

Evaluating Internet of Things Application in Sharm -El Sheik Hotels

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Abstract

The research aims Evaluate the internet of things (IOT) application in four and five stars hotels on Sharm El Sheik from the perceptions of hotel Guests prospective. Questionnaire was used to measure internet of things application and its impact on guest satisfaction, saving guest time, guest trust, and guest health procedures. The range of this study is restricted to four and five star hotels in Sharm El-Sheikh. The number of targeted Guests in four and five-star hotels in Sharm El Sheikh are (500), the total number of the valid questionnaires for analysis is (411). Therefore, the response rate is (82.2%) . The findings showed the degree of adopting (IOT) within four and a five-star hotel in SharmEl Shekih is still poor. The findings also showed that internet of things has a positive effect on guest health procedures, saving guest times, guest trust, and guest health procedures. Moreover a guest health procedure has a positive effect on guest satisfaction, While guest satisfaction, has a positive effect on guest loyalty.

Keywords, internet of things, guest’s satisfaction, and guest health procedures Sharm El-Shiekh Hotels.

Introduction

Hospitality Industry is one of the fastest developing sectors in the world; Hotel sectors have been characterized by continued updating in technological advancement. In recent decades, inventions in the hotels industry has developed at a fast moving pace (Rajeswari and SathishKumar,2019).

Hantrais et al,(2020), stated that in hotels the new digital technologies are ensuring social distancing through non- touch services through applying the internet of things (IOT) in all hotel departments to guarantee minimizing health hazards. In the last few years, internet of things has permeated most human living spaces,(Sadeeq and Zeebaree,2021). Moro and Perez, (2021), illustrated organizational management and services have altered so much as a result of technological advancement that they have become indispensable. The World Health Organization has issued many bulletins containing specific instructions to minimize hotels health hazards as social distancing was The first and foremost requirement (Shrivastava and S-Shrivastava,2021) , minimizing health hazards is a vital target for reaching the main target maximizing guest satisfaction and loyalty (Pelet et al,2021).

The current study aimed to investigate the degree of adopting Internet of Things application and the extent of their availability within four and five stars Hotels in Sharm - El Sheik.

Accordingly, the study problem can be formulated as follows: the insufficient adoption of internet of things and their applications in the hotel departments within the targeted hotels.

Literature Review

Concepts of Internet of Things

Pizam, (2017) and Chen et al., (2020). Rejeb et al. (2020) defined (IoT) is a network of interconnected devices that can turn on and off the web in order to use software and automate processes for smart applications. The concept of IOT in hotels is the usage of devices that connect the Internet to communicate and interact with each other (Ramgade and Kumar, 2021). A network of physical objects or "things" that are "embedded with electronics, sensors and software connectivity, allowing the objects to collect and exchange data," is referred to as the Internet of Things (IoT)

In sectors like power, financial, management facilities, healthcare, homes and workspaces, and manufacturing, the IOT and the digital technologies related are being used to the innovation of value propositions, value delivery, and value capture (Haaker, et al 2021).

While (Demir and Ventura, (2021)) described the Internet of things is a technological revolution in the world of devices that are connected to each other and transmit information and data through the Internet, which requires the availability of an infrastructure of technologies and sensors and a strong Internet network to complete the process..

Digital technologies (DTs), which combine information communication computing and connectivity technologies, include social, smart phone, analytics, computing cloud, the IOT, artificial intelligence (AI), and the technology of blockchain (Busulwa et al., 2022)

The Applications Of Internet of Things in Hotel Departments

Room Division Department

First in guest room, Hilton and Marriott have experimented with slightly different interpretations of the "connected room" concept, in which guests can manage many of the room's features using a tablet or their smartphone. Additionally, IoT platforms might eventually learn a visitor's preferred settings for temperature, lighting, TV channels, and window treatments, and prepare the room for them when they return. Hotels have the option to automatically send electronic key cards to guests' smartphones, enabling self-check-in (Infante-Moro et al., 2021). It automatically changes the temperature of the air conditioning with the soft music playing when the window is opened, reacts by doing the same when the visitor uses the restroom, and does the same when using the jacuzzi (Ortiz et al., 2021). second , IOT Door Lock Opening and entering the room via mobile is not new and was applied for the first time in 2014 by Starwood Hotels & resorts , It was applied to save time and effort and increase luxury, as the guest was able to reach and enter the room without stopping at the reception in accordance with Torres.A., (2018). Dikken N, (2020) stated that this technology is not only for opening the hotel room, but for use in the hotel departments that require a room key, such as the gymnasium, elevators, parking lots, and hotel restaurants. (Hanafiah et al., ,2021) illustrated that The customer receives the code through the mobile application, then goes to the door lock to pair the phone application with the door lock via Bluetooth technology.

Motion Sensors

The room gives the order to turn off the electricity inside the room and sends a message from the door lock to the administration that the guest is outside the room to start the process of cleaning or preparing the room, etc. the space if consumption goes over the permitted amount (Tyagi and Patvekar., 2019). the role of sensors in the room is a security role, as it enhances the sense of safety among guests in general, and women and the elderly, especially those who represent security as one of the most important factors for choosing a hotel where the guest knows that the room is monitored and that his property is inside the hotel room in safety (Anichiti et al., 2021).

Internet of Things Mini Bar and Smart IOT TV

In order to prevent the takeout from running out, the mini-bar connects to the Internet and sends a message with the withdrawals first. It also sends data on the drinks that were most frequently withdrawn while the customer was there the customer . (Verma et al., 2021). The visitor can customize his favorite music programmer and the morning programmer, which serves as an alarm to wake him up from sleep, through the screen. Additionally, it is used to make restaurant reservations, select the menu, make cleaning requests, and reserve other hotel services like massages and so forth (Sari, 2018).

Front Office

In F.O. Department, The Internet of Things aids in facilitating and speeding up the reservation process for visitors, saving them time and effort, showcasing the amenities of hotels, making electronic payments simple, and providing quick and easy access to hotels via mobile applications (Hossain et al., 2022). (Kim Je et al., (2021) stated if a consumer makes a reservation using hotel applications or a middleman, like Booking or another, the automated system responds to the guest directly, and the reservation employee can respond to the reservation, start the capabilities from a mobile device, and end the reservation. The following advantages of implementing the Internet of Things in the reception department, according to Chen et al., (2020), were highlighted. Facial recognition cameras placed at hotel gateways are used to facilitate and speed up guest entry, which affects how much they enjoy their stay and helps management maintain control. We are simplifying and speeding up the check-in and check-out procedures, beginning with parking, bag pickup, lodging, and room delivery. Additionally, Stringam and Gerdes ,(2021) added the following to the benefits of the Internet of Things: follow up and know the condition of the room, as well as what is available for sale and what is out of service; Strengthening guest information management so that the system can make recommendations about the guest if he repeats the stay in the future; about his habits; the types of food and drinks he prefers. As –Sharma & Kaushik, (2021) said, the Internet of Things helps the guest relations department, which uses the stored information about the client to communicate, pay attention, solve customer concerns, and follow up on the consumer after they check out. evaluating the quality of the services offered to the client by delivering client comments and suggestions.

Food & Beverage Department

In F&B Department, the importance of the Internet of Things in the restaurants is included the following:

- Utilizing mobile applications to make meal reservations and bill payments for visitors is quick and accurate.
- The effectiveness and speed of restaurant operations, including the speed of implementation and delivery while cutting down on wait times; accuracy in recording client requests; where the customer chooses what they want from the carte menu; and customer loyalty and satisfaction (Su et al., 2022).
- While Mercan et al, (2020) added The use of the Internet of Things improved the efficiency of employee evaluations as well as the effectiveness and speed of communication between restaurant staff members and between the restaurant and the kitchen.
- Bigliardi et al, (2022). confirm the importance of cost control, reducing menu printing, providing the papers used to record meals, ensuring order accuracy, managing waste, regulating supply quality, and controlling foods in refrigerators and warehouses.
- The Internet of things in the kitchen: its significance to reducing fire accidents in the kitchen is to install sensors for temperature, humidity, gas leakage, and flame mass, and send data to automatic control and action devices via a Wi-Fi network.
- (Reddy et al., 2022). Umapathi and Sabbani(2022) added control of the kitchen's water, lighting, and ventilation as well as strict management of its operations through mobile applications that directly receive warning messages from the kitchen.
- Livinsaetal, (2021), also mentioned reducing time, effort, and cost in the cooking process while maintaining quality and speed in performance, reducing mistakes in food recipes, and reducing labour costs and supervision. (kiziQuldosheva et al., 2022).
- The types of food stored in the refrigerator are controlled by the barcode system affixed to the food storage, which the refrigerator recognizes by scanning the barcode. The refrigerator also takes advantage of the refrigerator's communication with the other devices for preparing and cooking recipes, as well as helping the procurement department with the instantaneous update of the inventory to prevent the hotel from experiencing a sudden shortage of any kind of food Lastly, The quickness and simplicity of IoT device maintenance in the kitchen, whereby via Wi-Fi it enters the factory on its system and detects in any area where the fans, motor, door, or other malfunction, and whereby it is possible to fix the fault either directly or online (John et al., 2022).

Accounting Department

Through the use of mobile applications and a unique password for the financial management system, technology in financial management has made it easier to transfer money, provide electronic payment services, and ensure that transfers and payments reach hotels quickly(Phan et all., 2022).

The Internet of Things aided in strict control of revenues and expenses, controlling costs and payments, and electronically disbursing salaries, preventing overcrowding in accountants' offices, its crucial role in saving time and effort and relieving psychological pressure for the financial management staff who have major responsibilities in the hotel, organizing and sending financial reports to the higher management and the owner to take measures regarding the facility's financial position, and organizing the work of procurement and receipt Also, check on the condition of the stores and finish the inventory according to yurtlu,(2021).

Security and Safety Department

The Internet of Things is crucial in lowering crime rates and tightening control over every square inch of the hotel (Ghosh et al.,2022). (Jausin et al ,(2022)stated smart temperature sensors can detect fires early and activate alarms, water sprinklers, and electronic warnings through smart speakers The use of these sophisticated contraband detection tools was made possible by the smart gates, which gave the security division control over the hotel's entrances and exits. The most stringent control by means of a motion detector that has a motion sensing in a certain range by means of radio waves and infrared rays and issuing sirens if necessary (Hoque and Davidson,2019).

The Relationship Between Internet of Things and Guests' Satisfaction, Guest Health Procedures, Guest Saving Time

Guest satisfaction is defined as the discrepancy between the services that the customer receives inside the hotel and those that he anticipated receiving prior to checking in at the hotel (Hayat and Esenyel, 2020) The Internet and a quick mobile phone search, according to Shen(2022) combine information about hotels from all over the world with their locations, services, and offers into the hands of prospective customers, resulting in customer satisfaction at an early stage in the planning stage for a reservation. According to Tushar et al. (2022) the implementation of the IOT in hotels was one of the most significant technological advancements because it improved customer satisfaction throughout the remaining stages and improved ease of dealing; privacy; safety; reliability of information; speed of response; and reduction in the length of service. (El-Hakim et al., 2022) believed that the customer's use of and interaction with these IoT devices created a sense of contentment because the customer was up to use and interaction with these IoT devices gave the customer a feeling of happiness because they were in touch with the times and in line with technological advancements, which led to the customer feeling satisfied with the services offered.

According to (Samuthjinda et al.,2022)IOT in hotels has increased customer satisfaction by removing the intermediary and opening direct communication channels for online reservations through web and mobile applications. (Cherdouh et al,(2022.) illustrated the use of IoT technology has helped to improve customer satisfaction by making mobile applications easier to use and by raising overall customer satisfaction. In accordance with (Kim. Y and Kim. H.,2022), IOT allowed the customer to collaborate with the hotel in building a positive reputation by posting reviews and photos on websites designed specifically for this. Hotels were able to study, analyze, and measure the level of customer satisfaction with their services via IOT. The guest's emotions and perceptions were impacted by the Internet of Things, which also provided sensory stimuli to improve the customer experience and go above and beyond expectations for customer satisfaction(Pelet et al., 2021). According to Wei and Kim(2022) the Guest Relations department was able to gauge customer satisfaction and provide officials with guidance thanks to the Internet of Things . Martijn, (2018)stated cutting-edge technology the IoT has started to have an impact on business profitability, cost savings, and customer satisfaction.The electronic key cards that the hotel sends to your mobile phone to access the room directly and save you from wasting your valuable time in the hotel reception are another way that the Internet of Things will improve the guest experience, in addition to personalized rooms, predictive repair, and maintenance.

The Relationship Between Internet of Things and Guest Health Procedures

More hotel chains are turning to digital applications as a result of the pandemic of COVID-19 to enable a "work anywhere" economy and reduce risk in day-to-day operations. The COVID-19 pandemic intensifies the need for 5G technology in businesses. Better connectivity for communications is one benefit of 5G networks, but intelligent connectivity using platforms like the cloud, huge data, (IoT), and (AI) is another. For instance, the use of facial recognition for quick check-in and payment via 5G and AI in the hotel industry results in a significant improvement in service effectiveness, security, preventing disease from spreading and providing health measures (Lau, 2020). Barnawi et al. (2021) stated skin temperature is measured by telethermographic systems or thermal imaging systems (TIS). A thermal infrared camera and a temperature reference source are both included in these systems. In relation to external thermal stresses, skin temperature is a suitable and effective indicator of human sensations and thermal states. This data is derived from thermal images captured using infrared imaging. (Maitra and Shukla, 2022) although it won't be able to stop a pandemic from starting, technology can help with more effective pandemic control. Medical equipment like infrared and wireless thermometers is frequently used at toll gates, building entry and exit gates, airports, markets, hotels, train stations, stores, clinics, and various other public locations. These temperature-monitoring devices estimate the body temperatures of people without making physical contact with them; they have also been successful in identifying those who may have COVID-19 and require additional care. Alizadeh et al. (2020) it can be difficult to design systems like remote surgery, online healthcare, online banking, or online shopping systems. One of the main factors that customers now consider when selecting a hotel and indicating their intent to book there again is the hotel's cleanliness reputation and adherence to hygienic practices in all of its departments. According to Arkhipova et al., (2021) one of the most crucial elements in preserving visitor safety is for hotels to strengthen guest health procedures for patrons and employees, tighten control over these procedures, and look for tools that will ensure their implementation. The current state and the health standards demanded by hotels reinforce social distance at every turn. Leghari et al. (2022) that IoT applications are a health risk in hotels by logging in and out, dealing with smart rooms, and dealing with restaurants. Finally, (Maitra and Shukla, 2022) stated that during the Corona period, these Internet of Things (IoT) devices have developed into a tool for tracking movement in the hotel and monitoring sterilization, as well as for inspecting employees and clients to make sure there are no viral infections.

The Relationship Between Internet of Things and Guest Saving Time and Guest Satisfaction

Chen et al. (2021) assured that One of the most important benefits of applying the Internet of Things (IoT) in hotels is the speed in completing the various hotel operations, whether on the part of the hotel management between management and employees, or on the part of the customer in terms of operations before, during and after the hotel stay. In accordance with (Nair et al., 2022) In the pre-stay stage, the hotel was able to shorten the time in reaching thousands of customers and transmitting to them the latest offers and price updates in a few seconds through Internet of Things (IoT) applications represented in e-mail or social media (Samuthjinda et al., (2022) explained that the customer was able to view and compare dozens of hotels through the hotel websites on the Internet, and make the purchase decision and complete the reservation, payment and confirmation in a very limited time. Boo and Chua (2022) Explained that the application of the (IoT) has shortened the time in the stage of logging in and out by registering through mobile

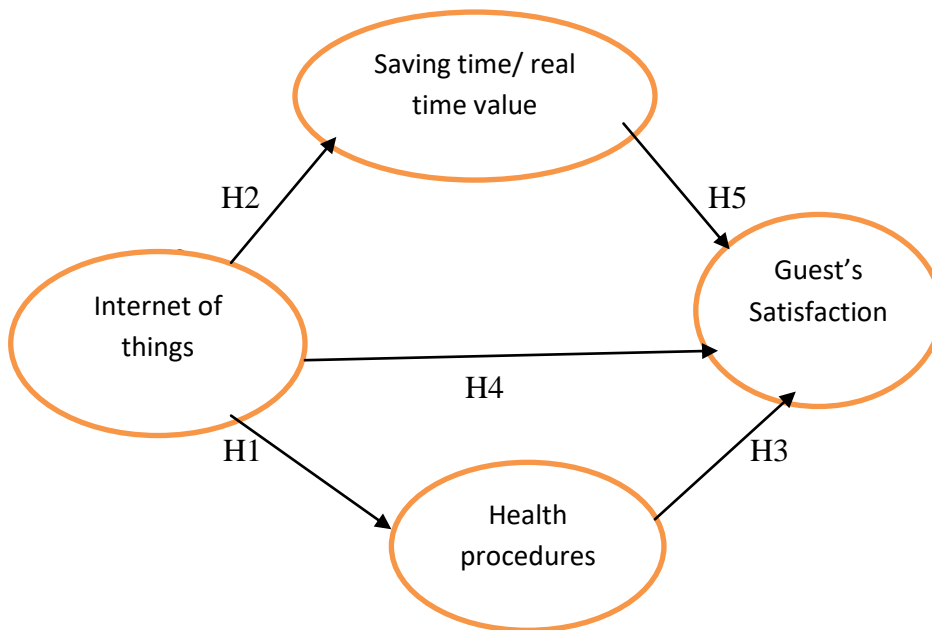
applications or the latest with facial recognition technology in hotels, which is a combination between (IoT) and artificial intelligence (AI).

Anvarovns(2022) assured that entering the Internet as an intermediary between the hotel and the client helped avoid the client waiting for services and wasting time in communication or follow-up, Rather, the customer was able to obtain a greater amount of services instead of waiting and wasting time, which had a great impact on customer satisfaction(Lei et al (2021) believed that ,the new innovations in instant messaging technology between the customer and the hotel enhanced the satisfaction of the customer, who was able, through instant messaging from his mobile phone, to negotiate the price, make reservations, and confirm payment in a very limited time.Elziny and Mohamed(2022) explained that ,since customer satisfaction is the focus of the hospitality sector, hospitality management companies have changed management methods to take the speed factor in performance and saving customer time as one of the most important ways to reach customer satisfaction.

Methodology

Conceptual Framework

This Framework aims to develop the theoretical framework that will be used to guide the current research, to determine variables that will be measured and statistical relationships that may exist between those variables



So the study hypotheses are as follows:

- H.1 – Internet of Things has a positive effect on guest health procedures.
- H.2 – Internet of things has significant effect on saving guest time.
- H.3 – Guest health procedures has a positive effect on Gust’s Satisfaction.
- H.4 – Internet of things has significant effect on Guest’s Satisfaction.
- H.5 – saving guest time has a positive effect on guest satisfaction.

Study Instrument

The questionnaire was piloted through reviewing by certain academic experts to ensure its appropriateness, clarity, and easy of comprehension. Some changes were proposed and later adopted. Where a pilot study was conducted with 20 of hotels five and four star managers in Sharm El Sheikh and with 50 guests of four and five stars hotels in Sharm El Sheikh. So a 500 random sample of four- and five-star guests in Sharm El-Sheikh was selected as a sample, which was extracted according to the following equation:

$$\frac{N \times P (1- P)}{[[N - 1 \times (d^2 \div Z^2)]+ p(1- p)]}$$

The questionnaire is based on a comprehensive literature review. Measurement tools of the variables in this study are showing as following: (a) Compensation Scale (CS) developed by Mensah (2014) to measure the effect of internet if things application and its impact on guest satisfaction, saving guest time, guest health procedures and guest trust. Four and five stars hotel guests in Sharm El Sheik were selected to be study population. So a random sample was selected to distribute the questionnaire. A sum of 500 questionnaire forms was distributed to the guests of sharm El sheik five and four stars hotels, only 411 were valid with response rate (82.2%).

Descriptive statistics have been used to analyze the data by using Statistical Package for Social Science (SPSS.25) with regard to the quantitative data analysis.. There are a number of uses of descriptive statistics, including: description of sample characteristics and specific research questions

Study Findings

Instrument Reliability

Reliability is the extent of how reliable is the model in measuring the intended construct. The use of the below mentioned criteria represents verification of the measurement reliability. Internal reliability: when the Cronbach’s Alpha value is (0.7) or higher, then this type of reliability has been reached.

Table (1): Cronbach’s Alpha and composite reliability results

Criteria	No of statements	Cronbach's Alpha
Internet of things application	10	0.986
Guest satisfaction	4	0.961
Saving guest time	6	0.977
Health procedures	7	0.953
Guest trust	6	0.974
Guest loyalty	4	0.979

To check and achieve questionnaire validity, the questionnaire form were revised and adjusted by the supervision committee and a number of academic professors. In the light of supervision

committee's comments regarding wording, language and design, the researcher set the final questionnaire form. Table (1) shows that the results of composite reliability values are greater than 0.7, and the Cronbach's alpha is also greater than 0.7, which indicates that the construct reliability is fulfilled, and there is both consistency and stability in the model.

Demographic Data

The researcher summarized personal data of the respondents utilizing descriptive statistics basically such as frequencies and percentages to present a description of the gathered data. Table (4) illustrates the percentage and frequency for demographic of respondents features in mentioned samples.

Table (2)

Variables Percentages	Categories	Frequencies	Percentages
Gender	Male	280	70%
	Female	131	30%
Education	High	300	72%
	Moderate	80	28%
	Post	31	7%
Nationality	Egyptian	240	58%
	Foreigner	171	42%
Age	From 21 to 30	160	39%
	From more 31 to 40	100	24%
	From 41 to 49	90	21%
	more than 50	61	16%

Table (2) illustrate that 280 (70%) of respondents are males and 131 (30 %) are females, that lead to the majority of the respondents were males. Point to educational level, (72 %) of respondents have high education degree, (28%) of respondents have moderate educational level and (7.3%) of respondents have post studies degree .according to nationalities (58 %) from the respondents are Egyptians, (42%) are foreigners .Regarding the age (39%) from the respondents are from 21.0 to 30.0 years old (24%) from 30.0 to 40 years o.(21%) from 40 to 50.0years .(16%) more than 50.0 years

Descriptive Statistics

Table (3) Descriptive statistics

Items	Mean	Std. Deviation
Internet of things	2.356	.602
Guest health procedures	4.386	.578
Saving Guest time	4.532	.516
Guest satisfaction	4.431	.618

table (3) states that the respondents' total means for the Internet of things applications criteria is (2.356) and its total standard deviation is (.602). By comparing the total mean value to the Likert Scale, it is found that the value is closer to moderate and poor, which indicates that the degree

adopting Internet of things within hotels under study in Sharm El Sheikh is not enough. Based on what have already been mentioned, it the implementation of Internet of things in the targeted hotels in SharmEl Sheikh could not reach its complete and the optimal implementation .The data illustrated in table (2) also indicate that the total mean of the respondents' agreement on the benefits of using Internet of things on guest health procedures is (4.386) , This value is closer to the value {agree (4)} which refers to respondents' agreement upon the benefits of using Internet of things on guest health procedures . The value of the total standard deviation is (.578) which demonstrates that there is no dispersion among the respondents' opinions. The results shown in the table (3) demonstrate that the total mean of the participants' agreement on the benefits of using Internet of things regarding Saving Guest time is (4.532). This value is closer to the value {agree (4)} which reflects the agreement of the respondents' opinions upon the benefits of using Internet of things regarding Saving Guest time. The value of the total standard deviation is (.516) which demonstrates that there is no dispersion among the respondents' opinions.

Table (2) indicates that the participants' total mean relating the benefits of using Internet of things in improving Guest satisfaction is (4.431) and its total standard deviation is (.618). By comparing the total mean value to the Likert Scale, it was found that the total mean value is closer to the value {agree (4)} which emphasizes the respondents' agreement on the benefits of using Internet of things in improving Guest satisfaction.

Hypotheses Testing

H1. The Internet of Things has a Positive Effect on Guest Health Procedures

Table (4). Model summary

Std. Error of the Estimate	Adjusted R Square	R Square	R	Model
.30254	.651	.653	.808 ^a	1

a. Predictors: (Constant), Guest health procedures

Table (4) shows the results of Analysis of Variance (ANOVA) to verify the significance of analysis model of simple Linear Regression.

Table (5) Analysis of variance (ANOVA^b)

Sig.	F	Mean Square	Df	Sum of Squares	Model
.000 ^a	496.118	45.411	1	45.411	Regression
		.092	26	24.165	Residual
			26	69.575	Total
			5		

a. Predictors: (Constant), Guest health procedures

b. Dependent Variable: Internet of things

table (5) shows that the value of the correlation coefficient between the independent variable (guest health procedures) and the dependent variable, (internet of things), R value is (0.808), and the value of the coefficient of determination (R^2) is (0.653), additionally, the value of the adjusted coefficient of determination (Adjusted R^2) is (0.651), and the value of (F= 496.118) of table (2), and a statistically significant (0.000) which is less than the level of statistical significance ($\alpha= 0.05$). This shows that the combined independent variable (guest health

procedures) is able to explain (65.3%) of the changes that happened in the dependent variable (internet of things).

Table (6). Model summary as well as the Regression Coefficients

Sig.	T	Standardized Coefficients	Unstandardized Coefficients		Model	
		Beta	Std. Error	B		
.001	3.248	.808	.172	.557	(Constant)	1
.000	22.274		.039	.866	Guest health procedures	

a. Dependent Variable: Internet of things

Regarding Hypothesis 1, table (6), shows that there is a presence of a statistically significant standard and non-standard coefficient of simple linear regression equation on the independent variable (guest health procedures), as the value of (t= 22.274) with a statistically significant (0.000), it is less than the level of statistical significance ($\alpha = 0.05$), which shows the rejection of the null hypothesis and accepting the alternative, which stipulates: **"the internet of things has a positive effect on guest health procedures"**; this is agreed with (Lau, 2020). (2020) (Barnawetal,(2020) and so, there is a significant of the standard coefficient of simple linear regression equation whose value amounted to (.808), and non-standard is (.866).

H2. The Internet of Things has a Significant Effect on Saving Guest Time.

Table (7). Model summary

Std. Error of the Estimate	Adjusted R Square	R Square	R	Model
.37201	.473	.475	.689 ^a	1

a. Predictors: (Constant), Saving guest time

Table (7) shows the results of Analysis of Variance (ANOVA) to verify the significance of analysis model of simple Linear Regression

Table (8). Analysis of variance (ANOVA^b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	33.041	1	33.041	238.753	.000 ^a
	Residual	36.535	264	.138		
	Total	69.575	265			

a. Predictors: (Constant), Saving guest time

b. Dependent Variable: Internet of things

table (8) shows that the value of the correlation coefficient between the independent variable (saving guest time) and the dependent variable, (internet of things), R value is (0.689), and the value of the coefficient of determination (R^2) is (0.475), and the value of the adjusted coefficient of determination (Adjusted R^2) is (0.473), and the value of (F= 238.753) of table (5), and a statistically significant (0.000) which is less than the level of statistical significance ($\alpha = 0.05$).

This shows that the combined independent variable (saving guest time) is able to explain (47.5%) of the changes that happened in the dependent variable (internet of things).

Table (9): Model Summary As Well As the Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.604	.244	.689	2.476	.014
	Saving guest time	.828	.054		15.452	.000

a. Dependent Variable: Internet of things

Regarding hypothesis 3, table (9) shows that there is a presence of a statistically significant standard and non-standard coefficient of simple linear regression equation on the independent variable (saving guest time), as the value of ($t = 15.452$) with a statistically significant (0.014) which is lower than the level of statistical significance ($\alpha = 0.05$), which indicates the rejection of the null hypothesis and accepting the alternative, which stipulate: "**the internet of things has a significant effect on saving guest time**"; this is agreed with (Chen et al., 2021) (Nair et al., 2022)

so, there is a significant of the standard coefficient of simple linear regression equation whose value amounted to (.689), and non-standard is (.828).

H3. Guest Health Procedures have A Positive Effect on Guest Satisfaction.

Table (10). Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.558 ^a	.311	.308	.39751

a. Predictors: (Constant), Guest satisfaction

Table (10) shows the results of Analysis of Variance (ANOVA) to verify the significance of analysis model of simple Linear Regression

Table (11). Analysis of variance (ANOVA^b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	18.838	1	18.838	119.220	.000 ^a
	Residual	41.715	26	.158		
	Total	60.554	26			
			5			

a. Predictors: (Constant), Guest satisfaction

b. Dependent Variable: Guest health procedures

Table (11) shows that the value of the correlation coefficient between the independent variable (guest satisfaction) and the dependent variable, (guest health procedures), R value is (0.558), and the value of the coefficient of determination (R^2) is (0.311), and the value of the adjusted coefficient of determination (Adjusted R^2) is (0.308), and the value of ($F = 119.220$) of table (13), and a statistically significant (0.000) which is less than the level of statistical significance ($\alpha = 0.05$). This shows that the combined independent variable (guest satisfaction) has the ability to explain (31.1%) of the changes that happened in the dependent variable (guest health procedures).

Table (12). Model summary as well as the regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.108	.210	.558	10.033	.000
	Guest satisfaction	.514	.047		10.919	.000

a. Dependent Variable: Guest health procedures

Regarding hypothesis 4, table (12) shows that there is a presence of a statistically significant standard and non-standard coefficient of simple linear regression equation on the independent variable (guest satisfaction), as the value of (t= 10.919) with a statistically significant (0.000) which is less than the level of statistical significance ($\alpha = 0.05$), which shows the rejection of the null hypothesis and accepting the alternative, which states: "**guest health procedures have a positive effect on guest satisfaction**"; this is agreed with (Maitra and Shukla, 2022)

Therefore, it shows the significant of the standard coefficient of simple linear regression equation whose value amounted to (.558), and non-standard is (.514).

H4. The Internet of Things Significantly Affects Guest Satisfaction.

Table (13) Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.572 ^a	.328	.325	.42091

a. Predictors: (Constant), Guest satisfaction

Table (13) stipulates the Analysis results of Variance (ANOVA) to verify the significance of analysis model of simple Linear Regression

Table (14). Analysis of variance (ANOVA^b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.803	1	22.803	128.712	.000 ^a
	Residual	46.772	264	.177		
	Total	69.575	265			

a. Predictors: (Constant), Guest satisfaction

b. Dependent Variable: Internet of things

table (14) clarify that the value of the correlation coefficient between the independent variable (guest satisfaction) and the dependent variable, (internet of things), R value is (0.572), and the value of the coefficient of determination (R^2) is (0.328), and the value of the adjusted coefficient of determination (Adjusted R^2) is (0.325), and the value of (F= 128.712) of table (11) and a statistically significant (0.000) which is lower than the level of statistical significance ($\alpha = 0.05$). This indicates that the combined independent variable (guest satisfaction) has the applity to explain (32.8%) of the changes that happened in the dependent variable (internet of things).

Table (15). Model Summary As Well As the Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.849	.222	.572	8.311	.000
	Guest satisfaction	.566	.050		11.345	.000

a. Dependent Variable: Internet of things

Regarding hypothesis 5, table (15) shows that there is a presence of a statistically significant standard and non-standard coefficient of simple linear regression equation on the independent variable (guest satisfaction), as the value of ($t= 11.345$) with a statistically significant (0.000) which is less than the level of statistical significance ($\alpha = 0.05$), which shows the rejection of the null hypothesis and accepting the alternative, which stipulates: **"the internet of things significantly affects guest satisfaction"**; this is agreed with (Pelet et al,2021), (Abdel-Hamid et al,2022), (Chardouh et al,2022), (Ahmed et al,2022)and so, there is a significant of the standard coefficient of simple linear regression equation whose value amounted to (.572), and non-standard is (.566).

H5. Saving Guest Time has a Positive Effect on Guest Satisfaction.

Table (16). Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.624 ^a	.389	.387	.33392

a. Predictors: (Constant), Guest satisfaction

Table (16) illustrates the results of Analysis of Variance (ANOVA) to verify the significance of analysis model of simple Linear Regression

Table (17) Analysis of variance (ANOVA^b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	18.764	1	18.764	168.277	.000 ^a
	Residual	29.437	264	.112		
	Total	48.201	265			

a. Predictors: (Constant), Guest satisfaction

b. Dependent Variable: Saving guest time

Table (17) illustrates that the correlation value coefficient between the independent variable (guest satisfaction) and the dependent variable, (saving guest time), R value is (0.389), and the value of the coefficient of determination (R^2) is (0.389), and the value of the adjusted coefficient of determination (Adjusted R^2) is (0.387), and the value of ($F= 168.277$) of table (14) and a statistically significant (0.000) which is less than the level of statistical significance ($\alpha= 0.05$). This showing that the combined independent variable (guest satisfaction) is able to explain (32.8%) of the changes that happened in the dependent variable (saving guest time).

Table (18). Model summary as well as the regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig .	
	B	Std. Error	Beta			
1	(Constant)	2.258	.176	.624	12.793	.000
	Guest satisfaction	.513	.040		12.972	.000

a. Dependent Variable: Saving guest time

Regarding hypothesis 6, table (18) shows that there is a presence of a statistically significant standard and non-standard coefficient of simple linear regression equation on the independent variable (guest satisfaction), additionally, the value of (t= 12.972) with a statistically significant (0.000) which is less than the level of statistical significance ($\alpha = 0.05$), which indicates the rejection of the null hypothesis and accepting the alternative, which stipulates: **"saving guest time has a positive effect on guest satisfaction"**; this is agreed with (Anvarovns. R,2022) (Momani et all 2022) and so, there is a significant of the standard coefficient of simple linear regression equation whose value amounted to (.624), and non-standard is (.513).

Recommendations

- Increase the effective adoption of internet of things application in hotels by spreading awareness regarding the benefits related to hotels as well as guests.
- The hotels need to apply marketing policies and strategies that encourage guests, which lead to increasing the use of Internet of things regarding hotel services as reducing the prices of services provided by internet of things at hotel.
- Hotels should focus on the services provided to the guests through the Internet of Things in the accuracy of service and reducing time which enhance customer loyalty.
- Expanding the range of programs that used for Internet of Things applications, which increases ease of use, and the consequent increase in the desire to use
- Integration of the Internet of Things into gasification policies as one of the modern marketing methods to attract large segments of youth and children to book and get discounts for services by using the Internet of Things.
- The necessity of increasing customer confidence in terms of security and maintaining privacy of information and data, especially financial transactions, through the use of the Internet of Things to obtain hotel services.
- The need to use the Internet of Things not only to obtain hotel services, but to use it in evaluating customer complaints and questionnaires for guest reviews , and to publish it on websites in order to increase the confidence of guests.

Further Research

There are determinants of the current study, including the spatial determinants of the study, as it was applied to the city of Sharm El-Sheikh. Also, the questionnaire was directed to some inmates who are in hotels in the same study area. Thus, the results of that study cannot be generalized. Also, the study included a group of inmates with ages from 21 to more than 40 Thus; the study sample did not include guests over the age of 50 years. Also, the current study proposes future studies the challenges of applying the Internet of Things from the point of view of customers and management, and assessing the extent of applying the Internet of Things and its role in achieving sustainable development and contributing to reducing climate changes, given that the Internet of Things is one of the most important capitals of the hospitality industry. And the extent of its effectiveness in terms of service costs from an administrative point of view. It is also possible to study the impact of electronic services and service automation on the nature of hotel service.

تقييم تطبيق إنترنت الأشياء في فنادق شرم الشيخ

المستخلص

تهدف الدراسة إلى تقييم تطبيق إنترنت الأشياء في فنادق أربع وخمس نجوم في شرم الشيخ من تصورات نزلاء الفنادق. تم استخدام الاستبيان لقياس تطبيق إنترنت الأشياء وتأثيره على رضا النزلاء ، وتوفير وقت النزلاء ، وثقة النزلاء ، بالإضافة الي الإجراءات الصحية للنزلاء. يقتصر نطاق هذه الدراسة على الفنادق الأربع والخمس نجوم في مدينة شرم الشيخ. بلغ عدد النزلاء المستهدفين (500) نزيل ، ويبلغ إجمالي عدد الاستبيانات الصالحة للتحليل (411) بمعدل الاستجابة (82.2%). . وأظهرت النتائج أن درجة تطبيق إنترنت الأشياء في الفنادق الأربع والخمس نجوم في شرم الشيخ لا يزال ضعيفا. كما أظهرت النتائج أيضا أن إنترنت الأشياء له تأثير إيجابي على تحسين الإجراءات الصحية للنزلاء ، وتوفير أوقاتهم، وثقتهم. علاوة على ذلك ، فإن تحسين الإجراءات الصحية للنزلاء له تأثير إيجابي على رضا النزلاء ، في حين أن رضا النزلاء له تأثير إيجابي على ولائهم.

الكلمات الدالة : إنترنت الأشياء ، رضا النزلاء ، الولاء ، الثقة ، توفير وقت الضيف وتحسين الإجراءات الصحية للنزلاء.

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