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The Application of Intelligent Robot in the Modern Hotel Industry—Take the Full Season Hotel as an Example

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Abstract: This paper takes the whole season hotel as an example, and systematically examines the application status, existing problems and optimization countermeasures of intelligent robot in the modern hotel industry. Research found that the whole season hotel reception, room service, catering scene has initially realized the robot application, in improving service efficiency, optimize customer experience has achieved certain effect, but due to the limitation of the robot, man-machine collaboration, customer acceptance, cost, the scale of the intelligent robot application level remains to be further improved. To this end, this paper suggests that the whole season hotel should focus on strengthening the research and development of core robot technology, build an efficient collaboration system, provide personalized, high-quality robot services, strengthen intelligent cost management, robot scale application technology basis, service, intelligent robot can allocate the high-quality development of the hotel.

1. Introduction

1.1 Research Background

With the rapid development of artificial intelligence technology and the continuous improvement of the performance of intelligent robots, intelligent robots enter the hotel site to provide customers with thoughtful services with perception, interaction and mobile ability, which has become an important direction of the digital transformation and service upgrading of the hotel industry. In the face of increasingly fierce market competition and changing consumer demand, the hotel industry through technological innovation, improve service efficiency and service quality, enhance market competitiveness. Intelligent robot is regarded as an important breakthrough in the intelligent upgrade with its efficient, precise and unremitting characteristics in the hotel industry. The global service robotics market is expected to grow to $29 billion by 2024. In China, with the aging of the population, rising labor costs and other factors, as well as the strong support of the national government for the service robot industry policy, the hotel service robot industry has brought important development opportunities. From the perspective of the operation form of the hotel industry itself, it is difficult to continue the traditional extensive management mode and crowd strategy, and it is urgent to change to intensive, professional and intelligent. In particular, the COVID-19 outbreak has boosted the demand for contactless services. Intelligent robots can reduce

the direct contact between service personnel and customers, and become a new assistant for the epidemic prevention and control and resumption of production in the hotel industry.

At present, domestic and foreign scholars have conducted a series of studies on the application of artificial intelligence and robots in the hotel industry, mainly focusing on the following aspects:

(1) Factors affecting the adoption of artificial intelligence and robotics technology in the hotel industry. Nam et al. (2021)[1]Taking the Dubai hotel industry as an example, based on the TOE (Technology-Organization-environment) framework, the factors that influence the adoption of AI and robotics in the hotel industry. The study found that when introducing these new technologies, hotels need to consider from the technology, organization, environment and other aspects, and develop a comprehensive application strategy and implementation path.

(2) The impact of artificial intelligence and robots on the hotel service process and customer experience. Gupta, et al. (20,22)[2]A semi-structured interview with 26 employees in Seoul, South Korea, focusing on the Norodo East Gate Hotel, found that the deployment of AI robots could promote the automation, information collection, personalization and seamless connection of the hotel service process, thus improving the customer check-in experience.

(3) Influencing factors on hotel robot service failure and coping strategies. Hou Lujing (2021) [3]According to the specific situation of hotel robot service failure, the theory model is constructed based on the responsibility attribution theory and psychological perception theory, and customers are found that the robot is more controllable than the process failure, so they are more inclined to blame the robot; but when the customers' psychological perception level is low, the attribution path is not significant. This shows that the hotel needs to pay attention to improving the customer's sense of spirit in the robot appearance design and interactive function, so as to better solve the negative impact of the robot service failure.

(4) The impact of hotel robot inclusive service on customer behavior. Liang Shaohua (2020)[4]Earlier, we reviewed the application status of hotel robots under the background of artificial intelligence, and pointed out that although robots help hotels save labor costs, improve work efficiency and brand image, there are still many limitations in meeting the personalized and humanized needs of hotel services. Sun Jianxin, et al. (2024)[5]Based on the theory of empathy, the influence of the interaction of inclusive service positioning and customer social class on customer citizen behavior is discussed. It found no significant differences for inclusive and non-inclusive services and for high social class clients. Further testing of mediation mechanisms showed that the emotional empathy of lower customers plays a key role, while testing of regulatory mechanisms showed that the inclusive service positioning of upper customers can also significantly improve their civic behavior. This provides a new idea for the service process and interaction design of the hotel robot.

It is generally believed in domestic and foreign research that artificial intelligence and robots will reshape the service process and customer experience of the hotel industry, but they still face many challenges in practical application, such as insufficient technology maturity, strengthening man-machine cooperation, unbalanced customer acceptance, and large cost and investment. All these need the hotel industry and technology industry to strengthen industry-university-research cooperation, jointly crack. At present, although the application of intelligent robots in the hotel industry has been explored, it is still in the initial stage.

1.2 Questions

At present, many hotel groups such as Huzhu and Intercontinental have strengthened their layout in the robot field, applying it to reception, room service, catering, takeout and other links, so as to improve service efficiency and optimize customer experience. However, at present, the application

of intelligent robots in the hotel industry is still in the preliminary exploration stage, whether in terms of technology maturity, or in the actual operation effect, there are still many bottlenecks to break through. For example, robots need to improve their capabilities in semantic understanding, flexible control and other aspects, and often fail to give satisfactory responses to complex customer needs. Therefore, how to break through the above bottleneck, and effectively use robots to achieve the high-quality development of the hotel, this is a new topic in front of the hotel managers. On this basis, this paper takes Four Seasons Hotel as an example, and uses the case study method to systematically analyze its practice exploration, existing problems and optimization path in the application process of intelligent robots, so as to provide decision-making reference for the hotel industry to further promote the large-scale application of robots.

1.3 Study significance

From the theoretical sense, this paper introduces the robot application practice of China chain hotel, uses the case analysis method to diagnose the existing problems, and proposes the system optimization measures.

In a practical sense, this study is based on the typical cases of full-season hotels, and provides a path guidance for hotel enterprises to comprehensively and systematically promote the implementation of robot application.

1.4 Study Methods

1.4.1 Theoretical basis

Based on the technology-organization-environment (TOE) framework, this study discusses the application status and influencing factors of intelligent robots in the hotel industry. The TOE framework was proposed by Tonatsky and Fleischer in 1990, who believed that the adoption behavior of enterprise technology innovation is influenced by a combination of technological factors, organizational factors and environmental factors. Among them, technical factors refers to the existing and externally available technical characteristics of enterprises; organizational factor refers to internal characteristics such as scale, management structure and human resources; environmental factors refer to external characteristics such as industry environment, government policies and market demand. The TOE framework provides a comprehensive and systematic view of the adoption of complex technologies in specific industries and organizations, and has been widely used in emerging technology areas such as e-commerce, cloud computing, and big data.

This paper uses the case study method as the main research method. Case study method is a qualitative research method that explores the causes and laws behind a certain phenomenon through in-depth and detailed analysis of one or several cases. The present study approach is applicable to exploratory studies and can answer the questions of "how" and "why". The research question of this paper is "how to apply intelligent robots to the hotel industry, what is the problem, and how to handle it". At the same time, the application of intelligent robots in the hotel industry is also a contemporary phenomenon that is happening and constantly changing, and researchers cannot control the occurrence of events. Therefore, this case study method is well suited for the research topic of this paper.

1.4.2 Data collection

Multiple methods of data collection were used, including literature analysis and field observations.

(1) Literature analysis. Researchers widely collect and study the relevant literature of hotel

service robot research at home and abroad, and sort out its research status.

Through CNKI, Wanfang, VIP and other databases, with "intelligent robot", "hotel service robot", "artificial intelligence + hotel" as the keywords, search relevant literature to understand the cutting-edge research trends.

(2) Field observation. Researchers go deep into the service line of the whole season hotel, observe the operation situation of the robot, capture the detailed characteristics of human-computer interaction, and record and analyze the possible abnormal situation in the operation process of the robot.

Field observation was conducted in two phases:

The first stage: From July 15 to July 18, 2024, for three consecutive days, from 9:00-11:00 a. m. to 14:00-16:00 p. m. The main observation focuses includes the appearance design, navigation ability, service process, response speed, failure rate, etc.

The second stage: From July 20 to July 23, 2024, for three consecutive days, the time period is 10:00-12:00 a. m. and 15:00-17:00 p. m. On the basis of the observation in the first stage, the focus is on human-computer interaction, including how customers awaken and operate the robot, the robot's speech recognition and response ability, and obtaining customer feedback, etc.

(3) Interview. In order to further understand the subjective feelings and evaluation of hotel staff and customers on the robot application, the researchers interviewed 2 hotel reception staff and 20 hotel guests during the on-site observation period, with each interview lasting 20-30 minutes. It mainly involves the advantages and disadvantages of robot services, the impact on traditional service methods, the problems in the application, suggestions for future improvement and other topics.

1.4.3 Case analysis

In the analysis phase, this study uses the method of thematic analysis to classify, code and classify the collected multi-source data, and refined the application status, existing problems, countermeasures and suggestions of the hotel robot. Researchers in repeated comparative analyses, it determines the commonalities and characteristics of examples and attempt to propose more general theoretical propositions.

2. Application and application of intelligent robots in the hotel industry

2.1 Definition and characteristics of intelligent robots

Intelligent robot is a highly integrated artificial intelligence product with intelligent characteristics such as perception, interaction, decision-making and execution. It is generally believed that the intelligent robot is an intelligent and programmable robot, which can simulate human behavior and thinking, and has the characteristics of autonomous learning, autonomous decision-making, autonomous control and so on[6]. Considering the existing research, the intelligent robot mainly has the following key characteristics: First, it has the multi-modal sensory interaction ability such as vision, hearing and touch. Interaction with people naturally; second, the strong ability of data analysis and learning, and continuously improve its cognition and service level through machine learning algorithm; third, the ability to make independent decisions and adapt to the environment according to the changes of environment and tasks; and the ability of fine operation and dexterous control to meet the personalized and fine needs of service objects[7].

2.2 The application status of intelligent robots in the hotel industry

With the rapid development of artificial intelligence technology and the continuous improvement of the performance of intelligent robots, intelligent robots into the hotel site, the perception, interaction and mobility of customers, has become an important direction of the digital transformation and service upgrading of the hotel industry[8]At present, intelligent robot is more and more widely used in the hotel industry at home and abroad, mainly focusing on reception, room service, food delivery, luggage handling, cleaning and other links. In terms of room service, the robot can provide towels, water cups and other items according to the needs of guests, and can also provide food delivery service for guests[9]. In restaurants, some hotels have introduced intelligent food delivery robots, which can automatically deliver meals according to table numbers to improve the efficiency of food transmission. Although the application of hotel intelligent robot is mainly focused on single and repetitive tasks, but with the technological progress and product iteration, the breadth and depth of its application continues to expand.

2.3 Application prospect of intelligent robots in the hotel industry

From the perspective of hotel operation, in the current situation of rising labor costs, partially replacing labor with robots can effectively reduce operating costs and improve the input-output benefits[10]At the same time, the application of robots is also conducive to improving the standardization level of service, improve the efficiency and standardization level of service. From a customer's point of view, the robot can provide 724 hours of service anytime, anywhere, to meet customers' personalized needs. In addition, robots can also continuously optimize service methods and content through large-scale data learning, so as to make services more accurate and differentiated[11]Of course, although the application prospect of intelligent robots is good, the current capabilities in perception, cognition, dexterous control and other aspects still need to be improved.

3. Application status of hotel intelligent robot

3.1 Application in foreground service

As one of the earliest mid-range chain hotel brands to launch intelligent robots in China, quantitative hotel has carried out beneficial intelligent exploration and practice in the field of front desk service in recent years. According to the field trip, we know that the hotel has used an intelligent welcome robot in the front desk lobby, which can provide simple greetings and guidance services for guests. These robots have a beautiful and elegant appearance design, integrate the brand elements of the hotel, and have human-computer interaction methods such as voice interaction and screen touch, so that guests can feel the intelligent atmosphere of the hotel for the first time. In the reception link, the guests are still mainly to check in, but the welcome robot can assist the front desk service staff to guide the guests, play an auxiliary role in the peak hours of passenger flow, and improve the occupancy efficiency of the guests. In addition, the intelligent robot also undertakes the function of the front desk consultation service, so that the guests can understand the basic information of the hotel, public service facilities, catering places and other conditions through the robot screen touch or simple voice interaction.

3.2 Application in room service

At present, the hotel has been equipped with a number of intelligent food delivery robots on the

room floor, which can provide 24-hour food delivery service for hotel guests. After the guests place an order through the hotel mobile application, the robot can automatically plan the route, intelligently deliver the items placed by the customers to the door of the guest room, and remind the guests to carry them around through the intelligent voice system, so as to achieve efficient, convenient and contactless room service. Intelligent robots, based on flexible mobility capabilities, also provide out-of-room garbage recycling services. Guests can call the robot to the door to collect garbage through the intelligent control panel or voice commands, improving the environmental hygiene level of the room. On special days, such as festivals or guests 'birthdays, the hotel will also allow the robots to carry flowers, greeting cards and other gifts to the guests' room to send blessings, reflecting the humanized care. At the same time, based on the massive service interactive data of the robot, through big data analysis and machine learning algorithm, constantly optimize the personalized service strategy to make the service more accurate. However, the application of intelligent room robot also faces some practical problems, such as the robot facing some sudden and complex needs of the guests, the service ability is still insufficient.

3.3 Application in the catering service

At present, the hotel has launched an intelligent takeout robot in the restaurant, and established a robot catering service platform, forming a digital solution for the whole process from the front desk food ordering, kitchen production to the robot delivery. Customers simply order through the touch screen or mobile app at the restaurant's front desk, and the kitchen builds on the order. After the meal, the food is sent to the robot dining area for packaging. The delivery robot will then use positioning and navigation technology to accurately deliver food to customers' tables. The whole process realizes the seamless connection of food ordering, food ordering, food delivery, settlement and other links, and effectively improves the service efficiency. Through the analysis of the operation data of the food delivery robot, the hotel can find and solve the operation failure of the robot in time, and improve the stability and service life of the intelligent equipment. However, while catering robots bring a lot of convenience, there are also some operational problems, such as the gap between the robot and the restaurant ground, which may hinder its flexible access. Sometimes, robots are difficult to fully adapt to complex changes in the hotel dining environment and need manual help in handling some emergencies.

3.4 Application in the Concierge Service

At present, the application of intelligent robot in the field of concierge service is still in the initial stage and the exploration stage, and the application scope and function are relatively limited. Although the hotel in the lobby set up the concierge robot, but mainly is a simple welcome greetings and guidance services, guests can through the touch screen or simple voice interaction to provide basic information for the hotel, such as hotel restaurant location, check-out time, prepaid phone, etc., but in providing baggage handling, private butler, business assistant specificity, complexity service is not completely satisfied. At the same time, due to the limited level of speech recognition technology, the concierge robot currently only supports Chinese dialogue, which is still difficult to identify English and other small languages, and needs to be strengthened to serve international guests. However, it is worth affirming that the hotel has accumulated certain data resources through the concierge robot, including customers' consultation questions, operation behavior, etc., which lays a good foundation for the subsequent use of big data analysis, in-depth understanding of the needs of customers, and optimization of the service process.

3.5 Case comparison of other hotel brands

Ado LAB is a fully intelligent new hotel, the machine replaced the room card and some manual, self-service check in, face brush into the room, mobile phone check out; the robot can lead the way, can also deliver food. Its hotel intelligent robot, mainly used in the front desk reception, consulting services, guide check-in and other scenarios. Compared with the robots in the full season hotel, the intelligent robot is more cartoonish in appearance design, aiming to create a friendly and friendly atmosphere. In terms of functions, in addition to the basic questions and answers and guidance services, the ADO intelligent robot can also provide simple entertainment and interaction, such as group photos, which enhances the interest of customer experience. At present, the intelligent robot is mainly deployed in the hotel lobby, and has not yet gone deep into the room floor and restaurant scenes. In contrast, the food delivery robot of the whole season hotel has realized a large range of applications, forming an unmanned solution of the whole process from ordering to delivery.

In terms of human-machine collaboration, the intelligent robot is also still in its infancy. ADo intelligent robot exists more as an auxiliary tool, and its cooperation with the front desk service staff is not close enough. Customers often need to choose between artificial and robot services. The whole season hotel pays more attention to man-machine cooperation, and realizes the seamless connection in some service links, such as the division of labor and cooperation between the front desk service personnel and the welcoming robot.

4. Problems existing in the application of hotel intelligent robots

4.1 Technical limitations of intelligent robots

Through the investigation of the application status of intelligent robot in Four Seasons Hotel, it is found that although the intelligent robot introduced by the hotel has achieved preliminary results in reception, room service, catering delivery and other scenarios, there are still certain technical limitations. On the one hand, the robot is not intelligent enough in speech recognition and natural language understanding, and it is difficult to accurately understand some of the guests' oral expression and complex service requirements, unable to provide more personalized and humanized services. The accuracy and comprehensiveness of answers need to be improved when dealing with open questions. On the other hand, the robot lacks the flexible ability to adapt to the environment, making it difficult to freely cope with the complex and changeable environment of the hotel. For example, the robot food delivery may drop due to the uneven ground, and it cannot make independent decisions and flexible adjustments in time according to the dynamic changes of the hotel's catering environment. At the same time, the troubleshooting and maintenance of the robot is also very difficult. Once a failure occurs, the hotel does not have the technical capability of rapid investigation and maintenance, which may affect the normal operation of the hotel.

4.2 Collaboration between hotel staff and intelligent robots

The survey found that there were still some problems with the cooperation between hotel staff and robots after the introduction of intelligent robots. Some employees lack understanding of the working principle and operation process of robots, and do not know how to cooperate with robots. When the robot fails or fails, it cannot be handled in time, which affects the consistency and consistency of service. The hotel also lacks systematic man-machine collaboration process design and standard specifications, the division of labor between employees and robots is not clear enough, it is easy to escape and wait for some tasks to complete man-machine cooperation, and it is difficult to ensure the effect of service landing to achieve. At the same time, the existing performance

appraisal and reward mechanism of the hotel is still mainly based on human services, and the lack of man-machine cooperation performance in the evaluation system, which affects the enthusiasm of employees and robots to a certain extent.

4.3 Acceptance of intelligent robots by hotel customers

Through the introduction of intelligent robots, the hotel has created a new intelligent check-in experience for its customers. However, in practice, we found great differences in the acceptance of robotic services by different customers. Some customers, especially the younger generation, have an innate affinity and curiosity for smart technology. They are willing to try the robot service, and praise their intelligent and personalized service. However, another part of customers, especially the elderly customers, prefer the traditional manual services, believing that the robot services lack human touch and temperature, and are difficult to meet their own unique personalized needs, and often feel uncomfortable and uncomfortable when facing the robots. At the same time, some customers are also worried about the service quality and safety of the robot, believing that the robot may not be able to provide services in a timely, accurate and thoughtful way like human employees, and worried that the failure or control of the robot may affect their own security and privacy.

4.4 The cost problem of intelligent robot application

At present, the total cost of the hotel service robot is higher, far more than the traditional hotel electrical equipment. The cost of buying and maintaining a high-end robot is far higher than hiring many hotel attendants, which is undoubtedly a huge investment for cost-sensitive mid-range hotels. On the other hand, the application of robots also generates a large amount of support costs, including the necessary infrastructure investment such as network communication, machine room construction, as well as the daily costs such as power consumption, consumables and maintenance caused by robot operation. According to industry experience, the purchase price of a food delivery robot is usually between 50,000 yuan and 80,000 yuan. Assume that the hotel buys 5 robots, the average unit price is 60,000 yuan, and the total purchase cost is 300,000 yuan. According to the 5-year depreciation period, the annual depreciation cost is 60,000 yuan. In order to adapt to the operation of the robot, the hotel needs to carry out intelligent transformation of the corridor, elevator and other areas, including laying navigation magnetic strips, adding charging stations, etc. The initial investment is about 100,000 yuan. In the daily operation, the food delivery robot mainly uses the power supply mode of charging. Assuming that each robot needs to charge for two hours a day, the cost per kilowatt hour is 0.8 yuan, and the electricity cost is about 12,000 yuan a year. At the same time, the hotel needs to be equipped with a full-time engineer responsible for the daily maintenance and troubleshooting of the robot, with an annual salary of 80,000 yuan. To sum up, the total cost of the five food delivery robots introduced in the first year was about 512,000 yuan. In the next four years, the annual related cost will also be around 152,000 yuan. Although food delivery robots can save labor costs and improve food delivery efficiency to some extent, the direct economic benefits remain to be seen. In the current market environment, the payback period may take 3-5 years. For a mid-end hotel, such cost investment will undoubtedly bring greater financial pressure. Many hotels have to trade off the long-term benefits and short-term costs of robotic applications when making decisions. Managers need to carefully determine the investment scale and timing of the hotel's positioning, target customer group, financial status and other factors.

5. Countermeasures and suggestions to promote the application of intelligent robots in hotels

5.1 Strengthen the research and development and upgrading of intelligent robot technology

In view of the technical limitations encountered by hotels in the application of intelligent robots, hotels should actively cooperate with machine suppliers to strengthen the research and development of key robot technologies and the iterative upgrading of products. We should pay attention to speech recognition, natural language understanding, face recognition, emotional computing, artificial intelligence technology, through the optimization algorithm model, expand the training data, improve the robot understanding of user demand and interaction ability, make it can more accurately interpret the customer's voice, expression and behavior, to provide more natural, smooth, personalized service.[12]At the same time, it is also necessary to accelerate the innovation and breakthrough of cognitive intelligence technologies such as multi-modal perception, active learning and independent decision-making, and enhance the environmental perception and strain ability of the robot, so as to respond quickly and make decisions according to the real-time changes of the environment, and flexibly carry out work in the complex and dynamic hotel scene. It can be said that only by continuously increasing the research and development of key technologies, accelerating the upgrading of robot products, and improving the intelligent level and actual performance of robots, can we better adapt to the development direction and customer needs of the hotel industry.

5.2 Improve the cooperation mechanism between the hotel staff and the intelligent robots

In order to improve the pertinency and effectiveness of the intelligent robot skills training, the hotel uses theoretical research, case analysis, scene simulation, and field practice training to help employees accurately understand and master the working principle, operation process, and preventive measures of the robot, understand the reasons, and become the command work of the robot[13]. At the same time, the hotel also needs to systematically optimize the man-machine collaboration process, pay attention to the various services of the hotel, accurately locate the division of work of employees and robots, formulate the operation procedures and quality standards of man-machine collaboration, establish the information docking and sharing mechanism of man-machine collaboration, in order to achieve a clear division of labor.

The human-machine cooperation performance should be incorporated into the hotel assessment system, scientific and reasonable evaluation indicators and weights should be formulated, and the positive incentive mechanism for human-machine cooperation performance should be established to link the human-machine cooperation performance of employees with career development, salary and welfare, and mobilize the enthusiasm and creativity of employees to participate in man-machine cooperation.

5.3 Improve customers' intelligent robot service experience

The hotel innovates the content and form of robot service, through regular consultation, guidance, delivery of services, actively expand entertainment interaction, emotional company, health management and other quality services, through voice dialogue, body interaction, multimedia display and other ways, to create a richer, vivid and warm experience[14]., On the other hand, the hotel to speed up the construction of intelligent customer data, through customer occupancy, consumption and other related information system connection, using big data, cloud computing technology, multidimensional, dynamic insight and analysis of different customer groups, according to the data analysis results, provide accurate robot image and intelligent decision basis, according to the customer age, gender, preference attribute characteristics, provide more detailed, differentiated

service, improve customer service[15].

5.4 Optimize the cost management of intelligent robot applications

The hotel should strengthen the control of the robot procurement cost, follow the applicability principle of robot selection, reasonably determine the technical parameters and procurement scale of the robot according to the hotel's function positioning, service characteristics and development stage, and strive for more favorable purchase price through bidding and negotiation[16]. In the process of robot operation, it is necessary to strengthen energy consumption management, select energy-saving and environment-friendly robot products, and realize the minimum energy consumption of a single service by optimizing the running time and path parameters of the robot. The hotel should also establish a robot operation and maintenance cost management system, improve the service life of the robot, reduce the failure rate and save the maintenance cost by strengthening the daily maintenance of the robot and establishing the spare parts management information system. Hotels can also bundle robot services with the products and services of surrounding enterprises, and achieve revenue sharing through cross-border cooperation.

6. Conclusion

As one of the earliest mid-range chain hotel brands to launch intelligent robots in China, Quantitative hotel has realized the application of robots in reception, room service, food delivery and other scenarios. To a certain extent, this improves the service efficiency of the hotel, optimizes the customer experience, and highlights the brand image of innovative intelligent service throughout the year. However, due to the limitations of the robot technology itself, as well as the hotel in customer adaptation, cost control and other aspects, the application of intelligent robot in the full season hotel is still in the preliminary exploration stage, has not fully realized large-scale operation, and there is still a certain gap with the requirements of quality service. In this regard, this paper suggests that all-season hotels should further strengthen the industry-university-research cooperation with science and technology enterprises, increase the research and development investment of key robot technology and product iteration, enhance the intelligent ability of robot autonomous learning, and provide more advanced and mature technical support for the operation of intelligent hotels.

References

[1] Nam, Kichan, et al. "The adoption of artificial intelligence and robotics in the hotel industry: prospects and challenges." Electronic Markets 31 (2021): 553-574.
[2] Gupta, Shivam, et al. "Artificial intelligence enabled robots for stay experience in the hospitality industry in a smart city." Industrial Management & Data Systems 122.10 (2022): 2331-2350.
[3] Hou Lujing. Study on hotel robot service: influence of fault type and mental perception. Tourism Science, 2021, page 35 (4): 97-107.
[4] Liang Shaohua. Application status and thinking of hotel robot under the background of artificial intelligence. Modern Business, 2020 (18): 40-42.
[5] By Sun Jianxin, Ma Baolong, Li Xiaofei, etc. The impact of the interaction between the inclusive service positioning and social class on customer civic behavior. Journal of Management, 2024, 21 (5): 721-730.
[6] Li Jun, Song Chenpeng, Ye Haobin. Research on consumers' willingness to use service robots in an intelligent service environment [J]. Travel Magazine, 2023, 38 (06): 136-150.
[7] Liu Li, Liu Jian, Tan Yingling. B & B hotel service design study based on group intelligence and case reasoning. Packaging Engineering, 2022, 43 (04): 348-356.
[8] Zhang Xin, Cao Bing, etc. Consider demand information and electronic word of mouth [J]. Journal of Northeastern University (Natural Science Edition), 2023, 44 (10): 1506-1513.
[9] Song Xiaoxiao, Li Yunpeng, Tang Yue, etc. Research on the influence of service robot personification on hotel

customer sentiment and transaction intention. Journal of Capital University of Economics and Business, 2023, 25 (05): 79-94.
[10] Zhao Chen, Jack Ma Yun, Yu Lin, et al. Research on the functional design of isolated hotels in the post-popular era. Packaging Engineering Press, 2023, 44 (14): 91-99 + 117.
[11] Bai Ning. The impact of hotel service robot personification and online comment type on customers' willingness to spend. Research in Business Economics, 2023, (12): 181-184.
[12] Wang Xuhui, Su Chen. Anthropomorphic work can help alleviate customer dissatisfaction after failure of robot service and mediate the role of responsibility attribution [J]. Finance and Trade Research, 2023, 34 (06): 57-70.
[13] Li Jun, Song Chenpeng, Ye Haobin. Research on consumers' willingness to use service robots in an intelligent service environment [J]. Travel Magazine, 2023, 38 (06): 136-150.
[14] Chen Ling. Service robot cute design tolerance for hotel customers [D]. Sichuan Agricultural University, 2023.
[15] Hu Wenna. The impact of perceived benefits and risks on the willingness of hotel service robots is based on privacy computing theory [D]. Shanghai: Shanghai Normal University, 2022.