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Analysing the Impacts of Artificial Intelligence Service Quality and Human Service Quality on Customer Satisfaction and Customer Loyalty in the Hospitality Sector

Semele Sardesai[A], Edgar D'Souza[B*], Supriyanka Govekar[C]

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Abstract

This study explores the differential role of artificial intelligence (AI) and human interface (HI) in the hospitality industry and their impact on customer satisfaction and loyalty. In response to intense competition, the industry is increasingly adopting advanced technologies such as AI and artificial intelligence robotics (AIR) to enhance customer service and improve the overall experience. The primary objective of this research is to investigate how hotel visitors perceive AI service quality and human service quality and how these perceptions influence consumer satisfaction and loyalty. This contributes to the existing knowledge on the use of AI in the hotel sector and provides valuable insights for future research. Additionally, the study demonstrates that customer satisfaction acts as a mediator between both human service quality and AI service quality and customer loyalty. Importantly, the indirect effect is stronger for human service quality compared to AI service quality, highlighting the need to strike a suitable balance between AI efficiency and human empathy. The findings underscore the potential of AI-powered services to enhance customer satisfaction and operational effectiveness within service organizations. However, the study emphasizes the continued significance of employee service in shaping customer experiences in the service-dominant era. By understanding the potential benefits and challenges associated with AI adoption, organizations can make informed decisions and develop effective strategies for integrating AI technologies. This research contributes to the advancement of AI implementation in the hospitality industry, leading to improved business performance and enhanced customer experiences.

Keywords: *AI Service Quality, Human Service Quality, Hospitality, SEM, Customer Satisfaction, Customer Loyalty*

[A] V.M. Salgaocar Institute of International Hospitality Education, Manora, Raia, Goa, India
[B] Goa College of Hospitality and Culinary Education, Taj, Cidade de Goa, Vainguinim Beach, Vainguinim, Goa 403004, India
[C] Agnel Institute of Technology and Design, Assagao, Goa 403507, India
[*] Corresponding author: edgardsouza@hotmail.com

Introduction

Recent research shows that artificial intelligence and robotics (AIR) are penetrating in different areas of businesses and industries (Yang et al., 2020). Currently, the hospitality industry competes fiercely in a technologically advanced environment. Whether or not these businesses survive depends on their capacity to adjust to macro environmental circumstances, overall financial success, and how they expand and modify their services to meet the needs and expectations of their clients (Wikhamn, 2019). Service quality has widely been accepted as the predecessor to guest satisfaction that is the predecessor to guest loyalty towards a given product or service (Kheng et al., 2010; Dam, Dam, 2021). To improve customer service quality and experience, hotels are utilising state-of-the-art technology like AI and robotics (AIR). The planned behaviour theory asserts that a person's object-based mindset, expressed in how satisfied they are with the quality of the services they receive, is related to the calibre of those services (Lee et al., 2021). Artificial intelligence, or AI, which can learn, interact, and adapt, is being used increasingly frequently in the service industry and is swiftly emerging as a major driver of service innovation and transformation (Huang, Rust, 2020).

Recent developments in artificial intelligence and service robots have led to the deployment of AI-driven technologies in the provision of services (Belanche et al., 2020). The future of hotel service is shifting towards AI and robotics worldwide. The hotel industry uses robots to provide guests with front-line services (Belanche et al., 2020). Such service robots will increase client pleasure while reducing operating costs for the hospitality industry. These scientific and technological developments are transformed into resourceful tools for customer support, and they are employed to improve the guest's experience (Goel et al., 2022). According to Reis et al. (2020), the hotel sector is developing quickly because of AI-driven technologies, robotics, and big data. Key performance indicators are compiled by some companies using AI-powered point-of-sale technology, such as customer relationship management, revenue management, and property management systems (Mariani et al., 2018) to maintain their competitive edge and improve corporate performance.

Using AI technology to provide customers with services can increase positive customer loyalty for the business (de Kervenoael et al., 2020). While examining the use of AI in the hotel industries, Prentice et al. (2020) discovers that, independently, both AI and employee service considerably impact guest satisfaction. Despite the widespread adoption of technology in the service sector in general and the hotel sector in particular, striking the right balance between digital and human interactions remains challenging. Although providing more individualised guest experiences is still debatable, using artificial intelligence (AI), robots, and service automation is becoming more important in terms of service quality to gain a competitive advantage (Naumov, 2019). Therefore, analysing how artificial intelligence (AI) and human interface differ in the hospitality industry is essential.

Literature Review

Achcoso (1990) defined AI as "The experimental and theoretical study of perceptual and intellectual processes using computers and to make a computer perceive, understand and act in ways now possible only for humans". AI is defined by Mitchell et al. (2013) as "The machines that emulate human mind related cognitive functions such as learning and problem solving". The current application of AI and robots in the realm of the hotel and tourism industry are

attracting great attention and interest from the public (Ivanov et al., 2017). The influence of AI technology has been rapidly expanding post the unprecedented disruption caused by the COVID-19 crisis (Doborjeh et al., 2022). The current developments in AI and its widespread in service industries have impacted areas such as consumer demand, tourist experiences and perceptions, destination management and prediction of tourists' behaviour. Recent studies have also confirmed a significant correlation between AI services and perceptions of quality (Doborjeh et al., 2022).

In the realm of the hospitality industry, Yang et al. (2020) assert that AI and robotics present abundant opportunities for firms, enabling them to deliver superior services to customers while simultaneously boosting operational efficiency. The integration of service robots into hospitality settings significantly impacts customers' service experiences. Ahrholdt et al. (2017) define service quality as the overall perception customers have of their service encounters, encompassing various dimensions and associated attributes. In contrast, Parasuraman et al. (1985) delineate employee service quality as the ability of staff to meet or surpass customers' service expectations. This dimension evaluates employees' capacity to offer prompt, responsive, reliable, empathetic, and professional assistance that either matches or exceeds customer expectations. Notably, customer satisfaction, loyalty, and retention are intricately linked to employee service quality. Khadka and Maharjan (2017) assert in their research that customer satisfaction studies, often utilizing tools like SERVQUAL, aim to gauge the extent of customers' contentment with a given service. They emphasize the importance of investigating the interplay between customer satisfaction, loyalty, and service quality to ascertain whether customers are genuinely satisfied with the service they receive. Organizations consistently delivering high-quality service through their employees stand a better chance of attracting and retaining customers. Additionally, Prentice et al. (2020) highlight that human service quality encompasses both employee service quality and customer interaction, underscoring the intricate dynamics between service providers and customers. Thus, while service quality pertains to the efficacy and excellence of service delivery, customer satisfaction refers to the degree of contentment or fulfilment experienced by customers as a result of their interactions with a service.

Literature shows that customers have been more receptive towards personalised services and engagements thereby increasing their overall satisfaction of their experiences (Doborjeh et al., 2022). It has been seen that satisfaction always leads to revisit intentions and giving referrals. According to Huang and Rust (2020), the increasing use of AI can replace human workers, leaving hotels with less human interaction and offering drastically different guest experiences. Yet how AI is used, will affect how service automation affects hotels. A study by Yang et al. (2020) stated that robots are a viable alternative to humans due to the economic benefit of using a robot outweighs the use of a human. According to Ainsworth and Foster (2017), hotels are aware of increasing consumer comfort by enhancing the service setting or improving employee training in conventional human service situations. Yet, many customer service interactions involve no human-to-human contact, engaging with robots rather than real people (Lee, Lee, 2020). According to the literature, a service robot's resemblance to a human can affect customer service results, such as customer contentment and loyalty, as well as how uncomfortable and dangerous the robot is seen to be (Yoganathan et al., 2021).

The Resource-Based Perspective Theory, which contends that innovation is a function of a firm's resources and capabilities, is one of several theories on innovation but the theory that pertains to our research. According to this theory, firms with unique resources and capabilities, such as intellectual property or specialized knowledge, are more likely to innovate suc-

cessfully. A strategic resource is an asset that is priceless, uncommon, challenging to duplicate, and incomparable. According to Primawati (2018), hotels are currently undergoing an unsettling digital transformation, and tourists' behaviour in reaction to this development has created a complex and disruptive ecosystem where human-technology interactions lead to the emergence of new structures and stakeholders.

The interaction between people and AI has been the subject of earlier investigations. Yet, there has been comparatively little research on the type of service provided and how guest views of privacy and communication change in human interactions vs. AI interactions. Understanding why customers accept or reject this new route for service offering is also important for advancing AI technology. A research study by Mende et al. (2019) revealed that consumers display compensatory responses when they interact with the humanoid service robots rather than a human employee because humanoid service robots elicit greater consumer discomfort, i.e., eeriness and threat to humans and stated that it is unclear whether it will trigger positive or negative experiences. Studies on consumer attitudes have concentrated on customer satisfaction (Chung et al., 2020), customer loyalty (Alzoubi et al., 2021), and intention to use AI in the future (Ashfaq et al., 2020). Another research study by Prentice et al. (2020) found that whilst both service experience with employees and AI are significantly related to customer engagement and loyalty, only certain dimensions make significant unique variances. The findings of this study indicate that customer prefer employee service.

Consequently, this study aims to look at how hotel guests respond to various service agents, to assist hospitality service providers in finding a balance between AI and human service interface. It is critical to comprehend the visitor's perceptions and experiences with AI in providing service satisfaction (Di Vaio et al., 2020) and its impact on loyalty intentions. The current paper will provide specific areas to present a meaningful vision so that academics and practitioners can investigate hotel management practices in light of the paucity of literature on the effect of AI on guest experience in the hospitality industry and AI and human workers interaction in the workplace. This aspect will create an awareness of market potential with new technology that can actively assist hotels in reacting to the changing environment and standing out from rivals.

Thus, the following hypotheses are proposed along with the model:

H1: AISQ positively and significantly impacts CL
H2: AISQ positively and significantly impacts CS
H3: CS positively and significantly impacts CL
H4: HSQ positively and significantly impacts CL
H5: HSQ positively and significantly impacts CS
H6: CS mediates the relation between HSQ and CL.
H7: CS mediates the relation between AISQ and CL
H8: CS mediates the relation between HSQ and CL to a greater extent as compared to the relation between AISQ and CL.

AISQ - Artificial Intelligence Service Quality
HSQ - Human Service Quality
CS - Customer Satisfaction
CL - Customer Loyalty

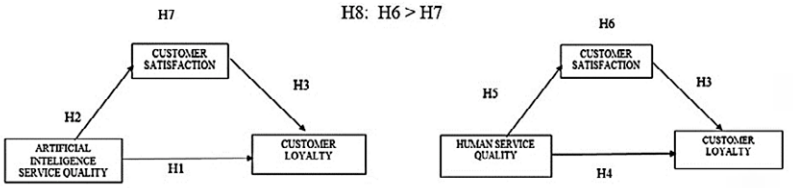

Figure 1. Proposed Model

Research Methodology

The data collection method employed Google Forms, conducted between November 2022 and March 2023. The study targeted 138 participants from India who had lodged in hotels classified within the 3-star to 5-star category. These hotels were equipped with various forms of artificial intelligence, encompassing functionalities such as facilitating travel bookings, recommending local attractions, regulating room conditions (temperature and lighting), providing information on-demand, and facilitating meal or beverage orders. Top of Form

Purposive sampling was used. As suggested by Hair et al. (2015), the sample size was suitable. Care was taken to include respondents of different demographic statuses. 57.2% were male and 42.8% were female; 54.3% (majority) were in the age group of 15 –25 years. We adopted a 5-point Likert- scale to collect responses. The structural Equation Modelling (SEM) method was used to test the hypotheses.

A structured questionnaire having five sections was used for data collection. Four scales were adopted to measure the constructs. All scales were formulated based on a 5-point Likert scale from 'strongly agree' - 5 to 'strongly disagree' - 1. Socio-demographic details like age, occupation and gender were collected in the first section. The second section contained AI Service Quality where in 8 – items were used to measure the AI Service Quality. The third section contained 11 - items to measure Human Service Quality (HSQ). In the fourth section, 8-items were used to measure Customer Satisfaction (CS) were used. The fifth section comprised of 2 items to measured Customer Loyalty (CL). The scale to measure AISQ was adapted from Prentice et al. (2020). Parasuraman et al. (1985) SERVQUAL was adapted for the HSQ scale. The Customer satisfaction scale was adapted from El-Adly (2019). The Customer Loyalty scale was adapted from Kandampully and Suhartanto (2003).

Data analysis and interpretation

After every construct was assessed for its validity and reliability, the validity of the measurement models was assessed using AMOS version 22. Items which had shared variance were identified from the modification indices and were removed to obtain a good model fit. Since the validity of the measurement model was found acceptable, the structural model was used to test the hypotheses.

Table 1. *Reliability of scales and Validity of measurement model*

CONSTRUCT	CODE	ITEM	Factor Loading	Chronbach's alpha	CR	AVE
AI SERVICE QUALITY				0.771	0.78	0.50
AISQ	AISQ3	AI provides quick access to hotel service assistants	0.551			
	AISQ4	AI is useful in ordering meals/drinks	0.889			
	AISQ5	AI suggests special dishes for my meal	0.651			
	AISQ7	AI helps in travel booking and in choosing safe routes	0.625			
HUMAN SERVICE QUALITY				0.9	0.90	0.50
HSQ	HSQ1	A human employee is aware of the impression he makes on others	0.513			
	HSQ3	A human employee has insight into his/her own motives and behavior	0.667			
	HSQ4	A human employee evaluates the motivation of others by interpreting situations	0.705			
	HSQ5	I feel safe and secure with the human employees during my stay at the hotel	0.698			
	HSQ6	I feel human employees are filled with knowledge to provide me with information about surrounding areas	0.734			
	HSQ7	I feel human employees are courteous and polite	0.754			
	HSQ8	Delivery of promises made to me by human employees is according to my preference	0.779			
	HSQ9	Dependability in handling my problems during my stay by human employee is satisfactory to me	0.728			
	HSQ10	Maintenance of error - free records by human employee is ideal	0.688			
	HSQ11	Delivery of services within the time promised to me by human employees is satisfactory	0.619			
CUSTOMER SATISFACTION				0.822	0.836	0.565
CS	CS2	During my stay at that hotel, I was able to forget my problems	0.562			
	CS4	The furnishing of that hotel was aesthetically appealing	0.772			
	CS5	My choice to stay at that hotel was a wise one	0.788			
	CS6	Overall, I feel satisfied about that hotel	0.859			
CUSTOMER LOYALTY				0.912	0.92	0.85
CL	CL1	I will revisit the hotel in future	0.869			
	CL2	I will recommend this hotel to others	0.969			

Source: The authors

Note: CR- composite reliability; AVE – Average variance extracted

Structural Equation Modelling

From Table 2, it can be seen that AISQ explains 13% of the variance in CL whereas HSQ explains 17% of the variance in CL. AISQ explains 12% of the variance in CS whereas HSQ explains 31% of the variance in CS. However, CS explains 70% of the variance in CL. This means that Customer Loyalty is greatly influenced by Customer satisfaction. Hence the hotels must improve their Service Quality if they want repeat customers or want their customers to give recommendations. It can be observed that the impact of HSQ on CS (.555) is greater than the impact of AISQ on CS (.347). It can also be observed that the impact of HSQ on CL (.416) is greater than the impact of AISQ on CL (.358). *Hence it implies that the human touch is more important than the AI. AI can be used to complement Humans but not to replace them.*

Table 2. *SEM Coefficients and the Significance*

	Std	Estimate	S.E.	C.R.	P	R^2	
H1: AISQ → CL	.358	.320	.097	3.293	***	13%	SUPPORTED
H2: AISQ → CS	.347	.223	.073	3.067	.002	12%	SUPPORTED
H3: CS → CL	.836	1.165	.192	6.073	***	70%	SUPPORTED
H4: HSQ → CL	.416	.560	.1244	4.508	***	17%	SUPPORTED
H5: HSQ → CS	.555	.495	.107	4.614	***	31%	SUPPORTED

Source: primary data

*Notes: *** p-value < 0.01*

R^2 – shows how much variance in Dependent variable is explained by independent variable

From Table 2, it can be observed that all the five hypotheses H1, H2, H3, H4 and H5 are supported.

Table 3. *SEM Path Coefficients and the significance for the mediating effect of Customer Satisfaction on the relationship between AISQ and CL*

	Std	Estimate	S.E.	C.R.	P
AISQ → CL without mediating variable	.358	.320	.097	3.293	***
AISQ → CL Direct with mediating variable	.064	.055	.059	.939	.348
AISQ → CL indirect effect with mediating variable	.283				.005 ***

Source: primary data

*Notes: *** p-value < 0.01*

From Table 3 it can be observed that initially there is a positive and significant direct relationship between AISQ and CL. Upon introduction of the mediating variable CS, this relationship becomes non-significant hence proving full mediation. There is also an indirect relationship (.283) which is positive and significant (1% level of significance). Proving mediation according to Hayes (2018).

Thus, it can be concluded that Customer Satisfaction mediates the relationship between AISQ and Customer Loyalty. Hence H6 is supported.

From Table 4 it can be observed that initially there is a positive and significant direct relationship between HSQ and CL. Upon introduction of the mediating variable CS, this relationship becomes less but is still significant (proving that there is a mediating effect of CS). There is also an indirect relationship (.504) which is positive and significant (1% level of significance). Thus, proving mediation (Hayes, 2018)

Thus, it can be concluded that Customer Satisfaction mediates the relationship between HSQ and Customer Loyalty. Hence H7 is supported.

Table 4. *SEM Path Coefficients and the significance for the mediating effect of Customer Satisfaction on the relationship between HSQ and CL*

	Std	Estimate	S.E.	C.R.	P
HSQ → CL without mediating variable	.416	.560	.124	4.508	***
HSQ → CL Direct with mediating variable	.131	.154	.092	1.673	*
HSQ → CL indirect effect with mediating variable	.504				.001 ***

Source: primary data

*Notes: *** p-value < 0.01; * p-value < 0.10*

Further it can be observed that the indirect effect of CS between HSQ and CL is greater (.504) than the indirect effect of CS between AISQ and CL (.283). Hence H8 is supported.

Discussion with implication, limitation and future research direction

In comparing our study to similar published research, it becomes evident that the integration of artificial intelligence (AI) and robotics in the hospitality industry is a topic of growing interest and importance. Our study builds upon the foundation laid by previous research, such as the work of Yang et al. (2020), which highlights the numerous opportunities AI and robotics offer to hospitality firms in enhancing service quality and efficiency. Similarly, Ahrholdt et al. (2017) and Parasuraman et al. (1985) emphasize the critical role of service quality, both from AI-driven systems and human interactions, in shaping customer satisfaction and loyalty.

Our findings contribute to this body of knowledge by providing empirical evidence of the impact of AI service quality and human service quality on customer satisfaction and loyalty. Consistent with the findings of Prentice et al. (2020), we demonstrate that both AI and human service quality significantly influence customer satisfaction. Furthermore, our study extends this understanding by revealing the mediating role of customer satisfaction in the relationship between service quality dimensions and customer loyalty, echoing the findings of Khadka and Maharjan (2017) and their emphasis on the importance of studying the relationship between customer satisfaction, loyalty, and service quality.

Building upon the insights gained from our study and related research, several implications emerge for practitioners and researchers in the hospitality industry. Company owners, managers, and marketers can leverage our findings, along with those of Belanche et al. (2020) and Reis et al. (2020), to develop and implement effective strategies for integrating AI and human service interactions in their operations. By understanding the complementary roles of AI and

human empathy, organizations can optimize service delivery to meet the evolving needs and expectations of customers.

Furthermore, our study underscores the need for future research to explore the broader implications of AI adoption in the hospitality sector. By expanding upon the work of Doborjeh et al. (2022) and Naumov (2019), researchers can delve deeper into the complexities of AI-human interaction, considering factors such as customer privacy, communication dynamics, and the overall guest experience. Additionally, studies examining the long-term effects of AI implementation on customer behavior and market dynamics, as suggested by Primawati (2018), can provide valuable insights for industry stakeholders navigating the rapidly evolving landscape of AI-driven service innovation.

Despite the contributions of our study, several limitations warrant consideration. Firstly, our sample comprised only Indian hotel guests who interacted with AI products connected to those hotels, limiting the generalizability of our findings. This echoes the concerns raised by Naumov (2019) regarding the challenges of generalizing findings in a sectoral and geographic context. Future research should aim to replicate our study across diverse demographics and geographic regions to enhance the robustness and applicability of the findings.

Furthermore, while our study focused on the impact of AI and human service quality on customer satisfaction and loyalty in the hospitality sector, there may be other contextual factors and variables that influence these relationships. Future studies could explore additional service quality dimensions, as Ivanov et al. (2017) suggested, and consider the moderating effects of factors such as cultural differences, technological readiness, and organizational capabilities.

Conclusion

Our study aimed to investigate how consumers' perceptions of hospitality service quality vary depending on their interactions with artificial intelligence (AI) or human staff members. We examined the impact of both Artificial Intelligence Service Quality and Human Service Quality on customer satisfaction and loyalty.

Our findings indicate a significant and positive relationship between both human service quality and AI service quality with customer satisfaction, aligning with previous research by Prentice et al. (2020). Additionally, we observed that customer satisfaction mediates the relationship between both human service quality and AI service quality with customer loyalty. Importantly, our study reveals that the indirect relationship between human service quality and customer loyalty is stronger compared to the relationship between AI service quality and customer loyalty, echoing the findings of Mende et al. (2019), who highlighted consumers' compensatory responses to humanoid service robots and their potential impact on service experiences.

Furthermore, our study emphasizes the preference for human interactions among consumers, as revealed by Prentice et al. (2020). Despite the prevalence of AI-powered services within organizations and their potential to enhance customer satisfaction and operational effectiveness, our findings underscore the continued importance of human empathy in shaping service experiences, particularly in the current service-dominant era.

Moving forward, finding a suitable balance between AI and human collaboration is essential for service providers. This requires careful consideration of both AI efficiency and human empathy to make informed decisions about where to integrate AI solutions in their value chain.

By acknowledging the potential negative effects of AI adoption and strategically incorporating AI technologies into their operations, organizations can better meet the needs and expectations of both customers and employees.

Our study contributes to advancing knowledge on the integration of AI and human service interactions in the hospitality industry. By highlighting the importance of both AI and human service quality in shaping customer satisfaction and loyalty, our findings provide valuable insights for practitioners and researchers alike. By focusing on these technologies and implementing appropriate strategies, organizations can enhance their business performance and effectively navigate the evolving landscape of service innovation.

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