The Impact of Artificial Intelligence Empowerment Level on Customer Satisfaction After Artificial Intelligence Service Failure: Automated Social Presence as a Mediator

Haitao Wen[a],Qi Shu[b],Xin Shu[c*],Conghui Wang[d] and Nuo Cheng[e]

[a]wenht@jlu.edu.cn, [b]shuqi_email@163.com, [c]*sx13974371765@163.com, [d]2010843397@qq.com, [e]1401639783@qq.com

School of Business and Management, Jilin University, Changchun, China

Abstract. As AI services is used in more and more scenarios , the probability of failure is getting higher and higher,the research on coping strategies is very necessary. The aim of this paper is to investigate the impact of AI empowerment level on customer satisfaction after AI service recovery and the mediating effect of automated social presence(ASP) under hotel service scenarios. A single-factor (AI empowerment level: high vs. low) between-groups design was used with 169 participants.The results suggest that the level of AI empowerment effectively raises the service recovery evaluations from customers(customer satisfaction) after AI service failures, and the effect is mediated by automated social presence(ASP). This study sheds light on the role that employee empowerment plays in the process of AI service recovery and provides suggestions for service industry managers.

Keywords: AI Service Failure, Service Recovery, AI Empowerment，Automated Social Presence.

1 Introduction

AI technology has gained popularity in various fields, with worldwide sales of service-oriented AI increasing by 85% in five years[1].However, widespread AI applications also lead to inevitable service failures,which are prevalent in hotels, leading to mismatched responses and dissatisfaction among customers[2].Therefore, studying AI employees' service failure and recovery is crucial to maximizing AI's value and enhancing service quality[3].

Prior studies on AI service recovery have concentrated on AI's empathy, humor, explanation, reward, and apology[4].However, exploration of deeper features such as AI empowerment are lacking.

Therefore, The objective of this study is to deeply examine the mechanism by which AI empowerment affects the customer satisfaction. We focused on two core research questions: How does AI empowerment affect customer satisfaction? How does it do so through ASP? This study aims to assist enterprises in enhancing customer satisfaction, averting disputes, and cutting costs.

MSEA 2024, May 24-26, Jinan, People's Republic of China

DOI 10.4108/eai.24-5-2024.2350196

2 Literature Review and Hypotheses

2.1 AI Service Failure and Recovery

Service failure occurs when customers are dissatisfied with the service interaction process[5] or when service performance falls below their expectations[6]. Based on service failure, AI service failure as the dissatisfaction of customers when the service provided by AI does not meet customer expectations.

AI service recovery refers to using artificial intelligence technology to restore customer trust, satisfaction, and overall service quality after a failure. Its essence remains unchanged from the general concept of service recovery.

Current AI service recovery research focuses on enhancing customer satisfaction via self-deprecating humor, emotional accuracy, and selecting apt recovery strategies. Yang showed that self-deprecating humor can boost customer satisfaction and restore trust[7].Xu found that improving customers' perceived intelligence, sincerity, and emotional accuracy can enhance satisfaction in AI service recovery[8].

2.2 AI Empowerment

There are two kinds of empowerment accordingly: structural and psychological. Because AI can’t feel emotions till now, empowerment in this study refers to structural empowerment.and the process of taking robots controlled by AI technology and algorithms as the object to carry out the empowerment behavior so as to automatically provide customer service more efficiently.

Previous studies seem to have some clues about the relationship between AI empowerment and customer satisfaction. Amabile argued that creativity is fostered when employees have high autonomy[9]. As to AI, it will calculate the optimal problem-solving method through its algorithm when it is exposed to various tasks and environments, which means a higher level of creativity. It has been confirmed that creativity is essential for ensuring customer satisfaction and achieving a competitive edge. Further more, empowerment allows employees to access more available resources that can be used as a coping strategy in service recovery and improve customer satisfaction.

So we put forward the hypothesis:

H1: H1: The level of AI empowerment positively influences customer satisfaction following AI service recovery..

2.3 Automated Social Presence

Automated social presence(ASP) is a kind of social presence that specifies the perceived object as an intelligent machine and is the degree to which AI make consumers feel that they are with another social entity.Therefore, we can infer that AI with high empowerment level can interact with consumers more effectively and improve ASP.

So we put forward the hypothesis:

H2a: AI's high empowerment level has a positive impact on ASP.

Based on social presence theory, increased ASP levels may lead consumers to perceive that they have been treated properly, and that would offer enhanced functionalities and social value than interacting with less complicated technologies[10]. Some researchers believe that high-level ASP can improve consumer experience and relevant outcomes, such as satisfaction, participation and happiness[11].

So we put forward the hypothesis:

H2b: The relationship between AI's high level of empowerment and customer satisfaction is mediated by ASP.

3 Methodology

In this study,we tested the effects of the level of AI empowerment on consumers' satisfaction after the AI service recovery and examined the mediating role of ASP in hotels(see Figure 1).

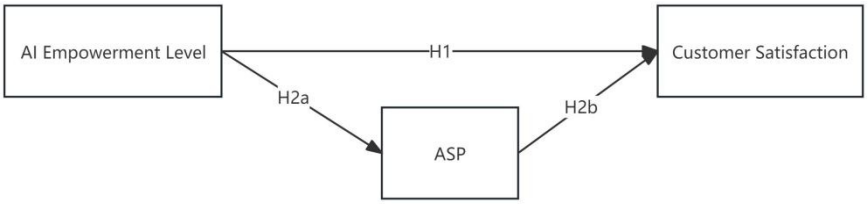

Fig. 1. Research model.

3.1 Participants and Procedure

Study 1 employed a single-factor (AI empowerment level: high vs. low) between-groups design. The research commenced in February 2024 and concluded in March 2024, spanning approximately one month. A total of 169 participants were initially recruited to complete an online questionnaire. Following the exclusion of 9 responses that did not pass the screening question test, 160 valid questionnaires were collected, resulting in a valid response rate of 94.7%.

Participants were randomly assigned to either of the two AI empowerment level groups in the studies. Our manipulation of the AI empowerment level was based on the concept of employee empowerment. Three items were modified from the original scale[12] to assess customers' perceptions of the AI empowerment level. An independent-samples t-test revealed that participants perceived the AI empowerment level to be significantly higher in the high-level AI empowerment group compared to the low-level AI empowerment group (Mhigh = 5.67, Mlow = 3.48, p = 0.000)(see Table 1). Therefore, our manipulation was deemed successful..

Table 1. Independent-samples t-test results.

Heading level	Empowerment level of AI	N	Average	SD	t	P
Perceived	Low	80	3.48	1.383	-11.656	0.000

empow-erment level of AI	High	80	5.67	0.946	-11.656	0.000

This study utilized a questionnaire comprising four sections. The initial section collected demographic data such as gender, age, and education level. To control for participants' pre-experiment emotions influencing customer satisfaction, participants were also instructed to complete a seven-point semantic scale (ranging from sad to happy; bad mood to good mood; irritable to pleased; depressed to cheerful; 1 = strongly disagree, 7 = strongly agree) to assess their mood[13]. Subsequently, participants engaged with a scenario description involving AI service failure and recovery strategies, while the fourth section gauged participants' perceptions of the severity and attribution of the AI service failure, as well as their perception of AI empowerment to validate our manipulations. This section also measured the variables in the model. The severity of the service failure was evaluated by asking participants, "To what extent do you think this service failure is severe?" (1 = not at all, 7 = very much)[14]. Customer satisfaction was assessed using three items[15], tailored to the scenario: "I was satisfied with the way AI handled the service failure," "I am satisfied with the outcome of the service failure handled by AI," "I felt that the AI recovery efforts met my expectations," "I am satisfied with the efforts made by AI to remedy the service failure," "Overall, I am satisfied with my experience in the hotel" (1 = strongly disagree, 7 = strongly agree). Additionally, ASP was measured using a three-item, seven-point self-report scale adapted from the original social presence scale[16]. These scales were translated into Chinese to facilitate their administration on the Chinese language platform.

3.2 Results

Reliability and Validity Tests. This study employed SPSS 26.0 and AMOS 26.0 to assess the reliability and validity of the scale. The Cronbach's α= 0.929(see Table 2). This indicates that the data recovered in this case has a high internal consistency.

Table 2. Analysis of the reliability.

Cronbach'α	N
0.929	11

The KMO value is 0.911(see Table 3)，and the significance level is less than 0.05, which indicates a satisfactory validity.

Table 3. KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.911
Bartlett's Test of Sphericity	Approx. Chi-Square	3006.592
	df	55
	Sig.	0.000

The emotions test results shows that participants' emotions are basically stable(Average=5.57,5.84,5.49,5.08) and the average value of the severity of the service failure is in the lower general range(3.82),which indicates that there is no obvious influence of participants' emotions and the perceived severity of failure in this study.

Difference analysis of ASP and customer satisfaction after service recovery with high and low levels of AI empowerment. The outcomes of the independent-samples(see Table 4) t-test of AI empowerment level on ASP and customer satisfaction showed that AI empowerment level significantly affected customer satisfaction in AI service recovery(Mhigh = 5.23, Mlow = 3.87, p = 0.000) and ASP(Mhigh = 4.67, Mlow = 3.78, p = 0.001).

Table 4. Results of independent-samples t-test of AI empowerment level on each variable.

Variable	AI empowerment level	N	Average	Standard deviation	t	P
ASP	Low	80	3.78	1.671	-3.447	0.001
	High	80	4.67	1.616		
Customer satisfaction	Low	80	3.87	1.751	-5.022	0.000
	High	80	5.23	1.680		

Analysis of the mediating effect of ASP. Table 5 shows that in Model1, the AI empowerment level significantly and positively affects customer satisfaction ($\beta = 0.390$, $P < 0.001$). In Model2, The AI empowerment level exerts a substantial and beneficial impact on ASP ($\beta = 0.261$, $P < 0.001$). And after adding the mediating variable ASP in Model3, R^2 also increased, and empowerment level ($\beta = 0.340$, $P < 0.001$) and ASP($\beta = 0.170$, $P < 0.001$) both markedly affects customer satisfaction. The results suggest that ASP plays a mediating role in the effect.

Table 5. Analysis of the mediating effect of ASP.

variable	Model 1		Model 2		Model 3	
	customer satisfaction		ASP		customer satisfaction	
	β	t	β	t	β	t
Gender	-0.140	-1.883	0.025	0.32	-0.144	-1.962
Age	0.074	0.980	0.207**	2.664	0.039	0.507
Educational background	0.093	1.235	-0.009	-0.119	0.095	1.272
AI empowerment level	0.390***	5.282	0.261**	3.427	0.346***	4.569
ASP					0.170*	2.213
R^2	0.167		0.114		0.193	
F	7.784***		4.962***		7.363***	

***：P＜0.001；**：P＜0.01；*：P＜0.05。

3.3 Discussion

These findings robustly substantiate our hypothesis that the level of AI empowerment significantly influenced customer satisfaction in cases of AI service failure and the effect is mediated by ASP.Therefore,H1,H2a,H2b are all verified.

4 Conclusions and Limitations

As human services, the failure of AI services is inevitable[17]. This paper introduces the effect of AI empowerment level on customer satisfaction after AI service recovery and the mediating effect of ASP under hotel service scenarios.Our findings suggest the following.

First, we conducted a situational experiment to verify that AI empowerment level positively affects customer satisfaction after service recovery, which provides the answers to the first research question.

Second, our findings reveal the mechanism of the effect.We observed that ASP is the mediator of AI empowerment level and customer satisfaction. The higher the AI empowerment level, the higher the level of ASP of customers, and the higher the customer satisfaction after service recovery,which answers the second research question.

4.1 Theoretical Contributions

Our study proposes the concept of AI empowerment, which provides a new idea for the future research and examines the effect of AI empowerment level on post-recovery customer satisfaction, providing an innovative theoretical perspective on customer evaluations after AI service failure.What's more ,this study introduces social presence theory to AI recovery research.

4.2 Practical Implications

First, this study makes recommendations for the application and promotion of AI services in the tourism and hospitality sector, which should not only pay attention to the technology of AI services, but also to the failure and recovery of services.

In addition, this study found that giving AI a higher level of empowerment can effectively improve customers satisfaction. Enterprises need to evaluate the empowerment scope of AI services, dynamically adjust the empowerment of AI, and give AI more autonomous decision-making rights and resources for low-risk services.

4.3 Limitations and Future Directions

While this study provides some meaning, it is crucial to recognize its limitations.

First of all, there are many recovery ways of AI services. The recovery methods used in this study are normal text response and financial compensation, and future research can focus on more recovery methods.

Second, the empowerment of AI service in this study mainly lies in the two aspects of information acquisition and resource use. In future research, AI empowerment can go deeper into a more diversified and comprehensive direction.

Finally, given that our experiment specifically recruited Chinese participants, future studies should include a broader range of cultures and countries.

Acknowledgement. This work was supported by Graduate Teaching Reform Project of Jilin University (Grant No. 2023JGZ018).

References

[1] Japan's Robot Sales Increased by 21% to the Highest Value Ever - IFR Presents World Robotics Report, PR Newswire Association LLC: New York(2019).

[2] Chen, Y.A., et al.: Investigating the determinants of performance of artificial intelligence adoption in hospitality industry during COVID-19. International Journal of Contemporary Hospitality Management 35(8), 2868-2889 (2023).

[3] Xu, X.A. and J. Liu: Artificial intelligence humor in service recovery. Annals of Tourism Research 95((2022).

[4] Li, X.G. and Y.J. Sung: Anthropomorphism brings us closer: The mediating role of psychological distance in User-AI assistant interactions. Computers in Human Behavior 118((2021).

[5] Bitner, M.J., B.H. Booms, and L.A. Mohr: CRITICAL SERVICE ENCOUNTERS - THE EMPLOYEES VIEWPOINT. Journal of Marketing 58(4), 95-106 (1994).

[6] Khamitov, M., Y. Gregoire, and A. Suri: A systematic review of brand transgression, service failure recovery and product-harm crisis: integration and guiding insights. Journal of the Academy of Marketing Science 48(3), 519-542 (2020).

[7] Yang, Z.M., J.L. Zhou, and H.J. Yang: The Impact of AI's Response Method on Service Recovery Satisfaction in the Context of Service Failure. Sustainability 15(4), (2023).

[8] Xu, X.a., N. Wen, and J. Liu: Empathic accuracy in artificial intelligence service recovery. Tourism Review (2023).

[9] Amabile, T.M., et al.: Assessing the Work Environment for Creativity. Academy of Management Journal 39(5), 1154-1184 (1996).

[10] Huang, R.T.R.M.-H.: The Feeling Economy: How AI is Creating the Era of Empathy. (2021).

[11] Yoganathan, V., et al.: Check-in at the Robo-desk: Effects of automated social presence on social cognition and service implications. Tourism Management 85((2021).

[12] Staniulien, S. and A. Zaveckis: Employee Empowerment in Remote Work in Case of Lithuanian Companies. Sustainability 14(14), (2022).

[13] Townsend, C. and S. Sood: Self-Affirmation through the Choice of Highly Aesthetic Products. Journal of Consumer Research 39(2), 415-428 (2012).

[14] Hess, R.L.: The impact of firm reputation and failure severity on customers' responses to service failures. Journal of Services Marketing 22(5), 385-398 (2008).

[15] Maxham, J.G. and R.G. Netemeyer: A longitudinal study of complaining customers' evaluations of multiple service failures and recovery efforts. Journal of Marketing 66(4), 57-71 (2002).

[16] Hassanein, K. and M. Head: Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping. International Journal of Human-Computer Studies 65(8), 689-708 (2007).

[17] Lv, X., et al.: Does a cute artificial intelligence assistant soften the blow? The impact of cuteness on customer tolerance of assistant service failure. Annals of Tourism Research 87(103114 (2021).