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Faculty of Tourism and Hotels

The Role of Advanced Information Technologies
in Decision-making: Applying on a Sample of
Egyptian Hotels

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RESEARCH JOURNAL OF THE FACULTY OF TOURISM AND HOTELS
MANSOURA UNIVERSITY
ISSUE NO. 11 (PART 2), JUNE. 2022

دور تكنولوجيا المعلومات المتقدمة فى صناعة القرار: بالتطبيق على عينة من الفنادق المصرية

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ملخص:

فى الوقت الحاضر، يؤدى التطور السريع فى مجال تكنولوجيا
المعلومات والاستخدام المتزايد لهذه التكنولوجيات إلى توليد
كميات هائلة من المعلومات فى كل لحظة، مما أدى الى تغيير
الطريقة التى تتم بها الأعمال وكيفية اتخاذ القرارات. وبالتالي،

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بما أن صناعة الفنادق هي صناعة كثيفة المعلومات، لذلك يتعين على الفنادق مواكبة هذا التطور السريع والسعي إلى تبني تكنولوجيا المعلومات المتقدمة التي تعمل على تحسين عملية اتخاذ القرار. و من ثم، تم إجراء هذا البحث بهدف دراسة تأثير تكنولوجيا المعلومات المتقدمة على اتخاذ القرار، لذلك يركز البحث على أبرز تكنولوجيا المعلومات المتعلقة بعمليات تشغيل المكاتب الأمامية و المكاتب الخلفية في صناعة الفنادق. تتلخص مشكلة هذا البحث في غياب الأدبيات ذات الصلة في هذا الموضوع فيما يتعلق بالفنادق المصرية، وكذلك عدم وعي مديري الفنادق والموظفين بالاستخدام الأمثل لتكنولوجيا المعلومات، بالإضافة إلى النقص في تطبيق تكنولوجيا المعلومات الأكثر تقدماً في الفنادق المصرية على الرغم من تطبيقها في بعض السلاسل العالمية الكبيرة. لذلك، تم إجراء مقابلات منظمة مع عدد 90 مدير من مديري الفنادق فئة الأربع نجوم وفئة الخمس نجوم في ثلاث مدن مصرية هي؛ القاهرة وشرم الشيخ والغردقة، لدراسة تأثير تكنولوجيا المعلومات المطبقة في الفنادق المصرية على اتخاذ القرار، بالإضافة إلى تحديد أي من تكنولوجيا المعلومات المتقدمة يتم تطبيقها في الفنادق المصرية و أي منها لا يتم تطبيقه، وكذلك تحديد الفروق بين إدراك المديرين تجاه

متغيرات الدراسة وفقاً للدرجة الفندقية. و قد أظهرت النتائج أن تكنولوجيا المعلومات المتقدمة لها تأثير معنوي على عملية صنع القرار. بالإضافة إلى ذلك، كشفت النتائج أيضاً أن كلاً من الفنادق فئة الخمس نجوم والفنادق فئة الأربع نجوم تطبق تقريباً نفس تكنولوجيا المعلومات وأن كلاهما لا يطبقان تكنولوجيا المعلومات الأكثر تقدماً مثل ؛ (الروبوتات والواقع الافتراضي وأكشاك الخدمة الذاتية) ، بالإضافة إلى أن وعي مديري الفنادق من فئة الخمس نجوم يختلف عن مديري الفنادق فئة الأربع نجوم تجاه مساهمة تكنولوجيا المعلومات المتقدمة في عملية صنع القرار.

Abstract

Nowadays, the increasing evolution in information technology field and the increasing use of these information technologies create more information and change the way both business is done and how decisions are taken. Thus, whereas hotel industry is an information-intensive industry, so, hotels have to keep pace with this rapid evolution and seek to adopt the advanced information technologies that improving the decision making process. This research was conducted with the aim of examining the impact of advanced information technologies (ITs) on decision making, so the research focus on the most prominent information technologies related to the operations of front-office and back-office in hotel industry. The problem of this

research is summarized in the absence of the related literature in these subject concerning to the Egyptian hotels, as well as the lack of hotel managers and employees awareness of the optimal utilization of information technologies, in addition to the shortage in implementing the most advanced ITs in Egyptian hotels although they are implemented in some of the largest global chains. So, an organized interviews were conducted with 90 of four and five-star hotel managers in three Egyptian cities, Cairo, Sharm-Elshiekh and Hurghada, to investigate the impact of the implemented ITs on decision making, in addition to determine which of the advanced ITs are implemented in the Egyptian hotels and which are not implemented, as well as determine the differences between managers' perceptions toward the study variables according to the hotel degree. The results revealed that the advanced ITs significantly affect the decision making process. As well as, it also revealed that both for and five-star hotels approximately implement the same information technologies and both of them do not implement the most advanced ITs such as; (robots, virtual reality and self-service kiosks), as well as the awareness of five-star hotel managers differ from four-star hotel managers toward the contribution of advanced ITs in the decision making process.

Keywords: Information technologies, Decision making, IT in hotels, Artificial intelligence, Advanced ITs.

Introduction

Nowadays, the widespread and increasing developments in information technologies (ITs) change both business practices and strategies (Hua, 2016), as it contributes to raise productivity, lower production costs,

dematerialize production, support the circular economy and improve resource efficiencies (Sachs, et al., 2019), through providing several technological means that simplify the business processes and enabling organizations to easily collect, store, process, send, retrieve and analyze data and information (Elgohary, 2019a). Therefore, information technology is considered the greatest force that driving change in any industry and will continue to alter the way an industry conducts business in the future, regardless of segment, property size, and geographic location (Olsen et. al, 2000). So, each organization have to keep pace with this evolution to survive in the fierce competitive environment.

Hotel industry is one of the most influenced industries by these changes, so any hotel want to survive and outperform its competitors have to adopt the proper information technologies (Elgohary, 2019b), as it has become vital and inseparable from business operations, cost control, strategic planning and customer services (Laudon & Laudon, 2020). Herein, adopting new ITs provides several benefits for the hotel such as; improve customer service, streamlining business processes, improve operations, minimize costs, increase revenues, support decision making, shorten cycle times, rapid response to data analytics, respond to the market quickly and proactively, in addition to the strategic, operational, and tactical benefits (Frimpon, 2011).

Although all the benefits that a hotel can gain from implementing the appropriate information technologies the hotel industry is often criticized to be a late and slow technology adopter (Okumus, et al., 2017). As well as, the hotel Managers' attitudes and knowledge limit the full IT implementation (Law et al., 2013). Accordingly, the hotel

managers in deferent levels whether general managers, chief information officers (CIOs), IT managers, HR managers, front office managers, Room division managers, etc and even frontline employees need to be trained in managing change and identifying the potential barriers to IT projects, and how to overcome them (Okumus, et al., 2017).

Research Problem

With the increasing use of information technologies organizations face increasing challenges as the advanced ITs changes business models and customers' behaviors, which in turn force organizations to keep pace with these rapid changes and evolution in order to be able to survive in the high technology sensitive market, improve its performance and increase its market share.

Hotel industry is one of the most influenced industries by these changes as it is a human and information intensive industry, and there are number of researches studied the role of using information technology in the hotel industry but there is an absence of the researches that have dealt with these subject in terms of hotels located in Egypt. Therefore, it is necessary to study this subject, as while adoption of information technologies are existing in the large hotel chains in Egypt, the local four and five-star hotels have a shortage in implementing these information technologies. In addition, the hotel managers and employees are unqualified and do not have the awareness of the optimal use of information technologies and its great benefits, as many of them consider the output of ITs as a set of transactions' information and ignore the advantage of this information in managing business more efficiently.

Research Importance

The importance of this research stems from the study problem besides the rapid increase of technology changes and usage which force hotels to keep up with these changes in order to survive in the highly technological sensitive market. Therefore, hotels have to adopt information technologies, as they become inseparably from business activities, due to their ability to support decision making, enhancing customer loyalty, decreasing costs, attracting new customers and so on. Thus studying and developing information technologies become imperative in order to optimizing its utilization and improving businesses. This research contributes to the hotel industry by focusing on the main information technologies that enhance decision-making process. Which in turn provide hoteliers with a knowledge about the importance of implementing new technologies and increase their awareness about the benefits of implementing these technologies and how to optimize its utilization in terms of enhancing decision-making.

Research purpose

This research aims to

- Identify the extent to which hotels adopt the advanced information technologies.
- Investigate the extent to which hotel managers perceive the implementation of advanced information technologies in hotel industry in Egypt.
- Investigate how advanced ITs affect decision-making in Egyptian hotels.

Literature review

The success of any organization depends on the extent of decisions' success and the speed in which they are taken in order to achieve the established goals. Decision-making is defined as “a process of judging various available options and narrowing down choices to a situation one” (Panpatte, & Takale, 2019). As well as, it is defined as “a process of making a choice from a number of alternatives to achieve a desired result” (Eisenfuhr, 2011). Or “the process where by an individual, group or organization reaches conclusions about what future actions to pursue given a set of objectives and limits on available resources. This process will be often iterative, involving issue-framing, intelligence-gathering, coming to conclusions and learning from experience” (Schoemaker & Russo, 2014).

From these definitions, it is clear that decision-making process is inseparable from information, as not just the process of decision-making but also implementing and evaluating the established decision depend on information. Whereas, the causes and aspects of a targeted problem could be explicit or implicit so gathering the required related-data and information as well as analyzing and evaluating the surrounding conditions and alternatives help in reaching the best decision (Avgerou & Walsham, 2017).

Due to the nature of hotel industry as an information intensive industry (Elhory, 2012)* and with the increasing demand for intensive information from customers and hotel practitioners, hotels have to adopt ITs (Law et al. 2019), as they represent a rich and essential source of information and provides ways to collect, communicate and benefit

* In Arabic

from this information (Elhory, 2012)*. This facilitates management, planning, policymaking and overall hotels' operations, as well as it is essential for processing data effectively to enable a hotel to be more flexible to guests' demand, understanding their preferences, making effective decisions and keeping costs down.

Technologies are changing so rapidly across industries. Therefore, hotel industry is also evolving faster with the disruption of information technologies (Law & Jogaratham, 2005, p.11). So adopting new ITs by a hotel and improving the IT knowledge for all hotel employees is essential to achieve a sustained competitive advantage (Bilgihan et al., 2011; Ozturk et al., 2012; Pereira-Moliner et al., 2016). Specially, with the information revolution and the growing advancements in cloud, smartness, Artificial Intelligence (AI), Internet of things (IOT) and Business Intelligence (BI) that reengineer the entire ecosystem of the tourism sector impose hotels to be smart hotels. Which in turn affect the hotel management in both back office and front office.

In this context, there are a large number of technologies, which contribute significantly to the efficiency of both 'back office' and 'front office' in hotels management, as they affect various interest groups such as; guests, employees, tour operators, suppliers, etc. (Bilgihan et al., 2011) and support different management levels. – These technologies include, operational IT systems, customer intelligence technologies; (i.e. AI applications and IOT), and BI tools-. Therefore, and because the prominent role of business automation in conducting and simplifying

* In Arabic

business transactions, hotels have to choose the proper ITs to automate their business processes. In the following, the researchers explain the most effective technologies in hotels.

A. Operational IT Systems:

There are many hotel operational systems to automate the hotel operations in both back-office and front-office. The providers of these systems have bundled packages for using multiple modules under one administrative panel, while these packages varies from one provider to another as some vendors specializing in a particular operational area and others covering a broader range.

Among the most widely used systems in hotels are; Enterprise resource planning (ERP), Point of Sale (POS), Customer Relationship management (CRM) and Human Resource management (HRM) (Laudon & Laudon 2020).

B. Artificial Intelligence and IOT (Customer Technologies):

Regarding to hotel industry, IOT and AI applications create what is called “Smart hotel”. As well as, they represent the most profound example of the hotel technology advancement, as AI is existing in the majority of ITs and plays an important role in hotels management as it has the ability to carry out the traditional human functions automatically at any time and from anywhere (RevFine, 2020). These encourage hotel owners to implement an intelligent system to improve management efficiency and provide corresponding recommendations accurately that

enables hotels to meet the guests' needs, as it allows hotels to: (Daryaei et al., 2013; Bilgihan et al. 2016 and Ivanov & Webster, 2017)

- Take quick actions.
- Access data in a desired format and get valuable information.
- Reduce costs and achieve cost effectiveness.
- Avoid making decisions in an uncertainty environment.
- Predict market trends and set goals.
- Forecast the financial crises probability.
- Eliminate human errors and improve business processes.
- Track the guests' needs that enables to deliver superior and more personal service and provides a more streamlined and seamless experience for guests during their accommodation through several ways as follows:
 - Collecting and interpreting the guest data
 - Mapping and identifying the user's preferences to create a tailor-made accommodation package

- Implementing more targeted and effective marketing techniques
- Determining the efficacy of a publicity campaign proactively

Furthermore, AI can be applied in forecasting tourism demand; arrivals and expenditure, waste generation rates in hotels, hotel occupancy, the hotel energy demand and etc. (Sun et al., 2019). Which in turn allows automation of some processes in hotels and provides significant opportunities to optimize data analysis which ultimately leads to improve decision-making process.

In addition, although the use of AI within the hotel industry is still in its relative infancy, it is expected that hotel technologies in the future will have unlimited development possibilities, such as hotel robots, using big data to analyze guest's preference, and even DNA payment (Law et al. 2019). Some of the top AI applications that are applied in hotels are: AI-chatbots, Social listening tools, Service automation, Virtual reality and Augmented reality, Contactless technologies and Robots

Accordingly the researcher hypothesizes that:

H1. There is a significant effect of advanced ITs on customer satisfaction

H2. There are significant differences between the hotel managers' perceptions toward study variables according to hotel degree.

Methodology

An empirical research was developed to investigate the aim of the research and prove the hypotheses

Research Design

A self-administrated questionnaire was developed for data collection in Arabic language -to suit the study population culture - in order to measure the impact of advanced ITs, as independent variable on decision-making as dependent variable. The questionnaire was based on 3 parts containing 27 statements as follows

The first part examines the advanced ITs implemented in four and five-star hotels, it contains 18 statements describe the adopted advanced ITs in four and five-star hotels.

The second part deals with decision making, it contains 6 statements describe the extent to which the adopted ITs enhancing decision making process.

The third part contains 3 statements to gather general data about the hotel degree, managers' years of experience and the number of IT courses that managers have taken in each hotel. The respondents had to answer 24 close – ended questions -in first and second part- adopted from different scales of previous studies with multiple choices on the five-point Likert scale ranged from 1 to 5; 1= totally disagree, 2= disagree, 3= neutral, 4= agree and 5= totally agree.

Data collection method:

Data of the research were collected from both primary and secondary sources. A self – administrated questionnaire form was used to collect primary data for the empirical investigation, whereas literature review was used to collect secondary data for the model construction.

The research attempts to identify the influence of advance ITs on decision making in four and five-star hotels in three Egyptian cities (Cairo, Sharm El Sheikh and Hurghada), so the population was represented in all managers of four and five-star hotels in those three cities.

So, organized interviews were conducted with 90 four and five-star hotels managers, to determine to which extent advanced ITs contribute in the decision making process. Only 73 managers accepted to help us and answer the survey; distributed as 50 managers of five-star hotels and 23 managers of four-star hotels.

Data Analysis

The *Statistical Package for Social Science (SPSS V23.0)* program was used to analyze the research data. The authors used descriptive analysis to determine the reliability of study model and the relation degree between dependent and independent variables. In addition, simple linear regression model and kruskal Wallis test were used to prove the hypotheses validation.

Descriptive Statistics:

The descriptive statistics was conducted to measure the computed mean of each scale items, in addition to, determine which items customers are perceived more than others.

Table (1) displays the descriptive statistics, reliability coefficients and correlations between the study variables.

Table.1: Reliability Coefficients & Correlation Matrix

Variables		Advanced ITs	Decision making
Reliability		0.914	0.936
Correlations	Decision making	.441**	1

Source: By researcher based on statistical analysis.

The descriptive statistics was conducted in order to measure the computed mean of each scale to determine to which

extent managers perceive each scale. The results clear that the computed mean of each scale is above 3.40 which indicates that managers highly perceive the advanced ITs implemented in hotels and their contribution in decision making.

The reliability coefficient is strong at 0.60 and above, while less than 0.60 is a poor coefficient, as endorsed by (Rizkallah, 2002). The values of reliability coefficients for the research scale are (0.914) and (0.936), which indicates strong internal consistency and reliability of all study scales.

The correlations demonstrate the relationship between the independent and dependent variables. The results clears that there is a significant medium positive relationship between implementing advanced ITs and improving decision making as its correlation figure is (.441).

Descriptive Statistics:

Advanced ITs:

The following table shows the computed means of each item in the Advanced ITs variable and clarifies the strength of the variable itself and the strength of each item.

Table (2)

The Descriptive of Using Advanced ITs in Hotels

S	Statement	Mean
1.	The hotel has a unique website	4.78
2.	The hotel has a dedicated CRM system	4.14

3.	The hotel has an online reservation system	4.68
4.	The hotel applies AI chatbot technology on its website and social media to timely answer customer questions	2.55
5.	The hotel has applications to measure customer satisfaction	4.19
6.	The hotel uses client tracking system	4.19
7.	The hotel has applications to collect and analyze the customers preferences and opinions	4.19
8.	The hotel has applications to analyze the competition	4.01
9.	The hotel has applications to analyze the environmental conditions affecting the tourist demand	3.79
10.	The used system helps the hotel in demand forecasting	4.23
11.	The used system helps hotel in predicting crises	2.36
12.	The hotel's operating systems are linked with the suppliers' programs	3.58

13.	The hotel's reservation system is linked with the travel agents' reservation systems	3.73
14.	The hotel uses apps to help the guest and answer his questions instead of the receptionist	3.45
15.	The hotel uses the facial recognition technologies to receive the guest and allow him to enter private spaces	1.22
16.	The hotel has applications to deal with the guests' electronic complaints and suggest the appropriate solution	3.55
17.	The hotel provides personalized offers to each guest according to his needs	4.00
18.	The hotel informs guests about new products through email	3.78
Total		3.74
Source: By researcher based on statistical analysis.		

Table (2) clears that the total computed mean of the statements measuring the implementation of Advanced ITs in hotels is 3.74, with a percentage of (75%) which is a high percentage.

The results illustrate the level of applying advanced ITs in hotels from the perception of the investigated hotels managers. From these results it could be concluded that the implementation level of advanced ITs in the investigated hotels is as follows:

- The majority of hotels have “unique websites, online reservation systems and CRM systems”, with means of (4.78, 4.68, 4.14) respectively.
- The advanced ITs concerning to “demand forecasting, tracing customers, measuring customer satisfaction, collecting and analyzing the customers’ preferences and opinions, analyzing the competition and providing personalized offers to each guest according to his needs”, have average means (4.23, 4.19, 4.19, 4.19, 4.00, 4.00) respectively with implementation percentages of more than 80% of each of them, these refers to a high level of implementation.
- The advanced ITs concerning to “analyzing the environmental conditions that affect the tourist demand, inform guests about new products through email”, have average means (3.79, 3.78) respectively, with implementation percentages of 75%, these refers to a high level of implementation.
- Hotels have links between “their reservation systems and the reservation systems of travel agents” and between “their operating systems and suppliers’ systems”, have average means (3.73, 3.58) respectively, with implementation percentages of more than 70%, these refers to a high level of implementation.

- Advanced ITs concerning to “deal with guests’ complaints and suggest solutions” and “communicate with guests instead of the receptionist”, has average means (3.55, 3.45) respectively, with an implementation percentage of 69%, these refers to a relatively high level of implementation.
- Regarding to “using AI-chatbot, and predicting crises” their average means are (2.55, 2.36) respectively, these means are less than 2.60 which refers to a very low level of implementation.
- While using “facial recognition technologies”, has an average mean of (1.22), which indicates the lack of applying this technology.

Decision-Making:

The following table shows the computed means of each item in Decision-making variable and clarifies the strength of the variable itself and the strength of each item.

Table (3)

Descriptive of Decision-making Process from the Perspective of Hotels Managers

S	Statement	Mean
1	IT tools help to precisely identify the problem	3.86

2	ITs provide the required immediate information to make a decision in a timely manner	4.29
3	ITs provide sufficient and comprehensive information on each alternative to compare them	4.04
4	The outcome of each alternative can be predicted through the use information technology,	3.92
5	The implemented software provides information on evaluating the impact of the decisions	3.78
6	The implemented software provides reliable facts to make the right decision	3.86
Total		4.00
Source: By researcher based on statistical analysis.		

Table (3) shows that the total computed mean for all statements measuring decision-making variable is 4.00, with a percentage of (80%) which is a high percentage.

The results illustrate the extent to which ITs contribute to the decision-making process from the perspective of the investigated hotels managers. The results indicate a high level of the used information technologies contribution to identify the problem, provide the required information to formulate alternatives and predict the outcome of each one, in addition to its contribution to make the right decision and

evaluate its impact, as all means are higher than (3.40) as they range between (3.78, 4.29).

Testing Hypotheses

In order to test hypotheses the researcher used, **Simple Linear Regression Model** in order to measure the significance extent of the independent variable in affecting decision making (dependent variable). As well as, the Kruskal Wallis Test was used in order to identify if there are significant differences between managers' perception toward study variables according to the hotel degree.

Hypothesis One

Table (2) presents the results of the simple linear regression analysis, including R^2 , ANOVA test, and the significance of independent variable in affecting the dependent variable.

Table.4: The Results of the Simple Linear Regression Model

Variables	Dependent	Decision making			Model Significance
	Independent	β	t	Sig.	
Advanced ITs		.441	4.142	.000	$R^2 = .195$ $F= 17.160$ ($p \leq .05$)

- a. Dependent Variable: Decision making
- b. Predictors: (Constant), Advanced ITs

From the results in table (4) it clears that ANOVA test result ($F= 17.160$, $p \leq .05$) reveals that advanced ITs model affect decision making significantly, as well as only about (19.5%) of changes in decision making are affected by advanced ITs, while (80.5%) of changes are affected by other factors. Also, T test results clear that advanced ITs

has a significant impact on customer satisfaction. Therefore, hypothesis one “**There is a significant effect of advanced information technologies on decision making**”, is accepted.

Hypothesis Two

The following table (Table. 3) presents the differences degree between managers’ perceptions toward study variables according to the hotel degree; (4-star, 5-star).

Table. 5: Differences between hotel managers’ perceptions toward study variables according to hotel degree

Variables	N	Advanced ITs		Decision making	
		Mean Rank	Sig.	Mean Rank	Sig.
5-Star	50	33.78	.378	29.43	.031
4-Star	23	38.48		40.48	

a. Kruskal Wallis Test

b. Grouping Variable: Nationality, Age, Gender

The results show that there are significant differences between managers’ perceptions only toward the advanced ITs contribution on decision making according to the hotel degree. While there are no significant differences between their perceptions toward the adopted advanced ITs. These results reveal that four and five-star hotel are approximately adopting the same advanced ITs, while their awareness differ toward the contribution of these advanced ITs in decision making. Therefore the second hypothesis “**There are significant differences between managers’ perceptions toward study variables according to hotel**

degree” is partially accepted in terms of decision making and refused in terms of advanced ITs

Conclusion

Advanced ITs changes business models and ecosystems so each organization have to implement the advanced ITs to survive in today's highly technological ecosystems as these technologies lead eventually to support decision-making process and improve customer satisfaction. This study aims to measure the impact of advanced ITs on improving decision making in hotel industry, and determine to which extent four and five-star hotels in Egypt are tend to implement the advanced ITs, as well as investigating the significant differences between managers' perceptions toward study variables (advanced ITs and decision making) according to the hotel degree.

In conclusion and after reviewing related literature, designing data collection method, collecting data from sample units and analyzing data to test the research hypotheses. It was found that the results of this research is consistent with what was reported in the related literatures, as the results reveals a significant positive correlation between the advanced ITs and decision making, in addition, to the significant effects of advanced ITs on decision making. As well as, from the descriptive statistics of the advanced ITs it clears that hotels don't implement the highly advanced ITs such as (robots, IPTV, self-service devices, virtual assistance, VR & AR); although some of hotel managers reported that they have IPTV system, but they assert that they are deactivated. Furthermore, results clear that managers do not differ on their perceptions toward advanced ITs according to the hotel degree which indicates that four and five-star hotels approximately

implement the same technology, while they differ on their perceptions toward the contribution of advanced ITs on decision making according to the hotel degree

Recommendations

From the previous results the researcher could reached to a number of recommendations, for hotels' managers:

- Hotels must give more attention to apply AI technologies such as; predicting systems, AI-chatbot, concierge robot and others, due to their benefits in collecting and interpreting data, specially customer reviews which is consequently reflected on improving the decision-making and allow hotel to provide personalized services to each customer, and in turn increasing customer satisfaction.
- Hotels have to give more interest to the advanced technologies such as; robots, self-service kiosks, virtual assistants, IPTV, etc., as they have the ability to reduce operating costs, increase productivity and enhancing performance, as well as its existence at some hotel chains branches abroad Egypt.
- Hotels have to seek to fully automate services in such hotel areas; in-room ITs, room division ITs, food & beverage ICTs and general/back office ITs, as customers widely prefer interacting with technologies.
- Hotels must give more attention to social media and virtual & augmented reality due to their ability to affect the customer purchasing behavior.

- Hotels must give more attention to apply AI technologies such as; predicting systems, AI-chatbot, concierge robot and others, due to their benefits in collecting and interpreting data, specially customer reviews which is consequently allow hotel to provide personalized services to each customer, and in turn increasing customer satisfaction.
- Intensify the hotel's attention to CRM technologies to communicate with customers continuously and build a strong relationships with them
- Give more interest to customers' data analytics to recognize changes in customers' needs and expectations and in turn be able to provide a personalized services with higher value to satisfy them.
- Caring to follow customers' reviews and comments in real time in order to handle any negative reviews or comments as they are an important source for word-of-mouth, that encourage guests to visit the hotel.
- Educate customers about the new and personalized offers through e-mail, social media, the hotel website or app and more others.

References

Avgerou, C., & Walsham, G. (2017). *Information Technology in Context: Studies from the Perspective of Developing Countries* (1st ed.), Routledge.

Bilgihan A, Okumus F, Khal Nusair K, Joon-Wuk Kwun D (2011) Information technology applications and competitive advantage in hotel companies. *J Hospitality Tourism Technol* 2:139

Bilgihan, A., Smith, S., Ricci, P. and Bujisic, M. (2016), "Hotel guest preferences of in-room technology amenities", *Journal of Hospitality and Tourism Technology*, 7 (2), 118-134.

Daryaei, M., Shirzad, M., Kumar, V. (2013). Adoption of Business Intelligence In Hotel Industry. In proceeding of Fourth International Conference on Computing, Communications and Networking Technologies (ICCCNT(

Eisenfuhr, F. (2011). *Decision making*. New York, NY: Springer.

Elgohary, E. (2019a). The Impact of Financial Technology on Facilitating E-Government Services: An Empirical Study on Egypt. *Journal of Distribution Science*, 17(5), 51-59

Elgohary, E. (2019b). The Role of ERP Capabilities in Achieving Competitive Advantage: An Empirical Study

on Dakahlia Governorate Companies, Egypt. The Electronic Journal of Information Systems in Developing Countries, doi:10.1002/isd2.12085

Frimpon, M. F. (2011). A re-structuring of the enterprise resource planning implementation process. International Journal of Business and Social Science, 2(24), 231-243 .

Hua, N. (2016), “E-commerce performance in hospitality and tourism”, International Journal of Contemporary Hospitality Management, 28 (9), 2052-2079.

Ivanov SH & Webster C (2017) Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies—a cost-benefit analysis. International Scientific Conference "Contemporary Tourism – Traditions and Innovations", Sofia University, 19-21 October 2017

Laudon K.C. & Laudon J.P. (2020). Management Information Systems: Managing the Digital Firm, (16th ed.). Pearson

Law, R., & Jogaratnam, G. (2005). A study of hotel information technology applications. International Journal of Contemporary Hospitality Management, 17(2), 170-180.

Law, R., Leung, D. & Au, N. (2013). Progress and development of information technology in the hospitality

industry evidence from Cornell hospitality quarterly.
Cornell Hospitality Quarterly, 54 (1), 10-24.

Law, R., Sun, S. & Chan, I.C., (2019). Hotel technology: a
perspective article. *Tourism Review*, 75(1), 286-289

Okumus, F., Bilgihan, A., Ozturk, A.B. & Zhao, X.
(2017). Identifying and overcoming barriers to
deployment of information technology projects in hotels.
Journal of Organizational Change Management, 30 (5),
744-766, <https://doi.org/10.1108/JOCM-12-2015-0239>

Olsen, M.D. & Connolly, D.J. (2000). Experience-based
travel: how technology is changing the hospitality
industry, *Cornell Hotel and Restaurant Administration
Quarterly*, 40 (1), 30-40.

Ozturk, A.B., Radesh, P. and Hancer, M. (2012),
“Organizational level RFID technology adoption in the
hospitality industry”, *Tourism Analysis*, 17 (5), 629-642.

Panpatte, S. & Takale, V.D. (2019). To Study the
Decision Making Process in an Organization for its
Effectiveness, *The International Journal of Business
Management and Technology*, 3 (1.)

Pereira-Moliner, J., Pertusa-Ortega, E.M., Tarí, J.J.,
Lópezpez-Gamero, M.D. & Molina-Azorín, J.F. (2016),
“Organizational design, quality management and

competitive advantage in hotels”, International Journal of Contemporary Hospitality Management, 28 (4) 762-784.

RevFine, (2020 b), Hotel Technology Trends: 14 Upcoming Innovations You Must Know Accessed at 27 Oct, 2021, from: <https://www.revfine.com/hotel-technology/>

Rizkallah, A.N. (2002). Researchers evidence in statistical analysis: Testing and interpretation. Cleopatra for Printing and Computer, Cairo.

Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N. & Rockstrom, J. (2019). Six Transformations to achieve the Sustainable Development Goals. Nature Sustainability, 2, 805-814.

Schoemaker, P. & Russo, J. (2014). Decision-making, The Palgrave Encyclopedia of Strategic Management

Sun, S., Wei, Y., Tsui, K. L., & Wang, S. (2019). Forecasting tourist arrivals with machine learning and internet search index. Tourism Management, 70, 1–1