

Evaluation of Service Quality on Natural Language Processing Service: A Case on Train Station AI Service

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ABSTRACT

The application of artificial intelligence in customer service is the most concerning topic recently, and the human-machine cooperation between human customer service and AI customer service to complete customer service is an important management and the current research topic. This paper takes the application of smart customer service in railway stations as an analysis case and discusses the structural relationship among AI service quality, service value, satisfaction, and behavioral intention through structural equation model analysis technology. Our research model indicates that the service value is the important factor affecting the behavior intention of using AI customer service in a train station. Furthermore, the results of the IPA analysis show that empathy and ease of use are important variables for the quality of AI customer service. The research results of this paper will help to clarify the relevant management issues that may arise from the application of artificial intelligence in the service of science.

Keywords: AI Service Quality; Structural Equation Modeling; Train Station.

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1. INTRODUCTION

Many countries regard AI technology as an important foundation of national strength in the next stage and formulate relevant norms for AI development. For example, the United States launched the “American Artificial Intelligence Program” in 2019 to ensure the continued leadership of the United States in this field. The British government announced the “Modern Industrial Strategy” and increased R&D funds by 4.7 billion pounds for 5G and artificial intelligence, and formulating relevant norms for artificial intelligence, the plan also focuses on the ethical issues raised; China build the “New Generation Artificial Intelligence Development Plan” in 2017, which raised the development of artificial intelligence into a national strategy, and proposed the goal of becoming the world’s major artificial intelligence innovation center by 2030. The above-mentioned applications of AI

in the industry or the government's policies on AI illustrate the potential and importance of AI in future development.

In the past, the popularization of mobile commerce and the advancement of information technology have brought significant changes to the way of life of human beings, and artificial intelligence technology, which has begun to be valued in recent years, will inevitably lead to another wave of brand-new lifestyles, transaction concepts, and consumption habits. At the same time, it also provides a new type of business model that enterprises need under a brand-new business operation structure. Artificial intelligence will be the technology that will have the most profound impact on human life in the next 20 years, and the United States, China, and Japan are all leading countries in the development of AI-related application services. These AI applications include services such as robots, AI customer service, autonomous driving, and omni-channel retailing. The application of Smart Speaker or Artificial Intelligence Customer Service based on natural language technology will be an important platform that cannot be ignored.

The most likely application scenarios of AI in 2030 include applications in the field of smart cars, home service robots, AI-assisted medical applications, and smart education applications. In the past, the popularization of mobile commerce and the advancement of information technology have brought significant changes to the way of life of human beings. The rise of the Internet has brought the rise of big data, and cloud computing and big data have brought about the success of artificial intelligence. The development of artificial intelligence has gone from speech recognition to natural language processing to intelligent voice assistants, from graphic recognition to machine vision to unmanned smart supermarkets. AI technology has achieved quite successful progress in various fields. When the application of AI penetrates into our lives, artificial intelligence technology will drive another wave of new life forms, transaction concepts, and consumption habits, and also provide new customer service methods required by enterprises under a new technical operation framework, such as inquiring about ticket ordering, how to get to tourist attractions, etc.

Business activities around the world are facing the impact of new technological changes on related industries. Artificial intelligence will be the technology that will most profoundly affect human life in the next 20 years. These AI applications include robots, AI customer service, autonomous driving, omni-channel retail, and other services. The development of artificial intelligence is bound to bring considerable changes to the existing service fields (such as tourism, transportation, hotel industry, etc.). Since the tourism industry is an important internal driving force to support the development of a country's soft power, it is necessary to think about how to use intelligent customer service. AI equipment such as smart speakers to assist the service field to carry out multi-integrated human-machine collaborative services, which will help to think about the various possible development prospects of the service industry field in the future.

Smart speakers or chatbot are software that carries out conversations through auditory or textual methods and are programmed to simulate human conversational behavior. Although they still cannot pass the Turing test, chatbot have been used in conversational systems for various practical purposes, including customer service and information acquisition. The chatbot scans the input text for keywords and retrieves the most matching keywords or most similar phrases from the database to respond to the user. On

the other hand, Covid-19 in 2020 will have a huge impact on the tourism industry all over the world, and many customer services are also being carried out in a long-distance way.

According to the above description, we can know that smart customer service will play an important role in the future tourism consulting industry. This study aims to use SEM to understand the relationship between AI service quality, service value, satisfaction, and behavior intention. It is important to understand the crucial factors such as AI services quality, it will help us to clarify which factors are important to influence factors when constructing AI application services.

2. LITERATURE REVIEW

Behavior Intention is the most common factor in studying consumer behavior. Whether a person wants to do something will be affected by external or personal internal factors. Many scholars believe that consumers' attitude toward a product or service comes from personal past experience, and consumers' attitude towards this product or service will affect their purchase intention (Oliva et al., 1992). In addition, customers' perception of service quality will affect their evaluation of overall service satisfaction, and customer service satisfaction will affect customers' behavioral intentions (Timothy et al., 2018).

Undoubtedly, human behavior is influenced by many factors, identifying the connotation of behavioral intentions will help us construct models that affect behavioral intentions. Engel, Blackwell, and Miniard pointed out that behavioral intention refers to "the consumer's propensity to take a specific activity or behavior toward a product or enterprise after consumption". This behavioral intention is often included in the theoretical discussion of attitudes in psychology and consumer behavioral models. Attitude is mainly composed of three elements: cognitive component, affective component, and conative component. In attitude theory, cognitive elements and affective elements are regarded as the determinants of attitude, that is, an individual's overall evaluation of the object of an attitude is determined by the belief and feeling of the object the individual. It is not the intentional element that is regarded as the determinant of attitude, but the attitude, that is, the individual's behavioral intention is determined by the attitude (Engel et al., 1995).

Although there are many general models describing the use of new technologies in the literature, there are still scholars who believe that it is necessary to provide more improved models for the functions of emerging technologies. Nasirian describes those factors that will affect consumers' choice of products or services with AI technology. Using a voice assistant system as an example, the research results confirm that the quality of interaction can significantly affect an individual's trust and lead to the adoption of the technology (Nasirian et al., 2017). In recent years, the application of AI in the hotel industry has also attracted attention, such as the Henn-na Hotel in Japan is a famous case. Some scholars show that the development trend of AI applications in service science is limitless (Huang et al., 2022).

Reference (Sorell and Draper, 2014) shows the use of anthropomorphic artificial intelligence devices can be used to assist nursing staff in nursing homes, by recording and observing the daily life of patients, reminding the elderly to take medicine regularly, or helping them to complete rehabilitation exercises that they cannot do alone. Reference (Kambhampati, 2019) shows argues that with the rapid introduction of AI technology into

our lives, people begin to need to work collaboratively with AI systems, which requires AI systems to exhibit human-interpretable behaviors. During the COVID-19 outbreak, many hospitals began to use smart robots to disinfect hospital environments, and deliver medicines or food to patients to reduce human-to-human contact (Vinas, 2021).

There is also a lot of discussion on the application of artificial intelligence in the field of education. Artificial intelligence devices can be used as assistants for teachers, teaching academic knowledge and monitoring the learning process through interaction with students. With the outbreak of COVID-19, educational courses around the world have been forced to move from physical to online, and a large number of intelligent learning platforms have also been developed to deliver course content (Chih et al., 2010; Kizilcec et al., 2016).

Gursoy developed and empirically tested a theoretical model of AI device use acceptance, which the researchers hope can be used to explain customers' willingness to accept AI device use in service encounters. The model proposed includes three receptive generative phases (primary assessment, secondary assessment, and outcome phases) and six preconditions (social influence, hedonic motivation, personification, expected performance, expected workload, and emotion). The findings show that social influence and hedonic motivation are positively related to expected performance, while anthropomorphism is positively related to expected work. This study provides a conceptual AI device acceptance framework that other researchers can use to better study AI-related topics in the context of services (Gursoy et al., 2019).

On the other hand, although the application of artificial intelligence brings high efficiency, low labor cost, and novelty, the application of AI in the service industry still faces challenges. Zhang discusses the related topics of AI robotic hotels and robotic devices using a modified SERVQUAL model, which includes five dimensions of tangible, reliability, responsiveness, assurance, and empathy, and takes Beijing consumers as the research object. The results of the study found that education level, attitude, and income level had a significant impact on expectations in robot hotels, and the results of regression analysis showed that tangible and reactive expectations significantly and positively contributed to the increase in expectations of general users in robot hotels (Zhang and Qi, 2019).

Artificial intelligence and robotics will have a major impact on the traffic and restaurant industry in 2025 (Ivanov and Webster, 2019), and these technologies can more generally improve the efficiency and productivity of staff and handle repetitive tasks, speeding up overall operations. The process can even increase the interaction with the guests and improve the customer's satisfaction. In the restaurant industry, artificial intelligence can be assigned various tasks according to the needs of the restaurant, such as making reservations for customers, answering frequently asked questions about the restaurant, and providing menu and meal information (such as calorie counts, ingredients, allergens), ordering, Payment, collecting customers' dining experience, and through customer feedback can be used to improve service, develop personalized marketing advertising, and ultimately strengthen customer connections (Dale, 2016).

As for the research method this paper used, Structural equation modeling (SEM) is a statistical method used in social sciences and other fields to examine the relationships between multiple variables. It is a combination of factor analysis and regression analysis

that allows researchers to test a set of hypotheses about the relationships among multiple variables. SEM is a powerful tool for understanding complex relationships between variables and is widely used in fields such as psychology, sociology, marketing, and education. For example, Espita and Guhao (2022) used a descriptive-correlation technique based on SEM to determine the most suitable model for evaluating knowledge management performance in higher education institutions in Region VIII, Eastern Visayas. The sample size of the study consisted of 400 administrative staff members from higher education institutions within the region, from which also shows the indicators of the variables that influence most. Purnamasari et al. (2021) created a model using SEM to investigate the important relationship between promotion, trust in waqf institutions, waqf programs, and knowledge in Indonesia. It is acknowledged that the traditional concept of waqf is simpler than the new concept of cash waqf. The limited information about cash waqf results in a low rate of funds being managed by waqf institutions. The findings strongly indicate that enhancing trust between the community and waqf institutions could enhance fundraising for cash waqf. Considering this perspective and the experiences of other studies, utilizing SEM will facilitate the creation of a valuable model.

3. THE CURRENT DEVELOPMENT OF AI CUSTOMER SERVICE

The term Artificial Intelligence (AI) first appeared in the summer of 1956 at the Dartmouth Conference held at Dartmouth College in the eastern United States. Russell and Norvig defined AI in the book “Artificial Intelligence: A Modern Approach” as artificial intelligence is the study and design of intelligent agents, and intelligent agents refer to a person who can observe the surrounding environment and take action, and the system of actions can achieve goals. This definition covers the definitions of several practical subjects. It not only emphasizes that artificial intelligence can respond actively according to environmental perception but also emphasizes that the response made by artificial intelligence must achieve the goal. The laws of human thought are imitated. AI customer service is an important application of artificial intelligence technologies such as natural language processing and semantic analysis.

The term “ChatterBot” was originally coined by Michael Mauldin in 1994 to describe these dialog programs. Most chatbots today use virtual assistants (such as Google Assistant and Amazon Alexa) or other applications to introduce chatbots into business conversations, education, entertainment, finance, health, and productivity. Among them, conversational artificial intelligence can use natural language processing technology to interact with humans by voice and create a personalized customer experience. Many service industries are faced with the cost of human resources, and it is impossible for employees to solve problems for customers online 24 hours a day. The chatbot can achieve real 24-hour uninterrupted service. Therefore, introducing chatbot into the customer service field can greatly improve the utilization of human resources efficiency. AI chatbot has the ability to understand natural language. As long as enough training data is provided, it can classify the user’s dialogue, let the chatbot classify the user’s “intention”, and then do specific searches based on specific words, and give the correct answer.

Alibaba’s massive application of AI technology on Double 11 in 2017 can be regarded as the starting point for human beings to apply AI technology on a large scale. Ali’s AI customer service system can make guesses about user problems in advance, take the initiative to ask questions, and intelligently remind them. For example, when a user logs

in to the Alipay page “My Customer Service”, the AI customer service can prepare the corresponding questions in advance through data such as the user’s past behavioral trajectory, service needs, browsing pages, and other data before starting to ask questions. In addition, when the user encounters operational problems, the AI customer service system will first observe the customer, and then actively present the solution to the user in the form of a pop-up window according to the algorithm. Through the accumulated big data advantages, Alibaba’s DianXiaomi can analyze and predict consumers’ service demands in advance based on user behavior, and proactively reach users. Under the seamless technical design, when DianXiaomi encounters unanswerable questions It will be automatically transferred to manual labor, and consumers can also choose to transfer to manual labor when initiating consultation. For merchants, they can also set the reception order independently, such as prioritizing the machine before the labor or the labor before the machine or even assigning tasks proportionally. The most critical issue for the success of DianXiaomi is the ability to identify intentions with users.

The most important application of natural language processing technology is the robot industry. Robots have three characteristics: the robot body, physical activity, and observation ability (Andrea, 2020). The interaction between humans and robots is called Human-Robot Interaction (HRI), and related topics include social robots, artificial companions, and artificial moral agents. Although robots do not have human intelligence, they have artificial intelligence, and the premise conditions for social robots to work are that AI has emotional intelligence, social behavior, and the ability to interact with the environment. The application services of chatbots include the following aspects: (1) Data retrieval: search, reference data, and information search, such as when the train leaves, (2) Transaction: search data and corrections, such as booking tickets with my credit card, (3) Consultation role: According to the information input by the user, guide through the expert system, such as are these shoes suitable for me, (4) Social dialogue: Feel the emotions of customers and participate in open dialogues in the field of robotics expertise.

According to the latest statistics from the International Aviation Telecommunications Association, 14% of airlines and 9% of airports have introduced chatbot applications. KLM is the first airline to adopt AI customer service. In cooperation with Facebook Messenger, in addition to allowing passengers to receive flight information through Messenger, it is equipped with a database of 60,000 questions and answers, allowing AI customer service to answer passengers’ questions. Problems that cannot be handled will be forwarded to manual customer service. Therefore, “human-machine collaboration” and “multi-tasking mode” have become the key advantages of AI customer service. When customers are more inclined to use AI customer service, the repeatedly accumulated data in the system can help customers find answers more easily and faster. The company not only can save costs, but customers can also get higher quality service, and even improve sales performance.

Japan is one of the countries where the application of AI technology is relatively common. In Japan, AI has tried to make extensive use of the large and diverse data collected on railways, train stations, and cars, and use this data to compare it with bus, and weather information and link it with secondary data to create new business value. Below shows the artificial intelligence technology currently applied in JR stations, and its introduction is as follows:

(1) Robot police: Every day, the robot police will move according to a fixed patrol route, and carry various cameras through the fuselage to analyze whether there are dangerous items such as knives and guns, so as to ensure the safety of passengers.

(2) Station service robot: for the purpose of customer service and guidance service, it provides three languages, Japanese, English, and Chinese, and can provide passengers with train information, facilities inside and outside the station, and information on the surrounding areas and attractions of the station.

(3) Guidance robot: It has an automatic navigation service system with an automatic reply function, and also has software installed in the ticket vending machine or the information desk, which not only reduces the burden on staff but also improves the efficiency of passenger operations.

(4) Chat concierge APP: By combining human chat services and integrating AI technology with many exclusive database information, it provides interactive services for tourists. It can not only answer questions in real-time but also actively provide various kinds of information to users.

(5) AI vending machine: It uses sensors to read consumer information and compare it with past data to recommend products. In addition, information such as purchased products and customer attributes will also be wirelessly transmitted to the central server, which not only helps Development and sales strategies have also improved replenishment rates.

4. RESEARCH MODEL

The purposes of this study are to integrate relevant literature and to develop a comprehensive research framework to identify the relationships among key constructs. Figure 1 shows the conceptual framework of this study. The literature review shows that all of the research constructs such as AI service quality, service value, satisfaction, and behavioral intention have direct effects on each other. The comprehensive model of four service evaluation models proposed by Cronin, Brady, Brand, Hightower, and Shemwell (2005) is used to depict the antecedents to behavioral intention (Brady et al., 2005). Based on the literature review and the conceptual framework, numerous hypotheses were developed in this study:

H1: AI service quality of railway station travel service center has a significant positive effect on satisfaction.

H2: AI service quality of railway station travel service center has a significant positive effect on service value

H3: AI service quality of railway station travel service center has a significant positive effect on behavioral intention

H4: Service value has a significant positive effect on satisfaction.

H5: Satisfaction has a significant positive effect on behavioral intention.

H6: Service value has a significant positive effect on behavioral intention.

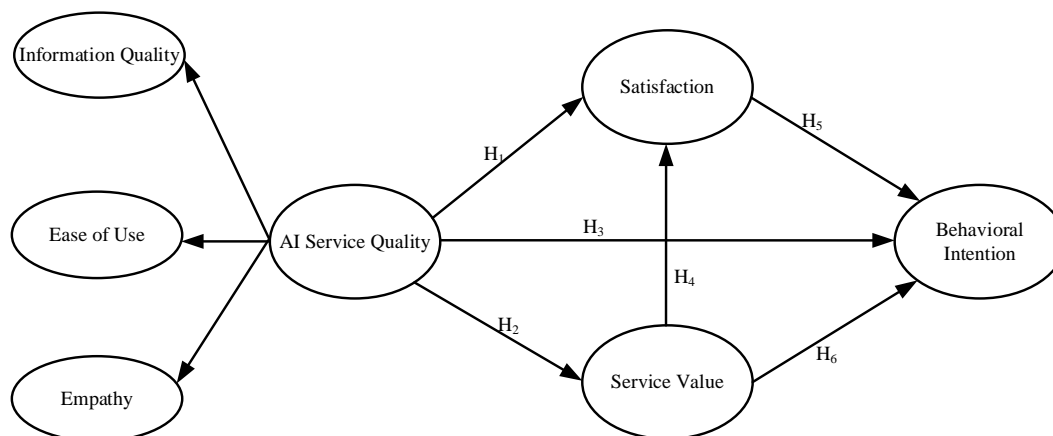


Figure 1. Conceptual Framework.

The following four major constructs are defined in our research model: (1) AI service quality, (2) Service Value, (3) Satisfaction, and (4) Behavioral intention. The measurement items of these constructs are adopted and modified according to previous research, and all of them use a Likert 5-point scale rating from “strongly disagree = 1” to “strongly agree = 5”. AI service quality is customers’ quality evaluations of delivery, and it is similar to the definition of outcome quality by Collier and Bienstocks (2006), customers’ evaluations of how the products or services are delivered. AI service quality in this study is defined as how the service is delivered after the tourists send consultation requests to AI customer service. To measure customers’ perception of AI service quality, eight questionnaire items are adopted and modified according to the literature related to behavioral intentions (Collier and Bienstock, 2016; Mentzer et al., 2001; Feng and Huang, 2006; Huang and Feng, 2007; Wang et al., 2020; Huang et al., 2019; Nguyen and Quach, 2021; Alam, 2020).

These eight items are categorized into three dimensions described as follows: (1) Information Quality, the information provided by the AI customer service is correct, timely, and helpful; (2) Ease of use, the operation interface of AI customer service is simple and easy to use; (3) Empathy, whether to provide personalized information for my needs.

5. DATA AND ANALYSIS RESULTS

5.1. Data Collect and Validity Analyses

We use an online questionnaire to collect a sample for the study. In total, 271 cases were gathered in June 2022. In our sample, more than 55% of the respondents are female, and most of the sample is 25-29 years old (42%). Most respondents (60%) have a College/University degree. Furthermore, more than 25% of the respondents are students or employees of a company, and more than 45% of the respondents live in northern Taiwan.

The following describes the reliability and validity analysis of the variables studied in this paper. The most common ways of testing internal consistency are computing Cronbach’s

alpha and item-to-total correlation. When the item-to-total correlation is above 0.4 and the reliability coefficient alpha value is above 0.7, the items demonstrate high internal consistency and hence the reliability of each dimension (Nunnally and Bernstein, 1994). Reliability refers to the consistency of a measure, whereas internal consistency is that the individual items of a scale should be measuring the same construct and be highly interrelated.

Table 1 shows the reliability tests as well as the internal consistency for all research constructs. According to Table. 1, all items within a factor or a construct have a high coefficient of item-to-total correlation (0.618 – 0.893), and this suggests a high degree of internal consistency for each dimension. Furthermore, Cronbach's alpha value of each construct is high (0.857 – 0.940), which confirms the consistency of the measurement variables. Validity refers to the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure. In addition to the reliability test, the validity of the variables was explored by confirmatory factor analysis (CFA). Table 2 and Table 3 show the internal consistency for all research constructs, including AI service quality, service value, satisfaction, and behavioral intention.

Table 1: RESULTS OF RELIABILITY TESTS

Items	Description	Item-to-Total Correlation	Cronbach's alpha
AI service quality (AI SQ1) – Information Quality			
AI SQ ₁₁	AI customer service can give me the correct information.	0.865	0.925
AI SQ ₁₂	AI customer service can provide me with multiple types of information in multiple ways (such as pictures, text, or videos).	0.881	
AI SQ ₁₃	AI customer service can provide different solutions for me to choose from.	0.800	
AI service quality (AI SQ2) – Empathy			
AI SQ ₂₁	If the AI customer service cannot help me solve the problem, AI will ask human customer service to assist me.	0.724	0.857
AI SQ ₂₂	AI customer service can provide customized information for me.	0.821	
AI SQ ₂₃	I think the AI customer service can listen to my questions patiently.	0.655	
AI service quality (AI SQ3) – Ease of Use			
AI SQ ₃₁	I think the use of AI customer	0.764	0.866

Items	Description	Item-to-Total Correlation	Cronbach's alpha
	service is easy.		
AI SQ ₃₂	I think the operation interface of AI customer service is user-friendly.	0.764	
Service Value (VAL)			
VAL ₁	I think AI customer service can make station service more reliable.	0.708	
VAL ₂	I think that it is more worthwhile to use AI customer service than human customer service.	0.786	0.886
VAL ₃	I think using AI customer service will save me time.	0.846	
Satisfaction (SAT)			
SAT ₁	In general, the AI customer service conformed to my expectations.	0.867	
SAT ₂	In general, I am satisfied with the AI customer service provided.	0.893	0.940
SAT ₃	Using AI customer service is a wise decision.	0.866	
Behavioural Intention (BI)			
BI ₁	I will recommend AI customer service to my friends.	0.789	
BI ₂	I am willing to try other service provide by AI technology.	0.618	0.860
BI ₃	Compare to human customer service, I prefer AI customer service.	0.778	

Table 2: RESULTS OF RELIABILITY TESTS (AI SERVICE QUALITY)

Factor	Loading	Item	Loading	Construct Validity	Average Variance Extracted	Composite Reliability
Information Quality	0.67**	SQ ₁₁	0.91**	0.918	0.790	0.828
		SQ ₁₂	0.93**			0.865
		SQ ₁₃	0.82**			0.672
Empathy	0.99**	SQ ₂₁	0.76**	0.868	0.688	0.578
		SQ ₂₂	0.90**			0.810

Factor	Loading	Item	Loading	Construct Validity	Average Variance Extracted	Composite Reliability
Ease of Use	0.76**	SQ ₂₃	0.83**	0.891	0.805	0.689
		SQ ₃₁	0.95**			0.903
		SQ ₃₂	0.84**			0.706

** Significant at 1% level; * Significant at 5% level

Table 3: RESULTS OF RELIABILITY TESTS

Factor	Item	Loading	Construct Validity	Average Variance Extracted	Composite Reliability
Service Value	VAL ₁	0.78**	0.892	0.735	0.608
	VAL ₂	0.88**			0.774
	VAL ₃	0.90**			0.810
Satisfaction	SAT ₁	0.91**	0.939	0.836	0.828
	SAT ₂	0.93**			0.865
	SAT ₃	0.90**			0.810
Behavioral Intention	BI ₁	0.90**	0.861	0.675	0.810
	BI ₂	0.87**			0.792
	BI ₃	0.72**			0.618

** Significant at 1% level; * Significant at 5% level

5.2. Path Analyses

The purpose of this study is to examine the relationships among AI service quality, service value, satisfaction, and behavioral intention in the train stations of AI customer service. To achieve these goals, structural equation modeling (SEM) was performed using AMOS to test the hypotheses in the research model. Table 4 describes all the criteria of the model fit index. The chi-square value for our sample is significant at the 0.00 level, and the chi-square/df is 1.69 which is below the limit of 5.00. The criteria of RMR and RMSEA values are all below the threshold value of 0.05 and 0.08. Other fit indices like GFI, AGFI, NFI, NNFI, and CFI are greater than the recommended level of 0.9. These results also show that the model is a good fit for the sample data (see Table 4).

There are six direct paths in the research model. Table 5 and Fig 2 show the results of these paths for our samples. In our research sample, except for the paths of AI service quality to satisfaction, service value and behavioral intention, each relationship between paired constructs are positive and significant. As for the service value, it has a significant positive effect on satisfaction as well as behavioral intention. Fig 2 shows the different paths of AI service quality, service value, and satisfaction and how positive for behavioral intention.

Table 4: OVERALL MODEL FIT OF RESEARCH MODEL

Fit Measures	Criteria	Results	Acceptability
Chi-square (df)	$P > 0.05$	81.36 (48) $P = 0.00$	Accepted
Chi-square/df	< 5.00	1.67	Accepted
RMR	< 0.05	0.014	Accepted
RMSEA	< 0.08	0.054	Accepted
GFI	> 0.9	0.94	Accepted
AGFI	> 0.9	0.91	Accepted
NFI	> 0.9	0.98	Accepted
NNFI	> 0.9	0.99	Accepted
CFI	> 0.9	0.99	Accepted

Table 5: PATH RESULTS OF RESEARCH MODEL

	Standardized Estimate	t-value
AI service quality → Service Value	0.44**	5.82
AI service quality → Satisfaction	0.06*	2.07
AI service quality → Behavioral Intention	0.06*	2.32
Service Value → Satisfaction	0.91**	14.10
Service Value → Behavioral Intention	0.53**	2.20
Satisfaction → Behavioral Intention	0.37**	3.17

** Significant at 1% level; *Significant at 5% level.

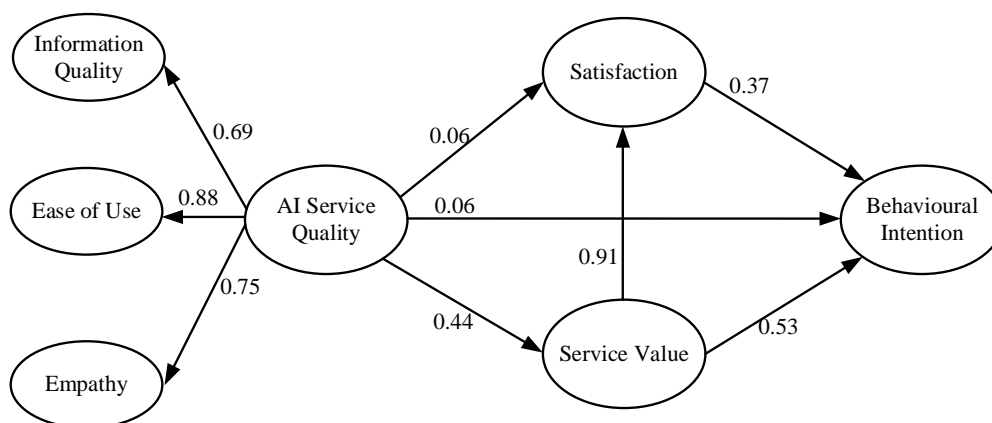


Figure 2. Path Results of Research Model.

Three different kinds of effects including direct effect, indirect effect, and total effect between research constructs were analyzed. The total effect is the sum of direct and indirect effects. And Table 6 shows these three kinds of effects between the constructs for our research sample.

First, we describe the direct effects, as shown in Table 6, the AI service quality, service value, and satisfaction have a direct effect on behavioral intention (0.06, 0.37, 0.53), and AI service quality also has direct positive effects on service value (0.44). Besides, service value exhibits a stronger direct influence on behavioral intention than AI service quality and satisfaction do (0.53 > 0.06; 0.53 > 0.37). Moreover, service value has a greater impact on satisfaction than AI service quality (0.91 > 0.06).

Figure 2 indicates the analysis of the indirect effects, AI service quality, and service value have indirect effects on behavioral intention via satisfaction value (i.e., AI SQ→SAT→BI; VAL→SAT→BI). And AI service quality has indirect effects on behavioral intention through service value and (or) satisfaction (i.e., AI SQ→VAL→SAT→BI; AI SQ→VAL→BI).

According to Table 6, we can find the indirect effects of AI service quality and service value on behavioral intention are 0.400 and 0.463. The indirect effects of AI service quality on behavioral intention are an aggregation of standardized coefficients from 3 indirect routes: (1) AI SQ→VAL→BI (0.233); (2) AI SQ→SAT→BI (0.022); (3) AI SQ→VAL→SAT→BI (0.148). Therefore, the indirect effects of AI service quality on behavioral intention are 0.403. In addition, the indirect effects of service value on behavioral intention are 0.337 (VAL→SAT→BI).

Finally, we summarize the total effect of the behavioral intention. In regard to the impact on behavioral intention, service value (0.867) has superior total effect effects than AI service quality (0.634) and satisfaction (0.370). Likewise, service value (0.910) exhibits higher total effects on satisfaction than AI service quality (0.867). These findings highlight the importance of the intermediate role of service value and satisfaction in the research model. If we focus on behavioral intention, the most important factor which plays the most important role is the service value, the second important factor is satisfaction. As the AI customer service plays the core service concept of the train station customer service, and the AI service quality also has direct and indirect effects on behavioral intention, it is worth for manager in-depth analysis.

Table 6: PATH RESULTS OF RESEARCH MODEL

Constructs	Direct Effects	Indirect Effects	Total Effects
AI service quality			
Service Value	0.44	-	0.440
Satisfaction	0.06	0.400 (0.44×0.91)	0.406
Behavioral Intention	0.06	0.233 (0.44×0.53) 0.022 (0.06×0.37) 0.148 (0.44×0.91×0.37)	0.463
Service Value			
Satisfaction	0.91	-	0.910
Behavioral Intention	0.53	0.337 (0.91×0.37)	0.867

5.3. Importance-Performance Analysis

Importance-Performance Analysis (IPA) is a simple and useful technique for identifying those attributes of a product or service that are most in need of improvement (Martilla and James, 1977). IPA maps highlight the relative positions of attributes in matrix format, with the important values on the vertical axis and performance values on the horizontal axis. AI service quality questionnaire items are classified into quadrants as shown in the graph (see Fig. 3): quadrant I (over-emphasized area), quadrant II (maintenance reinforcement area), quadrant III (improvement reinforcement area), and quadrant IV (secondary improvement area).

According to Fig. 3, the advantage of AI customer service in the train station is AI SQ23 (I think the AI customer service can listen to my questions patiently) and AI SQ31 (I think the use of AI customer service is easy). Therefore, the train station should maintain the advantage of quadrant II, and their resource allocation should be changed from quadrant I (AI SQ12: AI customer service can provide me with multiple types of information in multiple ways, and AI SQ13: AI customer service can provide different solutions for me to choose) to quadrant IV to improve the performance of AI SQ22 (AI customer service can provide customized information for me) and SQ32 (I think the operation interface of AI customer service is user-friendly).

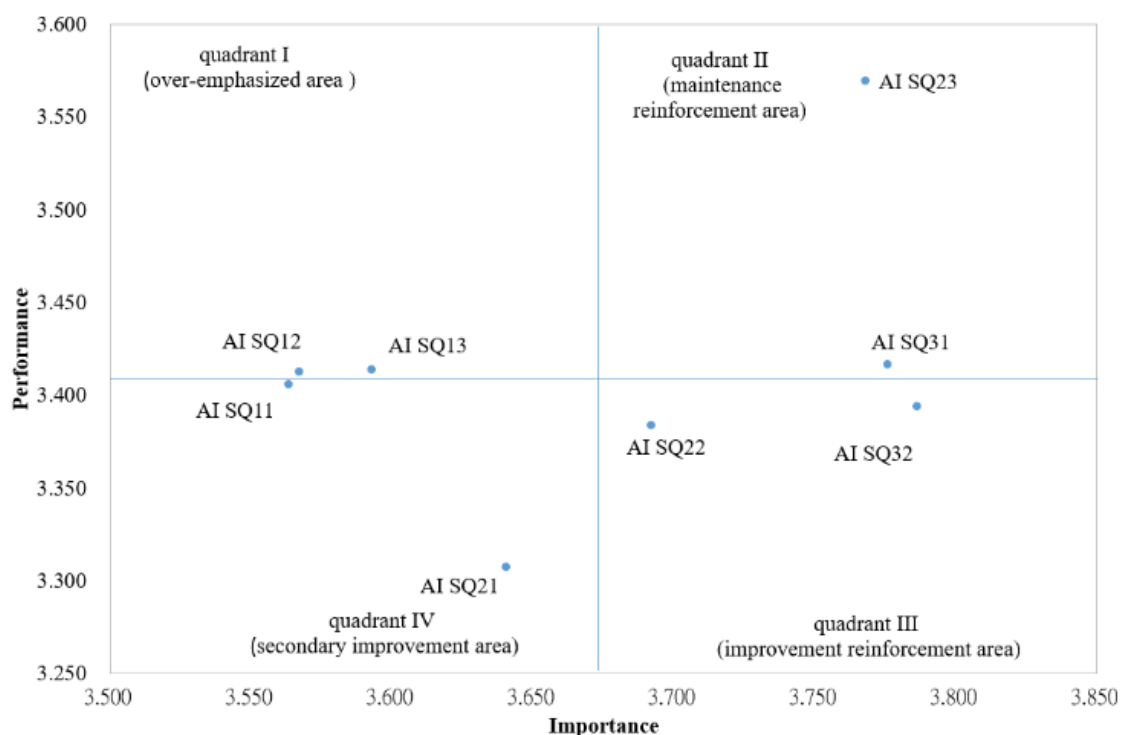


Figure 3. IPA Map

6. CONCLUSION

Voice will become the key to future services. At present, there are many services that import speech recognition systems into guidance robots. Although the application of natural language processing is still in the stage of accumulating data for interaction with users, and other natural language processing technologies for speech recognition the benefits of deep learning through the accumulation of data will allow the introduction of AI to bring win-win benefits to station operations and passengers. The development of artificial intelligence is one of the most concerning topics in recent years. From the

literature, it can be found that it has a wide range of applications. Many studies use artificial intelligence to plan routes, improve work efficiency, and reduce costs. In terms of human-AI interaction, the most eye-catching smart speaker is based on natural language technology. Smart customer service introduces a service model of natural language technology combined with digital information and proposes some new types of services for human-machine collaboration.

There are three factors that constitute the quality of AI services, namely: information quality, ease of use, and empathy. According to SEM analysis, the service value, satisfaction, and AI service quality have positive effects on behavioral intention. Furthermore, service value and AI service quality not only have a direct effect on behavioral intention but also an indirect effect on the behavioral intention by satisfaction. Furthermore, SEM analysis provided support that AI service quality dimensions are an indirect effect on the behavioral intention by service value.

AI service quality has a direct impact on tourists' satisfaction with using station AI customer service, perceived service value, and behavioral intention to use AI customer service, and service value is the most important factor affecting behavioral intention. The findings have both managerial and research implications. For managers of the train station, the AI service quality of customer service is composed of three concepts, including information quality, ease of use, and empathy. The results of this study have implications for managers of the train station. When customers use AI customer service in the train station, they will concern with "I think the AI customer service can listen to my questions patiently (AI SQ23)", and "I think the use of AI customer service is easy (AI SQ31)".

There is a common trend in the application of AI, which is to focus more and more on the interface design of business applications and human-machine communication. The application of AI will inevitably affect the way people live and work, so it will be an interesting and important research topic to analyze how people and machines work together. We suggest that researchers can further apply different behavioral models to analyze consumers' decision-making behavior and key variables in choosing AI customer service, this kind of research will be of great help to us in building human-centered AI services.

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