Factors Affecting RFID adoption in the Hospitality Industry

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The reason for this study was to investigate the impact of the factors such as, technological, organizational, and environmental on the adoption of radio frequency identification (RFID) technology by hospitality operators. The outcome of the study demonstrated that, technological, organizational, and environmental factors had huge effect on operators of hospitality industry who aim to adopt RFID technology. We recognize the factors those influencing the decision of adopting RFID technology by the hospitality operators, the vendors of technology in order to reach the prospective adopters they could plan suitable marketing techniques and also make them aware about the advantages of RFID technologies to expand the utilization of these advances in the hospitality industry.

Findings: 64.7% participants responded that the most suitable system of an RFID technology in hospitality industry is **"*Establishing Business Intelligence system".*** 35.3% respond in favor of "***Cash settlement system***". And 11.8% respond for "***Meeting Technology system***".

Key words: Radio frequency identification (RFID); Technology adoption; Hospitality

Introduction

The adoption and implementation of appropriate and suitable technology has turned into a competitive advantage for organizations. One such innovation is radio frequency identification (RFID). "RFID technology uses short-range wireless communication in radio frequency (RF) bands to transmit data to readers from inexpensive and disposable tags (microchips) and it automatically identifies objects or people with RFID tags several inches to several yards away" (Collins).

Basically, RFID is a system which is made out of an RFID tag and an RFID reader that is connected to a back office data processing computer. The tag gathers real time information and afterward transmits

that information by means of radio waves. The reader gets radio waves to read the information stored in the tag, and the data processing equipment processes all the gathered information. An RFID is utilized for a wide variety of applications. Such as, cashless settlement system, toll collection, establishing business intelligence, meeting technology, theft prevention, tracking library books etc.

Now days, the hospitality industry benefits by RFID technology, for example, more productive supplier management processes and better inventory management, yet enhancing the customer experience is the most imperative opportunity for RFID technology in the hospitality industry. Hence, organizations are looking to utilize the RFID technology to give additional incentive to their customers as opposed to concentrating exclusively on the supplier management process. The reason behind this study was to identify the factors deciding operator's adoption of an RFID technology in the hospitality industry. For this reason, in light of Tornatzky and Fleischer's (1990) Technology–Organization–Environment (TOE) model, the impacts of technological, organizational, and environmental context on the operators of hospitality in adoption of RFID technology were examined. Whereas, implementing RFID technologies expands efficiency over the supply chain by decreasing costs, this study considers RFID technology as a methods for modifying processes that deal specifically with customers. By utilizing RFID technology, the hospitality organizations can give comfort and convenience to the guests without the service provider being present face to face and they can also store a lot of information utilized for customized service. Anyhow, RFID technology and its applications are presently developing quickly, which causes instability about the advantages that RFID investments can give. Subsequently, managers of hospitality are having hard time with decisions regarding an adoption of an RFID technology, trying to identify the setup that is best for their operational needs. Consequently, there is a requirement for detailed understanding of the explanations behind RFID technology adoption in the hospitality industry.

Literature review

RFID technology permits the hospitality companies to gather continuous information about their clients that helps them to modify their services. There are several RFID applications in the hospitality industry such as, cashless payment system, establishing intelligence system, luggage and inventory tracking, and asset management, RFID electronic locking, and RFID meeting technology. After a broad literature review, only three different sorts of RFID technologies were incorporated into this research. The RFID technologies included in this study are RFID Cashless Payment Systems, RFID Establishing Intelligence system, and RFID Meeting Technology. The main reason behind picking these RFID technologies was of that they are either as of now being utilized or

they have an extraordinary potential to be utilized by hospitality organizations.

An RFID Cashless Payment System permits guests to set up a record connected to a RFID wristband that then can be utilized to burn through cash anyplace in the hotel. This technique kills the need to carry money or credit cards to make guest buys inside the property. For example there is park in Hershey Pennsylvania named Hershey Park which has implemented the RFID cashless system. This new system allows the guests to make in park purchases, check balances as well as they load more funds onto their wristbands at any of the parks 200 RFID enabled POS stations.

RFID Establishing Intelligence System is another application of RFID technology in the hospitality industry. One example of such a system is RFID technology that empowers guests to open their room door automatically as they approach it or as they wave the RFID-empowered gadget, (for example, a wrist band) over the door lock. At the point when the guests enter the room, they could discover the room set up to their person inclination for condition, (for example, lighting, window shades, room temperature, music, furthermore, TV channel). The organization Grand Hyatt San Francisco has adopted and installed RFID locks as a part of comprehensive renovation of its 659 guestrooms. As a result these RFID locks permit contactless guestroom entry, and they provide hotel staff an ongoing perspective of guestroom access attempts for quick security response in case of an intruder.

Another utilization of RFID technology in the hospitality industry is the RFID Meeting Technology. A nametag with a RFID chip in it can give meeting organizers ongoing information about the meeting. With RFID technology, meeting organizers could perceive what participants are doing in meeting rooms in real-time and analyze all the data after the meeting is over. The information gathered through RFID labels amid the meeting can be utilized to offer assistance coordinators with future conference planning, for example, upgrading sessions around interests and recognizing the requests of the gathering participants. At its Information on Demand Conference in Las Vegas, IBM utilized RFID innovation on nametags worn by participants that consequently tracks their session and feast participation. The chips on the name tags incorporated the name, title, and organization of the individual wearing it. As a participant walked through the entryway leading into a gathering session, an RFID collector read the information on the chips. With this innovation ongoing information about the participants were gathered effectively, which helped the meeting organizer with everyday meeting management.

Despite the fact that RFID technology is currently being progressively utilized by hospitality organizations with extraordinary advantages, it has a few downsides, for example, customer privacy. One privacy

concern is that RFID labels can be examined by anybody with a RFID scanner, which could possibly get to information encoded on RFID label. Another privacy concern is related with information gathering utilizing RFID. For instance, hospitality organizations can gather information about their clients without their knowledge and may neglect to give them the record of the data accumulated. Moreover, as already expressed, with RFID room key or nametag the guests or participants can be followed or tacked all through the office. A few guests or participants might think about this as security infringement.

Organizational adoption

There are different researchers who have proposed various technology adoption theories, for example, diffusion of innovation theory (DOI by Rogers, 1995), theory of planned behavior (Ajzen, 1991), technology acceptance model (TAM) (Davis, 1989) and TOE framework (Tornatzky & Fleischer, 1990). The Roger's (1995) DOI and Tornatzky and Fleischer's (1990) TOE structure has been broadly acknowledged and has been discovered helpful in understanding organizational level technology adoption.

Tornatzky and Fleischer (1990) built up the TOE framework, which characterizes a "context for change" comprising of three components: (1) technological, (2) organizational, and (3) environmental. As indicated by Tornatzky also, Fleischer (1990), technological context incorporates both inner and outer advancements or technologies that are applicable to the organization. In addition to this, technological context factors incorporate the perceived qualities of the technology. Moreover, organizational context factors incorporate "firm size and scope, the centralization, formalization, and many-sided quality of its managerial structure, the nature of its human asset. At last environmental context is "the field in which a firm leads its business—its industry, competitors, access to asset provided by others, what's more, dealings with government".

Numerous researchers have utilized the TOE structure to examine organizational level technology adoption. In the following session, the establishment of a theoretical framework research model and the theories of the study were discussed.

Theoretical framework

This study based on Tornatzky and Fleischer's (1990) TOE model contains eight determinants of RFID adoption were recognized within three contexts to decide if every context impacts organizational RFID adoption in the hospitality industry. Even though particular factors recognized within the three contexts may vary across over various studies, the TOE gives a helpful analytical system that can be utilized for examining several sorts of technology adoption at the organizational level. Thus, we believe that the TOE framework is suitable for examine organizational RFID

adoption, and we adopted this theoretical framework and increases it to the RFID domain in the hospitality industry.

Technological context

- ***Comparative advantage:***

The comparative advantage is defined as " the degree to which an innovation is perceived as being better than the idea it supersede" (Rogers 1995). Comparative advantage has been observed to be a vital element in deciding adoption of new innovations. Similarly as with different technologies, RFID technology has advantages directly and indirectly to organizations. The advantage of the RFID innovation is that it gives a positive perception and in this way makes an incentive for the organizations to utilize the technology. It is normal that comparative advantage of RFID innovation positively impacts the observation what's more, consequently its adoption. *Therefore, comparative advantage of RFID technology will have a fundamentally positive relationship with operators' intention to adopt RFID technology in the hospitality industry.*

- ***Perceived compatibility***

Most of the studies confirmed that compatibility had a positive relationship with technology adoption. For effective RFID adoption and implementation, RFID technology ought to be compatible with the existing technology infrastructure of the adopting association. Likewise, RFID innovation ought to be consistent with the necessities and the key objectives of the adopting firm. *Therefore, compatibility of RFID technology will have a fundamentally positive relationship with operators' intention to adopt RFID technology in the hospitality industry.*

- ***Perceived cost***

It is one of the most imperative factors that influence the decision to adopt another technology is the full costs required for adoption within the firm. Organizations attempt to pick up advantages from the adoption of a new innovation that would be proportionate with the costs related with it. With regards to RFID, the costs are probably playing an essential role in the adoption decision. Particularly, if the adopting association is not working with a bar code system as of now, the costs of RFID could be generally high*. Therefore, cost of RFID technology will have a fundamentally negative relationship with operators' intention to adopt RFID technology in the hospitality industry.*

- ***Perceived Complexity***

Complexity of a development has a negative relationship with its adoption. Complexity is defined as" the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers 1995). Various studies examined the relationship amongst complexity and innovation adoption and they most of the time found that complexity had a negatively affected adoption. An RFID system is more complex as compare to barcode system. In this manner, for hospitality associations, incorporating RFID advancements into current property management systems might be a critical issue to consider.

Therefore, complexity of RFID technology will have a fundamentally negative relationship with operators' intention to adopt RFID technology in the hospitality industry.

Organizational context

- ***Top level support***

Top level support shows the eagerness of senior management towards resource allocation for adoption of advancement. Past studies showed that top level support played a critical part in the adoption and the diffusion of innovation within associations. According to Prem kumar and Roberts (1999) "top level support is critical for proving a supportive atmosphere and providing sufficient resources for adoption of new technologies**.** *Therefore, Top level support will have a fundamentally positive relationship with operators' intention to adopt RFID technology in the hospitality industry.*

- ***Organization keenness***

Organizational keenness refers to the level of financial technological resources of the organization. Financial resources refer to the monetary assets accessible to pay for new technological advancement cost, the costs for implementation of any consequent improvement, and the costs acquired on a progressing premise amid utilization. Technical resources refer to the level of sophistication of the data systems utilization and the data systems' management in an organization. Many reviews showed that organizational keenness is a vital variable for development adoption**.** *Therefore, organizational keenness will have a fundamentally positive relationship with operators' intention to adopt RFID technology in the hospitality industry.*

- ***Awareness About RFID Technology***

Many studies indicated that having specialized information regarding an innovation in an organization will build the inspiration toward innovation adoption. An RFID system is extremely complex as compare to bar code system. In this manner, information about RFID technologies in an organization will have a positive effect on the adoption decision. For example, if an organization knows about RFID innovations through past experience, the probability of adopting such innovations would be high. *Therefore, awareness about RFID technology will have a fundamentally positive relationship with operators' intention to adopt RFID technology in the hospitality industry.*

Environmental context

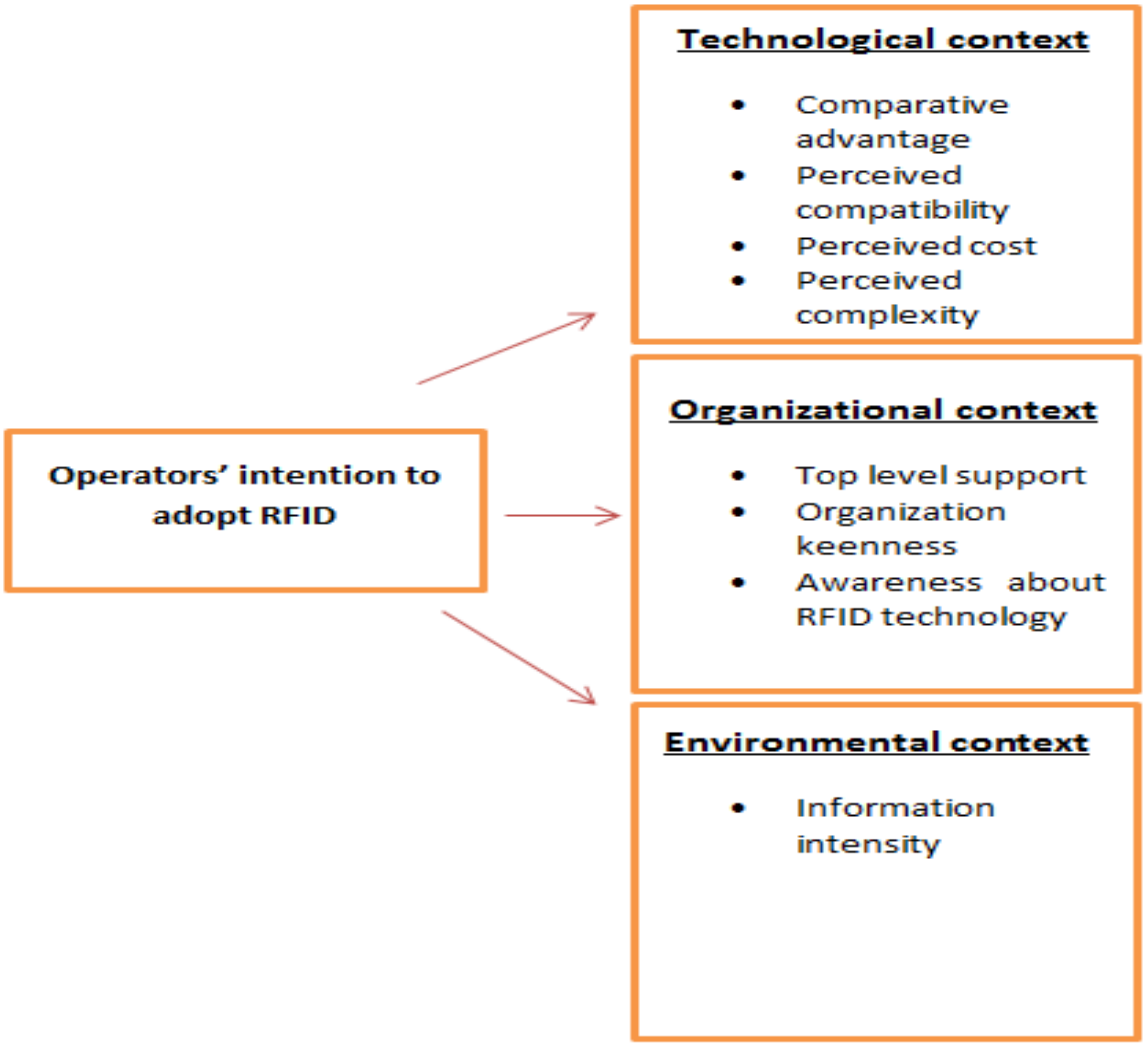
- ***Information intensity***

It refers to the level of information that is available in the product or service of an organization. For the reason that information intensive products have a tendency to be more complex than others are, they require more information to indicate their characteristics. *Therefore, Information intensity will have a*

fundamentally positive relationship with operators' intention to adopt RFID technology in the hospitality industry.

Methodology

After broad writing survey, three different sorts of RFID technologies (RFID Cashless settlement Systems, RFID Establishing Intelligence system, and RFID Meeting Technology) were incorporated into this research. The participants include technology decision makers of hospitality companies at the Karachi and supply chain and logistics experts were asked to fill the questionnaire consisted of 16 questions related to the systems mentioned in the research such as, cashless settlement system, establishing business intelligence and meeting technology system. And they asked to give their responses on any of the above mentioned systems.



Sampling and Data Collection

The data for organizational RFID adoption were collected by taking interview and also filled the questionnaire by two technological decision makers of the top Hotel industry in Karachi and by filling the questionnaire from the supply chain and logistics experts. Questions were asked to determine if the respondents were familiar with RFID technology and so on. A questionnaire was sent to 30 supply chain and logistics experts and also filled by two of the hospitality Technology Professionals. In return we got 17 responses.

Data analysis

In the first step of the analysis, how many people are aware about the RFID technology and which sort of the RFID technology have they used for example, Cashless settlement system, Business Intelligence system and RFID meeting technology, were calculated. Three exploratory factor analyses were performed for each technological, organizational, and environmental context to reduce the number of adoption attributes to a few dimensions. The participants were asked to select any one of the above mentioned RFID system first and further all question will be answered on that particular selection. Later it was determined how the selected system for each technological, organizational, and environmental context performed and to explore the impact of selected dimension on operators' intention to adopt RFID technology.

Results

Demographic data were collected regarding respondents' age, education, and Income level. All of the respondents were between the ages of 18 to 30 (100%). As for education level, 52.9% of the participants stated that they had a Master's degree. The majority (54%) of the participants' has a master's degree. The 35.3% of the participants mentioned that they had a bachelor's degree and two of them have been working in their current position as technological decision makers.

The results indicated that 70.6% participant has not utilized the RFID technology and 23.5% utilized it. Moreover, 50% used the cashless settlement system of an RFID, 33.3% used Establishing Business Intelligence system and no one utilized the Meeting Technology and 33.3% used the other RFID applications.

Furthermore, the majority (64.7%) of the participants responded that the most suitable system of an RFID technology in hospitality industry is Establishing Business Intelligence system. 35.3% respond in favor of Cash settlement system. And 11.8% respond for Meeting Technology system.

58.8% of the respondents strongly agree that RFID technology adoption for the selected system is a good idea and 41.2% strongly agree with this statement. 52.9% agree that adopting RFID technology for the selected system saves the time, 41.2% agree with this and other are neutral. 11.8% of the participants strongly agreed

that Adopting RFID technology for the selected system would not disclose the personal information, 23.5% agree, 35.3% neutral and 29.4% are disagree with this statement. 29.4% of the participants are strongly agreed that Utilizing RFID technology improves the effectiveness of the selected system and 70.6% agree with this. 23.5% are strongly agreed that the support of the top management for RFID technology utilization for the selected system is necessary, 47.1% agree with this and 29.4% responded neutrally. 11.8% are strongly agree that financial resources availability to meet the adoption and implementation cost of RFID technology for selected system matters, 64.7% agree, 17.6% responded neutral and others disagree with this. 35.3% strongly agree and agree that organizations that use RFID technology advantage financially, 17.6% responded neutral and other disagree with this. 17.6% strongly agree that their company expects to adopt RFID technology in near future for the selected system, 58.8% agree, 11.8% neutral and 11.8% disagree with this.

Conclusion and Recommendations

Overall, the results of this study demonstrated that, all of the technological, organizational, and environmental factors had huge effect on hospitality operators' intention to adopt RFID technology.

The outcomes showed that one of the technological factors, comparative advantage and compatibility, had the strongest effect on operators' intention to adopt RFID technology in the hospitality business. The cost and complexity had a significant negative effect on hospitality operators' intention to adopt RFID technology. The outcomes showed that as an organizational factor, top level support, organizational keenness and awareness about RFID technology had the most significant effect on hospitality operators' intention to adopt. Besides, the discoveries of the review uncovered that as an environmental factor, information intensity had a significant positive effect on hospitality operators' intention to adopt RFID technology.

While traditional hotel management practices work quite well but in an extremely competitive market, RFID-based services can help and improve the performance of hotels, restaurants, resorts and other establishments. The recommendations to Pakistan's hotel industry are that, they should adopt RFID technology to become better service provider to their guests and to gain competitive advantage. The customer service is the heart of the hotel industry; therefore, they should pay more attention on this. The RFID technology is beneficial for hotel industry as it provides, an anti-theft tool, real time information, key cards and payment cards, Track for Better Service, Security and Business Insights Thus! RFID is an all in one solution for every concern in today's world.

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