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The formation mechanism of customer forgiveness intention in hotel service failure contexts

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Abstract. This study develops a dynamic identification framework for hotel service experience quality through semantic mining of online reviews. Ctrip time-stamped reviews from January 2021 to December 2024 were obtained from a sample of 260 hotels across cities including Shanghai, Beijing, Guangzhou, Chengdu, and Hangzhou. After data cleaning, 156,000 reviews were translated into 10,842 monthly hotel data points. Our proposed framework includes a fixed ontology of service experience, aspect extraction via dependencies, sentiment scoring using SKEP, complaint intensity calculation, Bayesian changepoint detection, and Gaussian HMM model. Eight service dimensions are tracked, including room environment, cleanliness, staff service, facility reliability, catering experience, location convenience, price value, and problem recovery. Results show that semantic indicators capture service deterioration earlier than numerical ratings, particularly in cleanliness, facility reliability, and problem recovery, where complaint intensity exceeded the sample mean by 18%–27% during risk periods. The hidden-state model identifies stable high quality, gradual improvement, gradual decline, and service risk warning, achieving an F1-score of 0.829 and an AUC of 0.903 in predicting next-month service-quality decline. The proposed framework provides a reproducible method for detecting dynamic service-quality changes from large-scale online review texts.

Keywords: hotel service experience, online reviews, semantic mining, dynamic identification, quality change detection

1. Introduction

In the context of hospitality, service failure is described as a situation where the delivery of service fails to meet the expectations of the customers along several areas, including the cleanliness of the room, efficiency at the front desk, facilities maintenance, reservation effectiveness, catering services, handling of complaints, and recovery communication. Unlike general dissatisfaction, service failure tends to evoke anger, disappointment, mistrust, sense of injustice, and higher likelihood of complaining or switching providers. According to current literature in hospitality and tourism, service failure and recovery should not be viewed as simply a satisfaction-recovery approach but as a behavior-based process [1]. Forgiveness has been revealed as an important concept, providing insights into why some customers forgive after a negative service experience while others do not forgive even after being compensated [2].

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Hotel service recovery is especially complex because guests evaluate both the practical correction of the problem and the emotional meaning conveyed by the hotel's response. Active recovery actions, such as prompt correction, sincere apology, transparent explanation, and adequate compensation, can improve post-recovery responses after both initial service failure and double deviation [3]. However, customer forgiveness is not automatically produced by recovery actions. It depends on whether customers perceive the recovery as fair, whether their negative emotions are reduced, and whether trust in the hotel's responsibility and reliability is restored. Research on food delivery, online travel agencies, and social media recovery similarly indicates that apology, compensation, transparency, and explanation influence forgiveness through perceived fairness and relationship repair [4, 5].

This study develops a scenario-based empirical model to examine how customer forgiveness intention forms after hotel service failure. The model links service failure severity, recovery timeliness, apology sincerity, and compensation adequacy with perceived justice, negative emotion reduction, trust restoration, and forgiveness intention. Relationship strength is further considered because frequent guests and hotel members may evaluate failures differently from low-relationship customers. The purpose is to clarify the mechanism through which hotel recovery actions transform failure-induced dissatisfaction into tolerance, psychological repair, and willingness to forgive.

2. Literature review

2.1. Hotel service failure and customer negative response

Service failure in hotels is classified as procedural, interpersonal, physical, or output service failures occurring at the point of customer contact. The seriousness of the service failure experienced by the customer depends upon the loss suffered, the inconvenience caused to the guest, and the responsibility for the service failure that the hotel bears. Service failures that result in more severe consequences usually involve more intense emotions such as anger, dissatisfaction, betrayal, or mistrust, especially where guests feel that the hotel should be able to control such a situation. Service failures in hotels, such as dirty rooms, complaints that are not addressed, late responses to requests at the front desk, and bad attitudes among staff members, are more harmful because they represent clear violations of the basic requirements of comfort, security, and respect [6].

2.2. Service recovery and perceived justice

Service recovery refers to those corrective actions taken by the hotel in response to a service failure. A successful recovery action should be timely, apologize, explain the reason behind it, offer compensation, behave politely, and provide solutions to resolve the issue. Consumers evaluate recovery actions based on distributive justice, procedural justice, and interactional justice. Distributive justice involves offering a fair amount of compensation for the suffered loss, whereas procedural justice involves the promptness, ease, and flexibility of recovery efforts. Interactional justice includes how staff members behave during the recovery process, showing sincerity and respecting consumers' feelings. Research on consumer recovery has shown that consumers do not only judge recovery actions based on the compensation offered; consumers also evaluate the acknowledgement, acceptance of responsibility, and the way of treating them [7, 8].

2.3. Customer forgiveness intention and trust restoration

Customer forgiveness intention is formed through both emotional and cognitive repair. Attenuation of negative affect reduces anger and indignation, while rebuilding of trust helps reestablish confidence regarding the

trustworthiness and responsibility of the hotel. In consequence, the more likely it is for the hotel to earn the customer's forgiveness if he or she sees its efforts towards rectification as genuine, justifiable, and preventive of future problems. As far as research on service recovery is concerned, the idea of forgiveness has been regarded as an intervening variable in this process. Recent studies further suggest that relationship duration, customer dependence, recovery transparency, and public apology format can change how customers interpret recovery efforts and whether they are willing to forgive the provider [9, 10].

3. Methodology

3.1. Research variables and conceptual model

The independent variables are service failure severity, recovery timeliness, apology sincerity, and compensation adequacy. Service failure severity represents the perceived seriousness of the hotel service problem, including the degree of inconvenience, emotional disturbance, and perceived responsibility of the hotel. Compensation adequacy measures whether the material or symbolic compensation matches the guest's loss. The mediating variables are perceived justice, negative emotion reduction, and trust restoration. Perceived justice is modeled as a second-order construct formed by distributive justice, procedural justice, and interactional justice. Negative emotion reduction represents the extent to which anger, disappointment, and resentment decrease after the recovery attempt. Trust restoration refers to the customer's renewed belief that the hotel can provide reliable service, handle complaints responsibly, and prevent similar failures. The dependent variable is customer forgiveness intention, defined as the willingness to reduce blame, accept the recovery attempt, and maintain a tolerant attitude toward the hotel.

The measurement structure is specified as shown in Equation (1):

$$Y_{i,k} = \lambda_k \eta_{i,k} + \varepsilon_{i,k}, \quad k \in \{FS, RT, AS, CA, PJ, NER, TR, CFI\} \tag{1}$$

where $Y_{i,k}$ denotes the observed item vector of respondent i for construct k, λ_k denotes the factor-loading vector or matrix, $\varepsilon_{i,k}$ denotes the latent score of construct k. This measurement equation is appropriate because the study uses reflective Likert-scale indicators and confirmatory factor analysis to verify whether the observed questionnaire items consistently represent the corresponding latent constructs.

3.2. Scenario materials and questionnaire measurement

Four fixed scenarios of service failure are examined in this study. The scenario is set within the premises of a four-star business hotel whereby the failure will be associated with a dirty room and delayed action by the front desk staff in remedying the problem. A 2 × 2 factorial design will be applied in which the variables used include: (1) low level failure with immediate recovery; (2) low level failure with delayed recovery; (3) high level failure with immediate recovery; and (4) high level failure with delayed recovery. In order to measure only the independent variables in question, hotel type, trip purpose, room price, trip purpose, check-in time, and basic customer characteristics remain constant in each scenario.

The measures will be based on the 7-point Likert scales where 1 indicates "strongly disagree" while 7 indicates "strongly agree". Failure severity will be measured using perceived inconvenience, perceived seriousness, and perceived responsibility. Recovery timeliness will be measured by perceived speed of response, waiting time acceptability, and perceived efficiency. Sincerity of apology will be gauged through perceived sincerity of apology, willingness to take responsibility, and recognition of emotional impact. Adequacy of compensation will be measured using fairness of compensation, consistency with loss experienced, and generosity. Perceived justice will involve distributive justice, procedural justice, and

interactional justice items. Negative emotions will be diminished through reductions in anger, disappointment, and resentment. Trust will be restored through increased confidence in reliability, complaints handling, and safety of future stays.

The structural mechanism is expressed as shown in Equations (2)-(5):

$$PJ_i = \alpha_0 + \alpha_1 RT_i + \alpha_2 AS_i + \alpha_3 CA_i - \alpha_4 FS_i + \alpha_5 RS_i + \varepsilon_{1i} \tag{2}$$

$$NER_i = \beta_0 + \beta_1 PJ_i - \beta_2 FS_i + \beta_3 AS_i + \varepsilon_{2i} \tag{3}$$

$$TR_i = \gamma_0 + \gamma_1 PJ_i + \gamma_2 NER_i + \gamma_3 CA_i - \gamma_4 FS_i + \varepsilon_{3i} \tag{4}$$

$$CFI_i = \theta_0 + \theta_1 PJ_i + \theta_2 NER_i + \theta_3 TR_i - \theta_4 FS_i + \varepsilon_{4i} \tag{5}$$

where PJ_i denotes perceived justice, NER_i denotes negative emotion reduction, TR_i denotes trust restoration, CFI_i denotes customer forgiveness intention, RT_i denotes recovery timeliness, AS_i denotes apology sincerity, CA_i denotes compensation adequacy, FS_i denotes service failure severity, and RS_i denotes relationship strength.

3.3. Statistical model and analysis

Data analysis is conducted with SPSS 29, AMOS 28, and PROCESS Macro 4.2. SPSS is used for descriptive statistics, missing-value inspection, reliability testing, manipulation checks, and correlation analysis. AMOS is used for confirmatory factor analysis and structural equation modeling. PROCESS Macro is used for mediation and moderated mediation testing with 5,000 bootstrap samples. Reliability is assessed with Cronbach's alpha and composite reliability. Convergent validity is assessed with standardized factor loading and average variance extracted. Discriminant validity is verified by comparing the square root of AVE with inter-construct correlations. The serial indirect effect of recovery action (x) on customer forgiveness intention is specified as shown in Equation (6):

$$IE_x(g) = a_x(g)\,(b_1 + d_1 b_2 + d_2 b_3 + d_1 d_3 b_3),$$

$$x \in \{RT, AS, CA\}, \quad g \in \{LowFS, HighFS, LowRS, HighRS\} \tag{6}$$

where $IE_x(g)$ denotes the conditional indirect effect of recovery variable x under group condition g, and $x \in \{RT, AS, CA\}$. The coefficient a_x represents the effect of recovery action x on perceived justice under condition g. The coefficient b_1 represents the effect of perceived justice on customer forgiveness intention, d_1 represents the effect of perceived justice on negative emotion reduction, d_2 represents the effect of perceived justice on trust restoration, d_3 represents the effect of negative emotion reduction on trust restoration, b_2 represents the effect of negative emotion reduction on customer forgiveness intention, and b_3 represents the effect of trust restoration on customer forgiveness intention.

4. Experimental design

4.1. Participant recruitment and scenario assignment

The sample contains 420 respondents with hotel-stay experience within the past 12 months. Participants are recruited through Credamo, and only respondents aged 18 or above with completed hotel consumption experience are retained. Each of the four scenario groups contains 105 valid responses. Before reading the scenario, respondents answer screening questions about recent hotel use, travel frequency, and membership

experience. After reading the assigned scenario, respondents complete manipulation-check items, construct measurement items, and demographic questions in the same order. Random assignment is used to reduce selection bias across groups.

4.2. Data cleaning and measurement testing

Questionnaires completed in less than 180 seconds, responses with identical answers across all scale items, and cases failing the attention-check question are removed. Missing values are not accepted because all core items are set as required fields in the survey system. Manipulation checks are conducted by comparing perceived failure severity and perceived response timeliness across scenario groups with independent-sample t-tests. Reliability testing is conducted for each construct before model testing. Confirmatory factor analysis is then performed in AMOS. Items with standardized factor loadings below 0.60 are removed once, and the final model is re-estimated with retained items.

4.3. Structural testing and mechanism verification

The structural equation model first tests the direct effects of recovery timeliness, apology sincerity, and compensation adequacy on customer forgiveness intention. The second model adds perceived justice, negative emotion reduction, and trust restoration as mediating variables. Bootstrap mediation testing is conducted with 5000 samples and 95% confidence intervals. Multi-group analysis is performed across moderate-failure and severe-failure scenarios to compare path differences. Relationship strength is tested by dividing respondents into high-relationship and low-relationship groups according to membership status and previous stay frequency. The final output includes standardized path coefficients, indirect effects, group differences, and explained variance of forgiveness intention.

5. Results

5.1. Descriptive statistics, reliability, validity, and manipulation check results

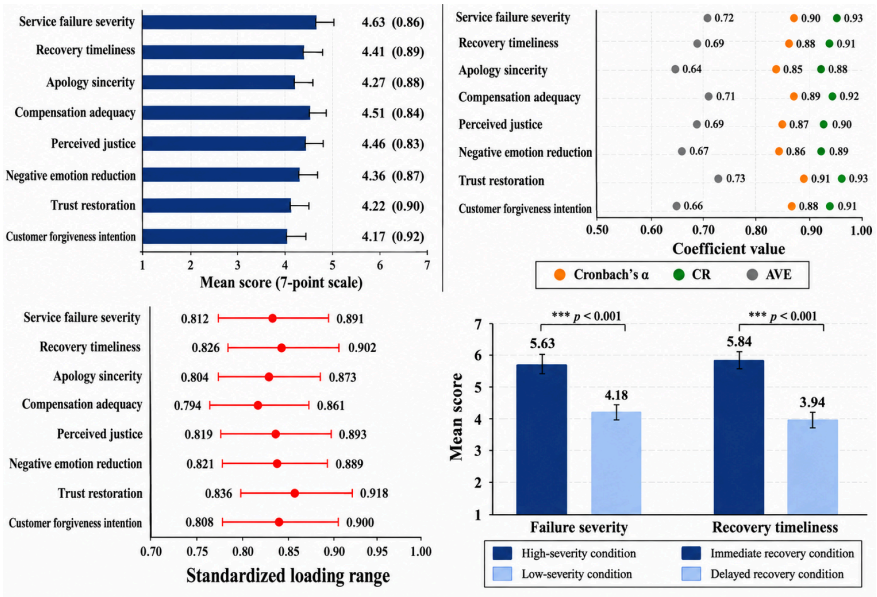


Figure 1. Visualized reliability, validity, and manipulation check results

The total number of valid responses obtained in the retained sample was 420. The mean age was 31.47 years with standard deviation of 6.82, while the average number of hotel stays within 12 months was 4.36 (standard deviation = 2.18). It was also found out through manipulation checks that the participants felt that the failure was more severe when exposed to the high-severity condition, compared to the low-severity condition. It was also found through the manipulation checks that participants perceived the service failure as significantly more severe under the high-severity condition than under the low-severity condition (Figure 1).

5.2. Structural path results for service recovery, perceived justice, trust restoration, and forgiveness intention

CFA results reflected that CFA model fitted adequately: $\chi^2/df = 2.184$, CFI = 0.957, TLI = 0.948, RMSEA = 0.053 ± 0.006, and SRMR = 0.041. Goodness of fit was observed for the structural model as well: $\chi^2/df = 2.236$, CFI = 0.951, TLI = 0.943, RMSEA = 0.055 ± 0.007, and SRMR = 0.045. Justice perceptions were increased by recovery timeliness, sincere apology, and compensation sufficiency. Perceived justice significantly reduced negative emotion and restored trust, while trust restoration showed the strongest direct effect on forgiveness intention (see Table 1).

Table 1. Structural path, mediation, and group difference results

Tested relationship / effect	Standardized estimate	SE	*t* / CR	95% CI
Recovery timeliness → Perceived justice	0.318 ± 0.047**	0.041	7.76	[0.236, 0.397]
Apology sincerity → Perceived justice	0.276 ± 0.044**	0.038	7.26	[0.201, 0.351]
Compensation adequacy → Perceived justice	0.241 ± 0.039**	0.036	6.69	[0.171, 0.312]
Service failure severity → Perceived justice	-0.214 ± 0.042**	0.037	-5.78	[-0.289, -0.142]
Perceived justice → Negative emotion reduction	0.496 ± 0.052**	0.049	10.12	[0.402, 0.591]
Perceived justice → Trust restoration	0.374 ± 0.048**	0.044	8.5	[0.288, 0.461]
Negative emotion reduction → Trust restoration	0.289 ± 0.046**	0.041	7.05	[0.209, 0.368]
Trust restoration → Forgiveness intention	0.421 ± 0.051**	0.046	9.15	[0.331, 0.510]
Negative emotion reduction → Forgiveness intention	0.268 ± 0.044**	0.039	6.87	[0.191, 0.346]
Perceived justice → Forgiveness intention	0.196 ± 0.041**	0.037	5.3	[0.124, 0.269]
Indirect effect of recovery timeliness	0.182 ± 0.034**	0.028	—	[0.126, 0.247]
Indirect effect of apology sincerity	0.157 ± 0.031**	0.026	—	[0.104, 0.218]
Indirect effect of compensation adequacy	0.139 ± 0.029**	0.024	—	[0.092, 0.195]
High vs. low failure severity path difference	-0.118 ± 0.036**	0.031	-3.81	[-0.181, -0.057]
High vs. low relationship strength difference	0.096 ± 0.033*	0.028	3.43	[0.041, 0.153]
Explained variance of forgiveness intention	$R^2 = 0.684 \pm 0.027$**	—	—	—

Note: ** and * indicate statistical significance at the 5% and 10% levels respectively.

These results are similar to previous studies on service recovery in the sense that timely correction, apology, compensation, and transparency can enhance post-service recovery reactions and lead to forgiveness [3-5]. The greater influence of restoring the trust indicates that confidence in the future reliability of the hotel in question is the important process through which recovery influences forgiveness.

5.3. Mediation, moderated mediation, and scenario group difference results

According to bootstrap analysis, perceived fairness, negative emotion reduction, and trust repair act as mediators between recovery promptness, sincere apology, and compensation and customers' willingness to forgive. Out of the three mediators, trust repair played a significant role in explaining the total indirect effect in cases of serious failure. Multi-group comparison showed that severe failure weakened the direct recovery-forgiveness path but strengthened the perceived justice–trust restoration path. High-relationship customers showed stronger forgiveness intention when recovery was prompt and apology was sincere, indicating that prior relationship strength provides a psychological basis for tolerance only when recovery actions are credible. Group differences observed in the study are in line with previous findings regarding the effect of serious failures on decreasing forgiveness, and regarding the role of customer dependence and preexisting relations in recovery [6-8]. But pre-existing relationships facilitated forgiveness in cases where recovery was timely and sincere.

6. Conclusion

The current research develops an integrative framework on the issue of customer forgiveness intention after hotels' service failure by considering factors such as recovery efforts, perceptions of justice, reduction of negative emotions, and restoring trust. The results of the scenario analysis show that hotel recovery efforts do not cause customers' forgiveness in a linear manner. First, customers evaluate the justice of the recovery efforts and then feel their emotional repair, after which they rebuild trust before developing forgiveness intentions. Recovery efforts become more effective in improving perceptions of justice if they are timely, sincere, and adequate, but the most significant driver of forgiveness intentions is trust restoration. Strong hotel recovery causes reduced tolerance and weakens the effect of recovery efforts directly on forgiveness intentions; however, at the same time, it makes the impact of trust restoration stronger. It can be concluded that the role of the strength of the relationship reveals that recovery leads to forgiveness if hotel recovery efforts are timely, sincere, and adequate.

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