pool et al.’s (2015) and Tsai et al.’s (2010).

As is shown in Table 2 and Figure 2, results of the analysis of our seventh hypothesis which is the impact of environmental context on attitude toward RFID acceptance show a regression coefficient of 0.14 in a significance level of \( p < 0.01 \) which means the hypothesis is supported. Therefore, we can conclude with certainty of 0.99 that environmental context has an impact on attitudes towards the acceptance of RFID technology. This result is consistent with the result of a similar research conducted in this field by Wang et al. (2010).

Lastly, results of the analysis of the eighth hypothesis which is the impact of environmental context on attitudes towards acceptance of RFID technology show a regression coefficient of 0.37 in a significance level of \( p < 0.01 \) which means the hypothesis is supported. Therefore, we can conclude with certainty of 0.99 that environmental context has an impact on attitudes towards acceptance of RFID technology. This result is consistent with the results of other similar researches conducted in this field such as those of Chen’s (2007), Wang et al.’s (2010) and Wu and Subramaniam’s (2011).

5 Discussions and conclusions

Current research is offering a framework for use of RFID in the hotel industry and examines the experimental impacts of internal and external factors on tendency to use this technology. By using technology-organisation-environment (TOE) framework and TAM, we have gained insights in key influential factors in the adoption intention of RFID in the hotel industry. The current research model and hypotheses provide readers
with a practical insight into the relationship amongst internal and external factors and their impact on RFID adoption.

In this research, SEM is used to estimate the parameters of the research model. The results of PLS software indicated that the research structural model was a good fit and all the measured path coefficient values were significant ($p < 0.01$).

The results of this study showed that there are outstanding determinants in TOE framework and TAM. Hence, the determinants influencing the adoption of RFID technology in the hotel industry not only should include their characteristics, but also should encompass factors within the organisation, external environment and psychological variables.

While RFID is considered an important technology that can provide strategic and operational merits, there is still no significant rate of adoption of this technology particularly in the hotel industry in Iran. Therefore, it is necessary to understand what determines the adoption of RFID technology in this sector. Based on the theoretical framework of TOE, TAM and expanding these models in the form of an integrated model, this study provides a research model to test the effects of five variables on the attitude and willingness to accept RFID technology in the hotel industry.

The results of this study include three remarkable concepts for research. First, the study reveals the impact of several key determinants in the adoption of RFID in the hotel industry. The key findings are as follows;

1. Whether or not hotels decide to implement RFID technology mainly depends on technological, organisational, environmental and psychological factors.
2. It was found that all measured variables are important determinants of adopting RFID technology, but three variables (ease of use, attitude and technology) were the ones playing the major roles in its adoption.
3. Among all the impacting factors, the most effective one influencing RFID adoption was attitude.

Second, this study empirically confirms the application of TOE framework and TAM in the analysis of the adoption of RFID technology. The framework that this study provides is a good starting point for the analysis of influencing factors on innovation acceptance decisions in organisational business processes.

Third, in comparison to previous research done in the field of influential parameters on RFID adoption, this experimental study uses a sample consisting of several different hotels in different fields of services which is done for the first time in the Middle East, and Iran in particular. Thus, this study provides several valuable findings important for understanding the factors impacting the adoption of RFID technology in the hotel industry.

### 6 Limitations and future research

This study has some limitations which makes it more difficult to generalise the findings. Firstly, the results only reflect the views of experts in the hotel industry in Iran. Thus, different cultural and environmental settings might produce different results. Future
research can be done in other service sectors related to the hotel industry to make these findings more comprehensive.

Secondly, RFID technology is still at the stage where it needs more work to be completed and is relatively new in this industry. Hence, the perception of participants in this study might not have been completely formed. Other research done in its stage of maturity in the hotel industry can be useful.

Thirdly, since the organisational sample for this research was obtained from a list provided by cultural heritage and tourism organisation, this list might not be an accurate representative of number of organisations. Therefore, a search for a more complete and comprehensive list which covers the study sample could lead to more accurate results in the future research.

Finally, all data were collected using cross-sectional study, so the variables and results may be limited to a period of time. Future research can be done at different times and compared to this research for more comprehensive results.

References


An integrated model of the adoption of radio frequency identification


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