

# Managing Drivers and Boundaries of Information Technology Risk Management (ITRM) to Increase Egyptian Hotels Market Share

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## ABSTRACT

ITRM can simply define as the process of identifying, evaluating, selecting, and implementing actions to reduce risk to guests and hotel assets. The goal of risk management represented in integrating actions that reduce or prevent information risks while taking into consideration ethical, political, social, cultural, and legal side. Information technology has become an essential part of hotel operations. Therefore, the need for obtaining information risk management is emerging. It is difficult to imagine a hotel operating and competing on the market without this process, for both customers and merchants, they bring threats of information vulnerability and security breaches at the same time. The study investigates the antecedents of hotel ITRM adoption and how this affects the hotel market share. The study used a questionnaire to collect data from 257 hotel employees to perceive their opinions on the Egyptian hotel ITRM adoption. It has employed structural equation modelling to measure the effect of the antecedents of hotel ITRM and its effect on hotel market share. The study has revealed very useful results in the way it evaluated employees' perceptions of hotel ITRM adoption and depicted the factors that hotels have succeeded to offer to support ITRM and attract customers to increase their market share.

**Key words:** *Information technology, risk management, information technology risk management, Hotels*

## INTRODUCTION

As a reason for globalization, markets become more competitive, dynamic, and customer driven; customers are demanding more variety, better quality, greater reliability and more efficient delivery (Hassadoust, F., and Farzaneh, 2011). The drive to move a product to the right place at the right time and at the lowest cost requires improved efficiencies, not only within the enterprise, but also on the entire supply network as well. Competition is no longer local but global, as companies are looking for ways to reduce its cost, while at the same time making every effort to enhance the quality of their products and in the long run satisfy customers' demand (Tsai, *et al.*, 2009).

The hotel industry has placed great emphasis on the provision of quality service to its customers (Camison, 2000; Cobanoglu *et al.*, 2001; Abou-Shouk and Khalifa, 2016). With the maximizing demand for intensive information from guests and hoteliers, hotels have used computer-based IT facilities to minimize costs, enhance operational efficiency, and improve services quality. The implementation of IT in their

work, hotel managers anticipate that the profit margins and financial returns will maximize (Hassadoust, and Farzaneh, 2011). Collins, and Cobanoglu, (2013) cleared that the investment in IT thus benefits the hotel if it enables customers to have a better experience and the hotel staff to work more efficiently to better assist customers. Likewise, Bilgihan *et al.*, (2011) identified Information technology (IT) as one of the main sources of sustainable competitive advantage in the hotel industry, especially, in an environment where customers' expectations and needs are Ernest Changing considerably, identifying and adopting the right technology becomes very important for hotels.

Kouns and Minoli, (2011) showed that Information can exist in many forms. Schwalbe, (2015) added, whatever the form of information, it should always be suitably protected. The IT organization typically manages the shared infrastructure of the enterprise, such as the servers, mainframes, data warehouses, networks, and intranets and, as such, operates as the custodian for a large portion of the corporate information content including possibly information belonging to customers

e.g., addresses, credit card numbers, telephone numbers. These information participants, including end users need to strive to ensure that their information assets are protected (Stanton *et al.*, 2005; McNeil *et al.*, 2015; Idé *et al.*, 2015).

Suhong, and Binshan, (2006) indicated that IT has become the backbone of commerce. Sadgrove (2016) added, it support the company's operations, relate businesses to the customers they serve. International Data Corporation, (2007) showed that recent rapid development of information technology created a foundation for information systems, wide application throughout the hotel industry. Kouns, and Minoli, (2011) identified that using information systems effectively, establishment of database systems and efficient management of information derived from databases have become increasingly important. At the same time, greater concerns for information security have arisen along with protecting databases and information processing from risks. Today, the common phenomena of breaches of information security have also threatened various business activities. Accordingly, companies have maximized their investment in ITRM, and one recent forecast indicates that the global market for information security shows a trend toward increased attention to development, approximately 15% annual growth through 2011 and over \$71.8 billion in sales. The reason for the increased investment in IT security is the rising number of noticeable and foreseeable threats to archived data, customer information, and thus business interests (Mohd *et al.*, 2007).

Hotels operations become more dependent on their computer-based information systems (Pongsak, and Sunil, 2007), and there is a real need to consider the security of their information systems (Law, and Hsu, 2006). Recently, information has become one of the main assets of many hotels (Lim, 2008), which related to confidentiality, integrity and availability (Ward, and Peppard, 2016; Bilgihan *et al.*, 2011), and the security of information considered one of the critical success factors of most major hotels (Hassadoust, and Farzaneh, 2011). ITRM system is fundamental for hotels (O'Connor, 2007), in order to market assurance and governance (Wiengarten *et al.*, 2016). Market assurance concerns the ability of an ITRM process to provide confidence, within the marketplace (Haimes,

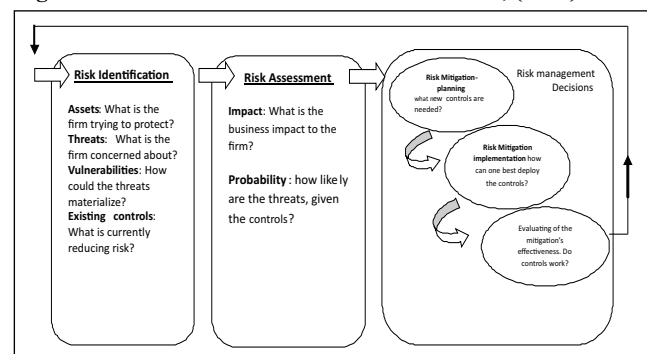
2015; Tsai, *et al.*, 2009), and to assure integrity, confidentiality, and availability of customer information (Murat and Bilgihan, 2012). Governance related to hotel management approach (O'Connor, 2007), and ITRM process is recognized as being a proactive way to manage information security (Ebenezer *et al.*, 2016; Kouns, and Minoli, 2011). This study aims to identify the antecedents of hotel ITRM adoption and how this affects the hotel market share.

## LITERATURE REVIEW

### Information Technology Risk Management Process

Mohd *et al.*, (2007) defined information technology risk as the probability of loss arising because of incorrect, vulnerability, incomplete, illegal access to information or an event impacting the set of company IT assets. Every company needs to acquire and share information in order to perform its own function, and as such, the information flows between different drivers, may be transformed or modified, and consequently increases risk, which should be properly managed (Ou, 2016; Tuncel, and Alpan, 2009). Dorofee, (2002) defined Information technology risk management as the process of identifying, evaluating, selecting, and implementing actions to prevent or reduce IT risks to guests and hotel assets. Risk management is to increase information security (Mayer *et al.*, 2016; Kouns, and Minoli, 2011), through spanning the areas of confidentiality, integrity, and availability (Glendon *et al.*, 2016). Confidentiality is protection against unauthorized access, appropriation, or use of assets. Integrity is protection against unauthorized manipulation, modification, or loss of assets. Availability is protection against blockage, limitation, or diminution of benefit from an asset that is owed (Peltier 2016; Chen and Mc Queen, 2008).

**Fig. 1: ITRM Process. Source: Jake and Daniel, (2010)**



Jake and Daniel (2010), illustrates the ITRM process to comprise risk identification, risk assessment, and risk management (Fig. 1). According to Westerman and Hunter, (2007), Risk identification refers to the process of ongoing identification of threats, vulnerabilities, or (risk) events impacting the set of IT assets owned by the organization. Risk assessment is the process of calculating quantitatively the potential damage and/or monetary cost caused by a threat, vulnerability, or by an event impacting the set of IT assets owned by the company (Shoniregun, 2005). Risk management comprises three steps, Risk mitigation planning, implementation, and evaluation. Risk mitigation planning refers to the process responsible for controlling and mitigating IT risks Beachboard, and Cole, (Beachboard, and Cole, 2008). Risk mitigation implementation refers to deploying and placing in service equipment and/or solution identified during the risk mitigation planning phase, or actuating new corrective processes (Dorofee, 2002). Hubbard, (2014) indicated that Evaluation the mitigation's effectiveness through Monitoring the environment for effectiveness against the previous set of threats, vulnerabilities, or events, as well as determining if new/different threats, vulnerabilities, or events results from the modifications made to the environment (Choi *et al.*, 2016).

### Drivers to ITRM Adoption

Kim *et al.*, (2009) argued that, hotel industry has broadly adopted apply of information system (IS), and it is important to secure the system since most hotels have to manage quest information in a broad customer database. Recently, due to the increased number of customers who access hotels via the Internet and employees permissible accessing Hotel Information Systems (HIS) through outside intranets, the importance of security for customer information, mostly acquired through on-line sources by the hotel, has become greater than ever.

Hotel Information Systems refers to all the computing software programs and hardware applied in the hotel operations, consisting of many subdivisions, such as front office, reservations, restaurant services, engineering, sales, accounting, housekeeping and guest services (Collins and Cobanoglu, 2013). Ultimately, Rosemary *et al.*, (2012) found out that hoteliers agreed a number of benefits

gained from using information technologies risk management in various hotels. Ultimately, Drivers of (ITRM) adoption found in literature have been categorised into five main groups; business facilitation, Cost reduction & productivity, service level, regulatory compliance, and security according to (Erzurumlu, and Erzurumlu, 2013 and Urciuoli *et al.*, 2013; Kearney, and Kruger, 2016).

### Business facilitation

Aziz *et al.*, (2012) identified Information technology as one of the main sources of sustainable competitive advantage in the hotel industry, especially, in an environment where customers' expectations and needs are Ernest Changing considerably, identifying and adopting the right technology becomes very important for hotels. According to Beachboard, and Cole, (2008) as well as Ernest Chang, and Ho, (2006) they said that, the use of ITRM by various hotels is related to the potential benefits of participating in international value chains, increasing market access and reach, lowering transaction costs, and improving market efficiency. Credence in such benefits has led up to the adoption of ITRM by various hotels (Hubbard, 2014). Competitive value for hotel companies and stakeholders will be increased locally and globally when information risk is mitigated and properly managed (Hassadoust, and Farzaneh, 2011; Bilgihan *et al.*, 2011).

According to Mohd *et al.*, (2007) showed that the utilization of ITRM tools help not only to fulfil defined hotels' goals but to optimize the work processes as well. Also, O'Connor, (2007) indicated that the right information technology risk management is available and it is correctly applied, a manager can obtain obvious organizational benefits and is able to stimulate the growth of the hotel, in line with the market evolution. Thus, the researchers hypothesize the following:

*H1: Business facilitation has a positive impact on the adoption of ITRM.*

### Cost reduction and productivity

Implementing ITRM will influence the structure, operations, and management of hotels, which will help to achieve hotel's objectives in terms of improving customer relationships, productivity, decision making, reducing costs generally and costs related to marketing

would be lower (Collins, and Cobanoglu, 2013; Hassadoust, and Farzaneh, 2011; Lin, 2016). The use of technology for registration would lead to a reduction in transaction costs as firms will be able to check-in guests faster with lesser number of employees (Bergen and Ridder, 2013), while responding to the guests' requests faster (Benaroch *et al.*, 2006). Moreover, the scope for human error in each transaction will be reduced through the use of on-line systems, which will further reduce costs (Nwakanma *et al.*, 2014). In addition to the governance and coordination mechanisms that need to be in place to control for opportunism, bounded rationality and risk behaviour of agents will be lower when lesser employees are involved in the transaction (Rosemary *et al.*, 2012). Ultimately, many hotels use ITRM to support their operations as ITRM has become the major facilitator of business activities in the world today (Bilgihan *et al.*, 2011). Thus, the researchers hypothesize the following:

*H2: Cost reduction & productivity has a positive impact on the adoption of ITRM.*

#### **Service level**

Jake, and Daniel, (2010) indicated that information technology risk management are part of a series of value-adding activities for acquiring, transforming, and distributing information that hotel managers can use to improve decision making, enhance organizational performance, and ultimately increase firm profitability (Ernest Chang, and Ho, 2006). Quality information should be related to customer needs and interests so that it adds value for customers (Benaroch *et al.*, 2006). Businesses have to focus on relevant information which responds to customer needs and attracts them to keep accessing the firm website as a quality information source (Flaviàn, and Guinaliu, 2006). The informational benefit is also more valuable to customers if website owners provide accurate information (Whitman, and Mattord, 2008). Finally, quality information has to be timely, which means that up-to-date or current information must be provided (Suhong, and Binshan, 2006).

The major attractions in commercial use of the web is the ability to access information more easily (Ernest Chang, and Ho, 2006; Nwakanma *et al.*, 2014), better levels of responsiveness to customers Jake, and Daniel, (Jake, and Daniel, 2010), and creating flexible ways to disseminate

information resources to their customers (IBM, 2011).

Virtual community is one of the popular online information sharing (Nor *et al.*, 2012). Implementing virtual communities will attract customers and enhance their involvement with the firm (Ernest Chang, and Ho, (2006), increase information sharing among customers (Whitman, and Mattord, 2008), and interact with customers on a global scale, in real-time, and using two-way interaction (Miltgen *et al.*, 2013). Information sharing among customers can help enhance customer service by increasing convenience, through collection of service performance information to support management decisions, and by making possible the offering of more customized products or extra services according to customer needs (Veenstra *et al.*, 2008; Kumar, 2004; Lacity *et al.*, 2009). Thus, the researchers hypothesize the following:

*H3: Service level has a positive impact on the adoption of ITRM.*

#### **Regulatory compliance**

Recently, a great number of laws and regulations created in reaction to corporate scandals address the information security issue and pressure organizations to effectively assess information security risk and/or to implement security measures (Overbeek *et al.*, 2011; Nwakanma *et al.*, 2014). Compliance for most of these regulations is mandatory (Jake and Daniel, 2010; Overbeek *et al.*, 2011), Law and Hsu, (2006) argue that, hotel industry are being asked to comply with more regulations, covering more aspects of the hotel. Most of these regulations are based around the protection of the hotels' information assets, or information they hold on behalf of others in the course of their business (O'Connor, 2007). Protecting these assets and demonstrating how that protection forms part of the enterprise strategy is becoming a core component of any compliance program (Nwakanma *et al.*, 2014; Nepal, and Chotiyaputta, 2016). But note that compliance isn't the same as security, securing information may make hotel compliant, but being compliant doesn't necessarily make hotel secure. Thus, the researchers hypothesize the following:

*H4: Regulatory compliance has a positive impact on the adoption of ITRM.*

#### **Security**

Law and Hsu, (2006) showed that the hotel industry has

been very attractive for hackers and fraudsters because of low computer and network security practices used by hotel staff. In the USA upwards of 55% of credit card fraud comes from the hospitality industry. Giving the fact that hoteliers have the responsibility of protecting their customers (Miltgen *et al.*, 2013), so, hoteliers should view information technology risk management as an invaluable and expected guest service (Chen and Dibb, 2010). These risks lead to direct financial losses, lost sales, decline in public confidence, loss of competitive advantage, loss of privacy, reputational damage causing brand devaluation, lost customers, customer complaints and defection, Jail time, fines, licenses suspension, reduced profitability, growth and compensation caused by the background noise of security incidents, control costs, and unspecified doubts about the effectiveness of security (Lin, *et al.*, 2016; Jake and Daniel, 2010; Dorofee, 2002).

According to Palvia, (2009), trust is emphasized more in an e-commerce context than in a traditional one because e-vendors' unethical behaviours carry a high risk, and sometimes consumers perceive a degree of social complexity in online transactions. Indeed, higher e-trust levels may lead to a higher e-loyalty toward a website and more use IT applications. Generally, customers' trust of (IT) adoption found in literature has been categorized into five main groups; Security/Privacy, Social presence, Credibility, Benevolence, and Website's attitude according to (Doong *et al.*, 2011).

Within the advancement of Internet technology, hoteliers provide a hotel's information, online reservations, and newsletters through their websites for customers. In addition, they collect customers' personal data when providing hotel services, such collected information greatly contributes to the hotel's marketing and promotional strategies, the hotel must preferentially protect customers' data to sustain integrity (Gilbert *et al.*, 2004). In order to protect customers' data, most hotels establish protocols pertaining to customers' privacy and security. Some examples of the protocols include self-regulation based on government guidelines and protection from outright legislation (O'Connor, 2007). Thus, the researchers hypothesize the following:

*H5: Security has a positive impact on the adoption of ITRM.*

### **Boundaries of ITRM Adoption**

Although ITRM process has a great role and importance in the hotels industry, but Stoneburner, (2002) indicated that there are practical challenges for any enterprises to adopt this process represented in how to organize and run an efficient and effective information security program for persistent, high-grade protection and, in turn, how to actually (i) identify IT risk events, (ii) assess the IT risks, and (iii) mitigate the IT environment to reduce IT risks.

According to Nwakanma *et al.*, (2014) as well as Abou-Shouk *et al.*, (2013) they showed that various hotel face four types of boundaries, namely resources limitations and internal boundaries which refer to hotel resources or capabilities and the hotel's approach and external barriers which are related to factors such as the environment, infrastructure, cultural and social barriers and legal, regulatory and political barriers. In addition to, adopted ITRM attributes represented in "Trial ability, Complexity, Reversibility, Modifiability, Observability and Suitability".

### **Resources Limitations and Internal Boundaries**

Collins and Cobanoglu, (2013) summarized resources limitations and internal boundaries are ITRM readiness factor which refers to the level of ITRM usage within the hotel. This category includes hardware and software compatibility, system interrelation, data conversion, troubles in updating and maintenance, ITRM infrastructure and migration from legacy system (Lin, *et al.*, 2016; Golshan and Rasid, 2012; McQueen, 2008). The second factor category refers to the hotel industry financial readiness (Webster *et al.*, 2006). Top management's recognition (Law and Hsu, 2006) and willingness (Jake and Daniel, 2010) to fund the adoption of ITRM will affect financial readiness for properties. The major cost of ITRM adoption is the cost of educating and training management and employees to use ITRM (Dyerson and Harindranath, 2007). Another concern of the top management is the losses of productivity due to abuse by ITRM staff readiness factor category refer to the IT and Risk management literacy level inside the hotel (Veenstra *et al.*, 2008). Similarly, Management support is another important factor category. Hence, the management level should not only support the ITRM applications but also understand how to align ITRM with the business strategies (Jake and Daniel, 2010). In

addition, the hotel internal culture refers to the collaboration level and style among the different managerial levels and team spirit and dedication to the business processes (Gilbert *et al.*, 2004). The anticipated financial and managerial benefits (IBM, 2011) and hotel size are important factors affecting the adoption of ITRM (Aziz *et al.*, 2012), as large hotel have more resources and infrastructure to facilitate implementation of ITRM adoption projects (Rosemary *et al.*, 2012). Thus, the researchers hypothesize the following:

H6: Resources Limitations has a negative impact on the adoption of ITRM.

H7: *Internal Boundaries has a negative impact on the adoption of ITRM.*

### **External Boundaries**

Chen and McQueen, (2008) summarized external barriers are uncertainty factor may be present because the transacting parties have incomplete or imperfect information, or because there are numerous unimaginable possibilities, which may arise during the course of the transaction. Kim, (2005) asserted that lack of trust is one of the most important future challenges for adopting ITRM within hotels because of customers fear of, higher risk in using the internet as a channel for financial transactions (Jake and Daniel, 2010), technology-based service delivery systems will not work as expected, and lack confidence that problems can be solved quickly (Chen and Dibb, 2010). Ghamatrasa, (2006) found that transaction risk occurs when online markets fail to assure that service will be delivered with sufficient quality.

Customer protection is a major legal issue associated with using the Internet (Stoneburner, 2002), to build customer confidence (Lim, 2008), in addition, fair liability is a key legal issue (Overbeek *et al.*, 2011). Gefen *et al.*, (2003) mentioned that responsibility must be set when financial losses occur in Internet transactions. Hassadoust, and Farzaneh, (2011), argue that, because of the lack of supporting law about electronic documents as legal evidence, hotels are still wary of making extensive transactions over the web. For example, it is unclear whether electronic documents and records are acceptable as sufficient evidence of transactions (Bigdeli and de Cesare, 2011),

as a result customers will not accept online transaction records (Overbeek *et al.*, 2011).

Information systems that can support both producing and selling goods is important for global economy (Jake and Daniel, 2010). Since going global bring in global competitive pressures, together with continuous innovation (Aziz *et al.*, 2012), many organizations are forced to rethink how they do business (Miltgen *et al.*, 2013). Furthermore, there are cultural, language, and political differences among countries in which the hotel going global must operate. As a result, a hotel must develop global hardware, software, and communications standards and create cross-cultural accounting and reporting structures (Nwakanma *et al.*, 2014), and information architecture and information technology infrastructure that supports their business goals (Aziz *et al.*, 2012).

Hotels should use ITRM to enhance their information processing (Lim, 2008), operations and decision making (Nepal, and Chotiyaputta, 2016), and to design, produce, deliver, and maintain new products (Choi *et al.*, 2016). Besides company's management needs to gauge whether or not they are they are receiving the kind of return on investment on ITRM that they should (Bigdeli and de Cesare, 2011). Finally, hotels should ensure that their information systems are used in an ethically and socially responsible manner (O'Connor, 2007). However, they have also introduced new problems and challenges of which managers should be aware (Law and Hsu, 2006). There are problems of security and control, privacy, use of systems to monitor quality assurance, accuracy, reliability and timeliness of information etc (Miltgen *et al.*, 2013). Information systems should be designed in such a way that people can control them in order to deal with the problems (Abou-Shouk *et al.*, (2013).

H8: *External Boundaries has a negative impact on the adoption of ITRM.*

### **Information Technology Risk Management Attributes**

Lim, (2008) defined complexity as the degree to which an ITRM adoption is perceived as relatively difficult to understand and use. As Rogers, (2003) stated complexity is negatively correlated with the rate of adoption. Thus, excessive complexity of an ITRM

system is an important obstacle in its adoption (Azam, 2007). So, ITRM system must be easy to use to be useful (Beckinsale and Levy, 2004). Dyerson and Harindranath, (2007) defines perceived ease of use as the degree to which a person believes that using a particular system would be free from effort. Customers also will perceive the system difficult to use for an intended task as not useful (Aziz *et al.*, 2012). MacGreogor and Vrazalic, (2005) asserted that new technology requires users to quickly learn it. Hence, one part of the final attitude towards the technology is affected by the degree of effort required to learn and comprehend its functionalities (Jake and Daniel, 2010). Altuntus *et al.*, (2011) indicated that business environments today progress and Ernest Change rapidly to keep up with evolving markets. Most business processes are supported by software systems and as the business processes Ernest Change, the systems need to be modified in order to continue supporting the processes (Nwakanma *et al.*, 2014). Modifications include extending, deleting, adapting, and restructuring the enterprise systems (Abou-Shouk *et al.*, 2013). The world around most software systems is constantly Ernest Changing; this requires software systems to be modified several times after their initial development (A'lvarez *et al.*, 2007). Ayeh, (2006) assured that maintenance cost generally presents the major cost factor during the lifecycle of a software system. Consequently, when developing a software system, stakeholders are very interested that the system is designed in such a way that future Ernest Changes will be relatively easy to implement, since this decreases maintenance cost (Kartiwi and MacGregor, 2007).

Tucker, (2008) stated that compatibility is the degree to which an ITRM adoption is perceived as consistent with the current values, past experiences, and needs of potential adopters. Rogers, (2003) asserted a positive relationship between an individual's prior compatible experiences and the new information technology risk management acceptance (Kendall *et al.*, 2001). They found that the extent of prior experience with similar technologies was positively associated with an ease of use belief about information technology risk management adoption (Beckinsale and Levy, 2004). According to MacGreogor and Vrazalic, (2005), trialability is the degree to which an ITRM adoption

may be experimented with on a limited basis. Also, trialability is positively correlated with the rate of adoption (Azam, 2007). The more an ITRM is tried, the faster its adoption is (Rosemary *et al.*, 2012). Lai and Samad, (2011) stated that the perceived belief of trialability connotes a risk-free exploration of the technology. That is trialability measures the extent to which potential adopters perceive that they have an opportunity to experiment with the innovation prior to the usage (Hesketh, 2009). Chen and McQueen, (2008) defined observability as the degree to which the results of an ITRM adoption are visible to others. Thus, the researchers hypothesize the following:

*H9: ITRM Attributes has a negative impact on the adoption of ITRM.*

### **Information Technology and Hotel Market Share**

According to Emarketer, (2005), The number of travellers who use the internet to plan and book trips continues to grow at a rapid rate, according to two reports by the Travel Industry Association of America (TIA). In 2000, more than 59 million online travellers used the internet for information on destinations or to check prices or schedules, growing 395 percent over the last three years. So, information technologies crucially impact customers' knowledge, attitudes and behaviours.

The hotel industry is also experiencing increased globalization, competition, higher customer turnover, growing customer acquisition costs and rising customer expectations, meaning that hotels' performance and competitiveness is significantly dependent on their ability to satisfy customers efficiently and effectively (Hassadoust, and Farzaneh, 2011). The online systems are becoming the main communication channel for the Business to Consumer market in the hotel industry. Therefore, hotels must exploit the online systems in order to develop trust and increase their market share. According to Mamaghani, (2009), Information Technology is the single greatest force affecting Ernest Change in the hospitality industry. Iris (2012) attributes this trend to both the rapid advances in technology as well as the increasing demands of the customers who look forward to flexible, specialized, accessible and interactive products and communication with principals. The IT based products and processes help the hotels to enhance the operating

efficiency, improve the service experience as well as provide a means to access markets on a global basis. The hotel level competitiveness generally refers to the ability of the hotel to increase in size, expand its global market share and its profit (Tsai, *et al.*, 2009). And according to QUN (2010), and other economists, market share refers to a company's sales revenue from that market divided by the total sales revenue available in that market. The gaining and retention of market share or customer base is the main goal of any service operator (Pongsak and Sunil, 2007). Murat and Bilgihan, (2012) agreed with Tsai, *et al.*, (2009), that a large body of empirical studies focused on technological progress of firms. These studies have established that the level of the technological progress of a company contributed to its economic performance and increasing market share. Thus, the researchers hypothesize the following:

*H10: ITRM has a positive impact on the hotel market share.*

**RESEARCH METHOD**

**The Questionnaire**

Data for this study were gathered using a questionnaire with a 5-point Likert-style scale (“1=strongly disagree” to “5=strongly agree”). Questionnaire items were adapted from previous studies (table 1). The questionnaire was pre-tested in five star hotels to evaluate its validity and reliability. 53 items were used to measure the eleven constructs of the hypothesized model: 'business facilitation' (measured by 5 items), 'cost reduction and productivity' (3 items), 'service level' (4 items), 'Regulatory compliance' (3 items), 'security' (3 items), 'hotel internal environment' (7items), 'hotel external environment' (7items), 'ITRM attributes' (6 items), 'resource limitation' (4 items), 'information technology risk management (ITRM)' (9 items), and 'hotel market share' (2 items). Personal data were also included in the form (i.e., gender, experience, education level, and the usage time of internet).

**Table 1: Questionnaire constructs**

ITRM	Researchers
Assuring the payment security on the website. Customer personal and financial data are well-protected on the website. The website guarantees the privacy of customer transactions.	Angriawan and Thakur, 2008; Chen and Dibb, 2010. Flaviàn and Guinaliu, 2006; Bart <i>et al.</i> , 2005.  Gefen <i>et al.</i> , 2003; McKnight <i>et al.</i> , 2002; Chen and Dibb, 2010.
IT assets are well-protected.  Assuring the election, application, check, and security assessment of safeguards.	Chen and McQueen, 2008; Law and Hsu, 2006; Hassanein and Head, 2009; Keeling <i>et al.</i> , 2010. Beachboard, and Cole, 2008; Gupta <i>et al.</i> , 2009; Cyr <i>et al.</i> , 2007.
Reviewing considers both effectiveness and efficiency, inclusiv e impact on the hotel operations. Actuating new corrective processes.	Bilgihan <i>et al.</i> , 2011; Dorofee, 2002; Bart <i>et al.</i> , 2005; Chen and Dibb, 2010; Gefen <i>et al.</i> , 2003. Tuncel, and Alpan, 2009; Angriawan and Thakur, 2008; Chen and Dibb, 2010; Flaviàn and Guinaliu, 2006.
The website is prepared to solve customers’ problems .	Lee and Turban, 2001; Palvia, 2009, Flaviàn and Guinaliu, 2006; Bart <i>et al.</i> , 2005.
Monitoring the environment for effectiveness and efficiency.	Bwalya, 2009; Johnson, 2007; McKnight <i>et al.</i> , 2002;Cyr <i>et al.</i> , 2007; Kim <i>et al.</i> , 2009.
Drivers	Researchers
Business facilitation Reach global customers. Tighter supplier relationships.  More productive partnerships. Outsourcing. Sustainable competitive advantage.	Gilbert <i>et al.</i> , 2004; Jake and Daniel, 2010 Jake and Daniel, 2010;Liao & Cheung, 2001 Hesketh, 2009; Bwalya, 2009 Bwalya, 2009; Paraskevas, and Buahlis,2003; Aron <i>et al.</i> , 2005 Veenstra , 2008; Kumar,2004; Lacity <i>et al.</i> ,2009; Bilgihan <i>et al.</i> ,2011; Westerman and Hunter,2007
Cost reduction & productivity Eliminate redundant administration tasks. Reduce helpdesk burden. Reduce process cycle time.	Bharosa <i>et al.</i> , 2011 Baida <i>et al.</i> , 2007; Jake and Daniel, 2010 Hasan, 2003; Chen and Dibb, 2010



Service level Information quality. Focused, personalized content. Comprehensive profile view. Service meets commitments to customers.	Ernest Chang,2006; Suhong and Binshan,2006 Liao and Cheung,2001; O'Connor,2007 Benaroch <i>et al</i> ,2006 Angriawan <i>et al</i> ,2008; Flaviàn and Guinaliu,2006
Regulatory compliance Comply with international data privacy regulation. Reduce customers' complaints. Reduce fines and legal costs.	Overbeek <i>et al</i> , 2011; Jake and Daniel, 2010 Overbeek <i>et al</i> , 2011; Jake and Daniel, 2010 Overbeek <i>et al</i> , 2011; Jake and Daniel, 2010
Security Consistent information security policy. Managing risk or reducing enterprise risk.  Consistent identity data.	Roca <i>et al</i> ,2010; Chen and Dibb, 2010 Benaroch <i>et al</i> ,2006; Flaviàn and Guinaliu,2006; O'Connor,2007 Bart <i>et al</i> ,2005; Beachboard and Cole,2008
<b>Boundaries</b>	<b>Researchers</b>
Internal Boundaries High-financial cost of ITRM adoption and maintenance.  Lack of staff and Managers' knowledge, awareness and experience of ITRM benefits. Resistance of staff towards IT applications.  Inadequate of ITRM training programs. Lack of IT assets.  Lack of support from top management.  Inadequate planning and preparedness for unpredictable, unusual or extreme information security incidents.	Collins and Cobanoglu, 2013; Ghamatrasa, 2006; Webster <i>et al</i> , 2006. Golshan and Rasid, 2012; McQueen, 2008; Gilbert <i>et al</i> , 2004; Jake and Daniel, 2010; Stoneburner, 2002. Altuntus <i>et al</i> , 2011; Simmons <i>et al</i> , 2008; Collins and Cobanoglu, 2013. Camison, 2000; Dyerson and Harindranath, 2007. Hesketh, 2009; Bwalya, 2009; Lai and Samad, 2011; Kim, 2005. Bwalya, 2009; Paraskevas, and Buahlis, 2003; Aron <i>et al</i> , 2005. Chen and Dibb, 2010; Law and Hsu, 2006; Veenstra <i>et al</i> , 2008; Lacity <i>et al</i> ,2009;Bilgihan <i>et al</i> ,2011; Westerman and Hunter, 2007.
External Boundaries Lack of trust in commercial exErnest Change.  Regulations and rules of the legal system.  Lack of local authorities' advice and support.  The availability of Internet access. Customer trust and satisfaction.  Ignorance, carelessness, negligence, or idle curiosity by users. Lack of credit card security understanding by customers.	Kim, 2005; Chen and McQueen, 2008; Overbeek <i>et al</i> , 2011. Law and Hsu, 2006; Jake and Daniel, 2010; Stoneburner, 2002. Chen and Dibb, 2010; Ghamatrasa, 2006; Gefen <i>et al</i> , 2003. Bigdeli and de Cesare, 2011; Chen and McQueen, 2008. Ghamatrasa, 2006 Bart <i>et al</i> , 2005; Beachboard and Cole,2008 A'lvarez <i>et al.</i> , 2007; Stanton <i>et al</i> , 2005; Stoneburner, 2002. Lim, 2008; Flaviàn and Guinaliu,2006; Gefen <i>et al</i> ,2003

**Validity and Reliability**

The questionnaire was designed in order to collect data from hotels' employees. For validity concerns, the survey was piloted on a sample of 40 employees to check its face and content validity. The comments of respondents related to language and design of questionnaire were considered in the final form. To investigate the content validity, corrected item-total correlation statistics were used to determine the retained variables (Netemeyer *et al.*, 2003). For reliability of constructs, Cronbach's alpha coefficient was computed and exceeded 0.70 for all constructs reflecting reliable results (Hair *et al.*, 2010).

**Sample Size**

Four hundred questionnaires were sent out for data collection from five star hotels in Cairo. 20 out of 33 five star hotels were randomly selected. Questionnaires were randomly distributed among employees. Of 400 distributed questionnaires, 257 questionnaires were found usable. Accordingly, the response was 0.64 which is found sufficient (Table 3).

**Analysis Technique**

Structural equation modelling (SEM), an advanced multivariate technique, was employed to investigate the causal relationships between drivers and

boundaries constructs and ITRM of the hotel. SEM allows the researcher to measure the relationships between the latent constructs and including measurement errors. SEM establishes both measurement and structural models to be used. While the structural model measures the causal relationship between independent and dependent latent variables, the measurement model measures the relationships between the constructs and their indicators. Warp PLS (version 4) software was used in analysis. For the measurement model, Average variance extracted (AVE) should be calculated. It is recommended that each latent variable should account for more than 50% of the variance explained to confirm convergent validity (Fornell and Larcker, 1981). Discriminant validity is confirmed if the square root of AVEs is greater than the correlations among constructs (Kock,

2012). Considering Cronbach’s alpha, and composite reliability statistics that should be greater than 0.70 for reliable findings (Hair *et al.*, 2010).

**RESEARCH FINDINGS**

**Descriptive Statistics**

The descriptive statistics showed that 60.3% of the respondents are males while 39.7% of them are females. 18.7% of the respondents are under 5years' experience, 19.8% of them are between 5 and 10 years, 31.1% are between 10 and 15 years, and 30.4% are more than15years' experience. 77.6% had university level of education, 11.6% secondary level, and 10.8% were post-graduate. 65% of respondents use the Internet regularly, and 29.2% often use it, and 5.8% use it rarely (Table 2).

**Table 2: Descriptive Statistics of the Respondents**

Description		Frequency	per cent
Gender:	Male	155	60.3
	Female	102	39.7
Experience:	Under 5 years	48	18.7
	5 to 10 years	51	19.8
	10 to 15 years	80	31.1
	More than 15 years	78	30.4
Education level:	Secondary or Technical education	78	11.6
	University education	191	77.6
	Post-graduate study	34	10.8
Using the Internet:	On a regular basis (> 4 times a week)	167	65
	Often (3-4 times a week)	75	29.2
	Rarely (1-2 times a week)	15	5.8
	Very rarely (0-1 times a week)	0	0
Occupation	Security	76	29.6
	Sales and marketing	75	29.2
	Front office	79	30.7
	Engineering	27	10.5

**The Measurement Model**

To test the measurement model, Table 3 outlines the construct loadings, average variance extracted (AVE), square root AVE (SQRT AVE), Cronbach's alpha, and composite reliability (Com. Rel.). Looking at AVE statistics, the revealed values of all constructs are greater than 0.50 which is evident of convergent validity. Discriminant validity is confirmed where

square root of AVEs is greater than the correlations among constructs. In total and from Table 5, convergent and discriminant validities are evident and the measurement model is valid. Considering Cronbach's alpha, and composite reliability statistics, all values of Cronbach's alpha and composite reliability are greater than 0.70 and the findings of the measurement model are reliable.

**Table 3: Measurement Model**

<i>Dependent Constructs (reflective)</i>	<i>Loadings</i>	<i>AVE</i>	<i>SQRT AVE</i>	<i>Cronbach's alpha</i>	<i>Com. Rel.</i>	
Business facilitation	BF1	0.793	0.598	0.773	0.759	0.850
	BF2	0.884				
	BF3	0.470				
	BF4	0.872				
	BF5	0.534				
Cost reduction and productivity	CR1	0.648	0.504	0.710	0.750	0.834
	CR2	0.619				
	CR3	0.692				
Service level	SL1	0.806	0.733	0.856	0.817	0.891
	SL2	0.876				
	SL3	0.810				
	SL4	0.489				
Regulatory compliance	RC1	0.803	0.631	0.794	0.707	0.837
	RC2	0.788				
	RC3	0.791				
Security	Sec1	0.760	0.664	0.815	0.743	0.855
	Sec2	0.899				
	Sec3	0.779				
Business internal environment	BIE1	0.869	0.638	0.799	0.801	0.873
	BIE2	0.930				
	BIE3	0.621				
	BIE4	0.740				
	BIE5	0.611				
	BIE6	0.744				
	BIE7	0.556				
ITRM attributes	ITRMA1	0.423	0.556	0.733	0.811	0.801
	ITRMA2	0.543				
	ITRMA3	0.754				
	ITRMA4	0.744				
	ITRMA5	0.821				
	ITRMA6	0.455				
Resources limitations	RL1	0.444	0.653	0.832	0.766	0.777
	RL2	0.711				
	RL3	0.654				
	RL4	0.592				
business external environment	BEE1	0.661	0.659	0.812	0.733	0.851
	BEE2	0.908				
	BEE3	0.845				
	BEE4	0.576				
	BEE5	0.678				
	BEE6	0.611				
	BEE7	0.632				
ITRM	ITRM1	0.885	0.783	0.885	0.723	0.878
	ITRM2	0.885				
	ITRM3	0.622				
	ITRM4	0.484				
	ITRM5	0.733				
	ITRM6	0.674				
	ITRM7	0.823				
	ITRM8	0.777				
	ITRM9	0.634				
Market share	MS1	0.917	0.841	0.917	0.811	0.914
	MS2	0.917				

Note: AVE: average variance extracted, SQRT AVE: square root, Com. Rel.: composite reliability

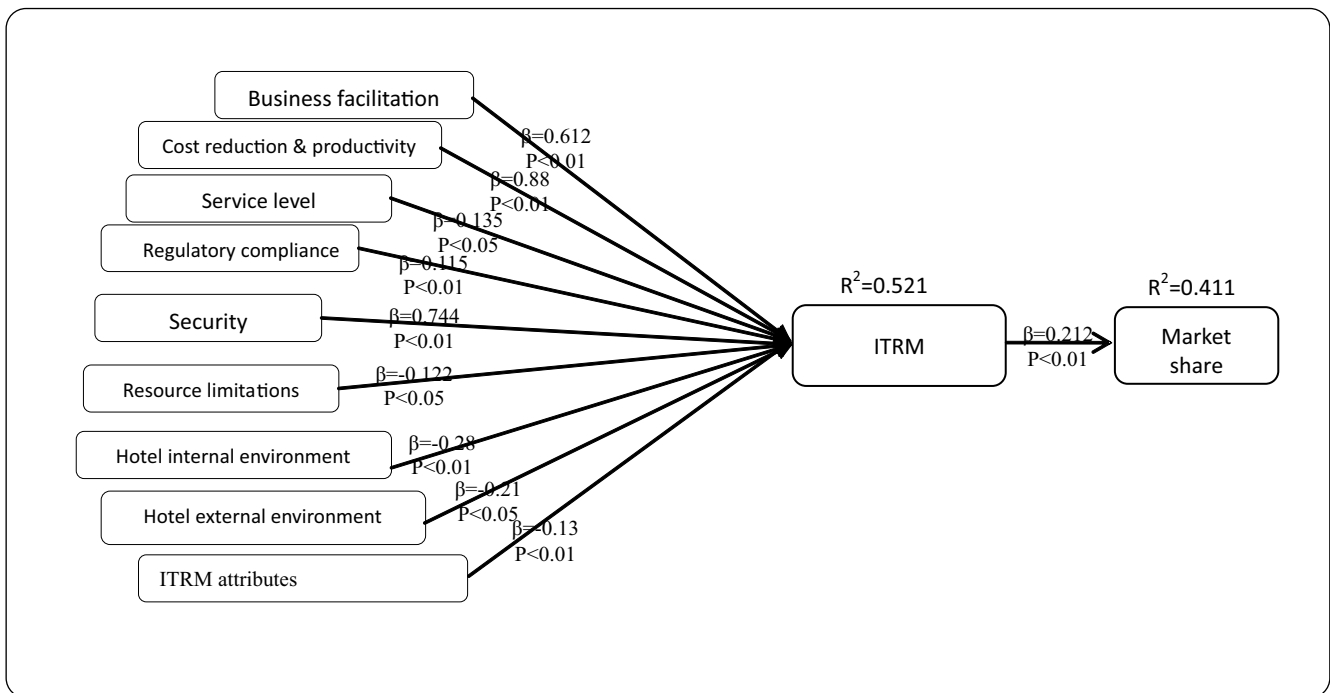
**The Structural Model**

The structural model is used to measure the causal relationships among the constructs. Figure 2 depicts the causal relationships and beta coefficients of independent variables (drivers and boundaries) on the mediator (ITRM). The model show good fit of data. The Average path coefficient (APC)=0.164,  $P<0.001$ , Average R-squared (ARS)=0.611,  $P<0.001$ , Average adjusted R-squared (AARS)=0.621,  $P<0.001$ , Average block VIF (AVIF)=2.133 (ideal fit), Average full collinearity VIF (AFVIF)=2.622 (ideal fit), TenenhausGoF (GoF)=0.677 (large), Sympson's paradox ratio (SPR)=0.777 (acceptable), R-squared contribution ratio (RSCR)=0.978 (acceptable), Statistical suppression ratio (SSR)=0.813 (acceptable), and Nonlinear bivariate causality

direction ratio (NLBCDR)=1.000 (acceptable).

It is found that drivers and boundaries have a significant effect on the implementation of information technology risk management (ITRM) within five star hotels. The findings revealed that the ten hypotheses measured in the study are supported and the factors involved in this study are significantly affecting ITRM of the hotel. However, the factors of the drivers and boundaries (independent variables) have different effect on ITRM of the hotel (mediator). Some factors were found positively affecting ITRM within hotels while some others were found negatively affecting it. The interpretation of positive and negative effects reflects how hotel's employees perceive the drivers and boundaries of the adoption of ITRM and information provided on the Egyptian hotels (Figure 2).

**Fig.2: The Structural Model of the Drivers and Boundaries Features Affecting Hotel ITRM**



Respondents perceive the five constructs of drivers to have a positive effect on the effectiveness of the ITRM. The business facilitation content is positively affecting the hotel effectiveness of ITRM (β=0.612 and  $p<0.01$ ) (H1). Furthermore, the cost reduction and productivity drivers are found positively affecting the implementation of the hotel ITRM (β=0.88 and  $p<0.01$ ) (H2), and service level (β=0.135 and  $p<0.05$ ) (H3). The regulatory compliance has a positive impact

on the ITRM implementation (β=0.115 and  $p<0.01$ ) (H4). The security drivers were found to have a positive effect on the hotel ITRM implementation and business (β=0.744 and  $p<0.01$ ) (H5).

On the other hand, four boundaries constructs were perceived negatively affecting the ITRM adoption, these are: resource limitations (β=-0.122 and  $p<0.05$ ) (H6), hotel internal environment (β=-0.28 and  $p<0.01$ ) (H7), hotel external environment of the hotel (β=-0.21

and  $p < 0.05$ ) (H8), and ITRM attributes ( $\beta = -0.13$  and  $p < 0.01$ ) (H9). Therefore, the nine hypotheses are statistically supported and the IT drivers and boundaries are significantly affecting the adoption of hotel ITRM. Drivers and boundaries explains 52% of variance in the effectiveness of hotel ITRM ( $R^2 = 0.521$ ). Furthermore, the information technology risk management (mediator) was found significantly affecting hotel market share (outcome variable) ( $\beta = 0.212$  and  $p < 0.01$ ) (H10).

## DISCUSSION OF FINDINGS

Studying the drivers and boundaries of Information Technology Risk Management, ITRM functions are important concern for hotels in a fierce competition among tourism enterprises to satisfy, retain, and expand their customers. Hotels are important sectors of hospitality industry that seek to improve their image and increase their customer-base. In this study, hotel employees in Egypt have expressed their opinions in nine critical components of ITRM drivers and boundaries. Cost reduction and productivity are ranked first positively affecting the adoption of ITRM. This is reflected in the elimination of redundant administration tasks, the reduction of helpdesk burden, and the reduction of process cycle time. Employees scored a mean value of (4.89) on this variable meaning that they are very satisfied with these features on the Egyptian hotel. Security is a crucial factor for ITRM adoption; fortunately it is a result of high level of consistent information security policy of the hotel IT data applied in the Egyptian hotels, particularly in managing risk or reducing enterprise risk. Security of a hotel website and IT assets is a feature of success for ITRM adoption as claimed by Law and Hsu (2006) who noted that Information security spans the areas of confidentiality, integrity, and availability, in addition to reflecting the hotel cares about their customers.

The business facilitation construct comes next affecting the ITRM adoption of a hotel. Having a mean value of (4.71) means that employees are satisfied with the IT business facility of Egyptian hotel. The business facilitation concept includes the easiness of reaching global customers, developing tighter supplier relationships, developing more productive partnerships with tourism enterprises, outsourcing and the ability to achieve sustainable competitive advantage. This finding is in line with Bilgihan *et al*,

(2011) agreed with Dorofee, (2002) that ITRM adoption, a hotel not only will be able to reduce the information risks exposure it faces, but also Business facilitation could be generated generally.

Service level is ranked fourth in the list of factors affecting the ITRM adoption of a hotel. The mean value of employees on this component is (4.55) which means that employees are very satisfied with IT service level of Egyptian hotels. This includes information content quality, focused personalized content, comprehensive profile view, and service meets commitments to customers. Although this component is vital for any IT application, some enterprises might believe that crowded IT content conveys many details and it is useful for customers which leads to customers feeling lost in the hotel IT content. However, clear structure of the IT service level and detailed information are crucial success factor. The service level is one of five features of ITRM adoption as claimed by to Angriawan *et al*, (2008). In addition, ITRM adoption engages service quality improving (Ernest Chang, 2006).

The next factor affecting the ITRM adoption of hotel is its regulatory compliance content. This construct includes a number of items: these are complying with international data privacy regulation, reduction of customers' complaints, and decreasing fines and legal costs. Having a mean value of (4.34) means that employees are solidly satisfied with the regulatory compliance content of IT in the Egyptian hotels. This construct reflects the importance of regulatory compliance application on the hotel IT content and how it helps customers in their decision-making process. In addition it affects their decision in selecting their holiday hotel or moving to search for another one. This finding is consistent with previous studies conducted by Overbeek *et al*, (2011) who mentioned that customers' perceive a hotel to be more reliable with their personal and financial data are well-protected on the hotel website, as well as provide a means to guarantees the privacy of customer transactions (Law and Hsu, 2006).

On the other hand, the results showed the defects in the Egyptian hotel ITRM adoption. The factors negatively perceived by employees are resource limitation, hotel internal environment, hotel external environment, and adopted technology attributes. Hotel internal

environment is ranked first negatively affecting the adoption of ITRM. Employees believe that the hotel internal boundaries are negatively affecting the adoption of ITRM. This construct includes a number of items: these are high cost of ITRM adoption and maintenance, lack of staff and managers' knowledge, awareness and experience of ITRM benefits, resistance of staff towards IT applications, inadequate ITRM training programs, lack of IT assets, lack of support from top management, inadequate planning and preparedness for unpredictable, unusual or extreme information security incidents, and lack of staff proficient English in time of neglecting the local language in technology implementation policies. The mean value of employees on this component is (3.61) which mean that employees are recognized hotel internal environment of Egyptian hotels.

Furthermore, the second negative perception of employees towards the hotel external environment implies displeasing appeal. This factor is crucial for hotel managers to improve the ITRM adoption of their hotel and staying ahead of competitors. The mean value of employees on this component is (3.51) which mean that employees are slightly accepted external boundaries of Egyptian hotels. This construct includes lack of trust in commercial exErnest Change, customer trust and satisfaction, ignorance, carelessness, negligence, or idle curiosity by users, and lack of credit card security understanding by customers.

ITRM attributes is ranked third in the list of factors negatively affecting the ITRM adoption of a hotel. This includes trialability, complexity, reversibility, modifiability, Observability and suitability. This could be addressed to IT producers who should make it available in trial, easy to use, and adapt it to fit the nature of services. This finding is consistent with previous studies conducted by Lim, (2008) who mentioned that attributes of ITRM used at hotels should be used easily. In addition, it can be updated and modified over time (Altuntus *et al.*, 2011), as well as adopters can observe and measure technology impacts on their hotels according to (Abou-Shouk *et al.*, 2013). Similarly Tucker, (2008) have found that technology should be suitable to culture and readiness of customers, suppliers or partners.

Resource limitation is ranked fourth in the list of

factors negatively affecting the ITRM adoption of a hotel. This includes inadequate financial resources, high costs of technology adoption: technologies and equipment, high cost of developing and managing websites, and ITRM implementation and maintenance. This finding is consistent with previous studies conducted by Abou-Shouk *et al.*, (2013) who mentioned that resource limitation is one of the main barriers affect of the ITRM adoption of a hotel. In addition, resource limitation includes high costs of technology adoption and its maintenance according to (Collins and Cobanoglu, 2013). Similarly Kim, (2009) have found that the high cost of developing and managing IT security systems considers also crucial barrier to adopt ITRM at hotels.

It is also clear that the ITRM of a hotel increases the potential intention of hotel market share in terms of increasing hotel reservation sales, and achieving high profitability and growth within hospitality industry. ITRM construct includes, assuring the payment security on the website, customer personal and financial data are well-protected on the website, The website guarantees the privacy of customer transactions, IT assets are well-protected, assuring the election, application, check, and security assessment of safeguards, reviewing process considers both effectiveness and efficiency, inclusive impact on the hotel operations, actuating new corrective processes, the website is prepared to solve customers' problems, and monitoring the environment for effectiveness and efficiency. The mean value of employees' opinions on this component is (4.88) which means that employees are very satisfied with IT ITRM policies of Egyptian hotels. In other words a high level of ITRM gives a credible image to customers about the hotel services. Keeling *et al.*, (2010) agreed with Angriawan and Thakur, (2008), that technological progress and IT security system at hotel not only will be able to reduce the IT risks exposure it faces, but also can enhance its economic performance and increase the hotel market share (Murat and Bilgihan, 2012; Tsai, *et al.*, 2009).

## CONCLUSION

This study investigated the factors affecting hotel ITRM adoption and the effect of ITRM on the market share intention of hotels. The study has tested ten

hypotheses of how these factors (business facilitation, cost reduction & productivity, service level, regulatory compliance, security, ITRM attributes, resource limitations, hotel internal environment, and hotel external environment) affecting the dependent variable (ITRM adoption within hotel) and how ITRM affects hotel market share intention. The study has used a questionnaire to collect data from 257 employees to perceive their opinions on the factors affect Egyptian hotels ITRM adoption and has employed structural equation modelling for analysis purposes. The study has revealed very useful results in the way it evaluated the perceptions of employees on the hotel ITRM and described the factors that hotels have succeeded to offer in their ITRM. Meanwhile, the study has provided general managers and marketing managers in hotels with some feedback on the overall perception of their ITRM from employees' viewpoint. The factors negatively affecting the ITRM of the hotel need to be addressed seriously by marketing managers particularly in relation to the boundaries. These factors

represent the main target of the hotel ITRM that need enhancement. Failing to achieve this target leads hotels to falling behind their competitors and in turn losing opportunities to increase their market-share and sales. This concludes that the Egyptian hotels still have critical issues and need to address some defects in their ITRM to improve their sales, and satisfy their customers. However, the hotels have succeeded in introducing ITRM that the employees believe it is acceptable and affect their potential market share.

It must be admitted that this study has some limitations. One limitation is the need to conduct qualitative interviews to fully understand how managers perceive the negative aspects of the hotel ITRM. Future research studies will investigate the perceptions of customers on hotel websites in addition to comparing two different samples, which could be employees' perceptions and customers' perceptions. The quantitative-qualitative approach will be useful in future studies to fully understand the subject of the study.

## REFERENCES

- Abou-Shouk, M., Lim, W. M. & Megicks, P. (2013). e-Commerce and small tourism businesses in developing countries: Drivers versus boundaries of adoption. *Tourism Planning & Development*. 10(3), pp 249-266.
- Abou-Shouk, M. A. & Khalifa, G. S. (2016). The influence of website quality dimensions on e-purchasing behaviour and e-loyalty: a comparative study of Egyptian travel agents and hotels. *Journal of Travel & Tourism Marketing*. pp 1-16.
- Altuntas, M., Berry-Stölzle, T. R. & Hoyt, R. E. (2011). Dynamic determinants of enterprise risk management adoption in the property-liability insurance industry: evidence from Germany. *Journal of risk management*. 123(17), pp1234-1244.
- Álvarez, L. S., Martín, A. M. D. & Casielles, R. V. (2007). Relationship marketing and information and communication technologies: Analysis of retail travel agencies. *Journal of Travel Research*. 45(4), pp 453-463.
- Angriawan, A. & Thakur, R. (2008). A parsimonious model of the antecedents and consequence of online trust: An uncertainty perspective. *Journal of Internet Commerce*. 7(1), pp 74-94.
- Aron, R., Clemons, E. K. & Reddi, S. (2005). Just right outsourcing: understanding and managing risk. *Journal of Management Information Systems*. 22(2), pp 37-55.
- Ayeh, J. K. (2007). Determinants of internet usage in Ghanaian hotels: the case of the Greater Accra Region (GAR). *Journal of Hospitality & Leisure Marketing*. 15(3), pp 87-109.
- Azam, S. (2007). Internet adoption and usage in Bangladesh. *経営行動科学*, 20(1), pp 43-54.
- Aziz, A. A., Bakhtiar, M. F. S., Syaquif, M., Kamaruddin, Y. & Ahmad, N. A. (2012). Information and communication technology application's usage in hotel industry. *Journal of Tourism, Hospitality, and Culinary Arts*. 4(2), pp 34-48.
- Baida, Z., Liu, J. & Tan, Y. H. (2007). Towards a methodology for designing e-government control procedures. In *International Conference on Electronic Government* (pp 56-67). Springer Berlin Heidelberg.
- Bart, Y., Shankar, V., Sultan, F. & Urban, G. L. (2005). Are the drivers and role of online trust the same for all web sites and consumers? A large-scale exploratory

- empirical study. *Journal of marketing*. 69(4), pp 133-152.
- Beachboard, J., Cole, A., Mellor, M., Hernandez, S., Aytes, K. & Massad, N. (2008). Improving Information Security Risk Analysis Practices for Small and Medium-Sized Enterprises: A Research Agenda. *Journal of Issues in Informing Science and Information Technology Education*. 5, pp 73-85.
- Beckinsale, M. & Levy, M. (2004). SMEs and internet adoption strategy: who do SMEs listen to?. *ECIS 2004 Proceedings*, p11.
- Benaroch, M., Lichtenstein, Y. & Robinson, K. (2006). Real options in information technology risk management: an empirical validation of risk-option relationships. *Mis Quarterly*. 30(4), pp 827-864.
- Bharosa, N., Janssen, M., van Wijk, R., de Winne, N., van der Voort, H., Hulstijn, J. & Tan, Y. H. (2013). Tapping into existing information flows: The transformation to compliance by design in business-to-government information exErnest Change. *Government Information Quarterly*. 30, pp S9-S18.
- Bigdeli, A. Z. & de Cesare, S. (2011). Barriers to e-Government service delivery in developing countries: The case of Iran. In *Emerging Themes in Information Systems and Organization Studies* (pp. 307-320). Physica-Verlag HD.
- Bilgihan, A., Okumus, F., "Khal" Nusair, K. & Joon-Wuk Kwun, D. (2011). Information technology applications and competitive advantage in hotel companies. *Journal of Hospitality and Tourism Technology*. 2(2), pp 139-153.
- Bwalya, K. J. (2009). Factors affecting adoption of e-government in Zambia. *The Electronic Journal of Information Systems in Developing Countries*. 38(4), pp 1-13
- Camisón, C. (2000). Strategic attitudes and information technologies in the hospitality business: an empirical analysis. *International Journal of Hospitality Management*. 19(2), pp 125-143.
- Chen, J. & Dibb, S. (2010). Consumer trust in the online retail context: Exploring the antecedents and consequences. *Psychology & Marketing*, 27(4), pp 323-346.
- Chen, J. & McQueen, R. J. (2008). Factors affecting e-commerce stages of growth in small Chinese firms in New Zealand: an analysis of adoption motivators and inhibitors. *Journal of Global Information Management (JGIM)*, 16(1), pp 26-60.
- Choi, T. M., Wallace, S. W. & Wang, Y. (2016). Risk management and coordination in service supply chains: information, logistics and outsourcing. *Journal of the Operational Research Society*. 67(2), pp 159-164.
- Cobanoglu, C., Corbaci, K. & Ryan, B. (2001). A comparative study: the impact of technology in lodging properties in the United States and Turkey. *International Journal of Hospitality Information Technology*. 2(1), pp 23-40.
- Collins, G. R. & Cobanoglu, C. (2013). *Hospitality information technology: Learning how to use it*. Kendall/Hunt Publishing Co.
- Contos, B. T. (2006). *Enemy at the water cooler: True stories of insider threats and enterprise security management countermeasures*. Syngress.
- Cyr, D., Hassanein, K., Head, M. & Ivanov, A. 2007. The role of social presence in establishing loyalty in e-service environments. *Interacting with computers*, 19(1), pp.43-56.
- Doong, H.S., Wang, H.C. & Foxall, G.R., 2011. An investigation of consumers' webstore shopping: A view of click-and-mortar company. *International Journal of Information Management*, 31(3), pp.210-216.
- Dorofee, C.A.A., 2002. *Managing Information Security Risks: The OCTAVE (SM) Approach*. July 2002, Addison Wesley Professional.
- Dyerson, R. & Harindranath, G., 2007, August. *ICT Adoption & Use by SMEs in the UK: A Survey of South East*. In *PICMET'07-2007 Portland International Conference on Management of Engineering & Technology* (pp. 1756-1770). IEEE.
- Ebenezer, C., Bath, P. & Pinfield, S., 2016. *Access denied? Managing access to the Web within the NHS in England: technology, risk, culture, policy and practice*.
- Egyptian Hotel Guide 2011-2012.*, (2012), 32nd edition, Egypt: Egyptian Hotel Association.
- Emarketer, (2005) *Travel agencies online*. available at: [www.emarketer.com](http://www.emarketer.com)



- Ernest Chang, S. & Ho, C.B., 2006. Organizational factors to the effectiveness of implementing information security management. *Industrial Management & Data Systems*, 106(3), pp.345-361.
- Erzurumlu, S.S. & Erzurumlu, Y.O., 2013. Development and deployment drivers of clean technology innovations. *The Journal of High Technology Management Research*, 24(2), pp.100-108.
- Flavián, C. & Guinalú, M., 2006. Consumer trust, perceived security and privacy policy: three basic elements of loyalty to a web site. *Industrial Management & Data Systems*, 106(5), pp.601-620.
- Fornell, C. & Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, pp.39-50.
- Gefen, D., Karahanna, E. & Straub, D.W., 2003. Trust and TAM in online shopping: an integrated model. *MIS quarterly*, 27(1), pp.51-90.
- Ghamatrasa, M., 2006. Internet adoption decision model among Iranian small and medium enterprises. Master's thesis, Lulea University of Technology.
- Gilbert, D., Balestrini, P. & Littleboy, D., 2004. Barriers and benefits in the adoption of e-government. *International Journal of Public Sector Management*, 17(4), pp.286-301.
- Glendon, A.I., Clarke, S. & McKenna, E., 2016. Human safety and risk management. Crc Press.
- Golshan, N.M. & Rasid, S.Z.A., 2012. Determinants of Enterprise Risk Management Adoption: An Empirical Analysis of Malaysian Public Listed Firms. In *Proceedings of World Academy of Science, Engineering and Technology* (No. 62). World Academy of Science, Engineering and Technology.
- Gupta, P., Yadav, M.S. & Varadarajan, R., 2009. How task-facilitative interactive tools foster buyers' trust in online retailers: a process view of trust development in the electronic marketplace. *Journal of Retailing*, 85(2), pp.159-176.
- Haimes, Y.Y., 2015. Risk modeling, assessment, and management. John Wiley & Sons.
- Hair, J., Black, W., Babin, B. & Anderson, R. 2010. *Multivariate data analysis: a global perspective*. Pearson Prentice Hall.
- Hasan, B., 2003. The influence of specific computer experiences on computer self-efficacy beliefs. *Computers in human behavior*, 19(4), pp.443-450.
- Hassandoust, F. & Farzaneh, M., 2011. Reviewing the influence of it applications such as implementing online distribution channels in hotel industry. *J Knowl Manag Econ Inf Technol*, 1(4), pp.106-121.
- Hassanein, K., Head, M. & Ju, C., 2009. A cross-cultural comparison of the impact of social presence on website trust, usefulness and enjoyment. *International Journal of Electronic Business*, 7(6), pp.625-641.
- Hendy, L., 2007. ISO 31000 Risk Management Guidance Standard. NSAI, 1Swift Square, Northwood, Santry Dublin 9, Ireland.
- Hesketh, D., 2009. Seamless electronic data and logistics pipelines shift focus from import declarations to start of commercial transaction. *World Customs Journal*, 3(1), pp.27-32.
- Hubbard, D.W., 2014. *How to measure anything: Finding the value of intangibles in business*. John Wiley & Sons.
- IBM., (2011) *Implementing e-customs in Europe- An IBM point of view, customs, borders and revenue management solutions*.
- Idé, T., Güven, S., Jan, E.E., Makogon, S. and Venegas, A., 2015, May. Latent trait analysis for risk management of complex information technology projects. In *2015 IFIP/IEEE International Symposium on Integrated Network Management (IM)* (pp. 305-312). IEEE.
- International Data Corporation, (2007) *Worldwide IT Security Software, Hardware, and Services. 2007–2011 Forecast: The Big Picture*. International Data Corporation (Doc #210018).
- Iris, M., 2012. The impact of information and communication technology (ict) as a key factor of tourism development on the role of Croatian travel agencies. *International Journal of Business and Social Science*, 3(24).
- Jake, K. & Daniel, M., (2010) *Information Technology Risk Management in Enterprise Environments: A Review of Industry Practices and a Practical Guide to Risk Management Teams*. Minoli Copyright 2010 John Wiley & Sons, Inc.

- Johnson, D.S., 2007. Achieving customer value from electronic channels through identity commitment, calculative commitment, and trust in technology. *Journal of interactive marketing*, 21(4), pp.2-22.
- Kartiwi, M. & MacGregor, R.C., 2007. Electronic commerce adoption barriers in small to medium-sized enterprises (SMEs) in developed and developing countries: A cross-country comparison. *Journal of Electronic Commerce in Organizations (JECO)*, 5(3), pp.35-51.
- Kearney, W.D. & Kruger, H., 2016. Theorising on risk homeostasis in the context of information security behaviour. *Information & Computer Security*, 24(5).
- Keeling, K., McGoldrick, P. & Beatty, S., 2010. Avatars as salespeople: Communication style, trust, and intentions. *Journal of Business Research*, 63(8), pp.793-800.
- Kendall, J.D., Tung, L.L., Chua, K.H., Ng, C.H.D. and Tan, S.M., 2001. Receptivity of Singapore's SMEs to electronic commerce adoption. *The Journal of Strategic Information Systems*, 10(3), pp.223-242.
- Kim, H.B., Kim, T.T. & Shin, S.W., 2009. Modeling roles of subjective norms and eTrust in customers' acceptance of airline B2C eCommerce websites. *Tourism management*, 30(2), pp.266-277.
- Kim, W.G., Ma, X. & Kim, D.J., 2006. Determinants of Chinese hotel customers'e-satisfaction and purchase intentions. *Tourism Management*, 27(5), pp.890-900.
- Kock, N. 2012. "Warp PLS 3.0 user manual", Laredo, Texas, ScriptWarp Systems.
- Kouns, J. & Minoli, D., 2011. Information technology risk management in enterprise environments: A review of industry practices and a practical guide to risk management teams. John Wiley & Sons.
- Kumar, R.L., 2004. A framework for assessing the business value of information technology infrastructures. *Journal of Management Information Systems*, 21(2), pp.11-32.
- Lacity, M.C., Khan, S.A. & Willcocks, L.P., 2009. A review of the IT outsourcing literature: Insights for practice. *The Journal of Strategic Information Systems*, 18(3), pp.130-146.
- Lai, F. & Samad, F., 2011. Enterprise risk management and the empirical determinants of its implementation. In *010 International Conference on Business and Economics Research vol. 1* IACSIT Press, Kuala Lumpur, Malaysia.
- Law, R. & Hsu, C.H., 2006. Importance of hotel website dimensions and attributes: perceptions of online browsers and online purchasers. *Journal of Hospitality & Tourism Research*, 30(3), pp.295-312.
- Lee, M.K. & Turban, E., 2001. A trust model for consumer internet shopping. *International Journal of electronic commerce*, 6(1), pp.75-91.
- Liao, Z. & Cheung, M.T., 2001. Internet-based e-shopping and consumer attitudes: an empirical study. *Information & Management*, 38(5), pp.299-306.
- Lim, W.M., 2008. Regression analysis of Internet technologies adoption factors and business performance of UK independent hoteliers. *Tourism and Hospitality Planning & Development*, 5(3), pp.233-245.
- Lin, C.K., Chen, Y.S. & Chuang, H.M., 2016. Improving Project Risk Management by a Hybrid MCDM Model Combining DEMATEL with DANP and VIKOR Methods—An Example of Cloud CRM. In *Frontier Computing* (pp. 1033-1040). Springer Singapore.
- MacGregor, R.C. & Vrazalic, L., 2005. A basic model of electronic commerce adoption barriers: A study of regional small businesses in Sweden and Australia. *Journal of small business and enterprise development*, 12(4), pp.510-527.
- Mamaghani, F., 2009. Impact of e-commerce on travel and tourism: An historical analysis. *International Journal of Management*, 26(3), p.365-375.
- Mayer, N., Aubert, J., Grandry, E. & Feltus, C., 2016, November. An Integrated Conceptual Model for Information System Security Risk Management and Enterprise Architecture Management Based on TOGAF. In *IFIP Working Conference on The Practice of Enterprise Modeling* (pp. 353-361). Springer International Publishing.
- McKnight, D.H., Choudhury, V. & Kacmar, C., 2002. The impact of initial consumer trust on intentions to transact with a web site: a trust building model. *The Journal of Strategic Information Systems*, 11(3), pp.297-323.
- McNeil, A.J., Frey, R. & Embrechts, P., 2015. *Quantitative risk management: Concepts, techniques and tools*. Princeton university press.
- Miltgen, C.L., Popovič, A. & Oliveira, T., 2013. Determinants of end-user acceptance of biometrics: Integrating the "Big 3" of technology acceptance with

- privacy context. *Decision Support Systems*, 56, pp.103-114.
- Mohd, N. F., Banwet, D.K. & Shankar, R., 2007. Information risks management in supply chains: an assessment and mitigation framework. *Journal of Enterprise Information Management*, 20(6), pp.677-699.
- Murat, U & Bilgihan, Y., 2012. Innovative Green Technology in Turkey: Electric Vehicles' Future and Forecasting Market Share. *Procedia-Social and Behavioral Sciences*, 41, pp.139-146.
- Nepal, S. & Chotiyaputta, V., 2016. Operation Risk Management: A Case Study Of Baggage Logistic Technology At Munich Airport. *วารสารปัญญาภิวัตน์*, 8, pp.273-282.
- Netemeyer, R., Bearden, W. & Sharma, S. (2003) *Scaling procedures: issues and applications*. London, Sage Publications.
- Nor, A. H., Shamsuddin, A., Wahab, E., & Hamid, N. A., 2012, December. Preliminary qualitative findings on technology adoption of Malaysian SMEs. In *Humanities, Science and Engineering (CHUSER), 2012 IEEE Colloquium on* (pp. 15-20). IEEE.
- Nwakanma, I.C., Ubani, E.C., Asiegbu, B.C. and Nwokonkwo, O.C., 2014. Factors Affecting the Adoption of ICT in the Hospitality Industry in Imo State. *International Journal of Computer Science Issues (IJCSI)*, 11(4), p.170-181.
- O'Connor, P., 2007. Online consumer privacy An analysis of hotel company behavior. *Cornell Hotel and Restaurant Administration Quarterly*, 48(2), pp.183-200.
- Ou, L., 2016, May. The risk of corporate information disclosure based internet and three-dimensional regulation mode. In *Control and Decision Conference (CCDC), 2016 Chinese* (pp. 4491-4496). IEEE.
- Overbeek, S., Klievink, B., Hesketh, D., Heijmann, F. & Tan, Y.H., 2011. A Web-based data pipeline for compliance in international trade. *WITNESS 2011*, p.32.
- Palvia, P., 2009. The role of trust in e-commerce relational external Change: A unified model. *Information & Management* 46(4), 213-220.
- Paraskevas, A., Buahlis, D., 2003. Outsourcing IT for small hotels: the opportunities and challenges of using application service providers. *Cornell Hotel and Restaurant Administration Quarterly* 43 (2), 27-39.
- Peltier, T.R., 2016. *Information Security Policies, Procedures, and Standards: guidelines for effective information security management*. CRC Press.
- Pongsak, H & Sunil, S., 2007. ICT Adoption Propensity in the Hotel Industry: An Empirical Study. *International Marketing Conference on Marketing & Society*, 8-10 April, 2007, IIMK
- Qun, R., 2010. Market Share Competition in The Chinese Online Game Industry. Thesis submitted in partial fulfillment of the requirements of the Business School of Bournemouth University for the degree of Doctor of Philosophy.
- Raus, M., Barbara, F., and Roman, B., 2009. Electronic customs innovation: An improvement of governmental infrastructures. *Government Information Quarterly*, 26, 246-256.
- Roca, J.; Machado, D.; and Vega, L., 2010. Personal innovativeness, security and privacy as determinants of e-trading adoption. *International Journal of Electronic Finance* 4(3), 269-286.
- Rogers, E.M. 2003. *Diffusion of innovations* (5th ed.). New York: Free Press.
- Rosemary, M., Bola, A., and Wilhelmina, S., 2012. An Empirical Evidence on the Usage of Internet Marketing in the Hospitality Sector in an Emerging Economy and its Relationship to Profitability. *International Review of Social Sciences and Humanities*, 4(1), 181-197
- Sadgrove, K., 2016. *The complete guide to business risk management*. Routledge.
- Schwalbe, K., 2015. *Information technology project management*. Cengage Learning.
- Shoniregun, A., 2005. Impacts and Risk Assessment of Technology for Internet Security: Enabled Information Small Medium Enterprises. Springer, New York.
- Simmons, G., Armstrong, G. and Durkin, M., 2008. A Conceptualization of the Determinants of Small Business Website Adoption: Setting the Research Agenda. *International Small Business Journal*, 26(3), 351-89.
- Stanton, J.M., Stam, K.R., Mastrangelo, P., and Jolton, J., 2005. Analysis of end user security behaviors. *Computers and Security* 24(2), 124-133.

- Stoneburner, G., Goguen, A. and Feringa, A., 2002. Risk Management Guide for Information Technology Systems: Recommendations of the National Institute of Standards and Technology, retrieved November 25, 2009.
- Suhong, L., & Binshan, L., 2006. Accessing information sharing and information quality in supply chain management. *Decision Support Systems*, 42(3), 1641–1656.
- Tsai, H., Song, H., & Wong, K. K., 2009. Tourism and hotel competitiveness research. *Journal of travel & tourism marketing*, 26(5-6), 522-546.
- Tucker, S. 2008. E-Commerce Standard User Interface: An E-Menu System. *Journal of Industrial Management and Data Systems*, 108(8), 1009–1028
- Tuncel, G., & Alpan, G. 2010. Risk assessment and management for supply chain networks: A case study. *Computers in Industry*, 61(3), 250-259.
- Urciuoli, L.; Hintsa J.; and Ahokas J., 2013. Drivers and barriers affecting usage of e-Customs-A global survey with customs administrations using multivariate analysis techniques. *Government Information Quarterly* 30, 473–485.
- Veenstra, A., Klievink, B., and Janssen, M., 2008. Barriers and impediments to transformational government: Insights from literature and practice. *Electronic Government, An International Journal*, 8(2/3), 226–241
- Ward, J. and Peppard, J., 2016. *The Strategic Management of Information Systems: Building a Digital Strategy*. John Wiley & Sons.
- Webster, M., Beach, R. and Fouweather, I., 2006. E-Business Strategy Development: An FMCG Sector Case Study. *Supply Chain Management: An International Journal*, 11(4), 353–62.
- Westerman, G. and Hunter, R., 2007. *IT Risk: Turning Business Threats into Competitive Advantage*. Harvard Business School Press, Boston, MA, 2007.
- Whitman, M. and Mattord, H., 2008. *Principles of Information Security*. Third edition, Course Technology, Florence, KY.
- Wiengarten, F., Humphreys, P., Gimenez, C. and McIvor, R., 2016. Risk, risk management practices, and the success of supply chain integration. *International Journal of Production Economics*, 171, pp.361-370.