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Service Robots in Hotels in Egypt: Customers' Willingness and Managers' Challenges

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Abstract

Dilemmas of staff deficiency or turnover especially in perilous times may be recovered by integrating service robots. In addition, there is continuous and global competition in the daily business environment of the hotel industry. Therefore, the current research aims to shed the light on artificial intelligence (AI) in general and service robots in hotels in Egypt in particular. It also aims to investigate the extent of customers' willingness towards robots, and to determine the impact of a set of factors on their willingness. Further, it aims to explore the challenges facing hotel managers to integrate robots in their hotels.

This study is considered a descriptive and exploratory one. First, Customers of the hotels provided data, as 46 hotels were chosen using the stratified random sample technique as a representative sample, then, respondents were randomly surveyed and 1200 valid responses were collected and analyzed through a set of statistical tests using the Amos program. Second, data were collected from 30 hotel managers using focus group technique.

The results revealed a positive willingness for hotel guests to interact with service robots in different operations. Also, the results emphasized the positive impacts of performance efficacy, anthropomorphism, social influence, and emotions on the hotel customers' willingness towards robots. Conversely, both intrinsic motivation and facilitating conditions were found to have no significant impact. In addition, the focus group results indicated that hotel managers have positive intentions towards integrating robots in their hotels; however, they face many challenges. Finally, the current research provides implications to hotel management for integrating robots that satisfying customers' willingness.

Keywords: Artificial Intelligence, Robots, Customers' willingness, Managers' Challenges, Egypt

1. Introduction

Artificial intelligence (AI) refers to a technology that facilitates human intellect in decision-making by fusing advanced hardware and software with massive databases (Rindermann et al., 2020; Khaleel et al., 2024). Computer algorithms are AI applications that provide machines the ability to apply human traits to improve answers in a way that is similar to that of humans (Watson et al., 2019;

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Hanna et al., 2025). Thus, using algorithms for deep learning AI systems can assist companies in creating offers that are specifically tailored to the demands and preferences of their previous clients.

Additionally, benefit computerization frameworks presently highlight robots which are being utilized by airport administration as substitutes for traveller data centers, whereas hotels are utilizing AI to streamline forms and quicken tasks customarily conducted by front-line workers benefit for concierge, visitor enrolment, room service, bar-tending, chatbots, and virtual speech help (Khaleel et al., 2024).

Consequently, robots proceed developing, at notable annual rates above thirty percent, and the International Federation of Robotics (2021) expects indeed more prominent developments within the utilize of assistance robots for skilled and individual purposes within another era. Robots presented to perform open intuition are picking up specific conspicuousness. Robots presented to perform public intelligence are picking up specific conspicuousness.

Practitioners and service researchers have rapidly adopted the use of robotic devices to enhance service engagements. (Huang and Rust, 2018; Wirtz et al., 2018; Huang, 2020; Irizar, 2022). Businesses in the hotel and tourism industries are becoming more and more interested in using AI to provide human services as new technologies continue to improve the consumer experience. (Khaleel et al., 2024; Kim et al., 2022).

Uses the "Spencer" robot at Amsterdam Airport Schiphol to provide customer care and assist travellers (KLM, 2016). Within the restaurant industry, Royal Caribbean International's cruise liner Quantum of the Seas features a bionic bar manned by robots (Carrozza, 2019). Furthermore, the hospitality industry has a lot of examples that already witnessed those service robots occurring when service-related sectors implement robotic employees. For instance, Hilton Worldwide and IBM are working together to test the use of "Connie," a robot concierge. Similar to this, other global companies like Holiday Inn Express and Aloft Hotels employ robots named "Relay" and "Wally" to provide room meals (Khaleel et al., 2024).

Approximately 86% of retail marketing programmes have intentions to invest in artificial intelligence, according to several studies (Persado, 2017; Hanna et al., 2025). Findings from other researchers found that about 75% of customers believe that customers' experiences with robots may be improved; over 68% of respondents said they would be open to having robots work as front desk clerks, 68% as room service attendants, 73% as porters, and 69% as waiters (Webster and Ivanov, 2020; Khaleel et al., 2024).

More comprehensively, AI such as service robots and catboats applications in hotels. In addition to giving customers authority, deliver amiable, dependable service, and ensure equity in all interactions with customers. (Segura et al., 2019; Kullmann, 2022; Hanna et al., 2025). Also, AI may provide privacy to a sensitive guest, extended access hours, speed, ease of use, using a service robot and chatbot software to communicate in the user's choice language and perform a range of features and activities include booking reservations at nearby restaurants, booking flights, and providing electronic concierge services (Timms, 2016; Talwar et al., 2017; Watson, 2018; Song et al., 2022; Hanna et al., 2025).

Besides, Artificial intelligence (AI) offers advantages to hotel operations as well as customers. These advantages include reduced costs, expedited production times, constant product quality, and supply chain management, etc (Lavigne et al., 2019; Padma and Ahn, 2020; Hanna et al., 2025). In this regard, the hotel operations consider adding AI applications such as service robots and chatbots to their product or service line as a competitive advantage (Marinova et al., 2017; Yampolskiy, 2018; Khaleel et al., 2024). Over the past decade, technology has emerged as the most significant factor influencing how customers interact with businesses and how services are provided. However, hotels in Egypt still not integrate robots in their operations which represent a gap for this study to investigate the reasons behind that and the

customers' willingness as well. Therefore, the current study mainly aims to achieve the following:

1. Exploring customers' willingness towards robots that provide services for hotels.

2. Determining the factors that may influence customers' willingness towards service robots.

3. Investigating hotel managers' intentions and challenges regarding service robots.

2. Literature Review

2.1 Customers' Willingness towards Service Robots

Customers' actual behaviors are influenced by their goals and willingness (Cronan et al., 2018; Hanna et al., 2025). As per the Theory of Reasoned Action, the main factor that determines customers' real behavior is their intention or willingness to use (Fishbein and Ajzen, 1975). Customers' willingness can be referred to as customers' motivation to take part actively in an activity. In particular, the readiness of the customer to utilise AI applications in upcoming service interactions is referred to as their willingness to accept the use of AI devices. As a result, the hotel business would have to invest time in recognizing the factors that influence customers' willingness towards technology (Zhang et a., 2021; Hanna et al., 2025).

Ivanov and Webster (2017) and Ivanov et al. (2018) emphasized that lodging companies should understand who their customers are and their future willingness to treat with robots. Otherwise, Lu et al. (2019) created a metric that measures the willingness of the customer and found six key indicators that indicate how likely customers are to use AI service robots to offer services: performance efficacy, intrinsic motivation, anthropomorphism, social influence, facilitating condition, and emotion.

2.1.1 Performance Efficacy and Customers'' Willingness

Performance efficacy characterizes the degree to which people accept technology applications (Venkatesh et al., 2003). For this development, the researchers may use many notions (quality of task outputs, enhanced self-competency, viability, and outcome wants); the estimation items reflect similar conceptualization (Venkatesh and Goyal, 2010). Moreover, performance efficacy provides the customer with reliable service. Performance efficacy is distinguished as the most grounded indicator of behavioural intentions in both obligatory and voluntary utilization of new technology (Tsai and Yang, 2013; Magdy & Hassan, 2024; Hanna et al., 2025). Therefore, the first hypothesis was formulated as follows:

H1: Performance efficacy has a significant positive impact on hotel customers' willingness towards robots.

2.1.2 Intrinsic Motivation and Customers' Willingness

Intrinsic motivation is used to describe the enjoyment experienced, whereas connection with a technology device, which has been demonstrated to foresee users' innovation utilized in customer and representative settings (Hassan et al., 2024; Hassan et al., 2022). Intrinsic motivation considers one of the main components that encourage the hotel customer to use AI applications (Venkatesh et al., 2012). The enjoyment and delight derived from interacting with automated personnel are associated with the basic principle of hospitality services, which warrants the consideration of intrinsic motivation as a basic component of the SRIW scale (Peters et al., 2019; Webster and Ivanov, 2020; Hanna et al., 2025). Therefore, the second hypothesis was formulated as follows:

H2: Intrinsic motivation has a significant positive impact on hotel customers' willingness towards robots**.**

2.1.3 Anthropomorphism and Customers'' Willingness

Anthropomorphism is the extent to which a character resembles or exhibits human characteristics (Goudey and Bonnin, 2016). Anthropomorphism incorporates the setting of facebook pages related to hospitality

technologies (Fan et al., 2020), self-service interfaces (Fan et al., 2020), mobile phones (Tussyadiah et al., 2018) and virtual agents in recommender systems (Thompson et al., 2017; Hanna et al., 2025). Moreover, the positive impact of anthropomorphism generally happens when items have human intelligence (Goudey and Bonnin, 2016; Mimoun et al., 2017). On the other side, AI programmes that resemble humans physically could endanger the humanity of their users. Nevertheless, Anthropomorphism has significant impacts on customers' willingness and trustworthiness of using service robots in hotel industry (Simmons et al., 2011). At the same time, Lu et al. (2019), demonstrated that anthropomorphism had a negative effect on customer willingness. Arguably, AIs consider a source of threat to customers and it will be uncomfortable for them because they can change their life by losing their jobs (Koo et al., 2021; Hanna et al., 2025). Therefore, the third hypothesis was formulated as follows:

H3: Anthropomorphism has a significant impact on hotel customers' willingness towards robots.

2.1.4 Social Influence and Customers' Willingness

Social influence is the extent to which the customers' decision to accept AI and automated systems is affected by customers' social systems (Xu et al., 2017; Magdy & Hassan, 2025). In required settings (workers), the positive impact of social impact on intention may well be credited to compliance; in any case, it influences voluntary (customers) technology choice by affecting perceptions. A few studies recommend that social impact can shape customers' recognition of technology (Canning et al., 2014; Bhaumik, 2018; Huang, Kao, 2021; Hassan & Magdy, 2024). Therefore, the researchers formulated the following fourth hypothesis:

H4: Social influence has a significant positive impact on hotel customers' willingness towards robots**.**

2.1.5 Facilitating Conditions and Customers' Willingness

Facilitating conditions refer to the available and accessible resources that would encourage hotel customers for using technology devices (Brown et al., 2006). This construct offers viewpoints on the organisational environment or technology that are designed to minimise barriers to consumer use (Skjuve and Brandtzæg, 2018). Facilitating conditions are effectively and successfully engaged in human communication to Recognise customer willingness and consider service robots as human replacements (Daugherty and Wilson, 2018; Hanna et al., 2025). Additionally, Venkatesh et al. (2003) and Alazab et al. (2021) stated that facilitating conditions construct refers to aspects of technology or organisational environments that are designed to reduce barriers to consumer use. Therefore, the fifth hypothesis was formulated as follows:

H5: Facilitating Conditions have a significant positive impact on hotel customers' willingness towards robots.

2.1.6 Empathy and Customers' Willingness

Empathy is fundamental to employee and customer service experiences (Lee and Leonas, 2018), but it speaks to a great high level of service robots full of feeling accomplishment (Huang and Rust, 2018). Furthermore, as a "people business," tourism significantly depends on human labour to provide its services (Koo et al., 2021). In this regard, empathy and effectiveness of the offering Employees have a significant influence on client willingness and service quality (Markovic et al., 2013). Additionally, Lu et al. (2019) declared that emotional have a noteworthy effect on Customers' willingness to deploy robots for service in the hotel industry. At the same time, Gácsi et al. (2016) demonstrated that there are significant effects between emotion and customers' willingness to use service robots in the hotel industry. Meanwhile, physically present service robots can convey the feelings of their customers by using precise facial expressions and body language. (Millstein, 2020). Therefore, the sixth hypothesis was formulated as follows:

H6: Emotions have a significant positive impact on hotel customers' willingness towards robots**.**

2.2 Integration of Robots in Hotels: Challenges

AIs would require reengineering of the forms inside the hotel, modifying the service operations manuals and training staff to utilize robots (Ivanov and Webster, 2017). Moreover, hotel managers may be anxious about the change and consider the technology as a risk for their occupations. Furthermore, employees' resistance may be a capable social calculation that should be considered when deciding on robots adoption (Ivanov and Webster, 2017; Sergeevic, 2020).

Costs for staff training to ensure viable and proficient work with robots and other AIs can be considered very expensive. In addition, some of the financial costs involved may be significant, which may prevent the hospitality industry from selecting AIs (Dunis et al., 2016). However, renting/leasing AI will mostly reduce these costs because the hospitality industry may outsource the robots rather than purchasing them and may charge for their use (Dunis et al., 2016; Hanna et al., 2025). The field study's second section in the current investigation, hotel managers were asked about their real intentions about integrating service robots in their hotels and what are the challenges they face in this matter.

3. Methodology

3. 1 Sampling and Data Collection

A stratified random sampling technique was employed to choose 46 five-star hotels for the sample from different destinations in Egypt, representing thirty percent of the 154 hotels' total population (EHA, 2020). Then, to choose the participants, a basic random sampling method was utilized. Data collection was conducted through two stages. The first stage, hotel guests were surveyed in order to investigate their willingness to accept AIs. A draft of the questionnaire was piloted to six experts in the tourism industry, seven managers from the hotel industry and 50 hotel guests to identify questionnaire deficiencies, problems with layout and design. Finally, 1900 Questionnaires were distributed from 7th September 2021 until 10th December 2020; out of the 1220 questionnaires gathered, only 1200 were deemed legitimate, accounting for 63% of the entire sample. This indicates a satisfactory response rate.

The second stage, data were collected from the hotel managers to investigate their intentions and challenges to incorporate robots into their hotel operations. Therefore, focus groups were conducted with thirty participants from different hotels

. 3.2 Questionnaire development and measures

The researchers used the developed model of service robots integrating willingness (SRIW) which, was established by Churchill (1979) and DeVellis (2012) and then developed by (Lu et al., 2019). SRIW scale involves seven-dimensions with 39-item. Specifically, performance efficacy includes eight items, intrinsic motivation includes five items, anthropomorphism includes seven items, social influence includes seven items, facilitating conditions includes five items and emotions includes four items. In addition, the three criteria that were used to gauge hotel customers' willingness to accept robots were modified from Venkatesh and Goyal (2010).

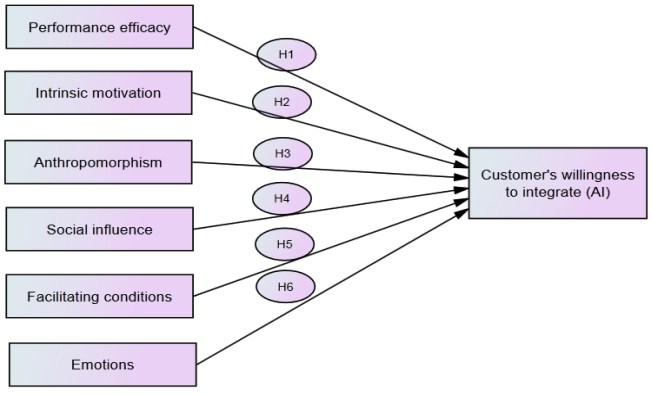

Figure 1. the Proposed Research Hypotheses

4. Results

4.1 Scale Measurement

The researchers used seven sub-dimensions of a confirmatory factor analysis to assess the validity of the measuring items: Performance Efficacy (PE), Intrinsic Motivation (IM), Anthropomorphism (AN), Social Influence (SI), Facilitating Conditions (FC), Emotions (EM) and customers' willingness (CW). The outcomes showed how well the seven-factor model suited the data. Moreover, internal consistency was shown by Cronbach's alpha (≥ 0.90). Convergent validity and discriminant validity were the two categories used to assess the validity of the assessed items as shown in figure (2).

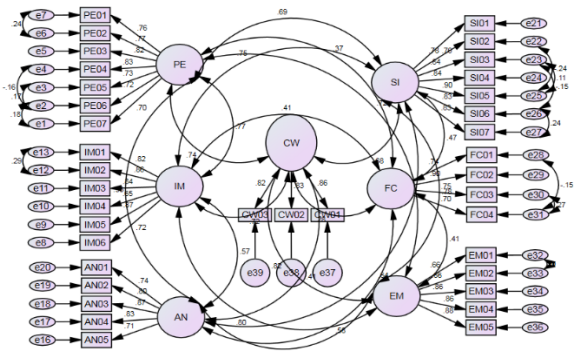

Figure 2. Scale Measurement

In addition, According to Bagozzi and Yi (1988), standardised factor loading ($p < 0.001$), average variance extracted ($p < 0.5$), and composite construct reliability ($p < 0.7$) were the evaluation standards for convergent validity. It was discovered that every prospective component examined in this study met this requirement (Bratt and Fagerström, 2020).

Therefore, CFA was carried out utilising maximum likelihood estimate. With $\chi2 = 3910.592$, df = 688, $p < .001$, $\chi2/df = 5.684$, root mean square error of approximation [RMSEA] =.068, comparative fit index [CFI] = 0.831, and Tucker-Lewis index [TLI] = 0.886, the first model appears to be a reasonable fit for the data. Nevertheless, two survey items (AN06–AN07) related to the anthropomorphism construct were removed since they had low factor loadings. A second CFA using the remaining items, once these were eliminated, revealed a satisfactory fit to the data ($\chi2 = 2902.673$, df = 596, $p < .001$; $\chi2/df = 4.870$; RMSEA = 0.057; CFI = 0.934; TLI = 0.927). Overall, the characteristics of the measuring model are summed up in table (2). With factor loadings ranging from 0.650 to 0.923, all survey questions demonstrated a significant correlation with their designated constructs ($p < .001$). Internal consistency is indicated by the composite reliability (CR) values, which vary from 0.618 to 0.947 and beyond the suggested standards of 0.60 (Bagozzi and Yi, 1988).

Additionally, convergent validity is confirmed by the average variance extracted (AVE) values, which ranged from 0.512 to 0.700 and above the suggested value of 0.50 (Fornell and Larcker, 1981). Finally, as table (1) illustrates, the AVE values for each concept were higher than the squared correlation between constructs, indicating discriminant validity (Fornell and Larcker, 1981).

Table 1: Results of confirmatory factor analysis

Constructs	Standardized Loading	CR	AVE
Customers' *Willingness*			
Performance Efficacy			
PE01	0.76	0.899	0.512
PE02	0.77		
PE03	0.82		
PE04	0.83		
PE05	0.73		
PE06	0.72		
PE07	0.70		
Intrinsic Motivation			
IM01	0.82		
IM02	0.86		
IM03	0.84	0.912	0.636
IM04	0.65		
IM05	0.87		
IM06	0.72		
Anthropomorphism			
AN01	0.74		
AN02	0.79		
AN03	0.87	0.883	0.624
AN04	0.83		
AN05	0.71		
Social Influence			
SI01	0.76		
SI02	0.78		
SI03	0.84	0.947	0.588
SI04	0.85		
SI05	0.92		
SI06	0.83		
SI07	0.83		

Table 1: Results of confirmatory factor analysis

Constructs	Standardized Loading	CR	AVE
Facilitating Conditions			
FC01	0.74	0.727	0.603
FC02	0.90		
FC03	0.75		
FC04	0.70		
Emotions			
Em01	0.66	0.868	0.686
Em02	0.86		
Em03	0.86		
Em04	0.86		
Em05	0.88		
Customer's willingness			
CW01	0.86	0.618	0.700
CW02	0.83		
CW03	0.82		

All factor loadings are significant at ($p < 0.001$).
(CR=composite reliability; AVE=average variance extract

Consequently, the average variance extracted value was determined to be significantly higher than the maximum shared variance (0.828) in table (1), discriminant validity was confirmed and validity was obtained. The result of the modification indices was verified as shown in table (2). Additionally, six criteria were used in this study to determine the overall model fit: chi-square/degrees of freedom, which fell between two and five, while the goodness of fit, normed fit, Tucker-Lewis, comparative fit, and comparative fit index values were higher than 0.90, lower than 0.08, and higher than 0.90 (Schubert et al., 2017). As a result, it was decided that the measurement model was sufficient to go before tests of hypotheses utilising moment structure analysis software.

Table 2. Model fit summary

Modification Indices	CMIN/DF	GFI	NFI	TLI	CFI	RMSEA
Customers' Willingness	4.8	.884	.919	.927	.934	0.057

Notes: CMIN/DF = chi square/ degrees of freedom; (GFI) = goodness of fit index; (NFI) = normed fit index; (TLI) = Tucker and Lewis index; (CFI) = comparative fit index; root mean square error of approximation = (RMSEA)

4.2 Respondents' Profile

Following data screening, a detailed account of the respondents' profiles (Table 3) was provided to illustrate the background against which this study was conducted. The age of most of the respondents (90%) was in the category ranging from 18 to 45 years old. Otherwise, respondents whose age is more than 45 years represented only 10 %.; this may have an influence on the results. Also, the higher percentage (61.8%) of respondents had bachelor's degrees. Furthermore, the highest percentage of respondents (33.4%) was students or recently graduated. Moreover, based on the respondents' marital status, the majority (53.3%) were single. In sum, the overall characteristics of the sample are young, single, students/recently graduated, highly educated, from different nationalities and no previous experience with robots.

Table 3: Respondents' Profile

Respondents' profile	Respondents	
	No.	%
Nationalities		
Russian	197	16.4
Italian	153	12.8
Egyptian	353	29.4
German	197	16.4
English	192	16.0
French	74	6.2
Others	34	2.8
Gender		
Male	685	57.1
Female	515	52.9
Age		
18-25	526	43.8
26-35	317	26.4
36-45	232	19.3
46-55	100	8.3
Older than 56	25	2.1
Educational Level		
High School	160	13.3
Bachelor's Degree	741	61.8
Master Degree or Doctorate	127	10.6
Others	172	14.3
Occupation level		
Top management /Professionals	131	10.9
Supervisory /Middle management	265	22.1
Self-employed / own business	191	15.9
Student / Graduated	401	33.4
Retired	30	2.5
Other	182	15.2
Dealt with artificial intelligence before?		
Yes	200	16.7
No	791	65.9
Sometimes	209	17.4

4.3 Managers' Profile

Five focus groups were conducted with 30 participants in total, which includes hotel managers from various departments. Only 2 managers were female, in agreement with previous literature which revealed that most hotel managers are male (Dogan and Vatan, 2019). In addition, most participants were experienced in the hotel field; had from 8 to over 20 years of experience and only 3 participants possessed less than ten years of expertise. Moreover, the positions of hotel representatives ranged from assistant and department managers to general manager. Furthermore, the number of rooms in their hotels was variable from 300 to 1500 rooms. Each participant was attributed with a unique code to refer to them without disclosing their identity.

4.4 Customers' Overall Willingness

The respondents were asked about their future willingness towards integrating robots in the hotels they will visit (table 5), they revealed their positive willingness to deal with reboots in the hotels. However, their preferences about reboots in the hotels varied based on the type of service that reboots will provide or the department to be in. Most of respondents preferred robots for luggage carrying, delivering food and drinks in room service and leaning the room and common areas of the hotel. Customers' desire to deal with robots for these services may be due to their needs for feeling privacy. The smaller percentages of respondents exhibited their needs for robots in *Welcoming / greeting a guest check-in and check out, taking orders with serving food and drinks in the restaurant/ Bar , Welcoming/greeting a guest at the restaurant and guiding guests to the table in the restaurant*. Although more than 35% of respondents showed their preferences about robots for these services. However, they were not ranked as the first priority for them. This may due to their real needs for hospitality and human touch in these services.

Table 4: Respondents' overall willingness towards robots

Which hotel services would you prefer to be carried out by reboots? (You can select more answers)		
1. Welcoming / greeting a guest check-in and check out	463	39%
2. Luggage carrying	656	55%
3. Providing information about hotel facilities (sales and marketing information)	558	47%
4. Processing cash and card payments	571	48%
5. Cleaning the room and common areas of the hotel	605	50%
6. Taking customer orders for laundry and delivering ready laundry	516	43%
7. Delivering food and drinks in room service	641	53%
8. Welcoming/greeting a guest at the restaurant and guiding guests to the table in the restaurant	420	35%
9. Taking orders with serving food and drinks in the restaurant/ Bar	466	39%
10. Serve as guards/ security	360	30%

4.5 Hypotheses Testing and Results Discussion

The structured equation analysis test (between non-observed variables) and path analysis test (between observed variables), depended on correlation analysis and linear regression analysis tests were conducted. Moreover, the statistical programs used in this study were SPSS- version 26 and AMOS-version 25. Each hypothesis can be classified as supported or unsupported based on the variable's total significance variance. In light of this, the structural equation model (SEM) is shown in figure (3).

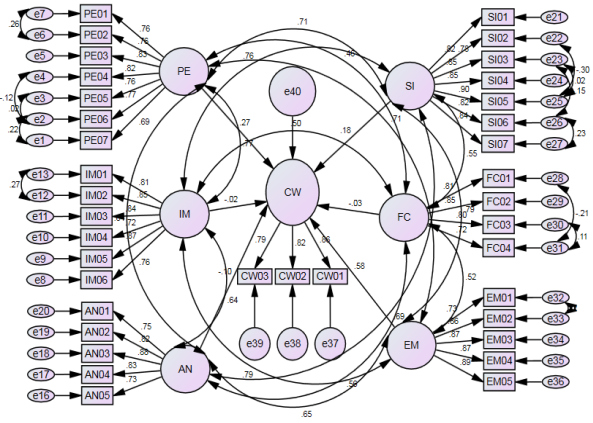

Figure 3: Structure Equation Model (SEM) for Guests Willingness

The structural model fit the data quite well ($\chi2$ = 2902.673, df = 596, p < .001; $\chi2$ /df = 4.870; RMSEA = 0.057; CFI = 0.884; TLI = 0.927). Thus, hypothesis testing was done using this model. Table (5) displays the structural model's findings.

As a consequence, the results indicated that PE (Performance Efficacy) (β = 0.396, t = 8.740, p < .001), EM (Emotions) (β = 0.774, t = 12.204, p < .01), SI (Social Influence) (β = 0.112, t = 2.698, p < .005), and AN (Anthropomorphism) (β = -0.117, t = -5.430, p < .001) had a positive and significant impact on customers' willingness towards robots. Thus, H1, H3, H4, and H6 were supported. By contrast, IM (Intrinsic Motivation) (β = 0.004, t = 0.079, p > .05) and FC (Facilitating Conditions) (β = 0.047, t = -1.711, p > .05) construct had a non-significant impact on customers' willingness showing no support for H2 and H5. Table (5) gives a schematic illustration of the outcomes.

Table 5: Structural model results–estimates and fit indices.

	Standardized estimates	T-Value	P-Value	Decision
H1: CW -----> PE	0.396	8.74	***	Supported
H2: CW -----> IM	0.004	0.079	0.937	Not supported
H3: CW -----> AN	-0.177	-5.43	***	Supported
H4: CW -----> SI	0.112	2.698	***	Supported
H5: CW -----> FC	-0.047	-1.711	0.087	Not supported
H6: CW -----> EM	0.774	12.204	***	Supported

*Note: *p < .05, **p < .01, ***p < .001.*

The findings recorded that around 74% of the observed variability (performance efficacy) influenced positively customers' willingness towards robots. This indicates that when the performance efficacy construct goes up by (1) standard deviation, hotel customers'

willingness goes up by (0.74) standard deviations. Accordingly, performance efficacy was a significant predictor of hotel customers' willingness towards robots in five-star hotels in Egypt. These outcomes were indeed consistent with Wirtz et al. (2018) and Hua et al. (2020) who noted that performance efficacy believes that the best indicator of consumers' intentions for both required and optional adoption of AI applications in the hotel sector. In the same, Elkhwesky et al., (2024) said that consumers' perceptions of an information system's ease of use and low learning curve are what cause them to have favourable usage intentions. Similarly, Lu et al. (2019) and Sigala (2020) advise service providers to pay careful attention to achieving performance efficacy of the new technology which increases customers' willingness to integrate AI in the hotel industry. Moreover, Ashfaq et al. (2020) asserted that a strong positive relationship was between the smartness of using technology and customers' perceived usefulness of AI applications in the hotel industry. While these results came contrary to Davis et al. (1989), who claimed that although using technology can improve performance, the effort required to do so outweigh the benefits.

The present study's findings demonstrated that intrinsic motivation was not a significant predictor of customers' willingness. Actually, the results of the current investigation concurred with Diestel and Schmidt (2012) as they maintained that obligation-based intrinsic motivation is more significant than enjoyment-based intrinsic motivation in the context of the workplace. In addition, Daunt and Harris (2012) pointed out that It could be possible to assist the person in preventing obligation-based intrinsic motivation from giving way to enjoyment-based intrinsic motivation. Van der Heijden (2004) claimed that customers view service robots more as a type of hedonic system, in which user acceptance is dominated by intrinsic incentive rather than extrinsic drive. Similarly, Lu et al. (2019) quoted that "*A higher level of intrinsic motivation was related to a higher level of willingness to use service robots in hotel services*". On the other side, some results came on the contrary (Brown et al., 2006; Venkatesh et al., 2012) as they investigated that customer's use and intrinsic motivation are regarded as the primary motivator behind technology use.

Relating Anthropomorphism, the results showed that around 41% of the observed variability (Anthropomorphism construct) influenced positively hotel customers' willingness towards robots. This indicates that when the anthropomorphism construct goes up by (1) standard deviation, hotel customers' willingness goes up by (0.41) standard deviations. The outcome is in line with Simmons et al. (2011) who believed that Anthropomorphism shapes the human-robot relationship by influencing how believable robots are interaction. In this regard, Wan and Aggarwal (2015) clarified that smart gadget possessing a human-like physical appearance could be hazardous for customers' sense of self. Thus, Anthropomorphism is generally beneficial when items actually exhibit human intellect (Goudey and Bonnin, 2016; Mimoun et al., 2017; Banerjee, 2025).

On the other side, some results came on the contrary with the results such as, Ackerman (2016), because robots' human likenesses generate the impression that human identity is in danger, individuals can start to feel uncomfortable with the concept that humans might be losing their uniqueness. Also, Lu et al. (2019) shown that hotel guests' desire to integrate AIs was negatively impacted by anthropomorphism. In essence, Wan and Aggarwal (2015) claimed that because human appearance is linked to intelligence and skill in task performance, anthropomorphizing a non-intelligent product is a useful tactic to increase customer willingness. This suggests that the role of human appearance in designing intelligent versus non-intelligent technologies for customer usage varies.

Besides, the findings showed that around 67.8% of the observed variability (social influence construct) influenced positively hotel customers' willingness towards AIs. It indicates that when the social influence construct goes up by (1) standard deviation,

hotel customers' willingness goes up by (0.68) standard deviations. The results are consistent with Venkatesh et al. (2003) and Canning et al. (2014) and Lu et al. (2019) and Liu et al. (2020) who mentioned that social influence can shape customer's perceptions of technology and influence customers' willingness to use robots in hotels. Furthermore, Lee et al, (2018) stated that customers' attitudes towards service robots may be influenced by their reference group, which can also have a significant impact on decisions about whether to accept or reject this new technology. Nimri et al. (2020) and Banerjee (2025) shown that when a referent's power status is relevant to an individual, or when people lack expertise or knowledge of a system or technology, social norms have a substantial impact on their decision-making. In these situations, referents' opinions can be helpful in determining if technology is worthwhile or useful.

Additionally, the results of the current research indicated that there was no significant influence of facilitating conditions on customer's willingness towards robots. The result came in accordance with; Chayomchai et al. (2020) who pointed that facilities condition had an insignificant direct influence on customers' willingness to integrate robots in hotels industry. Similarly, Elkhwesky et al. (2023) reported that the intention to use technological devices is not significantly influenced by facilitating conditions. These findings contradicted with Brown et al. (2006) they discovered a strong correlation between customer willingness to integrate AIs and enabling conditions. Moreover, Lu et al. (2019) shown that the willingness of customers to utilize AI in the hotel business is significantly influenced by the conditions that make it easier. Also, Banerjee (2025) noted that consumers' willingness to use service robots for restaurant services was highly impacted by conducive conditions.

Moreover, the results showed that around 81.5.8% of the observed variability (Emotions construct) influenced positively hotel customers' willingness towards robots. This indicates that when the emotions construct goes up by (1) standard deviation, customers' willingness goes up by (0.81) standard deviations. The results are consistent with Huang and Rust (2018) claimed that while empathy is crucial for interactions between employees and customers, it also reflects a very high level of service robot effectiveness. Similarly, Beattie et al. (2020) mentioned that emoticons are a "universal language" that chatbots may utilise to convey emotions and that there is a lot of room for development in this area. In addition Gácsi et al. (2016) and Lu et al. (2019) demonstrated that there are significant positive effects between emotion and customers' willingness to use service robots in the hotel industry. This outcome contradicts with Lim and Okuno (2015) who stated that one of the most difficult design problems facing designers today is incorporating emotions into artificial beings, and success seems several decades away. At this point, Sezer et al. (2019) claimed that the empathy, emotional intelligence and productivity of the service professionals all have an impact on the opinions, experiences, and quality of the services customers receive. Thus, artificial intelligence (AI) acts as a technical barrier between guests and hospitality staff.

5. Theoretical Implications

The results show that robots have a potential appeal from the guests to be integrated in different areas and services in the hotels. Furthermore, robots were seen to encourage quicker operation and give an elective choice for guests. Accordingly, the results call hotel managers to consider essential characteristics of robots such as performance efficacy, anthropomorphism, social influence, and emotions to get their customers" appeal towards these robots. Also, they should investigate a customer-friendly robot that works best for their hotel budget rules and their customers' appeal as well. In addition, hotel managers should study their customers' experience, to choose robots over the service employee interaction. Accordingly, several significant implications have been derived from this study at both theoretical and

practical levels. **First**, this is considered a pioneering study for exploring the hotel customers' willingness towards robots in five-star hotels in Egypt, by investigating many factors that create the main stages to integrate robots. **Second**, a framework of service robots was adopted to determine the customers' willingness; it would empower hotel directors and decision creators in to step forward towards integrating robots at their hotels. **Third**, independent hotels can gain a vision into the future development of using robots in their hotels. **Finally**, this study can be supportive for Egyptian and outside investors who look to extend their investments permitting them to get advantages of considering robots in five-star hotels in Egypt.

6. Practical Implications

The lodging industry must adopt AI applications as they proceed to create and change in arrange to stay a player within the AI application. Knowing the effect AI has on the client is critical to controlling how lodgings and clients are influenced by the utilization of AI applications in the hotel industry. Hotels must know how clients are influenced by AI and which advances work best for future success within the hospitality industry. Agreeing to the review of the literature and future patterns in the international area, the general recommendations can be proposed as follows:

1. Hotels should study the effect of AI applications on hotels and clients earlier to identify particular AIs to put into utilize.
2. Hotels ought to investigate client-friendly AI that works best for the hotels and clients.
3. The hotel should increase the awareness of employees to know the “advantages and disadvantages” of using the AI applications.
4. Effectively communicating between hotel staff and customers can improve AI implementation.
5. Communicating successfully can also help with client training costs.
6. Surveying clients to know how they feel (fear or happiness) when confronted with the choice of utilizing AIs is fundamental
7. The hotel should study the customer experience, to choose AI over the service employee interaction
8. The hotel ought to utilize more cost-efficient AI applications to meet budget rules and offer assistance to reduce client costs.

The hotel should research what the customer values and focus on customer needs. Not all customers have the same level of expertise in various technologies. Just because the project team and the technicians know how to use artificial intelligence applications does not guarantee that all customers will. In addition, go the extra step to make sure AIs are focused on the customer, and not just a way to reduce staff costs (Amekedzi, 2021). Success with AIs is dependent upon customer-focused design (Yang, Liu, Lv, Ai and Li, 2021). Adequate customer research is the only way to achieve this. Predicting customer appeal is not easy. "Neat ideas" may or may not add value to your customer. (Kimiagari and Malafe, 2021). Spend your time and money where it counts. Listen to your customer and strive to achieve more than they expect (Ibrahim, 2021).

The hotel should have a clear strategic purpose for the AI applications. Just because a competitor may utilize AI applications in next future, this is not the right reason to introduce one. It might be in a position to reduce costs, increase customer satisfaction and reach new customer segments, simultaneously, or might achieve chaos. The strategic purpose of AI has been just as important as its design. If customers perceived AI's usefulness. Furthermore, implementing the AI applications as a cost-savings measure; can lead to customers having a negative attitude toward AI applications such as robots and chatbots (Moriuchi et al., 2021). To encourage adoption and repeated use, to provide benefits over and beyond what the alternatives provide,

to invoke positive feelings about AI applications.

The hotel should provide protection and reassurances for privacy and security. Plan for hackers and cheaters. If there are means to obtain private customer or employee data a person is willing to try it. Online and interactive voice response technologies are especially vulnerable to this. Make sure employees and customers are informed of the rules and measures for security and provide training if warranted. This will build trust with your customers. Security measures can be expensive, don't forget to plan and budget for them throughout the life of the AI (Ehsan, Liao, Muller, Riedl and Weisz, 2021).

7. Limitations and Future Research

The study was conducted within the pre-implementation stage, where the respondents had not yet a possibility to test the robots integrations and their responses were only based on their expectations. Also, only 30 hotel managers were participated in this study through 5 focus groups. Hence, the results may not be generalized. Furthermore, the data was collected during the COVID-19 outbreak which may have influence on the respondents' responses. Only six factors were focused on this study; future researches may investigate other factors that may influence customers' willingness towards robots.

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