A STUDY OF CONSUMER INNOVATIVENESS AND SERVICE CONVENIENCE ON THE INTENTION TO USE ROBOT SERVICES IN HOTELS

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ABSTRACT

As one of the core elements of development in the digital economy, artificial intelligence technology has penetrated into every aspect of people's lives. In more and more scenarios, AI is gradually replacing human beings and providing direct services to people. The hotel industry is a key scenario for the application of AI on the ground, and AI robots are helping to innovate hotel services and maintain a competitive edge with their intelligent advantages. But the value of this advantage still needs to be realised through high frequency interaction with consumers, but currently, according to data, 61% of consumers are still reluctant to interact with service robots. Therefore, exploring how to improve consumer acceptance of AI robots in hotels is an important prerequisite for the introduction of AI robots in the hospitality industry and is fundamental to maximising the value of AI robots in the hotel scenario. In this paper, an empirical survey was conducted in the survey area of "All Seasons Hotel", which provides AI robot services in Shenzhen, and 391 valid questionnaires were collected from customers who have had AI robot services in hotels. The data were then analysed using SPSS and Smart PLS software to derive the impact of consumer innovativeness, service convenience and trust on the willingness to use AI robots in hotels.It was found that for hotels, service convenience can positively influence the intention to use hotel AI robots, while for individual consumer factors, consumer innovativeness cannot directly influence the intention to use hotel AI robots. Trust plays an important mediating role in the influence of service convenience and consumer innovativeness on the usage intention of hotel AI robots. This study providing new ideas and approaches to AI service innovation in the hotel industry.

Keywords: Consumer Innovativeness; Service Convenience; Trust; Intention to Use; AI Robort Technology

INTRODUCTION

1.1 Background
Today, the tourism and hospitality industry is facing an increasingly complex competitive environment, with new consumer needs being explored and the supply and demand situation in the labour market changing dramatically, making the development of the tourism and hospitality industry a new challenge. With the implementation of the "Smart+" hotel strategy, artificial intelligence has created a boom in the hospitality industry, with the development and application of hotel service robots being widely carried out around the world. In the US, Hilton

Group has teamed up with IBM to develop an artificially intelligent welcome robot. Starwood's Aloft Hotels has applied robots to deliver mail, toiletries and drinks to individual rooms. In Singapore, robots can help process guest orders, deliver food to guest rooms and assist with housekeeping management. In China, the Ali Future Hotel, which opened in Hangzhou's Xixi Park at the end of 2018, has robots that do most of the work from booking and check-in to check-out, and in 2019, World Trade Hotels has teamed up with Cloud Trace Technology to put the hotel service robot "Run" into daily operation at its hotels.

In the context of an ageing population, international tourism development and increasing consumer demand, the hotel industryhas a number of issues in terms of labour supply, service staff quality improvement and customer non-quantitative data processing (Bowen & Morosan, 2018; Yang & Chew, 2020). Robotics and artificial intelligence (AI) can provide a solution to these challenges (Bowen & Morosan, 2018). First, intelligent robots can replace frontline staff for repetitive and standardised tasks such as reception and accommodation check-in, information consultation and guidance, and automated delivery, which bring great convenience to the hospitality industry in managing human resources (Koo et al., 2021; Yang & Chew, 2020; Çakar & Aykol, 2020). Second, frontline employees, assisted by intelligent robots, have more time and energy to manage non-programmed matters, provide better personalized services to customers, improve service quality and achieve service innovation (Lee, Lin, & Shih, 2018; Qiu et al., 2019). Third, intelligent service robots can collect hotel accommodation data to assist companies in customer demand analysis and bring a more personalised technological hotel experience to customers (Koo et al., 2021; Wu, Wang, & Su, 2021). In addition, introducing intelligent robots into the hospitality industry can attract a large number of potential customers for hotel companies, exploiting the curiosity of potential customers and helping them to explore new markets (Reis et al., 2020; Wu, Wang, & Su, 2021). The Mercure Hotel in Chunxi Road, Chengdu, saw a significant increase in the hotel's OTA rating after the introduction of the Cloud Tracks hotel service robot, and hotel customers all felt very novel about the robot providing service as a model, especially children who are very fond of and accept the robot, often following it from downstairs to upstairs for the experience, and young people also very much enjoy taking photos and talking with the hotel robot.

The subject of this study is "All Seasons Hotel", which is a mid-range hotel brand under the Huazhu Group. It has covered 31 provincial-level administrative regions in China, and as of June 2022, has spread across 31 provincial-level administrative regions, 200+ cities and 1,500+ shops across China. Under the leadership of founder Ji Qi, Huazhu Group is the largest hotel management company in the world. In 2010, Huazhu was successfully listed on NASDAQ in the United States; in September 2020, Huazhu achieved a secondary listing on the main board of the Hong Kong Stock Exchange. At present, All Seasons has achieved a priority layout in north, Shanghai, Shenzhen and other tier cities, and accumulated extensive market acclaim. The strategy of continuous downward penetration will enhance the brand tension of All Seasons, further convey the oriental and moderate humanistic sentiment, and evoke a deeper oriental self-confidence in the nation. Shen Yijun, CEO of the All Seasons brand, has high hopes for the future of the brand, saying, "The product continues to improve we have to keep working in the direction of consistency in quality, consistency in service, consistency in experience, stronger system capability and more intimate service for family and friends. According to the plan, the total number of Golden Season All Around shops will reach

3,000 in the next 3-5 years, and steady and continued downward movement will be the key development direction in the next phase." The highest version of 4.0 fully intelligent Xiao Ai students introduced to "All Seasons hotel" in 2021, the robot is half a person tall and has a variety of functions, including in-building disinfection, contactless shopping, hygiene promotion, cleaning assistant, delivery of takeaway and delivery items, hotel delivery service and guidance service.

During the epidemic, hotels are relying on artificially intelligent robots to provide contactless services. Huazhu Group has asked its 5,700 hotels to implement intelligent "no-touch services" to reduce the gathering of people and reduce the risk of cross-contamination; if customers need to pick up takeaways or borrow items, the hotels will provide robot delivery services. A general manager of an "All Seasons hotel" in Jinan is very positive about the robots: "If we go by 120 rooms, 50% of them need to order food/deliver things, and it takes five or six minutes to deliver a single order, that means we have to deliver it non-stop for five hours, with robots, people can be freed up, and it can really top one and a half people!" The owners all have a calculation in mind: labour costs are the bulk of hotel costs, and people are becoming more and more expensive and "delicate". Along with the market advancement, the cost of artificial intelligence robot will gradually decline, and in the long run more affordable than the cost of labor. It is foreseeable that the future "machine for people" will become an important option for many hotels to reduce costs and increase efficiency.

1.2 Research Questions

Based on the current problems in theory and practice, this study poses the following research questions.

(1)What is the relationship between service convenience and intention to use AI robot services in hotels?

(2)What is the relationship between consumer innovativeness and intention to use AI robot services in hotels?

(3)What role does trust play in the impact of service convenience on intention to use?

(4)What role does trust play in the impact of consumer innovativeness on intention to use?

1.3 Research Objectives

Based on the research questions posed in this study, the research objectives of this study are as follows.

(1) To investigate the relationship between service convenience and intention to use AI robot services in hotels?

(2) To investigate the relationship between consumer innovativeness and intention to use AI robot services in hotels?

(3) To investigate the mediating role of trust in the impact of service convenience on intention to use?

To investigate the mediating role of trustin the impact of consumer innovativeness on intention to use?

1.4 Research Hypothesis

Hypothesis	Directions	Results
H1: Service Convenience has a positive effect on trust.	+	Supported
H2: Service Convenience has a positive effect on intention to use.	+	Supported
H3: Consumer Innovativeness has a positive effect on trust.	+	Supported
H4: Consumer Innovativeness has a positive effect on intention to use.	+	Not Supported
H5: Trust has a positive effect on intention to use.	+	Supported
H6: Trust has a mediation effect between the effect of service convenience on intention to use.	+	Partial Mediation
H7: Trust has a mediation effect between the effect of consumer Innovativeness on intention to use.	+	Full Mediation

LITERATUREREVIEW

2.1 Hotel Artificial Intelligence Robot

A hotel AI robot is a highly integrated AI product. Hotel robots are able to interact with humans due to improvements in image recognition and processing technology, as well as increased natural language processing capabilities. The robot's ability to express different emotions and understand human emotions is a fundamental element in facilitating communication and interaction and is an important measure of the quality of the robot's service (Hwang, Park & Hwang, 2013). At present, domestic robot R&D companies, represented by Cloud Trace Technology, have developed various types of hotel service robots that can adapt to hotel service scenarios such as welcome, luggage handling, front desk operations, room service, restaurant service and hotel security. The Kiwi Hotel in Japan shows that it is possible for a robot to complete a complete hotel service process. Subsequently, some scholars have used the Kiwi Hotel as a study to explore how robots operate in hotels and how they can replace the labour of human employees, finding a careful division of labour between robots and human employees based on job tasks rather than positions (Osawa et al., 2017). The robots are able to perform efficiently and excellently in standardised, programmed tasks, with part-time employees doing all the work that the robots cannot do. However, in order to cope with the complexity of the situation, the hotel staff have to take on more work than the average hotel employee.

As we all know, hotel robots have emerged to enhance the hotel guest experience and provide better and more comfortable services to residents. With this in mind, we can then look at what hotel robots are available and what functions they have. At present, there are four main types of hotel robots: one is in the hotel lobby; the other is in the hotel restaurant; the third is between the hotel and the guest room; and the fourth is within the hotel room. According to the different service scenarios, there are different robots. In the hotel lobby, there are hotel welcome robots; in the hotel restaurant, there are hotel food delivery robots; between the hotel

and the guest room, there are hotel delivery robots and hotel robot waiter systems; within the hotel room, there are Tmall Genie and Apple Siri, etc. In this regard, CloudTrace has the most experience in hotel greeting robots, hotel meal delivery robots and hotel delivery robots, and has served more than 600 hotels. In this aspect of robots within hotel rooms, many hotels prefer to introduce Apple's Siri and Tmall Genie in this article to study.

This research takes "All Seasons Hotel" as the subject, a subsidiary of China's Huazhu Group. Shen Yijun, All Seasons'CEO of All Seasons brand, said that"The core of a hotel is the accommodation product, and it is vital to provide guests with a comfortable accommodation experience. Based on consumer upgrades and changes in the experience and aesthetics of guests, All Seasons achieves product iterations every three years on average, constantly optimising product quality and service experience." After four generations of product iterations and updates, "All Seasons hotel" have now developed their own unique brand style in terms of aesthetic design, service concept and infrastructure. The new version of All Seasons pays more attention to the overall design balance, and every inch of space is extremely well thought out, striving to eliminate redundancy and get it just right. Soft light, warm colours, artificial intelligence and personalised service complement each other, and every detail is an invisible interpretation of All Seasons' oriental "moderation" wisdom. In terms of intelligent services, the self-service and robot "Xiao Ji" provide guests with an efficient and convenient check-in experience. The robotic services at "All Seasons Hotel" are shown in Table 2.1 below.

Table 2.1 The robotic services at All Seasons

	Service	Types	Specific content
The robotic services at All Seasons	Customer Service	Welcome robots, check-in kiosks, food delivery robots, etc.	Guest Service: Hotel AI robots that serve guests directly, including in the front office, F&B and other departments.
	Room Experience	Intelligent assistant robots, cleaning robots, etc.	Room Experience: Enhancing the guest experience in your room through intelligent hotel technology
	Security protection	Security robots etc.	Security protection: Improve guest security and privacy during check-in with smart technology, such as face recognition access control

2.2 Main Theory

2.2.1 Rational Choice Theory

Rational choice theory refers to rationality, that is, instrumental rationality that explains the connection between an individual's purposeful actions and the outcomes they are likely to achieve (Li, 2001). Rational choice theory is based on the following premises: firstly, individuals are seekers of their own best interests. Secondly, there are different behavioural strategies available in a given situation. Third, people rationally believe that different choices will lead to different outcomes. Fourth, people subjectively rank different preferences for the outcomes of different choices. Rational choice can be summarised as optimisation or utility maximisation, i.e. rational actors tend to adopt optimal strategies to achieve maximum benefit at minimum cost.

It is generally accepted that the basic theoretical assumptions of the rational choice paradigm include: (i) individuals are seekers of their own best interests; (ii) there are different behavioural strategies to choose from in a given situation; (iii) people rationally believe that different choices will lead to different outcomes; and (iv) people subjectively have different preference arrangements for the outcomes of different choices. It can be simply summarised as rational human goal optimisation or utility maximisation, i.e. rational actors tend to adopt optimal strategies to achieve maximum benefit at minimum cost.

The rational choice theory of economics holds that individuals make behavioural choices that seek to maximise their expected benefits under specific constraints, a view also known as the rational man assumption. The rational man assumption is a fundamental assumption in economics.

It is a fundamental assumption in economics and is an important building block in the construction of the theoretical edifice of economics. According to rational choice theory, this study is based on a questionnaire survey to obtain data from consumers of "All Seasons Hotel" in Shenzhen, so the consumers we are studying are also rational people. and convenience, and whether they are willing to continue experiencing hotel robot services. Therefore, their choice behaviour also follows the principle of maximising expected benefits.

2.2.2 Cognitive dissonance theory

The basic idea of cognitive dissonance theory is that when an individual is faced with a new situation and has to express his or her attitude, he or she will be psychologically in conflict with the new cognition (new understanding) and the old cognition (old beliefs) (Harmon-Jones, & Harmon-Jones, 2012.; Cooper, 2012).

Cognitive dissonance theory emphasises the uncomfortable, unpleasant feelings that arise when the cognitive components of a person's attitudes and behaviours, for example, contradict each other, and when one cognition is inferred from another opposing cognition. Cognitive dissonance theory states that, in general, an individual's attitudes and behaviours are compatible, so there is no need to change attitudes and behaviours. If there is a discrepancy between the two, such as doing something that is contrary to the attitude or not doing what you want to do, then cognitive dissonance occurs. Cognitive dissonance creates a psychological tension, which the individual tries to release in order to regain equilibrium. In order to properly understand the meaning of dissonance theory, we must pay attention to two points: firstly, the concept of 'cognition'. In Festinger's original meaning, cognition is defined to a large extent as the 'elements' of a cognitive structure, an element being a cognition. They are everything that

a person is aware of. They can be one's awareness of one's own behaviour, one's own mental state, one's personality traits, or one's awareness of something external and objective. In short, it can be a fact, a belief, an opinion or everything else. If a fact, despite its existence, is not known to the individual, it cannot be a person's cognition. Any two perceptions are either consistent, inconsistent, or irrelevant. Only if they are both relevant and inconsistent can they lead to dissonance. The second point to note is the precise meaning of "can be derived from the preceding". In an individual's cognitive structure, the consistency or inconsistency between elements is determined solely by the individual's mental meaning. In other words, the consistency of cognition is not determined by objective logic, but by the psychological logic of the individual. In the case of an individual, two cognitions are inconsistent if one cognition can be introduced by another opposing cognition. In fact, the two cognitions are not necessarily logically inconsistent; it is only because the individual experiences the difference between the two cognitions according to his or her own psychological logic that the dissonance arises. The theory is by its nature the main theory for explaining intrinsic motivation in individuals and is therefore widely used as an important basis for explaining changes in individual attitudes, and the cognitive dissonance theory is a new perspective in motivational psychology (Brehm & Cohen, 1962; Harmon-Jones & Harmon-Jones, 2007; Hinojosa, Gardner, Walker, Cogliser, & Gullifor, 2017).

One of the variables studied in this paper is consumer innovativeness, which refers to the degree of acceptance of an innovation by consumers who, as individuals, experience a certain amount of tension and discomfort with new things and old matters. This process is closely linked to consumer innovativeness, so an in-depth study based on cognitive dissonance theory is needed to analyse consumer innovativeness and their willingness to use AI robot services in hotels.

2.3 Consumer Innovativeness

Consumer innovativeness in this study refers to the level of consumer acceptance of an innovation and reflects the extent to which consumers accept the use of AI robots in hotels for service delivery (Midgley & Dowling, 1993).

Consumer innovativeness is the extent to which consumers accept innovations in the marketplace earlier than others, and the existing literature divides consumer innovativeness into three categories: intrinsic innovation, domain-specific innovation and actual innovation. Intrinsic innovativeness considers innovation as an intrinsic characteristic of an individual, a propensity to innovate and a cognitive style that reflects an individual's tendency to buy new and different products and brands, also known as personality innovation; domain-specific innovativeness refers to innovation involving a specific domain or product category, reflecting learning and acceptance of innovation (e.g. new products) in a specific area of interest; actual innovativeness refers to an individual's earlier adoption of innovative Actual innovation refers to the extent to which individuals are early adopters of innovative products, both in terms of information seeking and actual purchasing behaviour for new products, with actual innovation characterised by thrill-seeking, novelty-seeking and diversity-seeking (Bartels & Reinders, 2011; Grewal, Mehta, & Kardes, 2000; Sun, Youn, Wu, & Kuntaraporn, 2006) .

Consumer domain-specific innovation has been found to be strongly associated with product involvement, product knowledge and opinion leadership in specific domains.

Consumers with higher levels of innovation are expected to be more engaged with the service and product perceptions and are more receptive to the services of AI robots, so in this particular domain 'information stickiness' refers specifically to the relationship between the services of hotels using AI robots and consumers.

2.4 Service Convenience

Consumers' interest in saving time and effort has received academic attention since 1923 when Copeland listed 'convenience' products in his classification of consumer products. Previous studies on convenience have favoured time-saving strategies (Slrober & Weinberg, 1980; Nickols & Fox, 1983), stating that the time factor determines the degree of convenience, and that convenience is seen as a single construct with time as the main factor, and that the more time a product/service can save consumers, the higher the degree of The more time a product/service saves the consumer, the higher the level of convenience. However, some scholars have pointed out (Webser, 1987; Hornik, 1984; Jean, Cohen, 1995; Berry, 2002) that time is not the only construct that determines convenience, and that convenience should include multiple constructs. Webster (1987) states that convenience is any method, good or service that increases one's comfort or simplifies one's work; Jean and Cohen (1995) suggest that convenience includes time, effort and psychological cost factors, with the time factor being the time saved in the consumption process or allowing consumers to use the product or service at a convenient time; Berry (2002) argues that any service that helps to reduce the time, effort and psychological cost of shopping will help to increase the convenience of the service.

The design of a hotel's service system often has an impact on the amount of effort and time consumers spend on using the service. In addition to reducing the operational costs of the hotel, the expectations, perceived fairness and psychological costs of the service cannot be ignored (Carmon. 1995). The level of resource investment can be controlled by the hotel's own service system, determining how much manpower and capital to invest, and the use of AI robots in hotels can significantly improve the efficiency of service. On the one hand, robots have an unparalleled advantage over human employees for repetitive, procedural tasks, producing greater output in the same amount of time. In addition, by sharing the workload of other staff, the robots help to free up manpower so that that part of the workforce can focus on other tasks and improve the quality of service.

2.5 Trust

Trust is an important variable that is considered to be a strategic component of marketing research. It can be defined as a belief or expectation that a website will perform certain actions to meet the needs or expectations of its customers (Flavián, Guinalíu, & Torres, 2005).

For hotels, if they are satisfied with their services, consumers will develop trust and spend again or spread the word, expanding the hotel's visibility and creating a good image for the hotel. However, it is important to distinguish here between consumer satisfaction and consumer trust. Consumer satisfaction is a positive evaluation of a particular service, for example, if a consumer experiences an AI robot for the first time and is satisfied with the efficiency of the robot's service, but once there is a problem with the robot, then that consumer is not satisfied. In other words, it is a perceptual evaluation indicator. Consumer trust, on the other hand, is the consumer's sense of trust in the hotel itself, including its products and services, that they can

rationally face the successes and disadvantages of the hotel. A survey by Bain & Company in the USA showed that 65-85% of consumers who claimed to be satisfied or even very satisfied with the product and the company would switch to another product and only 30%-40% would buy the same product or the same model of the same product again.

2.6 Intention to Use

In recent years, with the rapid development of technology and digitalisation, AI robots have been used in the hotel industry to improve the efficiency of business operations.

Firstly, in terms of the types of applications for hotel AI robots, depending on the nature of the work, hotel AI robots have been designed in various types to meet the needs of consumers. Secondly, in terms of the job design of hotel service robots, due to the specific nature of the hospitality industry, service robots are mainly used to check in customers, clean floors, deliver things to customers, provide concierge services and other common cleaning tasks, etc. However, academic research on hotel service robots is currently novel and scarce, and is mainly prospective, descriptive, or speculative, explaining characteristics of hospitality robots and their advantages and disadvantages in their applications.

The term "artificial intelligence" refers to a program, algorithm, system or machine that exhibits intelligence. In line with previous research, this paper adopts a more general and broad definition of AI, i.e. tools that can enhance the intelligence of products and services can be referred to as "AI", such as "intelligent services", "algorithms", "big data", and "big data". algorithms", "big data technologies", "robotics" and a range of other specific technologies and applications that have "artificial intelligence" as a core feature. As AI is used in a wide range of everyday scenarios, researchers are beginning to focus on the implications and consequences of these applications. The hotel robotics industry is experiencing rapid growth due to policy support, technological developments and advances, and the increased demand for contactless services in the event of an epidemic.

A suitable theoretical framework is provided by the technology acceptance model in the early stages of the AI robot use willingness study. Lee et al. (2018) Based on the Technology Acceptance Model (TAM) study of restaurant robots, the results show that attitudes directly influence service robot acceptance, while perceived usefulness and perceived positivity act on attitudes, which in turn influence service robot acceptance.

Park and Del Pobil (2012) incorporated two features, perceived system quality and perceived pleasure, into a traditional technology acceptance model to examine users' intention to use a service robot. The results show that users' perceptions of service robot system quality indirectly influence users' intentions and attitudes towards using the service robot through the two core key perceptions of perceived ease of use and perceived usefulness. In comparison, the effect of perceived enjoyment through the same path was less than the effect of perceived system quality. zhong et al (2020) proposed an integrated model based on the theory of planned behaviour, technology acceptance model and perceived value theory to study the intention to use service robots in the hospitality industry, and empirically tested that whether customers use the robots was mainly based on the beneficial services that the robots could provide to customers in the hotel. This is followed by the entertainment and leisure functions of the robot.

Wirtz et al. (2018) propose a service robot acceptance model based on a technology acceptance model and role theory, which suggests that in service encounters, consumers typically value a pleasurable relationship with service employees, sometimes described as rapport, interaction and trust, which provides emotional and social value. Go, Kang and Suh(2020) show that advanced robots equipped with machine learning programs have already entered the hospitality industry, and due to the new features of the advanced robots and the strong interaction between the robots and consumers, relying solely on technology acceptance models propose an interactive technology acceptance model, as it is not sufficient to predict consumer acceptance of service robots due to the new features of advanced robots and the strong interaction between robots and consumers.

2.7 Hypothese propose

Berry's research suggests that customers are more likely to be psychologically satisfied if theycan easily access the convenience of a product or service. This can lead to repeat visits (Berry, 2001). It is well known that during an epidemic, AI robots in the hospitality industry provide a wide range of efficient and convenient services, including welcoming, temperature taking, cleaning and security. This leads us to the following hypothesis:

H1: Service Convenience has a positive effect on trust.

H2: Service Convenience has a positive effect on intention to use.

Stock and Merkle (2018) used an experimental approach to compare human-machine interaction with human-human interaction in innovative service scenarios and found that subjects responded positively to human-machine interaction and that the innovative services of humanoid robots helped to surprise customers and enhance the satisfaction and pleasure of the experience due to the expectation uncertainty mechanism, so in the process of human-machine interaction, the services of artificially intelligent robots are new to customers and have the potential to trigger their desire for exploration.This leads us to the following hypothesis:

H3: consumer innovativeness has a positive impact on trust.

H4: Consumer Innovativeness has a positive effect on intention to use.

Research has shown that the level of consumer trust in a product brand can have an impact on consumer loyalty intention to use, i.e., when consumers have trust in a product or company, the level of danger perceived by consumers in the process of purchasing the product or service will be reduced, which will increase the status of the company or product in the minds of consumers, thus increasing consumer loyalty to the company. The "All Seasons Hotel" studied in this paper, as a well-established hotel with a certain level of loyal consumers, can be trusted to a certain extent by adding the services of artificial intelligence robots. Lin (2010) suggests that customer satisfaction increases the cost of customers' willingness to switch use, increases customers' willingness to use again, and increases customers' willingness to use, while research suggests that the level of customer trust in a particular firm can effectively increase customer trust and satisfaction with a particular firm's products or services, as well as increase customer loyalty to product and service quality, resulting in a positive evaluation of that firm (Everard & Galletta, 2006). Innovative consumers make innovative decisions by actively acquiring a large amount of product knowledge, which involves a low perceived risk in the process. According to avoidance theory, innovative consumers are less sensitive to threats in their environment and therefore innovative consumers generally perceive less risk in purchasing new

products (Steenkamp & Baumgartner, 1992). According that, we propose the following research:

H5: Trust has a positive effect on intention to use.

H6: Trust has a mediation effect between the effect of service convenience on intention to use.

H7: Trust has a mediation effect between the effect of consumer Innovativeness on intention to use.

2.8 Research Framework

In the face of hotel AI robot service, since the interaction occurs between the consumer and the AI robot, the main subjects of interaction are the consumer as well as the AI robot. Then, the characteristics of consumers themselves and the characteristics of AI robot services, these two aspects will jointly influence the behavior of consumers. Further, based on the Rational choice theory, for consumers, different choices produce different benefits, and the principle of consumers is to maximize benefits(Coleman, Coleman, & Farraro, 1992).So they have different preference rankings for the results of different choices. Therefore, facing different service options provided by hotels, consumers have different perceptions of service convenience due to their different innovativeness, which leads to different levels of trust that AI robot services can meet their own needs of maximizing benefits, and then affects consumers' intention to use AI robot services (Stock & Merkle, 2018). In addition, if consumers have high social anxiety themselves, then such consumers will minimize their interactions with others and have a stronger preference for AI robot service options. Based on this, this study proposes the following conceptual framework. The independent variables are service convenience and consumer innovativeness, the mediating variable is trust, the dependent variable is usage intention, and the moderating variable is social anxiety.
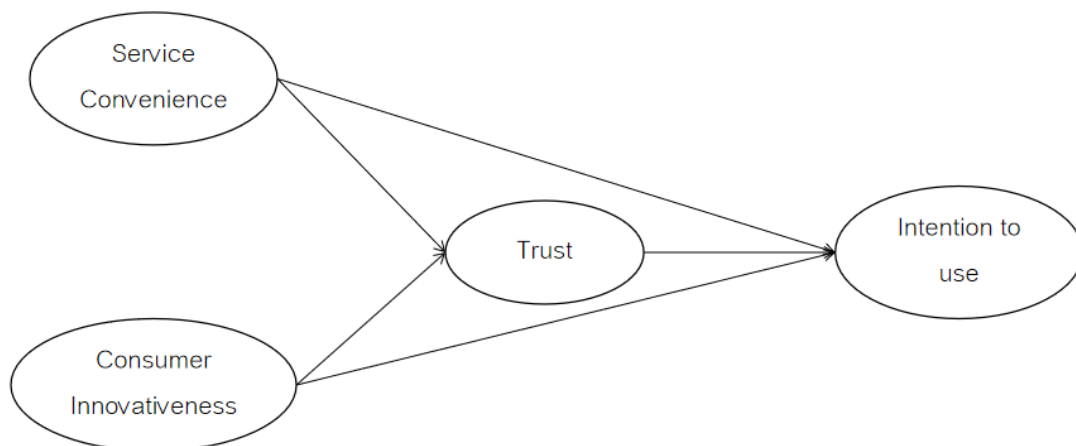

Figure 2.1 Conceptual Framework

METHODOLOGY

3.1 Research Design

This study adopts a quantitative research method. The first part of the questionnaire consisted of seven questions on the respondents' basic personal information, including gender, age and monthly disposable income, and the second part consisted of 17 questions on the study variables. The questionnaires were distributed using both paper and electronic questionnaires as tools for data collection. After data collection was completed, the collected data were analysed using SPSS 26.0 and Smart PLS 23.0 for the valid questionnaires collected.

3.2 Operational Definitions of variables

The four variables studied in this study, consumer innovativeness, service convenience, trust and intention to use, are operationally defined in the context of previous research and this study as follows:

Table 3.1 The Operational Definitions of variable

Variable	Operational Definitions	Sources
Consumer innovativeness	The level of consumer acceptance of an innovation and reflects the extent to which consumers accept the use of AI robots in hotels for service.	Midgley & Dowling (1993)
Service Convenience	The extent of the time, psychological cost, effort, etc. spent in using the hotel AI robot service.	Jean and Cohen (1995)
Trust	a belief or expectation that a AI robort technogies will perform certain actions to meet the needs or expectations of its customers	Flavián, Guinalíu, & Torres (2005)
Intention to use	The intention to re-use and recommend to others the use of AI bot services in hotels.	Go, Kang and Suh (2020)

3.3 Measurements of variables

Existing established scales for the corresponding variables were used as the measurement instruments for this study, with some questions modified for the context of this study to improve applicability. A five-point Likert scale was used for all questions in this study, with "1" indicating strong disagreement and "5" indicating strong agreement.

Convenience of service: To measure the convenience of service, the typical items from Shelvia, Prayitno, Kartono, & Sundjaja (2020) were used and adapted to the actual context of using the hotel service robots to measure the extent to which consumers perceive the experience of the hotel AI robots as satisfying their service needs and thus improving service convenience. The specific measurement questions for service convenience are shown in Table 3.2.

Table 3.2 Scale of Service Convenience

Variable	Measurement Scale Items	Sources
Service Convenience	SC1: Interaction with AI robot services in hotel is clear and understandable.	Shelvia, Prayitno, Kartono, & Sundjaja（2020）
	SC2: Interaction with AI robot services in hotel does not require mental effort.	
	SC3: I think it is easy to use AI robot services in hotel to do what I want to do.	
	SC4: In general, AI robot services in hotel is easy to use.	
	SC5: The using of AI robot services in hotel is convenient.	
	SC6: The using of AI robot services in hotel is hassle-free.	
	SC7: Compared to traditional manual service, I believe that AI robot services in hotel are more convenient.	

Consumer innovation: In order to measure consumer innovation, this study refers to the typical measurement questions of Jeon, Sung, & Kim (2020) and modifies them according to the actual usage context of the hotel service robot, mainly to measure the degree to which consumers are able to satisfy their innovativeness in experiencing the service situation of the hotel AI robot. The specific measurement questions for consumer innovation are shown in Table 3.3.

Table 3.3 Scale of Consumer innovativeness

Variable	Measurement Scale Items	Sources
Consumer innovativeness	CI1: When a new product or service is released, I am one of the first to use it.	Jeon, Sung, & Kim（2020）
	CI2: In general, I like to try out new products and services when they are available.	
	CI3: If I get news of new technology, I will fnd a way to try it out.	
	CI4: I am willing to give up existing product or service technologies to accommodate new innovative product or service technologies.	

Trust: This study used trust as a mediating variable. To measure consumers' perceived trust, this study referred to Liu's (2012) measurement scale and modified it to fit the actual context of using the hotel service robot, mainly to measure consumers' trust in experiencing the hotel AI robot service. The specific measurement questions of consumer trust are shown in Table 3.4.

Table 3.4 Scale of Trust

Variable	Measurement Scale Items	Sources
Trust	T1: I can rely on self-service technology to finish service I need reliably.	Liu (2012)
	T2: Given the state of existing self-service technology, I believe that technology-related errors are quite rare.	
	T3: In my opinion, self-service technology in hotel is very reliable.	

Intention to use: This study used consumer willingness to use as the dependent variable. In order to measure consumers' willingness to continue to use, this study referred to Guan, Xie, Shen, & Huan's (2012) measurement questions and modified them to fit the actual context of hotel service robot use, mainly measuring consumer behaviour after the hotel AI robot had provided its services. The specific measurement questions for consumer intention to use are shown in Table 3.5.

Table 3.5 Scale of Intention to Use

Variable	Measurement Scale Items	Sources
Intention to Use	IN1: I will use AI robot services in hotel again.	Guan, X., Xie, L., Shen, W. G., & Huan, T. C. (2021)
	IN2: I will still choose to AI robot services in hotel in the future.	
	IN3: I will recommend my friends to use AI robot services in hotel.	

3.4 Population and Sampling method

As this study focuses on consumers' intention to use AI robot services in hotels, the overall population for this study is consumers who have had experience with AI robot services in hotels. As this group is so broad, this study requires sampling and statistical analysis of the sample to reflect the overall population.

According to Taherdoost's (2017) data sampling method (Table 3.6), the overall and sample size with an overall variance of 50% and a confidence level of 95% are shown in the table below, where the sample size does not refer to the number of distributions, but rather the number of valid samples recovered. According to "All Seasons Hotel", more than 25,000 people experience a hotel stay through AI every day in "All Seasons Hotel", so there are more than 1 million customers who have used AI services in "All Seasons Hotel". According to Taherdoost (2017) for the calculation of the sample size, a valid sample size of 378 is required at a 95% confidence level for an overall number of more than 1 million.

Table 3.6 The Sampling Size Criterion by Taherdoost (2017)

Population size	Sample size	Population size	Sample size
50	44	1000	278
75	63	1500	306
100	79	2000	322
150	108	3000	341
200	132	5000	357
250	151	10000	370
300	168	25000	378
400	196	50000	381
500	217	100000	383
600	234	250000	384
700	248	500000	384
800	260	1000000	384

3.5 Data Collection Process

In this paper, a questionnaire survey was conducted to obtain data from consumers of "All Seasons hotel" in Shenzhen, Four" All Seasons hotels" in Shenzhen were located in Nanshan District, Futian District, Bao'an District and Longhua District, and one All Seasons hotel equipped with AI service was selected in each administrative district. The study employed relevant hotel service staff to administer questionnaires targeting customers who had spent money at the hotels and experienced the AI robot service. A total of 100-120 questionnaires were collected from each "All Seasons hotel". The distribution period was from 2 August 2022 to 7 August 2022, a total of seven days. The questionnaires consisted of both paper and electronic questionnaires. Upon check-out, customers were first asked if they had used the AI service during their stay, and if so, they were invited to fill in the questionnaire, and could choose to use either the paper questionnaire or scan the QR code to fill in the electronic questionnaire. The questionnaire includes the demographic variables of the respondents and the study scale, which contains question items measuring the four variables in the model.

3.6 Data Analysis Technique

A complete system of research data collection, integration and analysis is now in place in academia. In this paper, we refer to other studies and follow the following procedures for data processing.

(1) Descriptive statistical analysis. In this study, basic information of the sample was counted, including demographic variables such as gender and educational background. In addition to this, this study also conducted descriptive statistical analyses on four research variables, and the statistical results of these data can provide a preliminary picture of the distribution of the research sample.

(2) T-test and analysis of variance (ANOVA) were used to test the significance of the factors and to determine whether each factor had a significant effect on the test results. This was used to determine whether there were any demographic variables other than the independent variables that would interfere with the dependent variable and could be excluded

in further analysis.

(3) Reliability and validity analyses. This paper uses Cornbach's alpha coefficient to test the reliability of the scale to determine the stability of the data and to measure each dimension of each study variable. This paper uses factor analysis to verify the validity of the data to ensure the accuracy of subsequent data processing.

 (4) Structural equation modeling. For the structural equation model's explanatory power, predictive power is assessed to understand how well the conceptual model of this study is established.

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