Comparison of perspectives: Managers' and consumers' views on service robots within the hotel sector

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Abstract: *The hospitality sector is currently experiencing a notable surge in the integration of service robots, necessitating significant investments by hotels. It is imperative to investigate the perspectives of both hotel guests and management to provide valuable insights for hospitality establishments considering the implementation of service robots. Data were collected utilizing Amazon Mturk, and factor analysis and multiple regression analysis were employed. The results revealed distinctions in attitudes between 212 customers and 90 managers, highlighting influential factors such as service reliability, service emotionality, and security. Notably, both service reliability and service emotionality exerted a considerable impact on consumer adoption attitudes. Concurrently, for managers, service reliability, service emotionality, and security demonstrated substantial effects. These findings offer practical guidance for hotels seeking to enhance guest experiences and operational efficiency through the strategic integration of service robots.*

Keywords: service robots, comparative analysis, service reliability, service emotionality, security

1. Introduction

Service robots are becoming increasingly prevalent in our daily lives, assuming a growing number of tasks (Bazzano & Lamberti, 2018). Leading companies are amalgamating artificial intelligence with robots to significantly enhance their service systems (Rosete et al., 2020). The surge of service robots is transforming various industries by both substituting and augmenting human workers (Ivanov, 2020). This transformation is particularly evident in the hospitality sector industry (Chan & Tung, 2019; Choi et al., 2019). Moreover, the hospitality industry is giving considerable attention to the integration of service robots for human-centric services (Chi et al., 2020; Lu et al., 2019).

Within the hospitality domain, hotels are progressively adopting robot-driven systems to boost efficiency, reduce costs, and maintain high service standards for their guests (Festa, 2015). These service robots play a valuable role in assisting hotel guests through both physical and social interactions, introducing innovative methods of customer engagement and service delivery (Kuo et al., 2017). In addition, these service robots are also viewed as potential future additions to hotel staff, capable of either substituting for or assisting human employees leading to labor costs reductions (Rodriguez-Lizundia et al., 2015).

Service robots show promise for assisting travelers in timesaving through real-time engagement and alleviating perceived risks (Buhalis & Sinarta, 2019). The advent of robots signifies the forthcoming evolution of hotel services, particularly in labor-intensive environments (Pan, 2015). These service robots automate essential customer service tasks, offering hotel operators cost savings in labor, enhanced operational efficiency, prompt service, and improved employee well-being. Therefore, numerous industry experts and researchers anticipate service robots becoming a foundational and indispensable element of the guest experience (Tung & Law, 2017).

Scholarly interest in service robots within the hospitality field is on the rise, as evidenced by Murphy et al. (2017) and Tussyadiah and Park (2018). A significant portion of this research has primarily concentrated on assessing customer satisfaction and the willingness of service robot users to adopt automated systems (Lee et al., 2021). However, to make well-informed decisions regarding

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the integration of robot-assisted services, it is crucial to comprehend the perspectives of diverse customer groups, including their expectations and attitudes toward this technology. The incorporation of service robots necessitates substantial investments in terms of resources and effort from hotels. Therefore, hotels should exercise caution and thorough consideration when contemplating the integration of service robots into their service delivery systems.

It is essential to examine and evaluate the perspectives of both hotel customers and managers concerning their implementation of service robots to comprehensively understand the potential future impact of service robots in the hospitality sector. This investigation may offer fundamental insights that can guide hotels in their decision-making process. More specifically, it seeks to address two pivotal questions: (1) What are the attitudes of hotel guests towards the adoption of service robots? and (2) What are the attitudes of hotel managers regarding the adoption of service robots? A comparative analysis of perceptions between managers and customers is anticipated to provide valuable and enlightening insights for hospitality establishments considering the integration of service robots into their operations.

2. Literature Review

2.1 Service robots

The advent of technology has ushered in a new era for service robots, enabling them to deliver services with unparalleled productivity and efficiency compared to their human counterparts (Calderone, 2019). Consequently, there has been a noticeable surge in their adoption across various settings such as schools, homes, hospitals, and, particularly in hotels (Bera et al., 2018). Service robots possess the potential to revolutionize the service industry by providing efficiency and effectiveness that surpass human capabilities (Huang & Rust, 2018). Equipped with tireless operation, physical prowess, and rapid computing abilities, they are poised to enhance productivity, automate tasks, and manage hazardous duties (Calderone, 2019). Furthermore, customers often perceive the quality of robotic services to be on par with human services (Choi et al., 2019; Choi et al., 2020). This favorable reception extends across various types of robots, including domestic service robots, healthcare assistants, restaurant servers, and hotel service robots (Brengman et al., 2021; Fuentes-Moraleda et al., 2020; Hwang et al., 2020).

Service robots are becoming increasingly integral in various sectors within the hospitality industry, including hotels, restaurants, events, theme parks, airports, car rental agencies, museums, and travel companies. Research related to service robots in hospitality and tourism is expanding, exploring topics such as implementing service robots in hospitality, employees' comprehension of robotics and customer perceptions (Chan & Tung, 2019; Li et al., 2019; Lu et al., 2019; Murphy et al., 2019; Yu & Ngan, 2019). Traditionally, research in the hotel industry has predominantly centered on aspects like service quality, human resource management, service delivery procedures, and cost-benefit analyses related to service robots (Ivanov et al., 2018; Wirtz et al., 2018). This research has also tackled the challenges associated with service automation and service robots (Ivanov et al., 2017).

2.2 Service robots in the hotel sector

Service robots in hotels perform a wide range of duties that extend beyond basic tasks such as carrying guests' belongings, offering greetings, assisting with check-ins, or addressing common inquiries. Guests have varied expectations and attitudes towards these robot services during their stay. The presence of service robots enhances guests' convenience and overall satisfaction by reducing unnecessary human interactions and potential misunderstandings, as these automated robots efficiently handle such tasks (Ivanov, 2020). A crucial element in the successful implementation of service robots is understanding the specific features and characteristics of robots that elicit positive responses from consumers in service-oriented settings. Without this understanding, businesses may introduce service robots into their interactions without a clear understanding of how to optimize their use (Stock & Merkle, 2018). Although many hospitality establishments are exploring the integration of service robots into their frontline services, only a limited number have achieved effective implementation.

Anticipated to offer dependable, convenient, and efficient services (Johnson et al., 2015), service robots have become a focal point for innovative hotels aiming to provide unique guest experiences. One noteworthy example is the Henn-na Hotel in Japan, recognized by the Guinness World Record as the pioneer in robot-operated hotels. Utilizing dinosaur and human-like robots, this establishment delegates tasks such as front desk responsibilities, butler services, housekeeping, and concierge services to these automated entities (Nagao, 2018). In New York City, the Yotel employs a robot porter, named Yobot, to securely manage guests' luggage (Festa, 2015). Hilton Worldwide took the lead in incorporating a robot concierge, Softbank's NAO robot, to provide information about local attractions, restaurants, hotel amenities, and more (Hilton, 2016). Additionally, Starwood introduced robotic butlers represented by Savioke's Relay robot to deliver amenities to guest rooms, eliminating the need for human staff (Crook, 2014).

2.3 Diverse perspectives about service robots

The existing literature offers a wide array of perspectives and recommendations concerning the integration of service robots in the hospitality industry. These viewpoints cover diverse themes, including financial management, managerial expertise, the significance of anthropomorphism, and the dynamics of interactions between humans and robots (Ivanov et al., 2018; Ivanov et al., 2019; Murphy et al., 2019; Tussyadiah et al., 2020). Elements such as perceptions of anthropomorphism, intelligence, and security in human-robot interactions significantly influence users' receptiveness to adopting service robots in hotel settings (Tussyadiah & Park, 2018). The impact of service robots on the hotel brand experience is intricate and varies depending on the specific category or type of hotel (Chan & Tung, 2019). Factors such as the effectiveness of robot performance, internal motivation, the presence of human-like characteristics, facilitating conditions, and emotional aspects notably shape the readiness of hotel customers to engage with service robots (Lu et al., 2019).

Service robots demonstrate the capacity to learn from experiences, adapt to new surroundings, and perceive their environment using cameras, microphones, sensors, facial recognition, and voice recognition (Pagallo, 2013). These versatile robots come in various forms, such as text-based, voice-based, video-based, three-dimensional virtual, physical, humanoid, and non-humanoid (van Doorn et al., 2017; Wirtz et al., 2018). Moreover, the utilization of facial and voice recognition enables highly personalized service at minimal cost (Wirtz et al., 2018). In the hotel industry, service robots handle a range of tasks, from concierge services to food and beverage preparation, check-in and check-out procedures, and housekeeping. Despite their potential for cost savings and efficiency improvements, they face challenges, including limitations in emotional intelligence and concerns about data security (Holder et al., 2016; Huang & Rust, 2018).

The hospitality sector is experiencing a noticeable surge in the adoption of service robots. Numerous hotel companies are actively pursuing avenues to enhance guest experiences, streamline operations, and reduce costs through the integration of service robots. Despite being in its early stages, discussions regarding the benefits and concerns of this technology have been extensive (Wirtz et al., 2018). Therefore, it is imperative to explore how this technology is positioned to revolutionize the industry and its practices. This requires examining the perceptions and attitudes of both managers and consumers towards service robots, given that managers play a pivotal role in implementing such technology. By comparing the perspectives of consumers and managers, this study seeks to provide insights into service robots, their economic advantages, and the security and safety concerns associated with their adoption in the hospitality industry.

3. Methodology

Survey questionnaires were developed based on prior research examining service robots across various industry contexts (Huang & Rust, 2018; Tussyadiah & Park, 2018; Wirtz et al., 2018), recognizing that the implementation of service robots in the hotel industry is still in its early stages. Perceptions regarding the service capabilities of service robots were assessed through 14 statements, such as “Service robots will perform service tasks accurately” and “Service robots will deliver dependable service to customers.” Respondents rated these statements on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Furthermore, attitudes toward the adoption of service robots were evaluated using four bipolar scales. For instance, respondents were asked to rate the importance of adopting service robots in hotels using a scale from 1 (Not at all important, Extremely undesirable, The wrong thing to do, Extremely unnecessary) to 7 (Extremely important, Extremely desirable, The right thing to do, Extremely necessary) in response to the statement, “I think adopting service robots at hotels (my hotels) in the future is.”

The final segment of the questionnaire was dedicated to collecting demographic information from the participants. The research participants included both hotel managers and customers. Invitations to participate in the survey were distributed through a URL link to an online survey and were sent to the general managers of 79 hotels in the Midwest, with a request to distribute the survey among their managerial staff. Snowball sampling method was employed and resulted in responses from 90 managers. Although there may be some biases related to nonprobability sampling, the authors attempted to gather additional samples as it was a challenge to locate hotel managers. Due to the characteristics of the snowball sampling method, calculating the response rate was not possible. The data were collected from March to July 2022. Simultaneously, customer data were collected through Amazon Mturk, recruiting a total of 213 consumers from the United States. The data gathered via MTurk has demonstrated high reliability and is thus considered a valid method of data collection (Casler et al., 2013; Johnson & Borden, 2012).

Data analysis was carried out using SPSS software (version 29.0) in multiple stages. First, descriptive statistics were employed to present an overview of respondents’ demographic characteristics. Next, factor analysis was executed to create correlated variables from 14 items into correlated composites, aiming to identify a more concise set of factors and their respective scores. Finally, the prediction of attitudes toward service adoption was accomplished through multiple regression analysis, utilizing the means scores of factors for statements affirming the use of service robots in the hotel industry.

4. Results

A significant portion of consumers were male (61.4%), possessed a college education (71.7%), and fell within the age bracket of 31 to 50 (63.2%). Among the managers, gender distribution was evenly divided, with half being male and the other half female. A noteworthy percentage of managers (43.3%) were aged between 31 and 50. Regarding education, 40.0% of managers had some college experience, while 46.7% had completed their college education. See Table 1.

Table 1. Profile of participants

Profile	Frequency (%) Consumer (n = 212)	Manager (n = 90)
Gender		
Male	129 (61.4%)	44 (50.0%)
Female	81 (38.6%)	44 (50.0%)
Age		
30 and under	53 (25.0%)	26 (28.9%)
31-40	87 (41.0%)	21 (23.3%)
41-5	47 (22.2%)	18 (20.0%)
51 and over	25 (11.8%)	25 (27.8%)
Education		
Highschool	5 (2.4%)	5 (5.6%)
Some college	24 (11.3%)	36 (40.0%)
Bachelor's degree	152 (71.7%)	42 (46.7%)
Graduate	31 (14.6%)	7 (7.8%)

Note: Due to missing data, not all total sum to 212 (Consumer) and 90 (Manager)

Table 2 outlines the descriptive analysis of 14 statements about perceptions regarding the service capabilities of service robots. Among these statements, managers demonstrated higher mean values for the three statements compared to consumers. These specific statements were "Service robots will provide unbiased service to customers ($p > 0.05$)", "Service robots are vulnerable to technological hacking ($p < 0.05$)", and "Service quality offered by service robots is unpredictable ($p > 0.05$)." However, only one statement exhibited a discernible difference between managers and consumers based on the independent sample t-test ($p > 0.05$). Consumers reported higher mean values for the remaining 11 statements compared to managers. The independent sample t-test results suggested no significant differences between consumers and managers regarding two statements related to service robots in the hotel industry: "Service robots will provide prompt service to customers ($p > 0.05$)" and "Service robots will have the knowledge to answer customer's questions ($p > 0.05$)."

Table 2. Measurement properties

	Mean (Std. Dev.) Consumer (n = 212)	Manager (n = 90)	*t*-value	Sig
Service robots will execute service jobs correctly.	4.01 (0.879)	3.34 (0.938)	5.781	0.005*
Service robots will provide reliable service to customers.	3.92 (0.958)	3.33 (1.102)	4.424	0.007*
Service robots will provide unbiased service to customers.	4.06 (1.067)	4.09 (1.148)	-0.201	0.174
Service robots will provide prompt service to customers.	4.02 (0.948)	3.71 (1.019)	2.559	0.115
Service robots will be able to handle customer requests effectively.	3.89 (1.008)	2.81 (1.160)	7.647	0.006*

Service robots will be able to understand customers' specific needs.	3.75 (1.135)	2.06 (0.951)	13.235	0.010**
Service robots will give customers personal attention.	3.76 (1.171)	1.88 (0.981)	14.320	0.019**
Service robots will have the knowledge to answer customers' questions.	3.91 (1.015)	2.69 (0.927)	10.021	0.930
Service quality offered by Service robots is unpredictable.	2.71 (1.225)	2.77 (1.205)	-0.362	0.475
Service robots will be able to show empathy to customers.	3.19 (1.321)	1.53 (0.810)	13.284	0.001*
Service robots will be able to display appropriate emotions to customers.	3.31 (1.322)	1.73 (0.946)	11.666	0.001*
Service robots are vulnerable to technological hacking.	3.71 (1.127)	3.81 (0.923)	-0.769	0.009*
Service robots would create a risk for customer privacy.	3.54 (1.193)	3.46 (0.863)	0.654	0.001*
Service robots may pose a threat to customer safety.	3.30 (1.244)	2.87 (1.019)	3.171	0.001*

Note: 1 = strongly disagree and 5 = strongly agree; *$p < 0.01$ and **$p < 0.05$

Principal axis factoring with varimax rotation was utilized in conducting factor analysis. The primary objectives were to consolidate the 14 statements into essential dimensions that capture perceptions toward service robots in the hotel industry, encompassing the attitudes of both consumers and managers. The suitability of the factor analysis was evaluated through the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. Several criteria, such as eigenvalue, variance percentage, scree plot, and factor loadings, were taken into account to ascertain the optimal number of factors to extract, following the approach outlined by Hair et al. (2018).

For consumers, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy signaled a substantial level of shared variance (KMO = 0.823). Bartlett's test produced a value of 951.335 with a significance level of 0.000, affirming the appropriateness of the factor analysis. Initially comprising 14 statements, the analysis unveiled three distinct factor dimensions, each with eigenvalues exceeding 1.0. After removing three statements with factor loadings below 0.60 or those loading onto multiple factors, the identified three factors collectively explained 69.53% of the variance in the variables. The reliability analysis demonstrated alpha coefficient ranging from 0.78 to 0.83, indicating high internal consistency for each factor. The communality of each statement ranged between 0.61 and 0.80, suggesting that these three factors effectively captured the variance of the original values. Each factor was named based on the attributes of its constituent variables. The first factor ($\alpha = 0.83$), termed "Service Reliability," accounted for 37.36% of the total variance, with an eigenvalue of 4.11. The first factor was named based on common words describing service capacity (e.g., reliable, prompt, correctly, unbiased, and effectively). The second factor ($\alpha = 0.82$), labeled "Service Emotionality," explained 20.30% of the total variance, possessing an eigenvalue of 2.23. The second factor was named based on common words describing service capacity (e.g., emotions, empathy, and attention). Lastly, the third factor ($\alpha = 0.78$), named "Security," accounted for 11.87% of the total variance, with an eigenvalue of 1.31 (Table 3). The last factor was named based on common words describing service capacity (e.g., privacy, hacking, and safety).

Table 3. Factor analysis – Consumer

	Factor Loading			Communality
	Service Reliability	Service Emotionality	Security	
Service robots will provide reliable service to customers.	0.810			0.710
Service robots will provide prompt service to customers.	0.756			0.614
Service robots will execute service jobs correctly.	0.753			0.659
Service robots will provide unbiased service to customers.	0.731			0.605
Service robots will be able to handle customer requests effectively.	0.671			0.617
Service robots will be able to display appropriate emotions to customers.		0.863		0.783
Service robots will be able to show empathy to customers.		0.845		0.803
Service robots will give customers personal attention.		0.598		0.645
Service robots would create a risk for customer privacy.			0.857	0.745
Service robots are vulnerable to technological hacking.			0.835	0.729
Service robots may pose a threat to customer safety.			0.769	0.738
Eigen value	4.110	2.233	1.305	
Variance Explained (%)	37.360	20.303	11.868	
Cumulative Variance	37.360	57.663	69.530	
Reliability Alpha	0.825	0.815	0.780	

Note:
Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Total explained variance: 69.530%
KMO (Kaiser-Meyer-Olkin) Measure of Sampling Adequacy: 0.823
Bartlett's Test of Sphericity: $p = 0.000$ ($\chi^2 = 951.335$, $df = 55$)

For managers, the interrelations among variables within factors were deemed significant, as revealed by Bartlett's test of Sphericity ($\chi^2 = 401.644$, $p = 0.000$). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicated an acceptable level of shared variance (KMO = 0.668), confirming the suitability of the factor analysis. Applying a factor loading threshold of 0.60 for item inclusion in each factor led to the exclusion of three statements due to low factor loading or cross-loadings. Table 4 illustrates three factors derived from the 14 statements, collectively explaining

65.56% of the variance. Factor 1 (Service Reliability) accounted for 34.32% of the variance, with an eigenvalue of 3.78 and a reliability of 0.82. Factor 2 (Service Emotionality) explained 18.08% of the variance, possessing an eigenvalue of 1.99 and a reliability of 0.79. Finally, Factor 3 (Security) represented 13.16% of the total variance, reporting an eigenvalue of 1.45 and a reliability of 0.58.

Table 4. Factor analysis – Manager

	Factor Loading			Communality
	Service Reliability	Service Emotionality	Security	
Service robots will provide prompt service to customers.	0.829			0.690
Service robots will provide unbiased service to customers.	0.782			0.629
Service robots will provide reliable service to customers.	0.723			0.587
Service robots will be able to handle customer requests effectively.	0.705			0.610
Service robots will execute service jobs correctly.	0.663			0.711
Service robots will be able to show empathy to customers.		0.925		0.860
Service robots will be able to display appropriate emotions to customers.		0.841		0.726
Service robots will give customers personal attention.		0.728		0.635
Service robots may pose a threat to customer safety.			0.770	0.752
Service robots would create a risk for customer privacy.			0.732	0.583
Service robots are vulnerable to technological hacking.			0.640	0.430
Eigen value	3.776	1.989	1.447	
Variance Explained (%)	34.324	18.083	13.155	
Cumulative Variance	34.324	52.407	65.561	
Reliability Alpha	0.822	0.794	0.580	

Note:
Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Total explained variance = 65.561%
KMO (Kaiser-Meyer-Olkin) Measure of Sampling Adequacy = 0.668
Bartlett's Test of Sphericity: $p = 0.000$ ($\chi^2 = 401.644$, $df = 55$)

Table 5 illustrates that consumers exhibited higher mean values across all three factors compared to managers. Nevertheless, the independent sample t-test ($p < 0.01$) revealed significant differences between consumers and managers in relation to service emotionality and security.

Among consumers, service reliability showed the highest mean score of 3.99, followed by security at 3.52, and service emotionality at 3.41. Similarly, for managers, the ranking mirrored that of consumers, with service reliability holding the highest mean score at 3.46, followed by security at 3.38, and service emotionality at 1.72.

Table 5. Independent sample *t*-test

	Mean (Std. Dev.)			
	Consumer (n = 212)	Manager (n = 90)	*t*-value	Sig
Service Reliability	3.994 (0.738)	3.458 (0.823)	5.331	0.058
Service Emotionality	3.413 (1.089)	1.715 (0.770)	15.335	0.001*
Security	3.522 (0.989)	3.378 (0.691)	1.439	0.001*

Note: 1 = strongly disagree and 5 = strongly agree; *$p < 0.01$

A multiple regression analysis was executed to predict attitudes toward the adoption of service robots using perceptions of service robots in the hotel industry. The average scores for service reliability, service emotionality, and security were computed and employed as composite scales for the multiple regression analysis (Hair et al., 2018). The outcomes of multiple regression concerning attitudes toward service adoption in consumer perceptions are summarized in Table 6. The regression model displayed statistical significance ($F = 67.903$, $p < 0.05$). Notably, security did not demonstrate a significant impact on attitudes toward adoption among the three factors. Service emotionality ($\beta = 0.600$, $p < 0.001$) emerged as the most influential factor on attitudes, followed by service reliability ($\beta = 0.176$, $p < 0.05$). In combination, these two perception factors accounted for 51.2% of the variance in attitudes toward adoption. Regarding attitudes toward service adoption based on manager's perceptions, the multiple regression analysis indicated significant impacts for all three factors (Table 7). Service emotionality emerged as the most influential factor ($\beta = 0.392$, $p < 0.001$) on attitudes, followed by security ($\beta = -0.231$, $p < 0.05$) and service reliability ($\beta = 0.220$, $p < 0.05$). The regression model demonstrated statistical significance ($F = 15.603$, $p < 0.001$), signifying a notable impact of three factors. Together, these factors accounted for 35.8% of the variance in the attitudes toward adoption. The standardized beta values indicate that both service reliability and service emotionality had a noteworthy impact on attitudes regarding consumer adoption. Meanwhile, for managers, service reliability, service emotionality, and security collectively exhibited a substantial effect (Figure 1 & 2).

Table 6. Results of regression analysis – Consumer

Model Summary	*R*	R^2	Adjusted R^2	Std Error of the Estimate

Model	0.716[a]	0.512	0.505	1.93029	
ANOVA Model[a]	*SS*	*df*	Mean Square	*F*	Sig.
Regression	759.026	3	253.009	67.903	0.000[b]
Residual	722.849	194	3.726		
Total	1481.875	197			
	Unstandardized		Standardized		
Coefficients	B	Std. Error	Beta	*t*	Sig
(Constant)	-1.782	0.898		-1.984	0.049
Service Reliability*	0.652	0.218	0.176	2.991	0.003
Service Emotionality*	1.526	0.153	0.600	9.969	0.000
Security	0.113	0.143	0.041	0.785	0.433

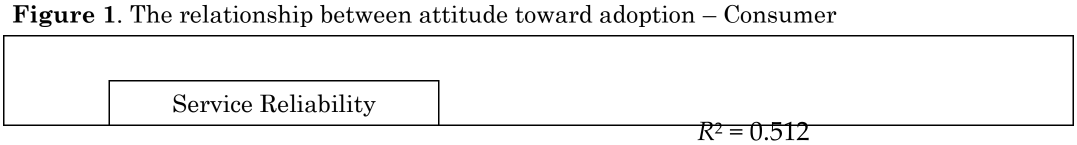
Note: [a]Predictors: (constant), Service Reliability, Service Emotionality, Security.
[b]Dependent Variable: Attitudes Toward Adoption

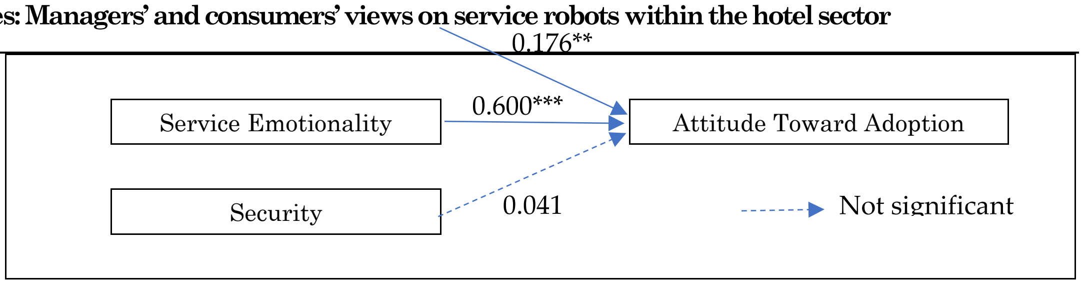
Table 7. Results of regression analysis - Manager

Model Summary	*R*	R^2	Adjusted R^2	Std Error of the Estimate	
Model	0.598[a]	0.358	0.335	2.22508	
ANOVA Model[a]	*SS*	*df*	Mean Square	*F*	Sig.
Regression	213.754	3	77.251	15.603	0.000[b]
Residual	415.881	84	4.951		
Total	647.635	87			
	Unstandardized		Standardized		
Coefficients	B	Std. Error	Beta	*t*	Sig
(Constant)	2.229	1.910		1.167	0.246
Service Reliability*	0.756	0.318	0.220	2.283	0.025
Service Emotionality*	1.380	0.323	0.392	4.271	0.000
Security	-0.934	0.373	-0.231	-2.504	0.014

Note: [a]Predictors: (constant), Service Reliability, Service Emotionality, Security.
[b]Dependent Variable: Attitudes Toward Adoption

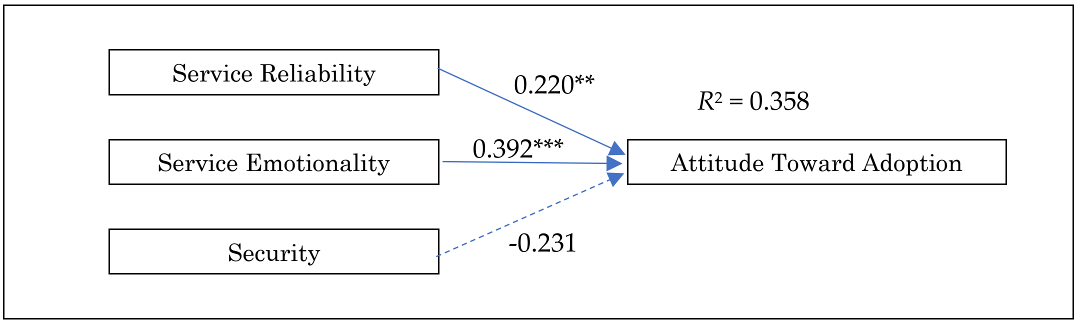
Figure 1. The relationship between attitude toward adoption – Consumer





(**p < 0.01, ***p < 0.001)

Figure 2. The relationship between attitude toward adoption – Manager



(**p < 0.01, ***p < 0.001)

5. Discussion and Conclusion

Service robots in the hotel sector are revolutionizing customer interactions and reshaping service experiences (Kuo et al., 2017). These robots, defined as "system-based autonomous and adaptable interfaces that interact, communicate, and deliver service to an organization's customers" (Wirtz et al., 2018, p. 909), are transforming the labor-intensive hospitality and tourism industry by both substituting and augmenting the workforce (Ivanov, 2020). Within the hotel domain, service robots play a crucial role by providing services such as luggage delivery, check-in/out, concierge, room service, wait staff, security, surveillance, and cleaning duties (Barten, 2024). They provide a consistent level of service, addressing the variability in service quality (den Hertog et al., 2010). However, their technological limitations prevent them from capturing moments of truth in guest interactions, a capability retained by traditional service methods (Murphy et al., 2017).

Installing service robots in hotels can enhance efficiency and productivity, particularly when utilized for repetitive tasks or during challenging working hours (Belanche et al., 2021; Maiani & Borghi, 2021; Xu et al., 2020). While various studies focus on service robots themselves, limited attention has been given to hotel managers planning to implement these robotic services (Stylos et al., 2021). Furthermore, the potential advantages of service robots hinge on guest acceptance and appreciation of the latest technology. Customers may be impressed by the robots' capabilities, leading to positive perceptions and attitudes (Belanche et al., 2020; Loureiro et al., 2020). Despite the convenience and enjoyment offered by robot assistants, concerns about the authenticity of service robots due to the absence of human touch persist. Customer acceptance is crucial for the successful integration of service robots, necessitating a deeper understanding of diverse customer types and their expectations, as it involves substantial investments in resources and effort by hotels.

This study aimed to examine specific factors from a comprehensive set of 14 statements capturing perceptions of service robots among consumers and managers in the hotel industry. Across three identified factors – service reliability, service emotionality, and security – consumers consistently held more favorable views about service robots compared to their managerial counterparts. This discrepancy highlights a significant gap in openness between hotel guests and managers regarding the acceptance of service robots. Hotel guests frequently emphasized the advantages of service robots, such as improved convenience and operational streamlining. In contrast, managers tended to focus more on cost implications, including initial setup expenses and ongoing maintenance. Multiple regression analyses revealed that consumers prioritized service reliability and emotional engagement, seeking personalized experiences from service robots. Managers considered a broader spectrum, where service reliability, service emotionality, and security significantly influenced their attitudes toward adopting service robots. Interestingly, while security concerns didn't significantly affect consumers' perceptions, they played a crucial role in shaping managers' attitudes. This difference can be attributed to managers' specific responsibilities for guest safety and data security. Overall, our research underscores substantial discrepancies in attitudes between hotel guests and managers regarding service robot integration in the hospitality industry, stemming from distinct priorities.

The research significantly contributes to refining theoretical frameworks related to integrating service robots in hotels, emphasizing the importance of acknowledging diverse perspectives among hotel guests and managers. It sheds light on the complex dynamics of technology adoption in service-oriented settings, emphasizing the necessity of considering both consumers and managers in technology adoption research. By identifying factors such as service reliability, service emotionality, and security as influential aspects in shaping attitudes, our research establishes a foundational understanding of the core elements influencing perceptions of service robots in the hotel industry. This adds depth to existing models by introducing aspects linked to service quality and security. The findings of our study offer valuable insights for future research in technology adoption within the hospitality sector, providing a basis to refine and broaden theoretical models for improved guidance in implementing service robots and associated technologies.

The outcomes of the study hold practical importance for hotel managers contemplating the integration of service robots in their establishments. The results suggest a growing potential for incorporating these robots into the hotel industry. However, managers need to understand the factors influencing both consumer and managerial attitudes toward these robots and formulate strategies to address associated concerns. Hotel managers should acknowledge the substantial gap between their own ideals and guests' attitudes regarding the adoption of service robots. This necessitates a strategic approach that aligns with the distinct priorities of each group. While guests prioritize personalized and emotionally engaging experiences, managers need to carefully consider costs, security, and potential risks. Given consumers' focus on positive aspects, hotels should prioritize guest-centric initiatives when implementing such technology. This involves creating service robot experiences that enhance efficiency and cater to guests' desire for personalized interactions. However, managers must specifically address security concerns related to service robots. Mitigating data breaches and other security risks is essential to safeguard guest information and privacy. Moreover, the significant impact of cost-related factors on managerial attitudes highlights the need for comprehensive cost-benefit analyses before adopting service robots. Despite substantial initial investments, evaluating long-term efficiency gains and reductions in labor costs is crucial.

The study primarily gathered data from two specific groups: U.S. hotel customers recruited through Amazon Mechanical Turk (MTurk) and hotel managers located in the Midwest. This targeted approach, focusing on a specific geographic and demographic range, raises concerns about potential sampling bias and the limited applicability of our findings to a broader global or industry-wide context. Moreover, the recruitment method relied on convenience sampling, utilizing MTurk for consumer participation and distributing surveys through hotel managers. This approach may not guarantee a representative sample, as individuals interacting with Mturk or responding to invitations from hotel managers may possess unique characteristics or interests related to AI technology. Therefore, interpreting the study's results requires caution due to these limitations in the sampling strategy. Additionally, concerning the data collection methodology, particularly for the manager group, there is a dependence on general managers to distribute the survey to their subordinates. This single-source approach to data collection might not sufficiently capture a representative sample of managerial attitudes, potentially introducing biases into the results. Hence, it is crucial to thoroughly acknowledge and address these biases in future research endeavors during the data collection phase.

This study was exclusively conducted within the U.S. market. However, within the hospitality industry, numerous global hotel chains envision the application of robots in hotels worldwide. Therefore, investigating the varied cultural perceptions of hotel guests would significantly enhance implications for supporting the global operations of hotels. The study's scope could be expanded to include different levels of managers, encompassing upper-middle level managers, and various types of hotels such as low-cost, upscale, and luxury establishments. By exploring different sections, marketers can better prepare for the adoption of diverse types of robots.

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