

# CONTINUOUS USE OF HOTEL SERVICE ROBOTS BASED ON EXPECTATION CONFIRMATION THEORY

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## Abstract

With the rapid development and transformation of artificial intelligence technology, artificial intelligence and robotics technology have begun to enter human social life. More and more hotels are using service robots to replace room attendants to complete some simple delivery tasks. The novel experience has won praise from customers, improved the consumption experience, helped hotels save costs in the hotel industry with a high employee turnover rate, and provided great convenience for human resources management in the hotel industry. This study has three research objectives: 1) To define the factors that influence customers' continued use of hotel service robots. 2) To test the model of factors influence customers' continued use of hotel service robots. 3) To explain the relationship among the influenced factors. The study found that the Expectation Confirmation affects Perceived Usefulness. Perceived Usefulness affects Continuous Intention. Perceived Usefulness affects Satisfaction. Expectation Confirmation affects Satisfaction. Anthropomorphism affects Continuous Intention. Anthropomorphism affects Satisfaction. Satisfaction affects Continuous Intention.

**Keywords:** Service Robots, Hotel Service Robots, Continuouse Use.

## 1. INTRODUCTION

More and more scholars pay attention to the factors that affect customers' acceptance (or resistance) of hotel service robots, previous relevant studies mainly focus on the factors of receiving hotel artificial intelligence or robot service and its impact on customer satisfaction, service quality and employee attitude (Chi et al., 2022). However, there is a lack of research on the sustained use of applied hotel service robots. Secondly, previous studies mainly examined customer decision making from the perspective of behavioral theories (Kaur et al., 2020), such as rational behavior theory (TRA), planned behavior theory (TPB), and technology acceptance model (TAM). However, some researchers have pointed out that these theories have shortcomings in predicting customer behavior (Hagger et al., 2002; Gilal et al., 2019). In this context, from the theoretical perspective of expectation confirmation theory (ECT), this research explores the influencing factors of customers' continuous use of service robots in hotels, and provides a basis for continuously maximizing the value of intelligent service robots in hotel application scenarios. The service robots studied in this research include check-in, check-out, welcome, food delivery, cleaning, butler service in hotel. This research takes the use of service robots in China's four- and five-star hotels as the research content, and explores the continuous use intention and influencing factors of hotel service robots from the perspective of expectation theory. In order to make the research more comprehensive, the Scope of Population in this research is mainly divided into two groups. The first group is hotel customers, whose

requirements are as follows: First, Chinese customers, second, customers who have used hotel service robots, and finally, the hotel they stay in is a four-star or five-star hotel in China. For this group of people. Quantitative questionnaire survey and qualitative interview methods were adopted. The number of questionnaires was 385 and the number of interviews was 30. The second group of people are experts, these experts mainly include hotel managers, digital experts, hotel management professional university professors. For this group of people, invite 12 experts to conduct face-to-face brainstorming.

## 2. RESEARCH HYPOTHESES

Based on the above research questions and objectives, this article proposes the following 7 research hypotheses:

- H1: Expectation Confirmation affects Perceived Usefulness
- H2: Perceived Usefulness affects Continuous Intention.
- H3: Perceived Usefulness affects Satisfaction.
- H4: Expectation Confirmation affects Satisfaction.
- H5: Anthropomorphism affects Continuous Intention.
- H6: Anthropomorphism affects Satisfaction.
- H7: Satisfaction affects Continuous Intention.

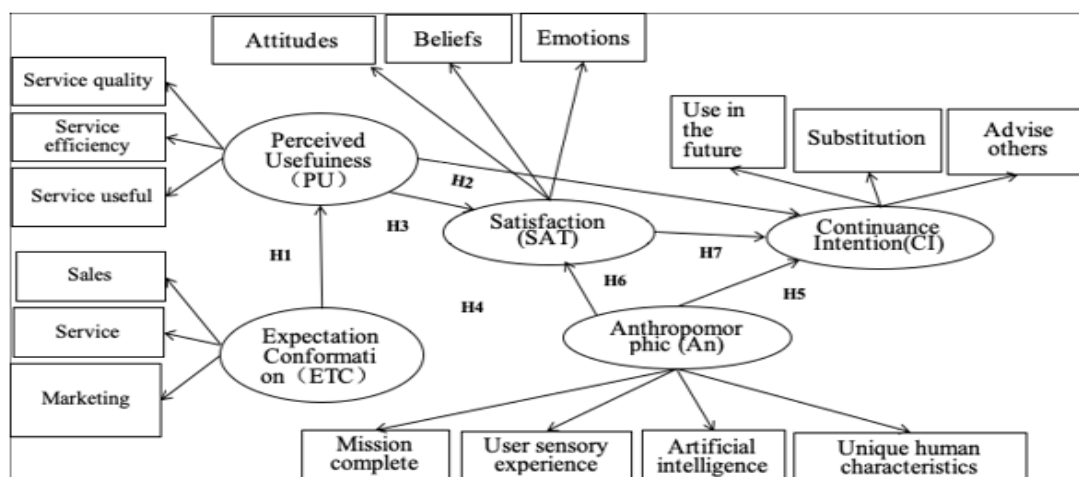


Figure 1: Conceptual framework

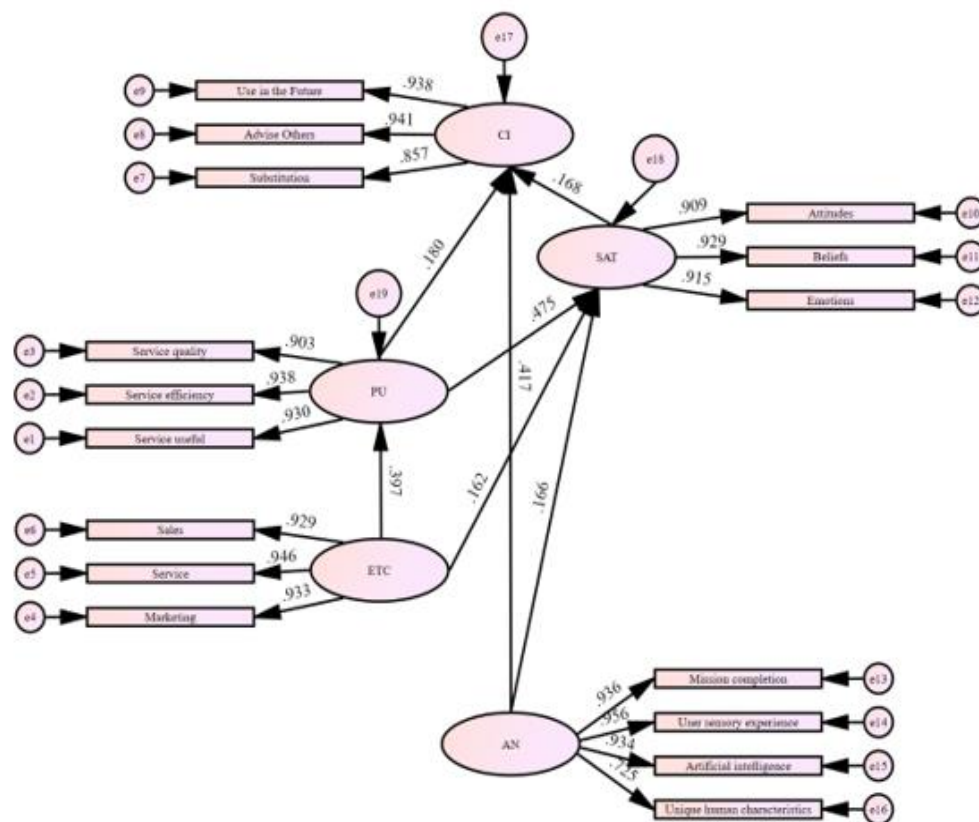
## 3. RESEARCH METHODOLOGY

Research methods in this research, this research adopts a mixed research method combining qualitative and quantitative research. Quantitative research includes questionnaire survey, qualitative research includes interview method, brainstorming method. Data collection and

analysis. In this study, SPSS26 and AMOS26 tool software will be used to process the quantitative data analysis. QSRNVIV0 software was used for qualitative data integration analysis.

#### 4. STRUCTURAL EQUATION MODELLING

Combined with the hypotheses of the previous research, structural equation modelling was constructed and the correlation lines between the independent variables were drawn, and substituting the data into AMOS 26 yielded the following results.



**Figure 2: Operating results of structural equation model diagram (standardized)**

Through the analysis of path relationship results, we can see that expectation confirmation has a significant positive impact on perceived usefulness, and the path coefficient is 0.397 ( $p < 0.001$ ), indicating that the coincidence between expectation and actual experience directly improves users' perceived usefulness to the system. When the user's expectations are confirmed, they will be more aware of the functional value of the system. The perceived usefulness of users has a positive impact on satisfaction, and the path coefficient is 0.475 ( $p < 0.001$ ), indicating that the more useful the system is, the higher the satisfaction of users. Expectation confirmation has a positive effect on satisfaction, and the path coefficient is 0.162 ( $p = 0.001$ ).

The realization of user expectations can directly improve the overall satisfaction of the system. Anthropomorphism also has a significant positive impact on satisfaction, and the path coefficient is 0.166 ( $p < 0.001$ ). Anthropomorphism design of the system can enhance user experience and improve satisfaction. For continuous use intention, perceived usefulness has a significant positive impact on users' continuous use intention, and the path coefficient is 0.180 ( $p = 0.002 < 0.05$ ). The more useful the system is, the more likely it is to continue to use the system. Satisfaction has a significant positive effect on the intention of continuous use, and the path coefficient is 0.168 ( $p = 0.004$ ). The higher the user satisfaction, the more likely the user will continue to use the system in the future. Anthropomorphic design has a significant impact on sustainable use intention. The path coefficient is 0.323 and the standardization coefficient is 0.417 ( $p < 0.001$ ), indicating that anthropomorphic design can enhance users' sustainable use intention.

**Table 1: Path coefficient table**

	path		Estimate	Std Estimate	S.E.	P-value	Label
Perceived Usefulness(PU)	←	Expectation Confirmation (ETC)	0.397	0.042	7.849	***	YES
Satisfaction (SAT)	←	Perceived Usefulness(PU)	0.475	0.05	9.28	***	YES
Satisfaction (SAT)	←	Expectation Confirmation (ETC)	0.162	0.04	3.276	0.001	YES
Satisfaction (SAT)	←	Anthropomorphic (An)	0.166	0.04	3.709	***	YES
Continuance Intention (CI)	←	Perceived Usefulness(PU)	0.18	0.049	3.166	0.002	YES
Continuance Intention (CI)	←	Satisfaction (SAT)	0.168	0.051	2.897	0.004	YES
Continuance Intention (CI)	←	Anthropomorphic (An)	0.417	0.038	8.511	***	YES
Service quality	←	F1	0.93				
Service efficiency	←	F1	0.938	0.032	33.046	***	
Service useful	←	F1	0.903	0.033	29.881	***	
Sales	←	F2	0.933				
Service	←	F2	0.946	0.029	35.441	***	
Marketing	←	F2	0.929	0.031	33.528	***	
Attitudes	←	F3	0.857				
Beliefs	←	F3	0.941	0.041	26.392	***	
Emotions	←	F3	0.938	0.039	26.245	***	
Use in the Future	←	F4	0.909				
Advise Others	←	F4	0.929	0.033	29.663	***	
Substitution	←	F4	0.915	0.036	28.689	***	
Mission completion	←	F5	0.936				
User sensory experience	←	F5	0.956	0.028	38.3	***	
Artificial intelligence	←	F5	0.934	0.031	35.22	***	
Unique human characteristics	←	F5	0.725	0.041	18.759	***	

In this study, a structural equation model is constructed to demonstrate the hypothesis relationship. The seven hypotheses proposed in this study all have positive and significant effects. Hypothesis H1 indicates that expectation confirmation has a positive impact on satisfaction, and users' expectation confirmation will enhance their satisfaction. H2 and H3 hypotheses verify the positive effect of perceived usefulness on continuous use intention and satisfaction, indicating that the more useful users think the system is, the higher their satisfaction will be and the more likely they will continue to use the system. H4 further confirms the positive impact of expectation confirmation on perceived usefulness, that is, when users' expectations are met, they are more inclined to think the system is useful. The H5 hypothesis shows that satisfaction has a positive effect on continuous use intention, and the higher the satisfaction, the stronger the continuous use intention of users in the future. The H6 and H7 hypotheses explore the impact of anthropomorphic design, which not only increases user satisfaction, but also significantly enhances user intent to continue using.

**Table 2: Result of the hypotheses**

Hypothesis	Sample interview questions	Result
H1: Expectation Confirmation affects Satisfaction.	Positive effect (+)	Accepted
H2: Perceived Usefulness affects Continuous Intention.	Positive effect (+)	Accepted
H3: Perceived Usefulness affects Satisfaction.	Positive effect (+)	Accepted
H4: Expectation Confirmation affects Perceived Usefulness.	Positive effect (+)	Accepted
H5: Satisfaction affects Continuous Intention.	Positive effect (+)	Accepted
H6: Anthropomorphism affects Satisfaction.	Positive effect (+)	Accepted
H7: Anthropomorphism affects Continuous Intention.	Positive effect (+)	Accepted

## 5. CONCLUSION

### 5.1 Quantitative research

Quantitative research finds that the sustainable use model of hotel service robots: (1) Expectation confirmation has a significant positive effect on perceived usefulness, and the path coefficient is 0.397 ( $p < 0.001$ ), indicating that tourists' expectation confirmation directly improves tourists' perceived usefulness on the use of hotel service robots.

When the user's expectations are confirmed, they will be more aware of the functional value of the system. (2) The perceived usefulness of users has a positive impact on user satisfaction, and the path coefficient is 0.475 ( $p < 0.001$ ), indicating that the more useful the user thinks the service robot is, the higher the user satisfaction will be. (3) The confirmation of users' expectations on the use of service robots has a positive impact on satisfaction, and the path coefficient is 0.162 ( $p = 0.001$ ).

The realization of users' expectations can directly improve the overall satisfaction of service robots. (4) Anthropomorphism of service robots also has a significant positive impact on satisfaction, and the path coefficient is 0.166 ( $p < 0.001$ ). Anthropomorphism design of service

robots can enhance user experience and improve satisfaction. (5) For users' intention of continuous use, perceived usefulness has a significant positive impact on users' intention of continuous use, and the path coefficient is 0.180 ( $p=0.002<0.05$ ). The more useful the service robot is, the more likely it is to continue to use it. (6) User satisfaction has a significant positive impact on the intention of continuous use, and the path coefficient is 0.168 ( $p=0.004$ ). The higher the user satisfaction, the more likely the user will continue to use the service robot in the future. (7) Anthropomorphism of hotel service robots has a significant impact on continuous use intention, with the path coefficient being 0.323 and the standardization coefficient reaching 0.417 ( $p<0.001$ ), indicating that anthropomorphism design of hotel service robots can enhance users' continuous use intention.

## 5.2 Qualitative research

### (1) Expectation Confirmation affects Perceived Usefulness

In interviews with visitors, it was found that service expectation validation, including technical stability, fluency of the interactive experience, and clarity of privacy policies, were key dimensions for customers to evaluate the value of robots. Technical stability ensures that the service process is not interrupted, and improves customers' trust in the reliability of the robot; Good interactive experience makes customers feel convenient and pleasant, enhancing the attractiveness of the robot; A clear privacy policy dispels customer concerns about the security of personal information and promotes deeper trust. These positive affirmations work together in the minds of customers, raising their awareness of the practical value of service robots and thus stimulating their willingness to continue using them.

### (2) Perceived Usefulness affects Continuous Intention.

Perceived usefulness has become a core element in exploring customers' intention to continue using hotel service robots. Using grounded theory and qualitative analysis methods, this study conducted in-depth interviews with hotel customers to reveal how perceived usefulness profoundly affects their intention to continue using it. Perceived usefulness, that is, the actual benefits and value that customers believe the use of service robots can bring to them, is one of the important factors driving the continuous use of customers. Specifically, when customers perceive that service robots perform well in terms of service quality, service efficiency and service usefulness, they are more inclined to continue using these robots. For example, service robots can accurately understand customer needs, provide professional services, and effectively solve customer problems, which can significantly improve customer satisfaction and trust, and thus enhance their willingness to continue to use.

### (3) Perceived Usefulness affects Satisfaction.

Perceived usefulness plays a crucial role in customers' intention to continue using hotel service robots. It not only directly affects the willingness of customers to continue to use, but also indirectly enhances this willingness by improving customer satisfaction. Therefore, when promoting and using service robots, hotels should pay full attention to and improve the perceived usefulness of service robots, and continuously optimize the service experience from



multiple dimensions such as service quality, service efficiency and service usefulness to meet the needs and expectations of customers, so as to win the trust and loyalty of customers.

#### **(4) Expectation Confirmation affects Satisfaction**

Based on grounded theory and qualitative analysis, this study conducted in-depth interviews with hotel customers and experts in related fields, revealing the central role of expectation confirmation in the formation of customer satisfaction. Specifically, customers will form initial expectations based on information such as marketing, past experience and word of mouth before contacting service robots. These expectations are verified or corrected in subsequent actual experience, which directly affects overall customer satisfaction. Sales expectation confirmation, especially the authenticity of publicity and price transparency, is the first step in building customer trust. When customers find that the hotel's promotional content matches the actual service, and the price information is transparent and not hidden, their expectations are initially confirmed, laying a solid foundation for subsequent positive experiences.

#### **(5) Anthropomorphism affects Continuous Intention**

Through qualitative analysis, we found that when hotel robots exhibit a high degree of quasi-humanness, customers are more inclined to continue using these robots. This is mainly because the quasi-human nature gives the robot more human touch and affinity, so that customers feel more warmth and care in the process of use. For example, through unique human characteristics such as emotional expression, social skills and creativity display, robots are able to establish a deeper emotional connection with customers, thereby enhancing their sense of belonging and loyalty. In addition, the humanoid also enables the robot to better understand customer needs and provide more personalized service, and this customized experience is one of the important factors to attract customers to continue to use.

#### **(6) Anthropomorphism affects Satisfaction**

The human-like nature of hotel robots has an important impact on customer satisfaction and continuous use intention. Humanoid not only enables robots to have more humanized service characteristics, but also enhances customers' emotional connection and sense of belonging, thus enhancing customer satisfaction and loyalty. Therefore, when introducing service robots, hotels should fully consider the design and optimization of quasi-human nature to improve customer experience and service quality. At the same time, future studies can further explore the differences in customer acceptance and preference of robots in different cultural backgrounds, so as to provide more accurate guidance for the global promotion of hotel robot services.

#### **(7) Satisfaction affects Continuous Intention**

The study found that customer satisfaction is based on the comparison between their pre-purchase expectations and the actual post-purchase experience. When the actual experience exceeds expectations, customers are satisfied; On the contrary, dissatisfaction may arise. In the context of hotel service robots, customer expectations may involve the functions, performance, service quality and other aspects of the robot. Through interviews with hotel customers, we found that when service robots can meet or even exceed customer expectations in actual operation, customer satisfaction will be significantly improved. For example, customers expect

robots to respond quickly and perform tasks accurately, and service robots achieve this through their efficient task execution capabilities, thereby enhancing customer satisfaction.

## **6. RECOMMENDATIONS**

In order to improve guests' willingness to use hotel service robots continuously, suggestions for improvement of service robots and management are as follows:

### **(1) The Expectation Confirmation of guests**

It is necessary to strengthen the management of the technical stability of hotel service robots, the fluency of interactive experience and the protection of privacy. Technical stability ensures that the service process is not interrupted, and improves customers' trust in the reliability of the robot; Enhance the good interactive experience, so that customers feel convenient and pleasant; And the need to protect the privacy of guests, protect the security of guests' personal information, the above needs to establish a more trusting relationship with guests.

### **(2) Improvements in perceived usefulness**

Service robots are improved in terms of service quality, service efficiency and service usefulness, so that service robots can understand customer needs and effectively solve customer problems, thus enhancing their willingness to continue to use.

### **(3) Improvement in satisfaction**

In marketing promotion, it is necessary to be more real and not exaggerate marketing, because when the actual perception is lower than the perception of marketing promotion, customer satisfaction will be reduced. At the same time, when designing hotel service robots, it is necessary to have a certain ability to recognize customer emotions and respond to provide personalized service needs.

### **(4) Anthropomorphic suggestions**

In terms of anthropomorphism, the design of robots requires the ability to imitate human behavior, emotions, and characteristics, in a variety of aspects such as task execution ability, error processing ability, autonomous learning, and user sensory experience. Specifically, when the robot performs a task, it needs to adjust quickly when encountering problems, and a solution needs to be given in the program design. Robots need to add autonomous learning systems to optimize service. Robot appearance design, sound interaction and haptic feedback are also important factors affecting customer satisfaction. When the robot's appearance design meets human aesthetics, the sound interaction is natural and smooth, and the haptic feedback is comfortable.

## **7. FUTURE RESEARCH**

- 1) The willingness of continuous use of hotel service robots can be tracked for a long time. With the progress of robot technology, it is worth discussing whether the variables affecting the continuous use of guests will change;



- 2) In the research, it is found that guests have high requirements for the anthropomorphism of hotel service robots, so special research can be conducted on the anthropomorphism of hotel service robots.

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