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Evaluation of customer technology experience : The intermediary role of customer satisfaction and its impact on customer loyalty and word of mouth

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Abstract

This paper investigates the impact of AI-based chatbot technology experiences on customer loyalty and word-of-mouth (WOM) in the hotel context. This paper highlights the pivotal role of customer satisfaction as a mediation boundary in the underlying linkages. Using an online survey on Google Form, 310 five-star hotel guests within Greater Cairo responded. Their responses were analyzed using partial least squares structural equation modeling (PLS-SEM). This paper employed a multi-dimensional approach, exploring various aspects of customer experiences with chatbots and their subsequent effects on customer satisfaction outcomes. Findings revealed that customer experiences with chatbot technology positively affected customer satisfaction. Besides, customer loyalty and WOM were positively affected by customer satisfaction. Further, customer satisfaction partially mediated the nexuses between customer experiences of chatbots and both their loyalty and WOM. Accorsingly, this paper contributes valuable insights to the understanding of the focal role of chatbots in shaping customer perceptions and behaviors within the hospitality context. Therefore, analyzing customer feedback will allow hotel properties to improve their chatbot interactions with prospective customers to better match their preferences and encourage satisfied customers to share their positive experiences online. Furthermore, training and awareness programs can help hotel guests maximize the potential of chatbots, enhancing their immersive experiences. Lastly, implementing personalization strategies in chatbot interactions (e.g., tailoring responses based on guests' preferences) can enhance their satisfaction about these experiences.

Keywords: AI-based chatbots; customer experiences; customer satisfaction; word-of-mouth; hotel industry

Introduction

Chatbots have become integral to business strategies, offering solutions that cater to a diverse range of industries (Kaushal & Yadav, 2023). They play a crucial role in automating IT for business support, elevating customer experiences, and enhancing overall customer service (Wujarso, 2023). The hospitality industry, recognizing the growing potential across various sectors, is keen on leveraging chatbots that are capable of engaging directly with customers for frontline services (Zhu et al., 2023). In the hospitality context, chatbots offer a myriad of advantages, ranging from customer support and planning recommendations to aiding customer choices and managing booking and food delivery requests (Abdelhakim et al., 2023). Interactive and computerized chatbot concierges are transforming guest reservation and inquiry assistance in the hotel and lodging sectors (Sumarjan et al., 2023). These advancements underscore the significant impact chatbots are making on hospitality operations, contributing to streamlined, enhanced customer experiences (Roslan & Ahmad, 2023).

Carter and Knol (2019) highlight the profitability of artificial intelligence in the hospitality sector, emphasizing the growing prevalence of chatbot usage. Moreover, Ukpabi et al. (2019) noted Marriott Hotels' introduction of chatbot apps, leveraging the Facebook chatbot interface to facilitate hotel services through Messanger Box. Chatbots prove valuable in enhancing the pre-arrival experience (Calvaresi et al., 2023), allowing customers to reserve meals, spa appointments, and additional services (Gangwar & Reddy, 2023). Given technologies' diverse adoption across various sectors within the hospitality setting (Jayawardena et al., 2023), it becomes pertinent to explore potential differences in how guests interact with this emerging technology in each sector. Understanding these distinctions is crucial in assessing the impact of various technological aspects on the overall customer experience (Abdelhakim et al., 2023). This nuanced examination will shed light on the unique dynamics and preferences that shape human interactions with emerging technologies within the broader hospitality landscape.

McLean et al. (2020) delved into the influence of customers' perceptions of distinct human qualities and values of live chat services on their views and behaviors related to online travel shopping. Otherwise, Jiménez-Barreto et al. (2021) established an approach for understanding customers' motivations in chatbot experiences, while Yoon and Yu (2022) analyzed customer chatbot experience features and their effect on attitudes toward online menu curation chatbots, implying their future adoption. On the other hand, Nguyen et al. (2023) compared chatbots' recovery capabilities to those of employees for efficient service recovery. Besides, Zhu et al. (2023) investigated how customer perceptions of AI-powered chatbots influence their emotional and mental states, affecting their behaviors in comparison to online reservation platforms. In hospitality 5.0, Zhang et al. (2024) contributed to the expanding knowledge of human expectations in customer-chatbot interactions by exploring the potential effect of chatbot responses on expectancy violations.

Likewise, Sumarjan et al. (2023) explored how chatbot technology is intended to be utilized in hospitality and tourism contexts, emphasizing anthropomorphic representation, customization, and accurate interaction. However, Calvaresi et al. (2023) developed a proof-of-concept highlighting chatbot possibilities in the tourism sector from academic and industrial perspectives. Despite the growing significance of chatbots, recent studies on the focal role of chatbots on customer satisfaction still remain limited. As such, Abdelhakim et al. (2023) stressed the importance of developing chatbots that please customers and enhance their various perceptions. Accordingly,

this paper contributes to filling these research gaps by investigating how chatbot features (e.g., interaction, problem-solving, recreational activities, and adaptation) can influence communication effectiveness and impact on both customer satisfaction, loyalty, and word-of-mouth (WOM) (see Figure 1).

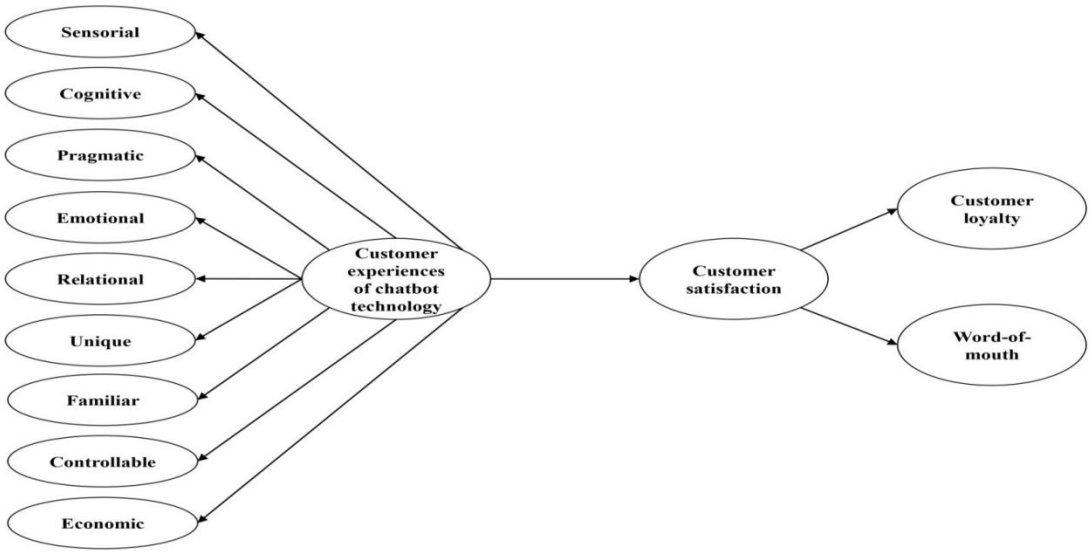

Figure 1. Research model.

2. Theoretical foundations

2.1. Underpinned theories of chatbot experience

Customer experiences are commonly defined as dynamic and all-encompassing interactive relationships that involve emotions, feelings, and sensations between customers and businesses (Sidaoui et al., 2020). Gu and Huang (2023) posited that customer experiences are shaped by the different purposes and emotional significance of the services they utilize, varying based on service inputs (e.g., assets and technology). According to Wujarso (2023), service experiences are a multifaceted construct that encompasses operational, sentimental, and interpersonal interactions in the dining experience context. On the other hand, customer experiences go beyond the transactional aspects and encompass various elements (Kacprzak & Hensel, 2023), including environment, society, technological advances, and sensory stimuli. These elements inherently constitute customer experiences, evoking feelings on physical, mental, cognitive, and moral levels (Veloso & Gomez-Suarez, 2023). This holistic view emphasizes the interconnectedness of diverse factors in shaping the intricate tapestry of customer experiences (Jayawardena et al., 2023), highlighting the importance of addressing these elements to create a comprehensive and meaningful interaction between customers and hotel businesses, as shown in Table 1.

Table 1. Measures of technology experience.

Measurement	Concept	Statement of clarifying
Sensorial experience	An encounter that stimulates customers' multiple senses (i.e., auditory, tangible, taste, and smell).	I felt capable of perceiving the images more clearly with the application installed. I believe the image had a significant impact. It really does make a huge difference to be allowed to observe them.
Cognitive experiences	An encounter in which customers are deliberating, interpreting, or acquiring knowledge intellectually	I learned more about the location with the help of the chatbot applications. I was intrigued about the destination because some of them complemented what I believed, and some of them were unfamiliar.
Pragmatic experience	An encounter where customers gains useful advantages from chatbots app, like effectiveness and simplicity.	since all of a restaurant's details are available on the chatbot app. My travels were now more productive. Anything was therefore more effective. I was able to avoid having to examine everything at the front desk with the productive help. It saves you some effort and assists me in locating the greatest restaurants and hotels available.
Emotional experience	An encounter that resonates with customers' sentiments and feelings as well.	I found the chatbots app to be somewhat fascinating at first.
Relational experience	An experience that customers can share with another person or engage in technology-mediated communication with others.	Reading those reviews was like having a chatbot app conversation with strangers.
Unique experiences	An platform in which customera come into contact with something unusual and dissimilar from his or her regular life.	It was not something I really expected to see in person. It was really informative. Since I do not bring these knowledge from home, I thought it was kind of special to use them.
Familiar experiences	An event that occurs in customers' everyday life or that they anticipate.	Utilizing Chabot's, for example, was all that different from what I would do at home.
Controllable experiences	Adecision-making experience that customers' choices, giving them greater authority over their trip.	We were able to choose our own destinations with more autonomy. I can take advantage of chatbots to figure out the most significant information to know about my destination, and then I can use hotel and restaurant apps to discover all the information and knowledge.
Economical experiences	An encounter where costs are reduced for customers compared to technological performance.	Occasionally, it will result in cost savings because, on occasion, the chatbot app provides price reductions. It is essentially financial savings plans. I am not obligated to spend extra money on tips; I can use chatbots.

Source: Shin et al. (2022).

2.2. Chatbot technology experiences

AI-based chatbots are communication tools employing AI technology and an underlying computer program to interact with humans (Shin et al., 2022). According to Nguyen et al. (2023), chatbots are apps integrated with artificial intelligence designed to automate customer service, replacing employees to address customer inquiries through textual or auditory messages on social networks. In this regard, business administrators are increasingly turning to AI solutions to enhance customer experiences (Camilleri & Troise, 2023) as information and communication technology and artificial intelligence (AI) become more integrated into service advertising (Pillai et al., 2023). In AI chatbot systems, when customers pose some questions, smart robots search the answering system for relevant contents and promptly respond (Al-Sharafi et al., 2023), allowing customers to independently learn about products and complete the purchasing process (Zhu et al., 2023).

Booking.com, for instance, utilizes AI chatbots in 43 languages to expedite lodging reservations and offer travel suggestions (Rady & Wahab, 2023), making booking processes more efficient and accessible to a global audience (Al-Sharafi et al., 2023). As such, these chatbots provide travelers with comprehensive information, such as budget-based destination recommendations, and keep them informed about upcoming trips (Chang et al., 2023). Further, the potential of chatbots extends across various sectors within the hospitality industry (Pillai et al., 2023), benefiting travel agencies, restaurants, lodging establishments, rental car companies, and customer information centers (Khan & Azam, 2023; Pillai et al., 2023). This emerging technology holds promise for streamlining operations and enhancing customer interactions in diverse areas of the hospitality realm (Abdelhakim et al., 2023).

2.3. Customer satisfaction

A hotel's success and long-term competitiveness often hinge on its ability to satisfy customers (Sidaoui et al., 2020), where customer satisfaction is closely tied to overall customer experiences (Chen et al., 2021). In this context, customer satisfaction refers to responses and emotions associated with customer expectations following purchase (Selem et al., 2023a). Internally, customer satisfaction is gauged through an assessment of service levels and quality that customers anticipate from exiting or previous transactions (Siallagan, 2023). As such, positive customer satisfaction not only encourages favorable WOM referrals but also increases the likelihood of repeat business and enhances loyalty levels (Do & Pereira, 2023). Further, it reflects sentiments arising from products' performance assessments against customer expectations (Veloso & Gomez-Suarez, 2023). Theortically, the expectation-disconfirmation paradigm is a framework that posits that customer satisfaction results from comparing the perceived effectiveness of products/services with anticipated outcomes (Rady et al., 2023). For instance, customers tend to be satisfied when they perceive their performance to exceed their initial expectations (Sawasdee et al., 2023).

Within the chatbot context, customer satisfaction plays a pivotal role in influencing willingness to engage with new technologies and shaping overall customer experiences (Chi, 2023). Given the substantial effect of customer satisfaction on intention to use chatbots (Della Corte et al., 2023), hotel businesses are advised to develop cutting-edge digital strategies to enhance customer satisfaction and foster repeat usage of chatbots in primary support roles (Bouchriha et al., 2023). As such, Sawasdee et al. (2023) underscored the importance of prioritizing customer satisfaction to drive successful and sustained chatbot adoption. The valuable insights provided by chatbots on customer experiences and their focal roles in customer satisfaction in marketing settings (Zhang et al., 2024), along with evidence indicating that experiences forecast customer satisfaction, lead to conclusions that hotel marketers should invest resources, time, and money in advancing service technologies (Huang et al., 2024).

On the other hand, technology deployment in the hotel industry has demonstrated a significant improvement in service standards, influencing customer satisfaction (Rizomyliotis et al., 2022). In this case, hotel managers and guests agreed that employing emerging technologies would positively affect guest satisfaction (Özen & Özgül Katlav, 2023). Thus, other AI-powered app usage enhances customer experiences, which positively impacts their satisfaction (Wu et al., 2023). Among emerging technologies, chatbots prove instrumental in developing critical strategies to enhance customer experiences in the hotel context (Zhang et al., 2024). Ma et al. (2024) asserted that customer experiences, encompassing both direct and indirect engagements with chatbots, are a crucial factor in evaluating chatbot services. Therefore, chatbot experiences will positively affect guest satisfaction.

Further, Rizomyliotis et al. (2022) confirmed that customer satisfaction was positively influenced by overall customer experiences. Besides, Yun and Park (2022) found that customer satisfaction was somewhat positively impacted by chatbot service characteristics determined by customer experiences. Therefore, customer satisfaction with chatbot apps was positively correlated with post-use acceptance (Huang et al., 2024). Zhang et al. (2024) revealed that chatbots' emotional responses can enhance customer satisfaction and decrease expectation violations. Additionally, customer satisfaction with chatbots was positively influenced by perceived intrinsic and extrinsic values of online customer experiences (Kumar et al., 2024).Therefore, this research proposes that:

H1. *Customer experiences of chatbot technology positively affects customer satisfaction.*

2.4. Customer loyalty

In this paper, customer loyalty is defined as behavioral loyalty, reflecting customers' tendency to stick with the smart tourism technology (STT) platform (Ng et al., 2023), driven by widespread uses of mobile technology and increased competition in the STT landscape (Shariffuddin et al., 2023). The importance of cultivating loyal customers is emphasized, as it shapes customer behavior and ensures sustained, long-term purchases (Felix & Rembulan, 2023). Azhari et al. (2023) affirmed that satisfied customers are loyal clientele outcomes, highlighting the pivotal role of customer satisfaction in determining business loyalty. As such, Lee and Li (2023) proved that travelers who fully engage with innovative tourism technologies are more likely to have memorable experiences and exhibit loyalty.

Accordingly, AI-powered chatbots play a focal role in customer-firm interactions, replacing human involvement to streamline services or collaborate with customers (Pavone et al., 2023). As a result, a causal relationship between customer satisfaction and loyalty is frequently cited in the marketing literature (Camilleri & Filieri, 2023; Felix & Rembulan, 2023; Pavone et al., 2023), emphasizing the impact of service satisfaction on customer loyalty (Chen et al., 2023). Numerous studies support the idea that happy online service customers are more likely to return, influencing their loyalty (see Azhari et al., 2023; Xie et al., 2023; Zaato et al., 2023). In this context, Venkatakrishnan et al. (2023) provided evidence of a positive correlation between customer satisfaction and loyalty. In today's internet-connected world, where smartphones are integral to everyday life, satisfied customers of mobile apps are likely to use them repeatedly (Alshurideh et al., 2023), shaping habits and fostering a pattern of use with chatbot apps (Blümel et al., 2024). Therefore, this paper proposes that:

***H2*.** *Customer satisfaction positively affects customer loyality.*

2.5. Word-of-mouth

In tourism research, WOM refers to informal, relationship-based customer communication about specific travel-related experiences and transactions (Bae et al., 2023; Šerić et al., 2023). Satisfied customers are more likely to share product/service benefits with others, providing their highest recommendations. Numerous studies have demonstrated that satisfaction serves as a significant precursor to influencing WOM (see Atito et al., 2023; Bae et al., 2023; Camilleri & Filieri, 2023; Jain et al., 2023). Notably, there is a gap in the current research landscape regarding the correlation between customer satisfaction with STTs, i.e., chatbots, and WOM. However, existing studies focus on WOMs related to upscale hotels rather than STTs. Recognizing that a customer's satisfaction with STTs leads to WOM, as satisfaction in the post-usage stage reflects overall customer experiences, this paper assumes that:

H3. *Customer satisfaction positively affects word-of-mouth.*

Given that the pivotal role of customer satisfaction serves as a mediator between various metrics of chatbot service quality, intent to buy, and WOM (Khan et al., 2022; Yu & Park, 2022; Zaato et al., 2023), the current paper contributes to our understanding of how e-service agents, i.e., chatbots, influence customer-brand relationships (Magno & Dossena, 2023) through customer satisfaction as a mediator. Additionally, customer satisfaction is identified as a mediating factor in the nexus between perceived hedonic beneficial effects and e-WOM intentions (Do et al., 2023). However, Venkatakrishnan et al. (2023) explored customer satisfaction as an intermediary in the relationship between service quality and customer loyalty. Therefore, this research proposes that:

H4. *Customer satisfaction mediates the association between customer experiences of chatbots and a) customer loyality and b) word-of-mouth.*

3. Methods

3.1. Instruments

Measurement scales tailored to the AI-based hotel setting were employed for relevant variables, drawn from current literature (see Table 2). Customer experiences of chatbot technology were assessed using 36 items, which is a second-order reflective scale, cited from Shin et al. (2022). This scale consists of nine subdimensions: sensorial (three items), cognitive (five items), pragmatic (four items), emotional (six items), relational (four items), unique (three items), familiar (three items), controllable (five items), and economic experience (three items). Customer satisfaction with chatbot technology was gauged with four items, derived from Chen et al. (2023). Lastly, Ng et al.'s (2023) scale was employed to assess customer loyalty with three items and WOM with four items. Each response was based on a seven-point Likert scale.

3.2. Procedure and data collection

Before data collection, four professors of international marketing were requested to assess survey items to verify their validity. Hence, no substantial changes were suggested; expect to summarize the survey's opening to better convey this paper's purpose. As such, these minor adjustments were made. In this regard, Greater Cairo was chosen because it has several more cultures and antiques than other Egyptian cities, as well as the most luxurious hotels and resorts (Magdi & Ibrahim, 2023). The Islamic culture is represented by Muhammad Ali, Amr Ibn Al-Aas, and Al-Hussein mosques, while Coptic civilization was exemplified by the Coptic Museum and historic churches, as well as the Sphinx and three pyramids that were related to Pharonic civilization (Khalil & Abd El Fattah, 2023).

Accordingly, a pilot study was carried out on 44 five-star hotel guests one week prior to data collection after inviting 80 hotel guests using Google Form. As such, public relations employees from within the targeted hotels reached out to guests by sending the questionnaire link that was prepared on Google Form to assess the chatbot-powered services provided. To choose current guests at targeted hotels, the filter question was added as follows: "*Are you this hotel guest now?"* Thus, those who answered yes were included in the pre-sample as well as the final sample. For pre-test findings, such guests emphasized the need to reformulate a few unclear items related to the mediating variable but did not make any significant changes to the recalled items.

To gather the dataset, a two-stage sampling technique was performed. Given that long-stay visas are available to international tourists planning to remain in Egypt for more than 90 days (Selem et al., 2023b), a purposive sampling was employed as the first stage to choose Greater Cairo's hotel guests. Since this sampling allowed for several respondent interactions, this helped extract a great deal of information from the dataset gathered (Obilor, 2023). This lets scholars explain how their discoveries primarily affect the target population. Moreover, the rationale behind this sampling is to enhance the study's rigor, data reliability, and findings by more aligning the sample size with the research's objectives. In the second stage, snowball sampling was employed to gather data from intended respondents between April and May 2023. This sampling focuses on increasing sample sizes until researchers have a sufficient dataset to evaluate definitive findings (Zickar & Keith, 2023) that will enable targeted organizations (in our case, five-star hotels) to make well-informed decisions. Hence, the survey was distributed with 400 online copies, and 322 responses were gathered, yielding a response rate of 80.5%.

Furthermore, Levine's test was conducted to check for homogeneity in 175 early and 147 late responses. Therefore, all responses were sorted to confirm they contained outliers. Therefore, 310 valid responses moved on to statistical analyses after twelve responses that included outliers were omitted. Lastly, an efficient technique for calculating sample size over the past 20 years was required since empirical research requires a representative statistical sample more and more frequently. To close the discrepancy, Krejcie and Morgan (1970) developed an easily accessible table for calculating sample size for a particular population. As per the existing sample size, 310 cases can be considered to be representative of the study population of up to 1,600 cases (Chaokromthong & Sintao, 2021). G*Power was also employed to explore sample adequacy. Thus, findings found that the power index exceeded 80% (i.e., power = 0.99638) with an effect size of 0.50, confirming the current sample's ability to be analyzed with further statistical tests (Lakens, 2022).

3.3. Common method variance (CMV)

Datasets derived from the same sources may have CMV issues (Ma & Zhang, 2023). Participants were assured that there was no preferred response for any question in the planned poll, and the survey was pre-tested to remove any ambiguous questions to lessen the likelihood of this issue. In addition, Harman's single-factor (HSF) test was conducted to determine if the change observed was mostly caused by one component (Howard & Henderson, 2023). However, the marker-correlation test (MCT) was employed since the HSF test was not good at diagnosing CMV issues (Shoukat et al., 2023). Accordingly, "psychological anxiety" was employed in this study as a marker variable. Therefore, the models (R^2 model with MCT = 42.11% and R^2 model without MCT = 41.66%) with and without MCT indications were statistically significant and closely correlated with their effects on WOM and loyalty. The variance inflation factor (VIF) findings also showed that all measurement items exceeded 3.3 (Ma & Zhang, 2023). Consequently, all previous

justifications showed that our dataset findings did not exhibit any discernible CMV-related problems (Shehata et al., 2023).

3.4. Sample adequacy and analysis strategy

For data analysis, partial least squares structural equation modeling (PLS-SEM) was performed. According to Hair et al. (2021), this method does not need distributional assumptions and aids in the evaluation of complicated models. Shoukat et al. (2023) describe how PLS-SEM may be used to experimentally evaluate the link between current theory and underlying constructs. Even if PLS is being utilized in social science more and more, Schuberth et al. (2023) questioned the correctness and dependability of this method while handling SEM data. For example, "the idea that PLS data may be used to validate a measurement model is a fabrication; the PLS path estimate cannot be utilized in null hypothesis significance testing." While PLS is "not a panacea," Hwang et al. (2023) responded to these worries about this approach is "*a substantial method that warrants a prominent place in any empirical researcher's statistical arsenal*."

Furthermore, even with complex sample sizes, PLS-SEM analysis yields statistically significant findings (Sarstedt et al., 2022). Previous, PLS-SEM was employed for small sample sizes (Hair & Alamer, 2022); nevertheless, Basco et al. (2022) contend that sample sizes of up to 8,000 instances are the most suitable for this methodology. This methodology is also used for theoretical expansions of known concepts (Guenther et al., 2023). The primary objective of this study is to obtain a more profound comprehension of increasing complexity (Assaker & O'Connor, 2023). In conclusion, PLS-SEM is regarded as a suitable method for investigating indirect effects (i.e., mediation effects), as in our instance (Becker et al., 2023). In this paper, the most up-to-date and flexible evaluation method, called "SmartPLS4 software," was utilized to evaluate both the inner and outer models, or test direct and indirect hypotheses and indicator reliability and constructs' convergent and discriminant validity (Selem et al., 2023a; Shehata et al., 2023; Shoukat et al., 2023).

4. Results

4.1. Respondent profile

Table 2 displays respondents' profiles (N = 310), which shows that 55.5% of respondents were female. With respect to participants' age range, 35–below 44 years old accounted for 30% of the sample, followed by 29% of those who were 25–below 34 years old. In terms of continental identification, 34.5% of respondents were Asian. Lastly, the average monthly income of respondents was between $3000 and $49999 (39.4%), followed by $5000 and $6999 (32.6%).

Table 2. Respondent demographics (N = 310).

Category	Frequency	%
Gender		
Male	138	44.5
Female	172	55.5
Age group (years)		
< 25	75	24.2
25 - < 34	90	29.0
35 - < 44	93	30.0
≥ 45	52	16.8
Continental affiliation		
Africa	44	14.2
Asia	107	34.5
Australia	45	14.5
Europe	34	11.0
North America	47	15.2
South America	33	10.6
Monthly income (dollors)		
< 3000	63	20.3
3000 - 4999	122	39.4
5000 - 6999	101	32.6
≥ 7000	24	7.7

4.2. Outer model

To determine the survey validity, convergent, discriminant, and internal consistency validity were examined (Hair et al., 2021). To meet the minimal reliability requirement, factor loading values must be at least 0.708. In our case, omega coefficient (ω), Rho_A, and composite reliability values were greater than 0.70 (Becker et al., 2023), suggesting that the minimal criteria were satisfied (see Table 3). Third, the average variance extracted (AVE) needs to be smaller than 50. In our situation, the AVE values were over this threshold (see Table 3). Given that the outer model satisfies all convergent validity conditions (Guenther et al., 2023), Table 4 presents the heterotrait-monotrait ratio (HTMT) findings. This indicates that no construct had a statistically significant value higher than 0.85 (Rasoolimanesh, 2022). According to Hair et al. (2021), all constructs are logically distinct. Further, the Fornel-Lacker criterion refers to the correlation between the latent variable and itself that is greater than its correlation with other constructs (see Table 4). As a result, these tests demonstrated outstanding discriminant and convergent validity (Assaker & O'Connor, 2023).

4.3. Inner model

After evaluating the outer model, the inner model's fit must be evaluated (Kock, 2022). Out of 5000 re-samples, 643 cases were analyzed using the non-parametric bootstrapping technique for the PLS-SEM model (Cho et al., 2023). Therefore, predictive relevance (Q^2), effect size (f^2), and coefficient of determination (R^2) of the model were evaluated (see Table 4). According to Becker et al. (2023), effect sizes (f^2) have three values: small (less than .10), medium (f^2 less than .14), and large (f^2 greater than .28) in tourism studies. Therefore, large effect sizes are shown in Table 5.

Table 3. Construct reliability and validity.

Constructs	Item	Descriptive statistics		Convergent validity		Internal consistency reliability		
		M	SD	SFL	AVE	CR	ω	Rho_A
Sensorial experience	SEP1: The technology behind chatbots appealed to all of my senses—sight, sound, smell, taste, and touch.	4.63	1.954	.882	.698	.874	.832	.851
	SEP2: My senses of sight, sound, smell, taste, and touch were all satisfied by chatbot technologies.	4.55	1.999	.792				
	SEP3: My senses of sight, sound, smell, taste, and touch were stimulated by chatbots.	4.35	1.978	.830				
Cognitive experience	CGP1: I was more knowledgeable about this hotel using chatbots.	5.08	2.010	.871	.753	.939	.911	.928
	CGP2: Using chatbot technology, I learned a lot about this hotel.	5.10	1.707	.890				
	CGP3: Technology for chatbots, I learned more details about this hotel.	5.11	1.972	.872				
	CGP4: I processed information about this hotel using chatbot technology.	5.09	1.747	.889				
	CGP5: Chatbot technology improved my understanding of hotels.	5.03	1.850	.816				
Pragmatic experience	The chatbot technology was _____				.720	.911	.887	.898
	PEP1: Impractical/practical.	4.53	1.652	.866				
	PEP2: Non-functional/functional.	4.57	1.759	.838				
	PEP3: Complex/simple.	4.73	1.820	.848				
	PEP4: Difficult/easy.	4.63	1.864	.841				
Emotional experience	EEP1: When using chatbot technology, I felt frustrated/relieved.	4.93	1.845	.892	.783	.935	.917	.924
	EEP2: During the use of chatbot technology, I sensed unhappy/happy.	5.08	1.873	.884				
	EEP3: When using chatbot technology, my feelings were anxious/relaxed.	4.92	1.743	.883				

	EEP4: My emotions when utilizing chatbot technology were unpleasant/pleasant.	4.01	1.922	.880				
	EEP5: When using chatbots, my feelings were uninteresting/interesting.	4.14	1.743	.890				
	EEP6: My emotions when utilizing chatbot were terrible/delightful.	4.07	1.872	.891				
Relational experience	REP1: Using chatbot technology, I was able to communicate with others.	4.90	1.711	.852	.688	.898	.883	.875
	REP2: Using chatbot technology, I experienced a sense of community.	4.82	1.774	.831				
	REP3: Technology, utilizing chatbots, was connecting me to others.	4.85	1.935	.809				
	REP4: I became a part of the community because of chatbot technology.	4.90	1.912	.826				
Unique experience	UEP1: It was my first time using chatbot technology.	4.03	1.846	.836	.690	.870	.861	.869
	UEP2: My use of chatbot technology was unusual.	4.95	1.845	.811				
	UEP3: I did not anticipate how I would react to chatbot technology.	4.96	1.923	.844				
Familiar experience	FEP1: I could connect chatbot technology to my day-to-day activities.	4.67	1.741	.800	.683	.866	.853	.861
	FEP2: Using chatbot technology, I experienced a similar feeling at this hotel.	4.81	1.721	.862				
	FEP3: Using chatbots, I detected a familiarity at this hotel.	4.81	1.613	.817				

Controllable experience	CEP1: Chatbot technology gave me the ability to manage my plans.	4.52	1.695	.866	.734	.932	.920	.929
	CEP2: My plans are now more under my control thanks to chatbot technology.	4.57	1.770	.861				
	CEP3: I was able to change my plans or activities in response to my circumstances using chatbot technology.	4.45	1.814	.852				
	CEP4: I was able to better organise my plans using chatbot technology.	4.60	1.863	.846				
	CEP5: I was able to change my plans or activities using chatbots.	4.56	1.872	.859				
Economical experience	ECP1: My experience at this hotel was more affordable thanks to chatbot technology.	4.87	1.865	.850	.717	.884	.865	.873
	ECP2: The use of chatbot reduced my visit costa to this hotel.	4.85	1.761	.859				
	ECP3: My interaction with this hotel was more affordable thanks to the use of chatbot technology.	4.79	1.832	.831				
Customer experience of chatbot techology	Sensorial experience	4.51	1.821	.771	.622	.937	.921	.929
	Cognitive experience	4.08	1.593	.793				
	Pragmatic experience	4.62	1.526	.768				
	Emotional experience	5.02	1.507	.825				
	Relational experience	4.87	1.552	.787				
	Unique experience	4.98	1.584	.793				
	Familiar experience	4.77	1.515	.815				
	Controllable experience	4.54	1.487	.779				
	Economical experience	4.84	1.519	.766				
Customer satisfaction towards chatbot technology	CST1: Overall, I am very happy with this AI-chatbot.	4.57	1.446	.799	.656	.884	.868	.879
	CST2: Overall, I like deal with this AI-chatbot.	5.23	.929	.842				
	CST3: AI-chatbot meets all of my expectations.	5.11	1.551	.812				
	CST4: I would suggest this AI-chatbot to a friend.	4.87	1.105	.785				

Customer loyalty	CLY1: Future use of this chatbot technology is something I plan to do.	4.75	1.805	.864	.696	.873	.862	.866
	CLY2: I would prefer chatbot technology over other travel apps or websites.	4.72	1.799	.795				
	CLY3: Future use of chatbot technology is my top preference.	4.86	1.908	.842				
Word-of-mouth	WOM1: I will advise people to use this chatbot technology.	4.69	1.589	.804	.630	.872	.856	.863
	WOM2: I will share this chatbot technology with those in my neighborhood.	4.48	1.758	.780				
	WOM3: I will educate others about the benefits of chatbot technology.	4.51	1.881	.767				
	WOM4: Iam happy to announce to others that I use chatbot technology.	5.37	1.722	.823				

Table 4. Discriminant validity.

Constructs		Fornell-larcker criterion				Heterotrait-monotrait ratio			
		1	2	3	4	1	2	3	4
1	Customer experience of chatbots	**.845**							
2	Customer loyalty	.165	**.873**			.373			
3	Customer satisfaction	.371	.312	**.831**		.535	.474		
4	Word-of-mouth	.256	.211	.158	**.867**	.410	.387	.246	

According to Becker et al. (2023), the suggested model was correct when each Q^2 value was greater than zero. As a consequence, Q^2 ratings for customer satisfaction, customer loyalty, and word-of-mouth were .366, .280, and .342, respectively (see Table 5), indicating that the model could accurately forecast outcomes (Kock, 2022). As indicated in Table 5's coefficient of determination (R^2), the structural model has an acceptable degree of predictive power (Magno et al., 2022), explaining 53.5%, 42.2%, and 43.8% of the variation in customer satisfaction, customer loyalty, and word-of-mouth, respectively (Assaker & O'Connor, 2023).

4.4. Hypotheses testing

To ascertain the direct and indirect effects' significance, confidence interval (CI) values were employed (Aburumman et al., 2022). Using the PLS algorithm, supporting hypotheses (H1–H3) (see Table 5 and Figure 2) are based on substantial findings for all direct effects (Becker et al., 2023). As such, customer experience of chatbots positively affected customer satisfaction toward this technology (β = .598, t = 18.573, CI = [.150; .843]). Further, customer satisfaction toward chatbot technology positively affected customer loyalty (β = .389, t = 16.825, CI = [.154; .634]) and word-of-mouth (β = .346, t = 16.918, CI = [.106; .573]). Table 4 findings demonstrated that customer experience of chatbots positively affected customer loyalty (β = .233, t = 7.504, CI = [.172; .293]) and word-of-mouth (β = .207, t = 6.674, CI = [.146; .268]) via customer satisfaction toward this technology. According to Richter et al. (2022), H4a and H4b were achieved through partial mediations (see Figure 2).

Table 5. Structural model assessment.

H	Structural paths	β	*t*-value	p-value	f^2	97.5% CI	Decision
Direct effects							
H1	Customer experience of chatbots → Customer satisfaction	.598***	18.573	.000	.472	[.150, .843]	Supported
H2	Customer satisfaction → Customer loyalty	.389***	16.825	.000	.269	[.154, .634]	Supported
H3	Customer satisfaction → Word-of-mouth	.346***	16.918	.000	.288	[.106, .573]	Supported
Indirect effects							
H	Structural paths	β	*t*-value	p-value	97.5% CI		Decision
H4a	Customer experience of chatbots → Customer satisfaction → Customer loyalty	.233**	7.504	.005	[.172, .293]		Supported

H4b	Customer experience of chatbots → Customer satisfaction → Word-of-mouth	.207**	6.674	.008	[.146, .268]	Supported
Quality indicators						
R^2 for Customer satisfaction		.535	Q^2 for Customer satisfaction			.366
R^2 for Customer loyalty		.422	Q^2 for Customer loyalty			.280
R^2 for Word-of-mouth		.438	Q^2 for Word-of-mouth			.342
Note: 2-tailed test; ***p < 0.001.						

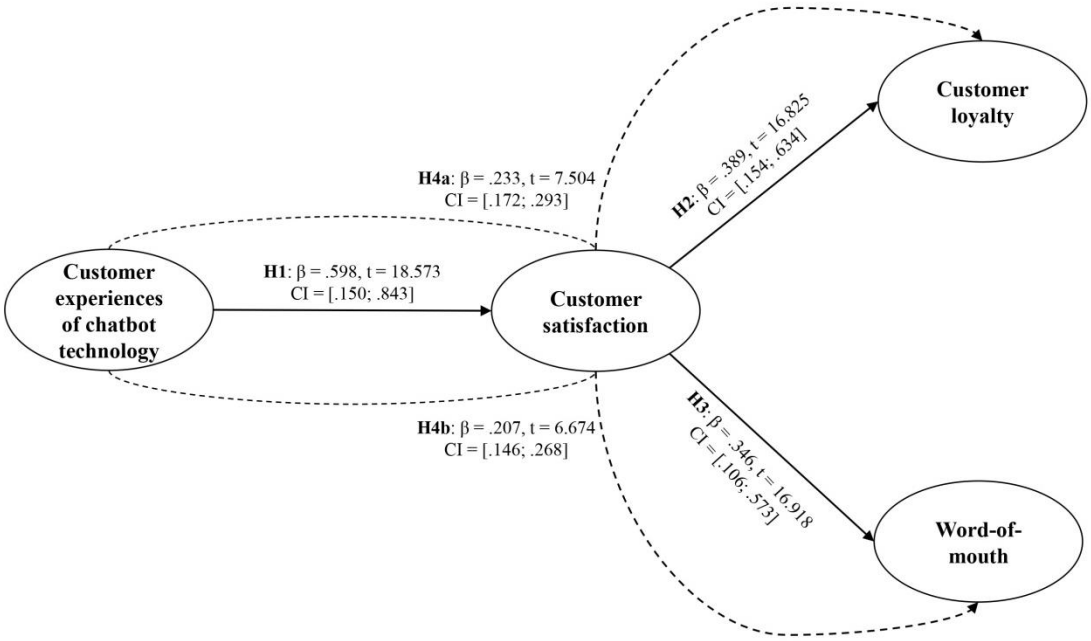

Figure 2. Structural model results.

5. Conclusion

This theoretical framework provides a robust foundation for understanding the intricate dynamics of guest experiences with chatbot technology in the hospitality context. This paper into sensorial, cognitive, pragmatic, emotional, relational, unique, familiar, controllable, and economical experiences contributes to a nuanced perspective on the multifaceted nature of technology interactions. Building upon underpinning theories, this paper supported H1, where customer experiences of chatbot technology positively affected customer satisfaction. This aligns with Özen and Özgül Katlav (2023), Rizomyliotis et al. (2022), and Magno and Dossena (2023), who highlight the significance of positive chatbot experiences in enhancing overall customer satisfaction. As such, the integration of sensorial, cognitive, and emotional aspects into chatbot interactions contributes to a holistic customer experience, fostering satisfaction levels.

Findings also proved that customer satisfaction positively affected customer loyalty, accepting H2. This finding is in line with Azhari et al. (2023), Chen et al. (2023), and Lee and Li (2023), who argued that satisfied customers who are driven by positive experiences with chatbot apps will exhibit higher levels of loyalty. This emphasizes the pivotal role of customer satisfaction in shaping continued usage (Xie et al., 2023). Further, findings affirmed that customer satisfaction positively affected word-of-mouth, accepting H3. This paper aligns with existing research that supports the link between customer satisfaction and word-of-mouth in the realm of smart tourism technologies (see Anand et al., 2023; Atito et al., 2023; Bae et al., 2023; Ng et al., 2023). This underscores the crucial effect of satisfied customers acting as advocates and participating in positive informal communication regarding their chatbot app-related experiences (Nieves-Pavón et al., 2024).

Regarding the medation effect findings, results confirmed that customer satisfaction mediatied the linkages between customer experiences of chatbot technology and both customer loyalty and word-of-mouth, accepting H4a and H4b. These mediating effects underscored the essential role played by customer satisfaction as an intermediary factor shaping the nexus between chatbot experiences and subsequent customer behaviors (Venkatakrishnan et al., 2023). The comprehensive exploration of customer experiences, encompassing pragmatic, relational, and unique aspects, contributes to creating higher satisfaction levels (Guo et al., 2023), subsequently influencing their loyalty and word-of-mouth (Wei et al., 2023). In this context, prior studies have highlighted the positive association between customer satisfaction and word-of-mouth in various contexts. For instance, Andersen et al. (2023), Do et al. (2023), and Zaato et al. (2023) found consistent evidence that satisfied customers are more likely to engage in word-of-mouth communication. This contributes to positive recommendations about their actual experiences (Wei et al., 2023). Similarly, Ng et al. (2023) identified a strong correlation between customer satisfaction and smart tourism technology-related word-of-mouth behavior. Moreover, Do and Pereira (2023) found supporting evidence for the mediating influence of customer satisfaction in the association between chatbot experiences and word-of-mouth communication.

5.1. Theoretical and practical implications

This research contributes to the existing literature by providing a comprehensive understanding of the nuanced relationships between customer experiences with chatbots, satisfaction, and subsequent behavioral outcomes. The multi-dimensional measurement scales offer a nuanced perspective on various facets of customer experiences. This enriches this theoretical framework that focuses on AI-service technology adoption. Results provide theoretical foundations related to customer satisfaction, loyalty, and word-of-mouth within the AI-driven hotel service context. Findings suggest that hotel businesses can benefit from integrating AI-based chatbots to enhance guest interactions. By focusing on improving various aspects of guest experiences with chatbot apps, hotel organizations can positively improve guest satisfaction levels, fostering their loyalty and positive word-of-mouth to friends or family. Understanding the focal role of customer satisfaction as a mediator emphasizes the importance of continuous improvement in chatbot apps to meet and exceed guest expectations in hotel settings.

Moreover, hotel businesses should focus on enhancing chatbot features that contribute to guest experiences. Investing in interactive, informative, and emotional chatbot development can elevate customer satisfaction. Besides, implementing personalization strategies in chatbot interactions (e.g., tailoring responses based on guest preferences) can further enhance their satisfaction. Personalized experiences contribute to a sense of familiarity and uniqueness, positively influencing overall satisfaction. As technology evolves, continuous monitoring and improvement of chatbot functionalities are crucial. Regular updates based on customer feedback and technological advancements ensure that chatbots remain effective and meet evolving customer expectations. Lastly, analyzing customer feedback will allow hotel businesses to refine chatbot interactions to better align with customer preferences and encourage satisfied customers to share their positive experiences with chatbots. Likewise, implementing referral programs or incentives for positive word-of-mouth can amplify the reach and impact of customer advocacy in the hotel context. Furthermore, training and awareness programs can help hotel guests maximize the potential of chatbots, contributing to enhanced experiences.

5.2. Limitations and further research

Despite the valuable insights gained, this study has limitations. The research focuses on the hotel industry in Greater Cairo, potentially limiting generalizability to other contexts. Future research could explore the applicability of findings in diverse cultural and geographical settings. Additionally, the study relies on self-reported data, and further research could incorporate objective measures of guest behaviors. The dynamic nature of technology suggests a need for ongoing investigation into emerging chatbot features and their impact on customer perceptions. Thus, exploring the crucial role of individual differences (e.g., technology readiness, cultural preferences) could provide a deeper understanding of the heterogeneous nature of customer responses to chatbot apps. Overall, this research can lay the groundwork for future studies to delve deeper into the evolving landscape of AI-driven service technologies and their implications for customer delight in diverse sectors like full service or family-style resturants.

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تقييم تجربة تكنولوجيا العملاء: الدور الوسيط لرضا العملاء وتأثيره على ولاء العملاء والكلمة المنطوقة

المستخلص

تبحث هذه الدراسة في تأثير تجارب العملاء لروبوتات الدردشة التفاعلية القائمة على الذكاء الاصطناعي في ولاء العملاء و الكلمة المنطوقة في السياق الفندقي. تسلط هذه الدراسة الضوء على الدور المحوري لرضاء العملاء في العلاقات الكامنة ين المتغيرات. باستخدام استبيان إلكتروني مُعد عبر Google Form، استجاب 310 من ضيوف فنادق الخمس نجوم الكائنة بالقاهرة الكبرى، ومن ثم تم تحليل استجاباتهم باستخدام نمذجة المعادلات الهيكلية القائمة على المربعات الصغرى الجزئية (PLS-SEM). استخدمت هذه الدراسة نهجًا متعدد الأبعاد، واستكشفت جوانب مختلفة من تجارب العملاء مع روبوتات الدردشة التفاعلية وتأثيراتها اللاحقة في نتائج رضاء العملاء. كشفت النتائج عن وجود تأثير إيجابي لتجارب العملاء لروبوتات الدردشة التفاعلية في رضاء العملاء. علاوة على ذلك، تأثر ولاء العملاء والكلمة المنطوقة بشكل إيجابي برضاء العملاء عن التجربة. علاوة على ذلك، توسط رضاء العملاء جزئيًا العلاقات بين تجارب العملاء لروبوتات الدردشة التفاعلية وكل من ولاء العميل والكلمة المنطوقة. بناءً على ذلك، تساهم هذه الدراسة برؤى قيمة لفهم الدور المحوري لروبوتات الدردشة التفاعلية في تشكيل تصورات العملاء وسلوكياتهم في سياق الضيافة. بالتالي، فإن تحليل تعليقات العملاء سيسمح للمنشآت الفندقية بتحسين تفاعلات روبوتات الدردشة التفاعلية مع العملاء المرتقبين لتتوافق بشكل أفضل مع تفضيلاتهم وتشجيع العملاء الراضين على مشاركة تجاربهم الإيجابية عبر الإنترنت. علاوة على ذلك، يمكن لبرامج التدريب والتوعية أن تساعد ضيوف الفنادق على تعظيم إمكانات روبوتات الدردشة التفاعلية، مما يساهم في تعزيز تجاربهم الغامرة. أخيرًا، يمكن أن يؤدي تنفيذ استراتيجيات التخصيص في تفاعلات روبوتات الدردشة التفاعلية (على سبيل المثال، تصميم الاستجابات بناءً على تفضيلات الضيوف) إلى تعزيز رضاهم عن هذه التجارب.

الكلمات الدالة: روبوتات الدردشة التفاعلية القائمة على الذكاء الاصطناعي؛ تجارب العملاء؛ رضاء العملاء؛ الكلمة المنطوقة؛ صناعة الفنادق.