

HUMAN-COMPUTER INTERACTION EXPERIENCE AND CUSTOMER LOYALTY IN CHINESE HOTELS: THE MODERATING EFFECT OF BRAND TRUST

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ABSTRACT

In the era of digital transformation, human-computer interaction has become a critical factor in shaping customer experiences and loyalty, particularly in the hospitality industry. This study investigates the relationship between human-computer interaction experiences and customer loyalty in Chinese hotels, with a focus on the moderating role of brand trust. Drawing on the Technology Acceptance Model, the research explores how perceived ease of use and perceived usefulness of human-computer interaction systems influence customer loyalty while considering the impact of brand trust as a moderating variable. Using a quantitative research design, data were collected from 350 hotel guests in China who had interacted with human-computer interaction systems such as mobile apps, chatbots, and self-service kiosks. The findings reveal that human-computer interaction experience significantly enhances customer loyalty, and this relationship is positively moderated by brand trust. Specifically, customers with higher levels of brand trust are more likely to remain loyal despite potential technical issues or usability challenges. The study underscores the importance of user-centric human-computer interaction design, trust-building initiatives, and cultural sensitivity in enhancing customer loyalty in the Chinese hospitality market. These insights offer valuable implications for hotel managers and technology developers aiming to optimize human-computer interaction systems to foster long-term customer relationships.

Keywords: Brand Trust, Customer Loyalty, Hospitality, Human-Computer Interaction, Technology Acceptance Model.

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1. Introduction

As digital transformation accelerates across industries, human-computer interaction (HCI) has emerged as a fundamental driver of customer experience, particularly within



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the hospitality sector (Su et al., 2022; Quiñones & Rojas, 2023; Ben, 2024). With the widespread integration of self-service kiosks, mobile applications, and AI-driven chatbots, the quality of HCI experiences is increasingly recognized as a key determinant of customer satisfaction and loyalty (Nam et al., 2021; Aziz et al., 2022). In the context of China's rapidly evolving hospitality market, characterized by the growing expectations of digitally proficient consumers, comprehending the role of HCI in fostering customer loyalty has become critically important (Su et al., 2022). Nevertheless, while substantial research has explored the influence of HCI on customer satisfaction, relatively limited attention has been paid to how contextual variables—such as brand trust—moderate this relationship in the Chinese hotel industry. Addressing this gap, the present study investigates the moderating effect of brand trust on the link between HCI experience and customer loyalty among Chinese hotel guests.

Customer loyalty, essential for sustaining long-term business performance, is intrinsically shaped by customers' cumulative experiences (Mascarenhas et al., 2006). In today's digitalized service environments, HCI-driven interactions—ranging from intuitive online booking platforms to customized in-room technological amenities—have become integral to the formation of these experiences (Quiñones & Rojas, 2023). For example, efficient mobile applications that streamline reservation processes or responsive chatbots that offer real-time support significantly elevate guests' overall satisfaction (Dwivedi et al., 2023). However, the translation of positive HCI experiences into enduring loyalty often hinges on the strength of customers' trust in the brand. Brand trust, reflecting the assurance customers place in a brand's reliability and integrity (Afzal et al., 2010), has been consistently linked to heightened loyalty through its role in mitigating perceived risks and fostering emotional bonds (Theng et al., 2013).

Although the significance of human-computer interaction (HCI) in the hospitality sector is increasingly acknowledged, empirical investigations into how brand trust shapes the relationship between HCI experience and customer loyalty remain scarce, particularly in non-Western contexts. To address this gap, the present study focuses on Chinese hotel guests—an underrepresented group in existing HCI research. By synthesizing perspectives from HCI scholarship, trust theory, and cultural studies, this research offers a nuanced account of how digital interactions influence loyalty within a culturally distinctive environment. In addition, the study advances the broader discourse on technology adoption in hospitality by demonstrating that brand trust acts as a pivotal boundary condition, either strengthening or attenuating the impact of HCI experiences. The originality of this study lies in its unique contextual application within the Chinese hotel industry, a setting that has been underexplored in existing research. However, to strengthen the novelty of this work, it is important to explicitly highlight how the study advances current research beyond existing literature. Specifically, by incorporating brand trust as a moderating variable between Human-Computer Interaction (HCI) experience and customer loyalty, the study introduces a new dimension to the Technology Acceptance Model (TAM), which has not been extensively tested in hospitality contexts. This research not only confirms previous findings but also extends our understanding of how trust dynamics shape the relationship between technology and customer loyalty in a culturally distinct setting, offering new insights that can inform future studies on digital customer experience in hospitality.

This research offers several significant contributions to academic literature, particularly through the lens of the Technology Acceptance Model (TAM). First, it broadens the application of TAM within the hospitality industry by investigating how perceived ease of use and perceived usefulness of HCI systems shape customer loyalty. While TAM has traditionally centered on technology adoption behaviors (Marangunić & Granić, 2015), this study extends its utility by linking users' initial perceptions to longer-term behavioral outcomes, such as loyalty, specifically within Chinese hotel settings. Thus, it bridges the gap between technology adoption research and customer relationship

management, providing a more comprehensive view of HCI's role in customer retention strategies.

Second, the study positions brand trust as a key moderating factor within the TAM framework. Although TAM emphasizes users' cognitive evaluations and functional appraisals of technology (Holden & Karsh, 2010), it largely overlooks relational and emotional dimensions. By embedding brand trust into the model, this research illustrates how trust amplifies the positive influence of perceived ease of use and perceived usefulness on customer loyalty, thereby enriching the TAM literature and offering deeper insights into the boundary conditions shaping HCI system success in service environments.

Third, this study advances the growing body of research on technology acceptance in non-Western markets by unpacking the distinctive cultural dynamics prevalent in China. Given that cultural constructs such as Guanxi and Mianzi significantly inform consumer behaviors (Leung et al., 2011), incorporating brand trust as a moderating variable sheds light on how localized cultural values mediate technology-customer interactions. These insights contribute practical value for scholars and practitioners engaged in culturally diverse hospitality markets.

The study begins with a comprehensive review of literature on Human-Computer Interaction (HCI), customer loyalty, and brand trust, from which hypotheses are derived. A detailed description of the research methodology, encompassing data collection and analytical procedures, follows. Empirical findings are then reported and subjected to rigorous analysis. The subsequent discussion interprets these results in relation to existing theory and practical applications. The manuscript concludes by outlining study limitations and proposing directions for future research.

2. Literature Review and Hypothesis Development

2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), introduced by Davis et al. (1989), has established itself as a foundational framework for explaining user acceptance and adoption of technology, particularly within service-oriented digital platforms (Al-Emran et al., 2020). At its core, TAM proposes that two principal determinants—perceived ease of use (PEOU) and perceived usefulness (PU) which shape users' technology-related behaviors (Davis et al., 1989). PEOU refers to the extent to which individuals believe that utilizing a system will require minimal cognitive effort (Davis, 1989), a consideration that has gained heightened relevance in today's mobile-centric environments where users' attention spans are increasingly limited (Tan et al., 2021). Meanwhile, PU reflects users' evaluation of a system's capacity to enhance task performance, encompassing not only functional advantages but also socio-emotional benefits in contemporary interpretations (Shareef et al., 2024). Numerous empirical studies have affirmed TAM's robustness across various sectors, including e-commerce (Shahzad et al., 2020), education (Kang et al., 2022), and healthcare (Almathami et al., 2022).

Within the hospitality industry, TAM has been widely utilized to investigate the adoption of innovations such as online reservation platforms, mobile hotel applications, and self-service technologies (Kim et al., 2020). Empirical evidence suggests that hotel guests demonstrate a higher propensity to embrace technologies perceived as easy to operate and capable of delivering clear benefits, such as expedited check-in processes or personalized service offerings (Neuhofer et al., 2015). Nevertheless, while TAM has proven effective in elucidating initial technology adoption, its application to long-term behavioral outcomes—such as customer loyalty—remains relatively limited. This gap is particularly salient in the context of HCI, where the quality of digital interactions

substantially influences customer satisfaction and sustained loyalty (Giovanis & Athanasopoulou, 2018).

Despite its widespread adoption, TAM has faced critique for its insufficient integration of emotional and relational factors, notably trust, which can profoundly shape technology use behaviors (Shahzad et al., 2020). Given the hospitality sector's emphasis on personal engagement and emotional resonance, extending TAM by incorporating relational constructs such as brand trust offers a more holistic perspective. Responding to this shortcoming, the present study integrates brand trust as a moderating variable to better capture the nuanced dynamics of HCI and customer loyalty within the hospitality context.

2.2 The Effect of Human-Computer Interaction Experience on Customer Loyalty

HCI encompasses the design, development, and deployment of interactive systems that facilitate communication between individuals and technology (Xu et al., 2020). Within the hospitality sector, technologies such as mobile applications, AI-powered chatbots, and self-service kiosks have become increasingly integrated into service delivery, offering enhanced convenience, personalization, and operational efficiency (Gore, 2024). Empirical evidence suggests that effective HCI systems contribute to improved customer satisfaction by minimizing service delays, reducing the likelihood of errors, and delivering seamless user experiences (Chen et al., 2021; Paneru et al., 2024). For instance, a user-friendly hotel application that enables guests to reserve rooms, order amenities, and access curated local recommendations can meaningfully enrich the overall guest experience (Lu et al., 2014; Jalaludin et al., 2023).

The link between HCI experiences and customer loyalty is grounded in the service-profit chain theory, which asserts that superior service experiences elevate customer satisfaction and, consequently, promote loyalty (Xu et al., 2011). Specifically, in the context of technology-mediated interactions, customers who perceive systems as both easy to use and beneficial are more inclined to develop favorable attitudes toward the brand, thereby fostering stronger loyalty (Kim et al., 2020). HCI systems thus play a critical role in boosting customer retention and encouraging repeat patronage (Lu et al., 2014). Nonetheless, the precise pathways through which HCI experiences are converted into sustained loyalty—particularly within culturally distinct environments like China—remain insufficiently explored.

In China's rapidly modernizing hospitality landscape, where consumers exhibit high levels of digital adoption, understanding the role of HCI in loyalty formation assumes heightened significance (Li et al., 2024). Chinese consumers, who prioritize efficiency and seamlessness in their brand interactions (Wang & Li, 2012), are also deeply influenced by sociocultural constructs such as Guanxi (interpersonal relationships) and Mianzi (social reputation). Consequently, an HCI system that fails to meet expectations or causes user discomfort can have detrimental effects on brand loyalty. Addressing this complexity requires an approach that accounts for the intersection of technological design and cultural sensitivity.

Hypothesis 1: Human-computer interaction experience positively influences customer loyalty among guests in Chinese hotels.

2.3 The Moderating Effect of Brand Trust between Human-Computer Interaction Experience and Customer Loyalty

Brand trust, conceptualized as customers' confidence in a brand's reliability and ethical conduct (Portal et al., 2019), serves as a pivotal factor in shaping users' perceptions of technology-mediated interactions (Morgan-Thomas & Veloutsou, 2013). When customers harbor strong trust in a brand, they are more inclined to attribute minor technical failures to external circumstances rather than the brand's deficiencies, thereby

preserving their loyalty. In contrast, diminished brand trust can exacerbate customers' negative evaluations of HCI systems, ultimately weakening their loyalty (Sweeney & Swait, 2008).

The moderating influence of brand trust assumes heightened importance in the Chinese hospitality sector, where consumer behavior is strongly shaped by relational norms such as *guanxi* (personal networks) and *mianzi* (social face) (Su et al., 2017). In this context, brand trust functions as an emotional bridge that connects technological interactions to customer loyalty outcomes. Trusted brands introducing new HCI systems are more likely to secure customer acceptance—even in the presence of occasional technical shortcomings—because trust mitigates perceived risks and strengthens emotional bonds, both of which are critical drivers of loyalty in the Chinese marketplace (Sirdeshmukh et al., 2002).

Furthermore, brand trust may amplify customers' perceptions of ease of use and usefulness associated with HCI systems, thereby reinforcing their influence on loyalty. Drawing upon the TAM, it is evident that customers who find technology easy to navigate and beneficial are more likely to adopt it and exhibit enduring loyalty (Davis, 1989). When combined with high brand trust, these favorable perceptions are magnified, producing a synergistic effect that further enhances customer commitment. Based on these arguments, we propose

Hypothesis 2: Brand trust strengthens the positive relationship between human computer interaction experience and customer loyalty among hotel guests in China.

3. Research Method

This study employed a quantitative research design to investigate the effect of HCI experience on customer loyalty and the moderating effect of brand trust among hotel guests in China. The target population consisted of individuals who had stayed in a hotel in China within the past six months and had interacted with HCI systems, such as mobile apps, self-service kiosks, or chatbots. This group was selected due to their increasing reliance on digital technologies in the hospitality sector, which has become a critical factor in shaping customer experiences and loyalty (Kim et al., 2020).

The study is particularly relevant in the context of China, where rapid technological advancements and cultural values (*Guanxi* and *Mianzi*) significantly influence consumer behavior (Su et al., 2022). By focusing on this population, the research aims to provide insights into how HCI systems can be optimized to enhance customer loyalty, while considering the moderating role of brand trust. This dual focus on technology and trust is essential in a market where emotional connections and perceived reliability play a pivotal role in customer decision-making (Su et al., 2022).

The research design serves two primary purposes: (1) to explore the effect of HCI experience on customer loyalty, and (2) to examine whether brand trust moderates this relationship. To achieve these objectives, data were collected through an online survey distributed via social media platforms and hotel booking websites. The survey targeted a diverse sample of hotel guests across different regions in China to ensure the generalizability of the findings.

The sample size was determined using Taro Yamane's (1967) formula, which is suitable for studies where the exact population size is unknown. Assuming a 95% confidence level and a $\pm 5\%$ margin of error, a minimum sample size of 400 respondents was required. This sample size was deemed adequate to represent the broader population of hotel guests in China. To ensure the quality of the data, specific sampling criteria were applied: (1) respondents must have stayed in a hotel in China within the past six months;

(2) they must have interacted with at least one HCI system during their stay; and (3) their participation in the survey was voluntary.

3.1 Measurement Tools

The questionnaire utilized in this study was developed through an extensive review of relevant literature. To ensure content validity, three domain experts specializing in human-computer interaction, hospitality management, and consumer behavior critically evaluated the questionnaire. Their review focused on the clarity, relevance, and appropriateness of each item, ensuring accurate representation of the theoretical concepts under investigation.

The survey comprised two main sections. The first collected demographic details, including respondents' age, gender, hotel-stay frequency, and familiarity with human-computer interaction systems. The second measured the key constructs of the study namely HCI experience, perceived ease of use (PEOU), perceived usefulness (PU), brand trust, and customer loyalty using scales drawn from established, validated instruments and carefully adapted to the study context to preserve psychometric integrity (Hinkin, 1998). In line with standard behavioural research protocols (Spector, 1992), all items employed a 5-point Likert scale (1 = Strongly disagree; 5 = Strongly Agree). To ensure semantic equivalence after translation, two bilingual researchers independently conducted a back-translation procedure (Brislin, 1986).

Each construct was measured using well-established scales from authoritative sources. HCI experience was operationalized within the Technology Acceptance Model framework through its two core dimensions: perceived ease of use and perceived usefulness. Perceived ease of use was assessed with a four-item scale adapted from Davis (1989), and perceived usefulness employed a four-item scale from the same source. Brand trust was captured using a five-item scale adapted from Chaudhuri and Holbrook (2001), while customer loyalty was evaluated with a five-item scale adapted from McMullan (2005). All scales were carefully contextualized to maintain their original psychometric properties.

To verify the reliability of the questionnaire, a pilot study involving 30 participants was conducted. Reliability analysis using Cronbach's alpha coefficients demonstrated high internal consistency across all constructs ($\alpha > 0.7$). Based on pilot feedback, minor refinements were made to enhance item clarity and precision without altering the original conceptual meanings.

3.2 Data Analysis Method

Data analysis in this study followed a two-stage procedure, comprising the evaluation of both the measurement model and the structural model. Initially, the measurement model was examined to confirm the reliability and validity, ensuring that the indicators accurately represented the underlying theoretical concepts. This validation step was essential to establish the robustness of the measurement instruments employed. Subsequently, the structural model was analyzed to test the hypothesized relationships among constructs, assessing the significance, direction, and strength of the proposed paths.

PLS-SEM was adopted for data analysis, utilizing the SmartPLS software package. PLS-SEM was deemed appropriate given the exploratory nature of the research, the complexity of the proposed model, and the study's emphasis on moderation effects. This method is particularly advantageous in handling non-normal data distributions and relatively modest sample sizes, characteristics that align with the present dataset (Sarstedt et al., 2020). Moreover, PLS-SEM offers flexibility and robust estimation capabilities, enabling reliable modeling even under conditions of increased analytical complexity. The use of PLS-SEM thus allowed for a comprehensive evaluation of both

measurement properties and the structural relationships integral to the research framework.

3.3 Measurement Model Assessment

The measurement model underwent a comprehensive evaluation to establish its reliability, convergent validity, and discriminant validity—three foundational criteria essential for verifying the robustness of the constructs utilized in this research.

Internal consistency reliability was assessed through two primary indicators: Cronbach's alpha and composite reliability (CR). Following widely accepted thresholds, values exceeding 0.70 for both metrics were deemed indicative of satisfactory internal consistency (Taber, 2018). Cronbach's alpha evaluates the extent to which the items within a construct are interrelated, providing an estimate of scale reliability. Composite reliability, often considered a more accurate measure, accounts for indicator loadings and offers a superior assessment of construct reliability, particularly in structural equation modeling contexts.

Validity was evaluated using the average variance extracted (AVE) criterion. An AVE value greater than 0.50 suggests that the latent variable explains more than half of the variance in its observed indicators (Voorhees et al., 2016), thereby confirming that the indicators adequately converge on the intended latent variable. High AVE values further affirm that the measurement model captures the underlying theoretical construct with minimal measurement error.

Discriminant validity was examined through two complementary methods: the Fornell-Larcker criterion and the heterotrait-monotrait (HTMT) ratio. According to the Fornell-Larcker approach, the square root of each construct's AVE should exceed its highest correlation with any other construct, thus demonstrating that constructs are empirically distinct (Fornell & Larcker, 1981). To strengthen the assessment, the HTMT ratio was also calculated. HTMT values below 0.85 indicate sufficient discriminant validity, minimizing concerns regarding multicollinearity and ensuring that constructs are not measuring overlapping concepts (Henseler et al., 2015).

By satisfying both Fornell-Larcker and HTMT criteria, the measurement model in this study demonstrates robust discriminant validity, thereby supporting the distinctiveness of all constructs under investigation.

3.4 Structural Model Assessment

Following the validation of the measurement model, the structural model was evaluated to assess the validity and strength of the hypothesized relationships among constructs. The assessment focused on three key aspects: path coefficients, significance levels, and overall model fit.

The relationships between latent variables were estimated using bootstrapping procedures within the Partial Least Squares Structural Equation Modeling (PLS-SEM) framework. A bootstrapping technique with 5,000 resamples was employed to generate empirical standard errors and confidence intervals. This approach enhances the robustness of parameter estimates by accounting for potential sampling variability, particularly when data distributions deviate from normality (Hair et al., 2017). Path coefficients reflect the strength and direction of hypothesized relationships, and their magnitude provides insight into the relative importance of different predictors within the model.

The significance of each structural path was determined by examining the associated t-values and p-values derived from the bootstrapped estimates. Conventionally, a p-value less than 0.05 indicates statistical significance, supporting the proposed hypotheses. T-values were interpreted to gauge the extent to which the estimated path coefficients differed from zero relative to their standard errors, thus providing a basis for assessing the stability and reliability of structural relationships.

To evaluate the global fit of the structural model, two widely recognized fit indices were utilized: the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI). An SRMR value below 0.08 signifies a good model fit, indicating minimal discrepancies between the observed and predicted covariance matrices (Henseler et al., 2016). Additionally, an NFI value exceeding 0.90 suggests that the proposed model offers a substantial improvement over a null baseline model, reflecting a high level of explanatory adequacy. Together, these fit indices provide a comprehensive evaluation of the model's representational quality and predictive relevance.

3.5 Moderation Analysis

The moderating effect of brand trust on the relationship between HCI experience and customer loyalty was tested using the product indicator approach, following the guidelines proposed by Kumar et al. (2021). This method involves creating an interaction term by multiplying the indicators of HCI experience and brand trust, thereby capturing the interactive influence of these two constructs on the dependent variable.

The rationale for employing the product indicator method lies in its ability to directly model the latent interaction effects within the PLS-SEM framework without requiring mean-centering or residual approaches. It offers a more precise estimation of moderation effects, particularly when both the predictor and moderator are treated as latent variables with multiple indicators.

To assess the significance of the interaction term (HCI Experience $\times$ Brand Trust), a bootstrapping procedure with 5,000 resamples was conducted. Bootstrapping provides empirically derived standard errors and confidence intervals, making it well-suited for detecting the significance of complex interaction effects, especially in non-normal data conditions. A statistically significant interaction term—indicated by a p-value less than 0.05 in which supports the presence of moderation, confirming that the strength of the relationship between HCI experience and customer loyalty varies depending on the level of brand trust.

In addition to examining the significance of the interaction term, the nature of the moderation effect can be further explored through simple slope analysis or interaction plot interpretation, although such analyses are more common in regression-based frameworks. In the current study, the focus remained on verifying whether the presence of brand trust amplifies or attenuates the influence of HCI experience on customer loyalty. This approach provides a rigorous and theoretically grounded test of the hypothesized moderating mechanism, offering deeper insights into the contingent role of brand trust within digital service encounters.

3.6 Ethical Considerations

Ethical standards were rigorously upheld throughout the research process to ensure the protection of participants' rights and well-being. Prior to data collection, all participants were thoroughly informed about the purpose of the study, the voluntary nature of their participation, their right to withdraw at any stage without penalty, and the assurance of anonymity and confidentiality regarding their responses. Informed consent was formally obtained from all participants before proceeding with the survey. No personally identifiable information (PII) was collected, and all data were anonymized to maintain strict confidentiality. The collected information was used solely for academic research purposes and was stored securely in accordance with data protection best practices.

This study adhered to the ethical standards set forth by the Institutional Review Board (IRB) of the affiliated university. The research procedures conformed to the principles articulated in the Belmont Report, including respect for persons, beneficence, and justice. Special care was taken to minimize any potential risks to participants and to maximize the societal and academic benefits derived from the study. Compliance with

these ethical guidelines ensured that the study maintained high standards of integrity, transparency, and participant protection throughout all stages of the research process.

4. Results and Discussions

4.1 Descriptive Statistics

The study collected 350 valid responses from hotel guests in China who had interacted with HCI systems during their stays. The demographic characteristics of the respondents are summarized in Table 1.

Table 1. Demographic Profile of Respondent

Variable	Category	Frequency	Percentage
Gender	Male	168	48%
	Female	182	52%
Age	18–24 years	70	20%
	25–34 years	157	45%
	35–44 years	88	25%
	45+ years	35	10%
Frequency of Stay	1–3 times/year	210	60%
	4–6 times/year	105	30%
	More than 6 times/year	35	10%

The sample consisted of 52% female and 48% male respondents, with the majority falling within the age range of 25–34 years (45%). Approximately 60% of the respondents reported staying in hotels 1–3 times per year, while 30% stayed 4–6 times per year. The remaining 10% were frequent travelers, staying in hotels more than 6 times per year.

4.2 Measurement Model Assessment

Table 2 presents the results of the reliability and convergent validity assessments for the key variables. Reliability was evaluated using Cronbach's alpha and composite reliability (CR), while convergent validity was assessed through the average variance extracted (AVE).

All variables exhibited strong internal consistency, as evidenced by Cronbach's alpha values exceeding the recommended threshold of 0.70 (Taber, 2018). Specifically, Cronbach's alpha values ranged from 0.88 (Perceived Usefulness) to 0.92 (Brand Trust), indicating high reliability across constructs. Similarly, CR values were consistently above 0.90, confirming the constructs' ability to capture underlying latent variables with minimal measurement error (Dash & Paul., 2021).

Convergent validity was established as all AVE values exceeded the recommended cutoff of 0.50 (Voorhees et al., 2016), with values ranging from 0.68 (HCI Experience) to 0.73 (Brand Trust). These results suggest that each construct explains a substantial proportion of variance in its indicators, supporting the measurement model's validity.

Table 2. Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
HCI Experience	0.91	0.93	0.68
Perceived Ease of Use (PEOU)	0.89	0.91	0.71
Perceived Usefulness (PU)	0.88	0.90	0.69
Brand Trust	0.92	0.94	0.73
Customer Loyalty	0.90	0.92	0.70

Table 3 presents the results of the Fornell-Larcker criterion assessment for discriminant validity. According to Voorhees et al. (2016), discriminant validity is established when the square root of the AVE for each construct exceeds its correlations with other constructs.

The diagonal elements in Table 3 represent the square root of the AVE for each construct, while the off-diagonal elements indicate the inter-construct correlations. The results confirm that all constructs meet the Fornell-Larcker criterion, as the diagonal values are consistently higher than the corresponding off-diagonal correlations. Specifically, the square root of AVE for HCI Experience (0.82), Perceived Ease of Use (0.84), Perceived Usefulness (0.83), Brand Trust (0.85), and Customer Loyalty (0.84) all exceed their respective inter-construct correlations.

The results indicate that each variable is empirically distinct from others, supporting the adequacy of the measurement model in capturing unique latent variables. The confirmation of discriminant validity ensures that the variables are not only theoretically but also empirically distinguishable, thereby strengthening the validity of subsequent structural model analyses.

Table 3. Fornell-Larcker Criterion for Discriminant Validity

Construct	HCI Experience	PEOU	PU	Brand Trust	Customer Loyalty
HCI Experience	0.82	0.65	0.68	0.60	0.63
Perceived Ease of Use (PEOU)	0.65	0.84	0.70	0.58	0.61
Perceived Usefulness (PU)	0.68	0.70	0.83	0.62	0.66
Brand Trust	0.60	0.58	0.62	0.85	0.70
Customer Loyalty	0.63	0.61	0.66	0.70	0.84

4.3 Structural Model Assessment

The structural model was evaluated using path coefficients, significance levels, and model fit indices. The results of the hypothesis testing are presented in Table 4. Table 4 presents the hypothesis testing results for the relationships under examination. Hypothesis 1 (H1), which posits that HCI experience positively influences customer loyalty, is supported with a path coefficient of 0.42, a t-value of 8.56, and a p-value less than 0.001, indicating a significant and positive effect. Additionally, Hypothesis 2 (H2), which suggests that brand trust moderates the relationship between HCI experience and customer loyalty, is also supported. The path coefficient for this moderating effect is 0.18, with a t-value of 3.45 and a p-value less than 0.001, confirming the significant role of brand trust in enhancing the relationship between HCI experience and customer loyalty.

Table 4. Hypothesis Testing Results

Hypothesis	Path Coefficient	t-value	p-value	Result
H1: HCI Experience → Customer Loyalty	0.42	8.56	< 0.001	Supported
H2: Brand Trust moderates HCI Experience → Customer Loyalty	0.18	3.45	< 0.001	Supported

4.4 Discussions

This study reinforces and extends the existing body of literature on Human-Computer Interaction (HCI) and customer loyalty in the hospitality industry. Consistent with earlier works (Kim et al., 2020; Wang et al., 2021), we find that HCI tools—such as mobile apps, self-service kiosks, and AI-powered chatbots—play a crucial role in enhancing

customer satisfaction and loyalty. However, this study distinguishes itself by introducing brand trust as a critical moderator of the relationship between HCI experience and customer loyalty, offering a deeper understanding of how customer trust in a brand can amplify or diminish the impact of HCI systems on loyalty. This finding aligns with recent studies by Prentice et al. (2022) and Li et al. (2020), which highlight the importance of trust in digital services. Yet, while previous studies focus primarily on trust as an independent variable, this study contributes by showing how brand trust interacts with technological factors to shape consumer behavior, offering a more nuanced model of loyalty formation.

In comparison with Lapets and Kfoury (2012), who emphasized the importance of user-friendly interfaces in HCI systems, this study expands the understanding of customer loyalty by showing that a well-designed app may still fail to drive loyalty if it lacks personalization and real-time updates. This highlights a difference in the findings: while prior research focused on the functional aspects of HCI systems, our study underscores the significance of meeting customer expectations in a dynamic, real-time environment. Moreover, the findings suggest that user-centric design is not enough on its own; personalization and adaptability are essential for fostering customer loyalty in a rapidly evolving digital landscape, a notion echoed in recent studies by Bu et al. (2021) and Zhang & Liu (2023).

The moderating role of brand trust is particularly relevant in markets with a high degree of cultural influence on consumer behavior. This study adds to the literature by considering how cultural factors, such as *guanxi* (relationship-based trust), influence the relationship between HCI experience and customer loyalty, specifically in the Chinese context. Previous research has often treated brand trust as a universal concept (e.g., Fournier & Avery, 2011), but our study suggests that trust in technology is deeply contextual, especially in culturally rich settings like China. This insight resonates with Zhao et al. (2023), who argue that *guanxi* plays a significant role in shaping consumer expectations and brand loyalty in China's digital marketplace. This study, therefore, bridges the gap between trust theory and cultural studies, offering a more comprehensive understanding of the role of trust in digital service settings.

Furthermore, while the relationship between HCI experience and customer loyalty has been well-established in the literature (e.g., Lapets & Kfoury, 2012), this study adds to the conversation by showing that trust is not a static factor but a dynamic one that evolves as customers interact with brands over time. The findings suggest that brand trust can act as a safeguard, compensating for minor service failures, and fostering resilience among consumers, which aligns with Gursoy et al. (2023)'s findings on trust recovery. This dynamic view of trust in the context of digital services expands the understanding of how brand trust operates, challenging earlier studies that did not consider the fluctuating nature of consumer trust in the face of technological disruptions.

This study also provides practical insights for hospitality managers. By demonstrating that brand trust enhances the effectiveness of HCI systems, our findings underscore the importance of investing in both technological infrastructure and trust-building initiatives. The practice of ensuring the reliability and security of digital systems, addressing customer concerns proactively, and maintaining transparent communication is crucial for fostering long-term loyalty. This supports the argument made by Fournier & Avery (2011) that trust-enhancing features of digital systems are essential for customer retention in the hospitality industry.

Our study suggests that hotels should prioritize trust-building initiatives alongside technological investments. By ensuring the reliability and security of digital systems, proactively addressing customer concerns, and maintaining transparent communication, hotels can strengthen relationships with guests and enhance the effectiveness of HCI systems in fostering loyalty. This aligns with the growing consensus in the literature that

the trust-enhancing features of HCI systems are critical for customer retention (Fournier & Avery, 2011).

5. Conclusion

This study demonstrates the significant role of HCI systems in shaping customer loyalty within the hospitality industry. The findings emphasize that the success of these systems is contingent upon their ability to meet customer expectations, deliver personalized experiences, and build trust. HCI tools, such as mobile apps, self-service kiosks, and AI-powered chatbots, offer considerable potential for enhancing customer satisfaction, but their effectiveness is determined by how well they align with customer needs and provide tangible value.

The study also highlights the critical importance of trust in mediating the relationship between HCI experiences and customer loyalty. Trust serves as a buffer, mitigating the negative impact of technical glitches or usability issues, particularly in markets where cultural values (Guanxi and Mianzi) are important. Hotels should, therefore, invest not only in developing robust and reliable digital systems but also in fostering trust through consistent service quality, transparent communication, and proactive issue resolution.

Furthermore, the research underscores the need for cultural sensitivity in the design and implementation of HCI systems, especially in culturally distinct markets like China. Adapting HCI systems to meet local expectations can significantly improve customer experiences and, in turn, strengthen loyalty. The integration of features that resonate with local values, such as respectful language in digital communication and tools that facilitate relationship-building, can deepen customer engagement.

5.1 Practical implications

This study offers several important managerial implications for hotel operators, technology developers, and broader industry stakeholders seeking to enhance customer loyalty through HCI. First, hotel organizations should prioritize the development of user-centered HCI platforms that are responsive to customers' evolving expectations. Regular usability testing, combined with real-time user feedback mechanisms, is essential to identify friction points and continuously refine system interfaces for greater intuitiveness and operational efficiency.

Beyond facilitating basic functionalities such as booking and check-in, mobile applications should be designed to offer personalized experiences—such as tailored recommendations, loyalty program integration, and predictive service offerings based on guests' historical behaviors. Such initiatives not only streamline service delivery but also foster deeper emotional engagement with the brand.

Second, building and sustaining customer trust is pivotal in strengthening long-term loyalty, particularly in digital service encounters. Hotel managers should proactively implement trust-building strategies, including consistent delivery of high-quality services, transparent communication regarding policies and procedures, and swift resolution of customer complaints. In the context of HCI, it is critical to ensure system reliability, cybersecurity, and compliance with data privacy standards. When technical disruptions inevitably occur, organizations must engage in immediate, transparent communication with affected customers, offer compensatory solutions where appropriate, and reaffirm their commitment to service excellence. Such practices help mitigate potential breaches of trust and reinforce the brand's reliability in the eyes of customers.

Third, hospitality providers must acknowledge and strategically incorporate cultural dimensions into the design and implementation of HCI systems, especially in culturally complex markets such as China. Recognizing the profound influence of

Guanxi (personal relationships) and Mianzi (social face) on consumer decision-making, HCI systems should be sensitively adapted to local norms. For example, embedding courteous language protocols into chatbot interactions, offering social sharing features that allow guests to highlight positive experiences, and designing service flows that minimize potential embarrassment can significantly enhance system acceptance and user satisfaction. Tailoring digital interfaces to respect cultural expectations not only enhances functional utility but also promotes emotional resonance, thereby deepening customer loyalty within culturally nuanced markets.

5.2 Limitations and Future Research Opportunities

Despite providing valuable insights into the relationship between HCI experience, brand trust, and customer loyalty in the Chinese hotel industry, this study has several limitations. First, the assumption that the sample of hotel customers in China is representative of the broader hotel customer population may limit the generalizability of the findings to other regions or cultural contexts. Future research could expand the sample to include participants from different countries or cultural backgrounds, particularly Western countries, to enhance external validity and explore cross-cultural differences. Second, the reliance on self-reported survey data introduces potential biases, such as social desirability bias and recall bias, which may affect the accuracy of the data. Future studies could mitigate these limitations by using objective data sources, such as behavioral tracking or observational data, to complement self-reported measures. Additionally, this study assumes that brand trust is the only significant moderating factor in the relationship between HCI experience and customer loyalty, which may oversimplify the complexity of customer behavior. Other emotional and relational factors, such as brand attachment, customer satisfaction, or customer delight, could also play a role and should be considered in future research. Lastly, this study focuses solely on HCI experience and overlooks other technological factors, such as platform type, user interface design quality, and the level of personalization in service delivery, which may also influence customer loyalty. Future research could examine these additional factors and their interaction with HCI experience and brand trust, providing a more comprehensive understanding of digital customer experiences.

Therefore, future research could incorporate these advanced technologies to capture a broader and more dynamic picture of how different HCI modalities shape customer experiences and loyalty behaviors in hospitality contexts. Third, the exclusive reliance on self-reported survey data may introduce common method bias, as respondents' perceptions could be influenced by social desirability or recall limitations. To mitigate this issue, future studies are encouraged to adopt mixed-methods designs, integrating qualitative interviews or behavioral data analytics to triangulate findings and provide a more nuanced understanding of customer-technology interactions. Finally, this study focused predominantly on cognitive evaluations (e.g., perceived ease of use and usefulness) and brand trust as key explanatory variables. Future research could expand the theoretical model by incorporating emotional constructs such as brand attachment, customer delight, or affective commitment, thereby offering a more holistic view of the psychological mechanisms underpinning customer loyalty in technology-mediated service environments.

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Author Contribution

Xie Lu¹ prepared the literature review and oversaw the article writing. Yuan Xinying² designed the research methodology and performed data collection. Chen Zeyu³ conducted the statistical analysis and interpreted the results. Johanudin Lahap^{4 *} supervised the project and finalized the manuscript.

Conflict of Interest

The authors have no conflicts of interest to declare.

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