

Factors that affect the adoption of information technology in the hotel industry. An analysis in a developing country

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Abstract

This study investigates the factors affecting the adoption of information technology (IT) in the hotel industry, specifically in Morocco, a developing country. Our research model incorporates the following four constructs: organizational characteristics, individual characteristics, perceived benefits, and external factors. For this aim, a questionnaire was developed and sent to the general managers of hotels in Morocco to collect data and verify the research hypotheses. A sample size of 233 hotels and riads was used. The hypotheses were tested using a partial least squares approach. The results of the analysis reveal that external factors (i.e., competitive pressure, customer pressure, supplier pressure, and government support) have the strongest effects on the adoption of IT, the individual characteristics and the benefits that hotel managers perceive they will get from IT adoption are also important, while the organizational characteristics have no significant impact. The theoretical and managerial implications of these results are discussed.

Keywords: information technology; adoption factors; hotel industry; developing countries.

1 Introduction

Over two decades, information technology (IT) systems have changed the way businesses operate in the hotel industry (Buhalis & Leung, 2018; Garrigos-Simon, Galdon, & Sanz-Blas, 2017), allowing hotels to reach customers directly (Leung, Law, van Hoof, & Buhalis, 2013; Sotiriadis, 2017), enhance their competitiveness, and improve their organizational performance (Inversini & Masiero, 2014; Melián-González & Bulchand-Gidumal, 2016).

In fact, the term “IT” is used to describe a wide range of digital technologies that enable data to be accessed, transmitted, stored, and modified through networks. Internet, email, website, Wi-Fi, booking engines such as Booking.com, SMS for notification and promotions, hardware (i.e., computers and smartphones), software, such as enterprise resource planning (ERP), computer reservation systems (CRSs), global distribution systems (GDSs), customer relation management systems (CRMs), property management systems (PMSs), knowledge management systems (KMSs), mobile applications, as well as social media platforms (such as Facebook, Twitter, YouTube, Instagram, TripAdvisor and LinkedIn), are some examples of the IT tools that have been broadly implemented throughout the hotel industry (Buhalis & Leung, 2018; Bulchand-Gidumal, Melián-González, & López-Valcárcel, 2011; Law, Buhalis, & Cobanoglu, 2014; Sirirak, Islam, & Khang, 2011).

However, evidence suggests that the IT adoption process in the hotel industry is affected by several factors that can be grouped into internal (Jia, Guo, & Barnes, 2017; Tarhini, Masa’deh, Al-Badi, Almajali, & Alrabayaah, 2017; Wang, Gunasekaran, Ngai, & Papadopoulos, 2016) and external factors (Abou-Shouk, Lim, & Megicks, 2016; Lin, 2017). Additionally, the decision of hotel managers in terms of increasing IT investments depends on how they perceive the use of such technologies. In other words, the more positive their attitudes, the more likely they are to invest in IT (Leung, Lo, Fong, & Law, 2015; Ramayah, Ling, Taghizadeh, & Rahman, 2016).

Furthermore, the importance of the business environment in which firms operate has been highlighted as an important determinant of their practices. In fact, prior studies have revealed that the adoption of IT differs from developing countries (DCs) to the developed ones. The reason behind this difference could be related to several factors, such as social and economic trends, as well as laws and rules applied in each country (Perdomo-Pérez & Suárez-Ortega, 2017).

This paper seeks to investigate the factors that influence the adoption of IT in the hotel industry in the specific case of DCs. The paper focuses in particular on luxury riads (traditional Moroccan houses that have two floors around an Andalusian-style courtyard containing a fountain and plants), three-, four-, and five-star hotels, and palaces (a term used to describe some luxury hotels among five-star hotels) in Agadir and Marrakech, the two most visited destinations in Morocco.

The purpose and the contribution of the study are to construct a model that connects the factors of adoption to the intention of hotels’ general managers in embracing the use of IT in the hotel industry, specifically in DCs, where there is a significant gap in the literature regarding IT adoption factors. To our knowledge, the current research is one of the first studies on DCs offering an overall understanding of the factors that influence IT adoption and the only one in Morocco.

The present work provides insight to the hotels’ managers, regarding the individual and organizational characteristics determining IT adoption, as well as providing awareness regarding the potential benefits gained through the integration of IT. Moreover, being informed of external factors such as the competitiveness and customer pressure makes managers aware regarding the intensity of competitiveness and the trends of the market in which they operate, and could

motivate them to innovate by applying a competitive strategy using advanced IT in order to maintain their positions in the marketplace and better respond to customers' needs and expectations.

The study will also help managers identify some barriers against adoption such as insufficient financial resources. This, in turn, could encourage governments and policymakers to take action and provide solutions through national programs and policies by providing funds, training programs and incentives, increasing public spending on technology projects, and ensuring and improving the IT infrastructure to enable both hoteliers and costumers to take full advantage of the opportunities offered by IT. Additionally, the government role to build capacity through entrepreneurship initiatives will help hotels discover best practices, make their business innovative and become more competitive.

2 Overview of IT adoption in Morocco

In the northwest of Africa and bordering the Mediterranean Sea and the Atlantic Ocean, is located the Kingdom of Morocco. The country is known for its rich cultural heritage. It is called the country of four seasons, and is seen as representing the entire African continent with its forests, deserts, mountains, waterfalls and beaches. Its strategic location near Europe is especially important. Morocco has been characterized by its political and economic stability compared to its neighboring countries.

Moroccan economy depends mainly on exports, private investment and tourism. The latter contributes by 6.8% to the national GDP (Gross Domestic Product) and represents more than 2 million direct and indirect jobs (HCP, 2017).

Tourism in Morocco began in the 19th century, and the number of tourists has successfully increased from 250 000 in 1953 to 12.3 million in 2018. With "Vision 2020", the country aims to reach 20 millions of tourists by 2020, and position Morocco among the top twenty tourist destinations worldwide (ONMT, 2010).

On the other hand, the Networked Readiness Index, which measures the readiness of a country to make effective use of IT, scores Morocco in the 78th rank among 148 countries (WEF, 2015). Despite this low ranking in terms of IT use, Moroccan government is becoming more and more aware of the benefits gained from IT adoption in different sectors, such as tourism. We highlight the national program "Maroc Numeric 2013", which seeks to make IT as a vector of human development; make IT as a source of productivity and added value for economic sectors and public administration; make IT industry as a pillar of the economy, and position Morocco as a regional technology hub. We also mention the program "Maroc Digital 2020", which adds to the previous program the creation of the "Digital Development Agency" that aims to reduce the digital access gap in half, and better respond to enterprises' needs and expectations, such as performing tests before investing in a digital application and benefiting from a financial program of digital transformation. Thus, we believe that this could accelerate the process of IT adoption in Morocco and increase the level of use in tourism in general and the hotel industry in particular.

3 Literature review

3.1 Adoption of IT in the hotel industry

Nowadays, IT has been dramatically transforming the hotel industry, and can be considered the most powerful tool in conducting business, from marketing, supporting operations and

managerial decision making, improving communication between employees, increasing employees' efficiency, to reaching a competitive advantage (Melián-González & Bulchand-Gidumal, 2016; Neuhofer, Buhalis, & Ladkin, 2015).

In terms of the factors that influence the intention to use IT tools, Matikiti, Mpinganjira, and Roberts-Lombard (2018) classified them into internal factors, which can be represented by managerial support and managers' levels of education and technical knowledge, and external factors, which includes pressure from competitors, perceived benefits, and perceived ease of use. Similarly, Lin (2017) stated that the most critical factors for IT adoption are top management support and consumer needs. Styvén and Wallström (2017) suggested four barriers (financial risk, time constraints, external environment, and lack of IT expertise and strategy) and three benefits (internal efficiency, marketing and competition, and financial benefit) in the adoption of IT tools by Swedish tourism companies. Additionally, Sunny, Patrick, and Rob (2019) stated that the perceived long-term benefits of hotel technology, such as workload reduction and performance enhancement, can be considered as a positive impact on the increasing level of technology use.

In analyzing IT adoption in the hotel industry, it is worth mentioning the technology, organization, and environment (TOE) framework (Tornatzky & Fleischer, 1990) that identifies three categories (technological, organizational, and environmental context of an enterprise), which influence the process by which an enterprise adopts and implements IT. The technological context refers to technology-related factors that influence the adoption of innovative IT. The organizational context refers to firm's profile characteristics, resources, internal social network on its IT adoption behavior, firm size and scope, formal and informal linking structures, internal communication, peer influence, organizational culture, and the quality of human resources. Finally, environmental resources refer to many external factors, such as government policies, competitors, and trading partners.

3.1.1 Comparison of IT adoption between developing and developed countries

Businesses in DCs have been argued to face unique challenges from those in developed countries and, thus, differ in the ways they adopt and benefit from technology. For instance, Zaied (2012) revealed that the lack of technological infrastructure such as slow telecommunication and Internet negatively influences the adoption of IT in DCs. Al-Weshah and Al-Zubi (2012) stated that the lack of skills is one of the most important barriers of IT adoption. Ahmad, Abu Bakar, Faziharudean, and Mohamad Zaki (2015) and Adebajo, Teh, and Ahmed (2016) showed that unawareness of potential benefits hinders the process of IT adoption in DCs. Similarly, the lack of financial resources, have also been considered as a major cause in businesses' hesitation to adopt IT in the hotel industry in DCs (Adebajo et al., 2016).

Evidence suggested that external factors such as competitive pressure (Krizaj, Brodnik, & Bukovec, 2014) and customer pressure (Lin, 2017) are key factors to adopt IT in DCs. Socio-cultural factors also influence the process of adoption of IT. In fact, each country is characterized by its own culture and values, and business internationalization to DCs encounters several risks due to institutions differences between the origin and the host country (Perdomo-Pérez & Suárez-Ortega, 2017). Thus, this difference impacts on how IT is adopted (El-Gohary, 2012; Ongori & Migiro, 2010; Sunny et al., 2019).

In the case of Morocco, the main challenges encountered by foreign lodgings operating in the country are lack of expertise in planning or managing tourism at the national level, inefficient public administration and lack of tourism promotion (Perdomo-Pérez & Suárez-Ortega, 2017).

Particularly, foreign managers clearly perceive more challenges than Moroccan ones. These challenges are related to the educational system, lack of suppliers and sometimes unqualified ones, as well as cultural and religious challenges.

Furthermore, the perception of potential benefits and barriers may depend on type and size of establishments (Perdomo-Pérez & Suárez-Ortega, 2017). In some cities in Morocco such as Marrakech, the number of riads exceeds the number of hotels, which could lead to the difference of challenges. In this case, foreign managers highlighted problems of corruption, discriminatory taxes and unfair competition, specifically from illegal guest houses (Perdomo-Pérez & Suárez-Ortega, 2017), while Moroccan managers of riads stressed specifically the lack of funds to support the development of their business.

3.1.2 IT adoption intention

According to many scholars, integrating a variety of IT inside the hotel has resulted in decreased costs, increased revenues, greater productivity, and improved service quality and guest satisfaction (Buhalis & Leung, 2018; Hua, Morosan, & DeFranco, 2015; Melián-González & Bulchand-Gidumal, 2016).

However, the decision of hotel managers in terms of increasing IT investments depends on how they perceive the use of such technologies. In other words, the more positive their attitudes, the more likely they are to invest in IT (Ramayah et al., 2016). In light of the above and of what has been stated in previous sections, three items will be tested to verify hotel managers' intentions to adopt IT: the positive attitude toward the hotel's adoption of IT (ADOPT1), the intention to increase the use of IT in the hotel (ADOPT2), and the intention to increase the hotel's IT investments (ADOPT3).

3.2 Development of hypotheses

3.2.1 Organizational characteristics

The organizational characteristics refer to the characteristics and resources of the firm that might influence the adoption of IT (Jia et al., 2017). Hotels' characteristics such as size and star rating are among the major determinants in adopting IT for business practices (Jia et al., 2017; Wang et al., 2016), in addition to organizational readiness in terms of financial resources (Law et al., 2014; Leung & Law, 2013). In other words, hotels with more sufficient financial resources are more likely to adopt IT (El-Gohary, 2012). Therefore, organizational characteristics are key factors toward the adoption of IT. In view of this, we propose the following hypothesis:

Hypothesis 1. Organizational characteristics influence the adoption of IT in the hotel industry.

To test hypothesis 1, the following two dimensions will be used according to the previous literature review: hotel characteristics and financial resources.

Hotel characteristics. Generally, small tourism firms have been less likely to implement IT tools than their larger counterparts. For instance, Escobar-Rodríguez and Carvajal-Trujillo (2013) observed that Spanish larger hotel chains showed a greater presence on social media platforms.

Wang et al. (2016) indicated that a firm's size (i.e., number of employees) is positively related to mobile hotel reservation systems.

On the other hand, existing theories have suggested that firms that handle large amounts of information are most likely to adopt more IT solutions to improve their efficiency, effectiveness, and competitiveness (Mndzebele, 2013). Additionally, Jia et al. (2017) state that firm scope (the degree of geographical dispersion of a firm's business activities) is another organizational characteristic that affects the adoption of IT. In light of the above, three items are proposed to measure hotel characteristics and structure effects: hotel's size (OHCHR1), hotel's information intensity (OHCHR2), and hotel's scope (OHCHR3).

Financial resources. Several results have found that the availability of financial resources enhances the adoption of IT within firms. Leung and Law (2013) demonstrated that the lower the cost of adoption, the more likely the new innovation will be adopted by hotels and vice versa. Okumus, Bilgihan, Ozturk, and Zhao (2017) demonstrated that cost and return on investment are considered as barriers against IT implementation in hotel companies. On that basis, the following items are proposed to determine the effect of financial resources on the accuracy of hypothesis 1: hotel's financial resources (OFINC1), cost of IT implementation (OFINC2), and return on investment (OFINC3).

3.2.2 Individual characteristics of the hotel's general manager

Researchers have pointed out that the general manager's support plays a key role in influencing the adoption of innovative activities in the organizations (Tarhini et al., 2017), as it can be considered as a source of encouragement and motivation for employees. Particularly, individual characteristics of managers are considered to be a determinant factor of IT adoption (Rahayu & Day, 2015). Thus, the positive attitude toward IT can heavily influence the manager's decision to implement IT within a firm (Ozturk & Hancer, 2014; Tarhini et al., 2017). In that regard, the following hypothesis is proposed.

Hypothesis 2. The individual characteristics of the hotel's general manager influence the adoption of IT in the hotel industry.

Evidence suggested that the general manager's characteristics, such as IT skills and openness toward change, are relevant in the development of all types of innovation (Jones, Simmons, Packham, Beynon-Davies, & Pickernell, 2014). Ramayah et al. (2016) stated that the deeper the CEO's IT knowledge and innovativeness, the greater the likelihood of website technology continuance. Rahayu and Day (2015) demonstrated that a manager's innovativeness, play a key role in adopting technology. Therefore, to see the effect on hypothesis 2, the following items are proposed: innovativeness of the hotel's general manager (IMCHR1), IT skills of the hotel's general manager (IMCHR2), and openness toward change of the hotel's general manager (IMCHR3).

3.2.3 Perceived benefits

Empirical studies have found that perceived benefits have a significant impact on IT adoption. In fact, considering the benefits induced by IT adoption, most tourism firms, regardless of their size, have adopted and used IT tools in their businesses (Krizaj et al., 2014).

Abou-Shouk et al. (2016) highlighted three types of perceived benefits that lead the actual level of technology adoption: marketing and competition benefits, business efficiency benefits, and essential benefits that support strategy and development. Leung et al. (2015) stated that the willingness to adopt IT in hotels is affected by both perceived direct and indirect benefits. Therefore, benefits that hotels' managers perceive are relevant to the decision to adopt IT. In that context, this study proposes the following hypothesis:

Hypothesis 3. There is a positive relationship between the perceived benefits of use and the intention to adopt IT in the hotel industry.

In order to test hypothesis 3, three perceived benefits will be used according to the previous literature review: marketing benefits, managerial benefits, and competitive advantage.

Marketing benefits. In the hotel industry, IT is considered to be one of the most powerful promotional tools. For example, in focusing on commonly mentioned advantages of social media adoption, hoteliers stressed that these tools help them to better approach their customers. As a result, they can improve their image and provide a touch of modernity (Garrido-Moreno, Lockett, & Garcia-Morales, 2015).

Specifically in DCs, Rahayu and Day (2017) stated that the top six IT benefits perceived by Indonesian enterprises are marketing and purchasing procurement activities, extending market reach, increasing sales, improving external communication, improving company image, improving speed of processing, and increasing employee productivity. In light of the above, three items are proposed to measure marketing benefits: promote hotels' product and service, (PMARK1), reach customers directly, (PMARK2), and improve customer satisfaction, (PMARK3).

Managerial benefits. Management benefits and their influences on IT adoption have been included in prior studies. For example, Melián-González and Bulchand-Gidumal (2016) designed a model that connects IT and hotel performance through it, illustrated how IT can improve employee productivity by reducing personal costs (e.g., online check-in) and making service interactions more available.

Specifically for the case of DCs, studies have examined the need for large firms to integrate their IT systems with their knowledge management strategies (Tarhini, Arachchilage, & Abbasi, 2015) to improve communication with employees and stakeholders, and support daily operations and managerial decision making. This is supported by Buhalis and Leung's (2018) study, revealing that internal data from IT applications among all stakeholders, consolidated with external environment context, form the hospitality big data on the cloud that enables managers to use business intelligence analysis to generate scenarios (e.g. yield management) that enhance revenue management performance. Their proposed model enables integrated applications, using big data to enhance hospitality decision making as well as strengthen competitiveness and improve strategies performance. In light of the above and of what has been stated in previous sections, the following items are proposed to determine the effect of management benefits on the accuracy of hypothesis 3: increase employees' performances (PMANAG1), improve communication and interactions with employees (PMANAG2), and support managerial decision making (PMANAG3).

Competitive advantages. Researchers have considered IT as an enabler to achieve the desired competitive advantages and as an important support for operational and strategic business decisions (Vratskikh, Al-Lozi, & Maqableh, 2016). In fact, ITs help hotels staying connected with their existing and potential customers, maintaining price leadership in the market and differentiating their products and services (Bertan, Bayram, Ozturk, & Benzergil, 2016). In light of the above, three items are proposed to measure competitive advantage: maintain price leadership in the market (PCA1), differentiate a hotel's products and services (PCA2), and enhance revenue generation (PCA3).

3.2.4 External factors affecting the adoption of IT in the hotel industry

In general, firms are forced to adopt some specific IT tools due to pressure exerted by various external forces. Based on the TOE, Jia et al. (2017) have shown that environmental context factors, including competitive pressure, significantly influence enterprises' intentions to use IT tools. El-Gohary (2012) adds that market trends play an important role in the use of IT tools. This is supported by Abou-Shouk et al. (2016)'s work, which showed a positive relationship between perceived environmental pressures and the perceived benefits of IT adoption by Egyptian travel agents. Thus, external factors are major determinants that oblige hoteliers to adopt innovate solution in their business in order to stay competitive in the marketplace (Sainaghi, Phillips, & Zavarrone, 2017). In that context, the following hypothesis is proposed.

Hypothesis 4. There is a positive relationship between external factors and the adoption of IT in the hotel industry.

In order to test hypothesis 4, four external factors will be used, according to the previous literature review, namely: intensity of competitiveness, customer pressure, suppliers' pressure, and government support.

Intensity of competitiveness. It has been argued that the competitive pressure affects the degree to which an organization will adopt IT in doing business (Jia et al., 2017). Tarhini et al. (2017) revealed that there is a significant impact of competitive pressure on behavioral intention to use IT services. Thus, hotels operating in a highly competitive market must continue to innovate by applying a competitive strategy using advanced technology in order to maintain their positions in the market and being different from competitors (Sitawati, Winata, & Mia, 2015).

In the case of Morocco, the country has always held a certain attraction for entrepreneurs to set up their own hotels, which has played a key role in the social and economic development of Morocco, as well as the increase of competitiveness in the hotel industry. Due to the widespread use of technology, IT solutions have become a real need for Moroccan hotels (Mohammed, Rashid, & Tahir, 2014; Perdomo-Pérez & Suárez-Ortega, 2017). In light of the above and of what has been stated in the previous section and to see the effect on hypothesis 4, measured via intensity of competitiveness, three items are proposed: intensity of competitiveness (ECOMP1), stay ahead of the hotel's competitors (ECOMP2), and the hotel's need to differentiate itself from its competitors (ECOMP 3).

Customer pressure. Many authors have stated that the tourism industry is influenced by increasing advances in new technologies and the tourists' constantly changing needs (Ho, Lin, & Chen, 2012; Jordan, Norman, & Vogt, 2013; Law et al., 2014). In fact, consumers increasingly

rely on technology in planning their trips and expect hotels to offer the technologies they enjoy at home (Jung, Na, & Yoon, 2013). Thus, customers are considered as driving forces of IT adoption (Mahrous, 2016). In light of the above, three items are proposed to measure customer pressure: pressure from customers (ECPRES1), the travelers' behaviors change (i.e., relying more and more on IT for arranging their personalized trips) (ECPRES2), and the experience of travelers in IT (ECPRES3).

Suppliers pressure. Supplier dependence is another important factor affecting the adoption of technology by firms. Jones et al. (2014) showed that supplier dependence influences a firm's external diffusion of technology. Some authors join the TOE framework with the institutional theory, since the institutional theory adds to the environmental context of the TOE framework external pressures from trading suppliers and competitors (Jones et al., 2014; Oliveira & Martins, 2011).

Furthermore, Zhang & Dhaliwal (2009) stated that large firms put pressure on suppliers to adopt technologies for supply chain management. On that basis, we propose the following items, to determine their effect on hypothesis 4: pressure from suppliers (ESUP1), suppliers' use of IT when conducting business (ESUP2), and the supplier dependence, the more likely the adoption of IT (ESUP3).

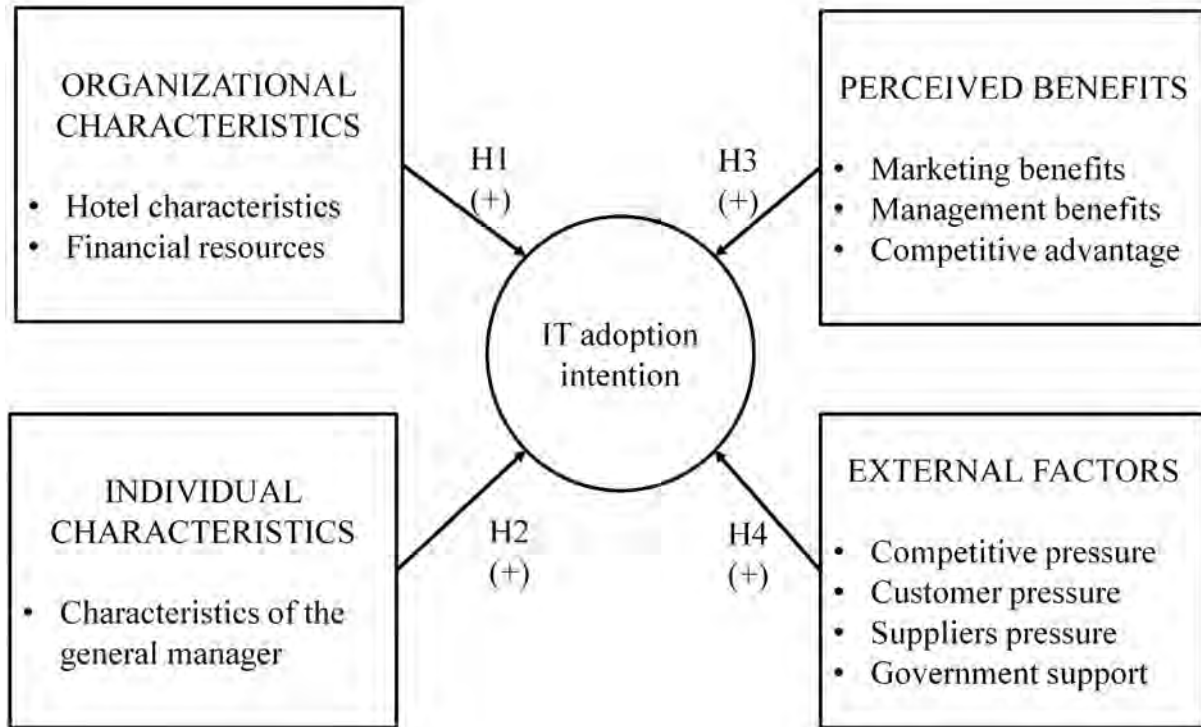
Government support. Several studies have suggested that contributions from the government play an important role in the adoption and implementation of IT in the tourism and hotel industry. For instance, Doh and Kim (2014) suggested that financial support from the government is meaningful for enterprises' innovations. Alam and Noor (2009) revealed that all types of financial support to Malaysian enterprises for IT adoption have been provided by government. Makame, Kang, and Park (2014) demonstrated that technology infrastructure is an important factor in IT adoption in Tanzania and national policy initiatives are valuable for building online trust and improving the technology infrastructure.

Additionally, Vrgovic, Vidicki, Glassman, and Walton (2012) revealed that, in DCs, a government agency using innovation hubs, could help enterprises to connect, communicate and collaborate with independent inventors and other parties to start all types of innovation practices. On that basis, the following three items are proposed to determine the effect of government support on the context of hypothesis 4: government' financial support (EGOV1), national programs and IT policies created by government (EGOV2), and government's assurance of the availability of IT infrastructure (EGOV3).

3.2.5 Hypothesized model

Based on what has been shown up to this step, we show our hypothesized model in Figure 1.

Figure 1. Factors affecting the adoption of IT in the hotel industry in DCs



4 Methodology

4.1 Research context

In general, the World Bank's human development index, measures life expectancy, educational attainment, and adjusted real income (\$ per person) to classify economies into less developed countries, DCs, countries in transition, and developed countries. In this classification, Morocco is considered a DC. In our study, we aim to analyze the importance of organizational characteristics, the individual characteristics of the hotel manager, the perceived benefits, and the external factors in the adoption of IT in the hotel industry of DCs.

4.2 Data collection procedure

In this study, we explore factors of IT adoption in the hotel industry, specifically in the case of a DC. To this aim, a research questionnaire was developed to collect responses. A self-administered questionnaire was delivered and later collected in person. This was done because face-to-face communication helps to enhance the response rate. Because of the limitation of access to all hotels' employees, questionnaires were addressed only to the attention of hotels' general manager in the cities of Agadir and Marrakech. They were written in French because it is

the second-most common language in Morocco. The questionnaires were delivered by the research assistants, who are students at École Nationale de Commerce et de Gestion de Marrakech et Agadir, and one of the authors of this study.

Data were collected from October 2015 to March 2016. 550 questionnaires were sent out. For this aim, we selected all three-, four-, and five-star hotels and palaces available in Agadir (65 hotels) and Marrakech (160 hotels); three luxury riads in Agadir (the only riads that the city has); and 322 luxury riads in Marrakech (out of a total of 883 riads) that have already adopted IT that could be ascertained externally (i.e., website, booking engines, TripAdvisor, Facebook, Twitter, Instagram). The reason behind this choice is that we had already conducted previous interviews with managers of one-star and two-star hotels and riads in Morocco and had found that their level of IT usage was extremely low, as well as their consideration for incorporating IT in their businesses in the near future.

We received a total of 285 responses, of which 52 were discarded for various reasons (e.g., responses missing in the questionnaire, respondents were not the intended informant). Thus, the final sample size contained 233 valid responses, a response rate of 42.36%.

Additionally, a pre-test was conducted in order to evaluate the constructs and other questions outcomes. This pre-test was done with 62 hotels in Agadir and Marrakech over a period of one month.

Due to the results of the pre-test, there were some changes made to the first version of questionnaire, mainly regarding the initial explanation, the way in which certain items were written, and the possible answer to the questions in Parts II and III of the questionnaire. We also got negative loadings for two of the variables: cost of IT implementation (OFINC2) and return on investment (OFINC3). Thus, in order to make reading of results easier, the two variables were inverted. Furthermore, we removed some questions that inquired about occupancy rates and ADR (Average Daily Rates) in the hotels since the feedback we got was that including these questions would significantly lower the response rate.

4.3 Description of the sample

Most responses refer to four-star hotels (40.77%). Among the respondents, 81.97% were male, and 18.02% were female. The majority of the respondents are between 41 and 50 years (32.62%), and 26.18% have between one and five years of experience as hotels' general manager. 44.64% of the respondents had a bachelor's degree, while 42.06% had a master's degree. 46.35% of hotels had a permanent IT manager while 39.05% rely on an external provider (see Appendix I).

In terms of technologies used, the majority of hotels (67.78%) used emails, 47.13% had websites, and 69.75% used booking engines (e.g., Booking.com), while 41.81% have had some type of integrated information systems (PMS) for over 10 years. Additionally, 91.09% of the hotels have Wi-Fi, 91.88% used Facebook and 89.98% used TripAdvisor. Mobile applications were in use in 56.96% of the hotels (see Appendix II).

4.4 Data analysis

We considered the structural equation model (SEM) with partial least squares (PLS) method and PLS-Graph Software Version 3.2.8., to test the hypotheses and analyze the measurement and structural model.

Several researchers (Hair, Hollingsworth, Randolph, & Chong, 2017; Rigdon, 2014), state that the main reason for using PLS is its value as an exploratory form of analysis as a confirmatory multivariate technique that includes measurement errors and the relationships between latent variables (LVs) and observed ones.

There are two sub-models in a SEM, the inner model specifies the relationships between the independent and dependent latent variables, whereas the outer model specifies the relationships between the latent variables and their observed indicators (Wong, 2013).

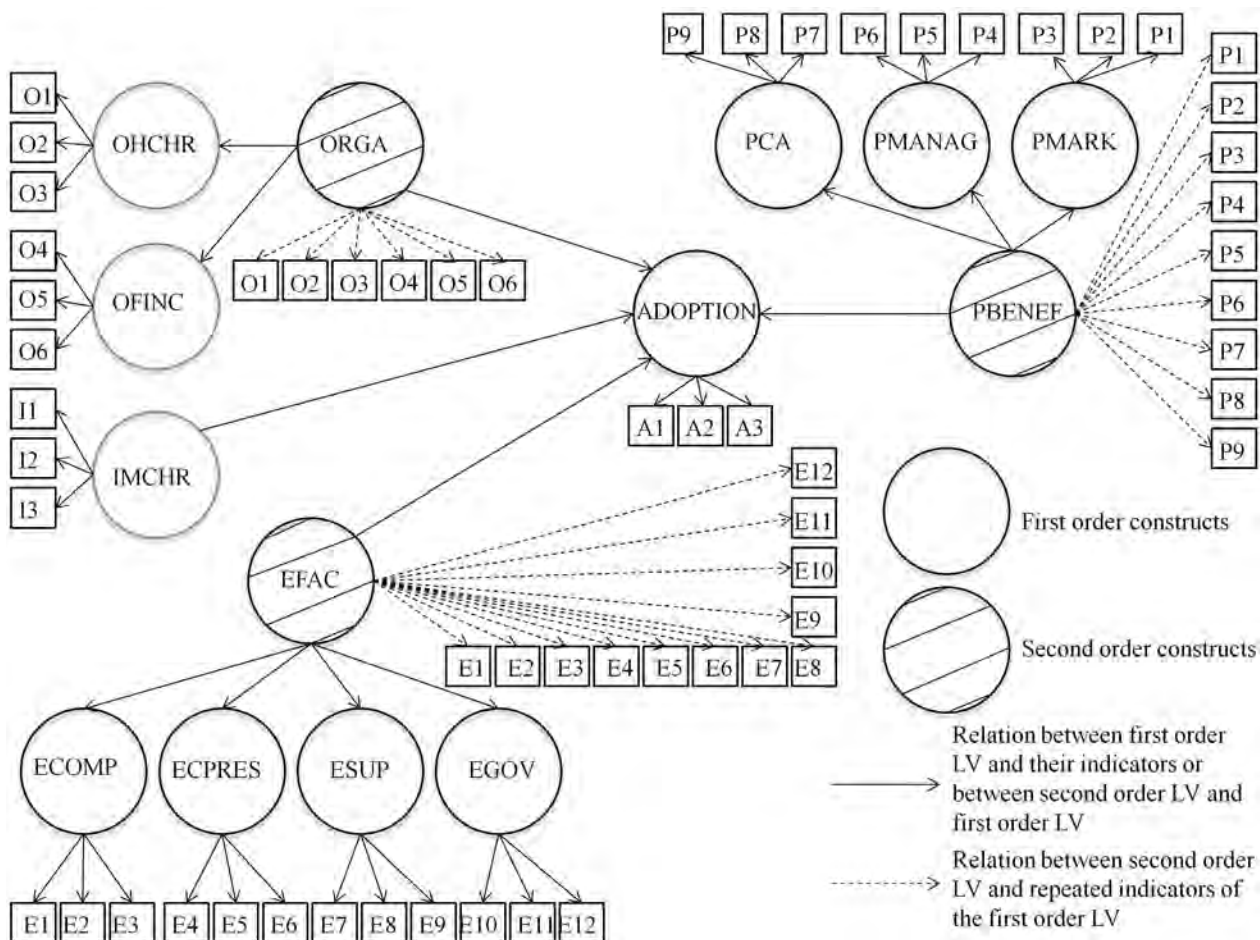
The PLS approach permits the simultaneous testing of hypotheses, allowing measures with single and multiple items as well as the use of reflective and formative indicators (Fornell & Bookstein, 1982). In the case of our model, reflective measurement scales are used, since all indicators of a construct are interchangeable.

To determine the minimum sample size for a proper PLS-SEM analysis, the “10-times rule” remains the most common and the favorite formula used due to its simplicity of application: 10 times the largest number of indicators used to measure a construct within the model (Hair, Hult, Ringle, & Sarstedt, 2017). Thus, the minimum sample size for the model assessment would be 120, since the construct EFAC is the one with the largest number of indicators, 12 (see Figure 2). Therefore, a sample size of 233 hotels is considered appropriate.

All constructs, dimensions and items derived from previous literature and were modified to suit the purpose of this study. For the questionnaire, the operationalization of variables (i.e., constructs, dimensions, measurement and references) is shown in Appendix IV. All items in the questionnaire are based on a five-point Likert-scale ranging from strongly disagree (1) to strongly agree (5), a total of 33 questions to test the constructs. The questionnaire also included a second part which enquires about general information of hotels and/or riads (name, category, who takes care of their computer system, etc.), as well as a third part, which represents general information of hotel’s general managers (gender, age, years of experience, education level) (42 questions for the three parts).

Following the methodology of Wetzels, Gaby, and Claudia (2009), our model is hierarchical and was constructed in the following order (see Figure 2): We constructed 11 first-order LVs and related them reflectively with their indicators (three for each one). The three second-order constructs were constructed by relating each of them with the corresponding first-order LVs and with their indicators. The three second order-constructs and the first-order construct IMCHR are related to the structural model with the first-order construct ADOPTION (three reflective indicators), the dependent LV.

Figure 2. PLS-SEM model



5 Results

5.1 Assessment of the measurement model

We first evaluated the convergent validity by examining indicator loadings, composite reliability (CR), and average variance extracted (AVE) (Hair, Matthews, Matthews, & Sarstedt, 2017). By checking Table 1, it can be seen that all of the indicators have indicator reliability values that are much larger than the minimum acceptable level of 0.4 and close to the preferred level of 0.7 for an exploratory research. All values of composite reliability are shown to be larger than 0.6, so high levels of internal consistency reliability have been demonstrated among all reflective latent variables. All of the AVE values are greater than the acceptable threshold of 0.5 (Bagozzi & Yi, 1988). Thus, the convergent validity is confirmed. The same conclusion can be stated for CRs and AVEs of the second order constructs (see Appendix V). Table 1 shows that all dimensions had Cronbach's alpha values above 0.6 (Fornell & Larcker, 1981), showing that all dimensions in this model exhibited internal consistency.

Table 1. Results summary for reflective outer models

Latent Variable	Indicators	Loadings	Cronbach's Alpha	Composite reliability	AVE
Hotel's characteristics (OHCHR)	OHCHR1	0.876	0.811	0.888	0.727
	OHCHR2	0.894			
	OHCHR3	0.785			
Financial resources (OFINC)	OFINC1	0.801	0.642	0.803	0.578
	OFINC2	0.798			
	OFINC3	0.675			
Characteristics of general manager (IMCHR)	IMCHR1	0.812	0.771	0.868	0.687
	IMCHR2	0.881			
	IMCHR3	0.793			
Marketing benefits (PMARK)	PMARK1	0.831	0.730	0.848	0.652
	PMARK2	0.852			
	PMARK3	0.734			
Management benefits (PMANAG)	PMANAG1	0.846	0.807	0.886	0.721
	PMANAG2	0.877			
	PMANAG3	0.825			
Competitive advantage (PCA)	PCA1	0.787	0.762	0.863	0.678
	PCA2	0.860			
	PCA3	0.821			
Competitive pressure (ECOMP)	ECOMP1	0.827	0.681	0.825	0.611
	ECOMP2	0.755			
	ECOMP3	0.761			
Customer pressure (ECPRES)	ECPRES1	0.780	0.778	0.871	0.694
	ECPRES2	0.853			
	ECPRES3	0.863			
Business suppliers pressure (ESUP)	ESUP1	0.835	0.770	0.867	0.684
	ESUP2	0.822			
	ESUP3	0.825			
Government support (EGOV)	EGOV1	0.890	0.882	0.927	0.809
	EGOV2	0.909			
	EGOV3	0.899			
IT adoption intention (ADOPTION)	ADOPT1	0.851	0.768	0.865	0.683
	ADOPT2	0.889			
	ADOPT3	0.732			

The discriminant validity was tested by examining the correlation between measures of overlapping constructs (Fornell & Larcker, 1981).

Table 2. The AVEs and the correlations between the first order constructs

	1	2	3	4	5	6	7	8	9	10	11
1.Characteristics of general manager	0.829										
2.Financial resources	0.523	0.760									
3.Hotel characteristics	0.718	0.517	0.853								
4.Competitive advantage	0.469	0.411	0.476	0.823							
5.Management benefits	0.500	0.470	0.515	0.638	0.849						
6.Marketing benefits	0.515	0.362	0.468	0.573	0.604	0.807					
7.Competitive pressure	0.339	0.449	0.424	0.593	0.553	0.482	0.782				
8.Customer pressure	0.298	0.316	0.367	0.538	0.400	0.441	0.597	0.833			
9.Government support	0.227	0.403	0.300	0.272	0.256	0.199	0.257	0.263	0.899		
10.Suppliers pressure	0.281	0.366	0.333	0.502	0.432	0.399	0.530	0.558	0.425	0.827	
11.IT adoption intention	0.442	0.363	0.427	0.462	0.426	0.423	0.384	0.408	0.351	0.473	0.826

Table 2 reveals that the square root of AVE of each latent variable (written in bold on the diagonal) is larger than the correlation values encompassed in the row and column of such variable. Thus, the discriminant validity is well established.

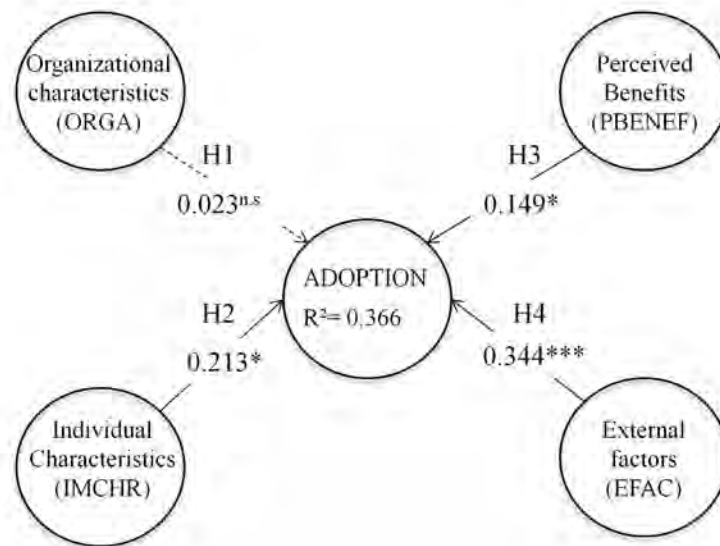
5.2 Assessment of the structural model and of hypotheses

We checked the structural path significance with bootstrapping (subsamples = 5000). Using a two-tailed t-test with a significance level of 5%, the path coefficient will be significant if the t-statistics is larger than 1.96. In our case, all of the t-Statistics are larger than 1.96 (detailed descriptive statistics of each variable can be found in Appendix III, which contains means, standard deviations, t-values and p-values), so we can state that all path coefficients in the inner model are statistically significant. This confirms our earlier findings.

Predictive relevance technique, known as the Stone-Geisser's (Q²) values (cross-validated redundancy measures) can be used to assess the research model's capability to predict (Q² values of 0.02, 0.15 and 0.35 indicate an exogenous construct has a small, medium and large predictive relevance for an endogenous latent variable respectively) (Hair, Matthews, et al., 2017). In our case, Q² = 0.226, which confirm that the measurement model is adequate and that the structural model has a medium to large predictive relevance for the adoption of IT.

As shown in Figure 3, the coefficient of determination, R², is 0.366 for the ADOPTION endogenous LV. This means that 36.6% of the variance of ADOPTION is explained by the four LVs (ORGA, IMCHR, PBENEF and EFAC).

Figure 3. Estimated causal relationships in the structural model



Note: dotted lines refers to non-significant (n.s.) paths; *p<.05 ; ***p<.001

Based on Figure 3, hypothesis H2, which predicted a positive relationship between individual characteristics and the adoption of IT in the hotel industry was verified (the path standardized coefficient $\beta = 0.213$), at the level of $p < .05$. The same happens with hypothesis H3, which established that there was a positive relationship between the perceived benefits of use and the mentioned adoption ($\beta = 0.149$, $p < .05$), and hypothesis H4, which predicted a positive relationship between external factors and the adoption of IT ($\beta = 0.344$, $p < .001$). However, Hypothesis H1, which predicted a positive relationship between the organizational characteristics and adoption of IT, is not significant ($\beta = 0.023$, n.s.).

Therefore, as proposed in hypothesis H2, individual factors which are represented by the first order construct the characteristics of hotels' general managers (innovativeness, IT skills, and openness toward change) have a significant contribution in the process of adoption of IT by hotels' managers.

Similarly, as proposed in hypothesis H3, hotel's general managers perceive a series of benefits that motivate them to adopt IT. Those benefits are classified into three types: marketing

benefits, management benefits and competitive advantage. All three of them have a significant contribution in the process of building the second order construct.

Also, the four proposed types of external factors (competitive pressure, customers' pressure, suppliers' pressure, and government support) have a significant contribution in the process of building the second order construct.

Finally, the non-significance of the hypothesis H1 permits to conclude that organizational characteristics do not constitute a factor that affects the adoption of IT by hotel's managers.

6 Conclusions and implications

The purpose of the current study was to investigate the factors influencing the adoption of IT in the hotel industry, specifically in the case of a developing country, Morocco. We tested the influence of four groups of factors: organizational characteristics, individual characteristics, perceived benefits, and external factors, using a sample of 233 hotel's general managers in Agadir and Marrakech.

The major conclusion of this study is that the greatest factors affecting the adoption of IT are external factors. This result corroborates with the findings of Jia et al. (2017), who demonstrated that environmental context factors, including competitive pressure, significantly influence enterprises' intentions to use IT services, as well as with those of Abou-Shouk et al. (2016), who revealed a positive relationship between perceived environmental pressures and the perceived benefits of IT adoption by Egyptian travel agents.

In addition to this, this study found that the individual characteristics of hotel's general managers also impact the adoption of IT, a result that aligns with Rahayu and Day (2015)'s study, which showed that hotelier's individual factors, such as innovativeness, IT experience, and IT ability, play a significant role in adopting technology.

Another important conclusion is that organizational characteristics have no significant impact on the adoption of IT. This result contradicts those of Wang et al. (2016) and Jia et al. (2017)'s indicating that organizational characteristics such as firm's size and scope are positively related to IT adoption. However, this result coincides with those of Rahayu and Day (2017). We believe this may be dependent on the context in which this study was done. Moroccan hotels are still at a low to middle level in the adoption of IT, thus not requiring significant financial resources, which they would need if they were using sophisticated IT tools.

The results also revealed that perceived benefits affect the process of IT adoption. This concurs with Leung et al. (2015)'s findings, which proved that the willingness to adopt IT in hotels is affected by both perceived direct and perceived indirect benefits. Furthermore, in this study, perceived benefits occur as a third factor affecting IT adoption. This could be explained that in the context of a DC, the lack of awareness of potential benefits slowed the IT adoption process.

6.1 Theoretical implications

In terms of theoretical implications, this study provides a measurement model that may be useful for academics and researchers conducting further research into IT adoption in the hotel industry, specifically in the case of DCs, where few studies have been conducted, and the majority were focused on factors affecting e-commerce adoption.

Although some previous researches investigated the IT adoption in DCs, the majority studied only the barriers, and in most cases the respondents were employees in general. The current study

thus provides further understanding of the relationships among all the factors that affect the process of adoption of the above-mentioned IT, from hotel managers' perspective given its important role in decision making.

The study reflects the perceptions of IT in Morocco in particular, where no study has been conducted on IT adoption factors in the hotel industry to date. Additionally, researchers could use this study in other DC to compare and verify if there are differences from one country to another. The measurement model of this study could also be used to investigate other disciplines of IT adoption and different categories of enterprises.

6.2 Managerial implications

As stated, the findings reveal that the greatest factors affecting the IT adoption in the hotel industry are external factors. Thus, this study suggests that hotel managers should take all the above varieties of external factors into consideration and try to apply novel strategies to cope with the current environment of high competitiveness and maintain their positions in the market (Sitawati et al., 2015). Managers should also consider the fact that travelers' behaviors are changing; a number of them rely on IT to arrange personalized trips, and the most experienced travelers require the use of IT devices before, during, and after their stays, and expect hotels to offer the technologies they enjoy at home. Thus, by adopting IT or by increasing the actual level of use, hotels can enhance their guest satisfaction and loyalty, make the differentiation from their competitors, and achieve a competitive advantage (Bertan et al., 2016; Buhalis & Leung, 2018). In the same sense, IT adoption can help hotels cope with competitive and suppliers pressure.

This study showed that the individual characteristics of hotel's general managers also impact the adoption of IT. Thus, hotels with managers that are innovative and have positive attitude toward IT are more likely to adopt IT (Ramayah et al., 2016). Additionally, considering the major role that the hotel's general managers play in decision-making process, their positive attitude is fundamental. Hence, the greater the positive attitude of the general manager, the more likely the adoption of IT. This is a result that should be taken into consideration by hotel owners when selecting the manager and when designing training processes for current managers.

The results of this study revealed that perceived benefits affect the process of IT adoption. Despite the slow adoption of IT in Moroccan hotels, managers are becoming more and more aware about the potential advantages they will gain by adopting such novel practices. However, suppliers of IT solutions should make IT tools more suitable for use by hoteliers so that their expectations are met.

Furthermore, recognizing the factors that affect IT adoption could encourage governments and policymakers to take action (Abou-Shouk et al., 2016). For example, government should promote IT awareness and its benefits for the hotel industry through national programs. Provide assistance and introduce effective training programs for hoteliers. They should also organize fairs and international congresses to exchange market knowledge and take advantage from the most innovative techniques used in the sector. Government can enhance hoteliers' motivation toward the adoption of IT through awards and certifications underlining the efficiency and core competency of the hotels.

Government intervention is largely important in setting up of national IT policy and enforcement of service standards and regulation. On the other hand, we suggest establishing open innovation centers in universities, in addition to extending entrepreneurship initiatives that could be used to help hotels discover best practices and become more competitive in the sector.

7 Limitations and implications for future research

This study has some limitations. Firstly, regarding the sample size, the focus on Marrakech and Agadir restricted the data collection, thus impacting the results of the study. Secondly, the findings might be different in contexts other than three-, four-, and five-star hotels and riads.

In this sense, future research should enlarge the sample size by adding other cities in Morocco and/or in other DCs. Additionally, other hotel types could be included. Also, barriers restraining and delaying the adoption of IT, such as security and privacy issues could be another interesting area for future research.

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