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THE IMPACT OF AI CHATBOT CHARACTERISTICS ON CUSTOMER EXPERIENCE AND LOYALTY: MODERATING EFFECT OF TECHNOLOGY READINESS

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ABSTRACT

This study investigates how AI chatbot characteristics intelligence, personalization, interaction quality, and service quality influence customer experience, satisfaction, and loyalty by using DeepSeek, a leading chatbot in China. The research was collected among 390 active users and utilized SEM, the results show that all four chatbot attributes significantly enhance customer experience, with personalization having the strongest impact. Customer experience positively influences both satisfaction and loyalty, which is also a significant predictor of loyalty. Furthermore, technology readiness moderates customer experience and loyalty, such that users with higher readiness exhibit a stronger positive effect. These findings support current knowledge on AI-supported service systems and give useful suggestions for creating chatbot experiences that are more personalized, interactive, and flexible for different types of users. The study emphasized the need for brands to balance technical functionality with user-centered design to foster long-term customer engagement and loyalty in AI-enabled environments.

KEYWORDS: AI Chatbots, Customer Experience, Technology Readiness, Customer Loyalty, Personalization.

1. INTRODUCTION

The development of artificial intelligence (AI) has brought significant changes to customer service, especially through the use of AI-powered chatbots (Kedi et al., 2024). These digital tools help companies provide quick and constant support, which can lead to better service performance and wider customer coverage. In China, which has the largest online user base globally, many businesses have adopted chatbots to manage high customer demand. For example, Alibaba uses AI chatbots to handle more than two million customer sessions and process around 10 million chat messages each day, showing the widespread use of this technology in the Chinese market (Gupta & Singh, 2024). Such 24/7 automated assistants enable companies to serve consumers at any time, meeting the high expectations of China's digitally savvy customers. Chatbots can enhance customer convenience and potentially foster loyalty to the service provider by providing timely responses and valuable information (Shahzad et al., 2024).

Despite their benefits, AI chatbots also pose challenges in delivering a satisfying customer experience (Chong et al., 2021). Jiang et al. (2023) found that customers often desire a more human-like interaction; making a chatbot feel more social and personal has increased user satisfaction and trust. Businesses must, therefore, design chatbot interactions carefully to ensure a positive customer experience, encompassing customers' cognitive and emotional responses during the service encounter (Wang et al., 2022). AI chatbot can provide high-quality of customer experience, as it can significantly enhance customer satisfaction and encourage continued use of the service. However, there is still a knowledge gap regarding which specific attributes of chatbots most strongly influence the customer's experience and subsequent satisfaction and loyalty outcomes. Thus, the present study develops a conceptual model linking key AI chatbot characteristics to customer experience and post-experience outcomes.

An AI chatbot like DeepSeek has quickly emerged as a global leader in artificial intelligence. Its technological progress offers insights into innovation, scalability, and efficiency dynamics in AI model development. Developing and applying DeepSeek's models within the context of Chinese regulations, particularly concerning content moderation and censorship, offers an important opportunity to explore service marketing in China. While previous studies have investigated AI chatbots primarily in Western or global contexts ((Kedi et al., 2024)), relatively few have examined how chatbot service quality and user experience operate in China's unique digital ecosystem. This study contributes novelty by focusing on DeepSeek, a leading Chinese AI chatbot that functions under distinct regulatory frameworks, linguistic environments, and user expectations. By situating the analysis in this market, we extend existing e-service quality and customer experience theories to highlight how cultural and institutional conditions shape chatbot adoption, personalization, and loyalty outcomes.

Thus, we focus on four critical chatbot service attributes identified in prior literature intelligence, personalization, interaction quality, and service quality and examine how each contributes to a favorable customer experience during Deepseek service interactions. We further propose that an enhanced customer experience will lead to higher customer satisfaction, which drives customer loyalty.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. AI Chatbots in Customer Service

AI chatbots are software programs that rely on natural language processing to communicate with users in a way that mimics human conversation (Adam et al., 2021). They have become widely used in customer service across various industries, allowing businesses to offer real-time assistance through text r voice-based platforms. Chatbots can simulate an interpersonal service experience by answering questions, assisting with tasks, and handling complaints or service recovery. Prior researchers suggest that well-designed chatbots can deliver high-quality service interactions that engage customers on a social level, much like human representatives. For example, Chong et al. (2021) found that chatbots offer consistent service around the clock, efficiently handling routine inquiries from potentially millions of users for firms. This scalability is especially valuable in markets like China, where online transaction volumes are enormous, and customers expect real-time assistance. However, the ability of chatbots to generate positive customer outcomes is strongly influenced by how users perceive the quality of their interactions. Chen et al. (2023) found that several key aspects must be in place for users to feel satisfied. Specifically, system quality, information quality, and service quality have been recognized as essential factors that contribute to a successful customer experience with chatbots.

Chung et al. (2020) proposed a multi-dimensional framework to evaluate how customers perceive chatbots, focusing on aspects such as interaction

quality, personalization, enjoyment, modern appeal, and the ability to resolve issues. Their study highlighted that chatbots can provide interactive, engaging, and even personalized service encounters, which are vital for maintaining a brand's essence in online environments. Likewise, Hsu and Lin (2023) incorporate conversational AI quality into an e-service quality framework to evaluate chatbot performance, a significant predictor of user satisfaction and loyalty. Building on prior work, **this research focuses on four key AI chatbot characteristics that are frequently noted as determinants of user experience** (1) intelligence, (2) personalization, (3) interaction quality, and (4) service quality.

2.1.1. Chatbot Intelligence and Customer Experience (H1a)

Chatbot intelligence is defined as the extent to which users believe the chatbot can comprehend their inquiries and deliver accurate and appropriate responses. The perceived intelligence of a chatbot–that is, its capability to competently understand queries and solve customer problems–is fundamental to a positive user experience. An "intelligent" chatbot can interpret customer requests correctly and provide accurate, helpful information or solutions, which reduces user effort and frustration (El Bakkouri et al., 2022). Research indicates that technical factors such as a chatbot's accuracy, reliability, and performance play a vital role in shaping the customer experience. When chatbots function properly, provide accurate responses, and efficiently address user needs, customers are more likely to perceive the interaction in a positive light. For example, in an online banking context, Eren (2021) found that a chatbot's performance and usefulness–which relate to its intelligence–positively influence customer satisfaction with the service.

Likewise, research on e-service quality for chatbots notes that if the bot can provide accurate information, it leads to a better customer experience and encourages continued usage (Misischia et al., 2022). In essence, a chatbot high in perceived intelligence can mimic the problem-solving abilities of a skilled human agent, thereby increasing customer confidence in the interaction. Customers feel their time is respected when the bot quickly understands their issue and provides a correct answer. This increases convenience and fulfills service expectations, contributing to a positive experiential outcome. **The empirical work of Hsu and Lin (Hsu & Lin, 2023) supports this notion** they found that a chatbot's core service quality significantly impacts users' subsequent satisfaction and loyalty. We thus expect chatbot intelligence to be a critical antecedent of customer experience.

H1a: Intelligence with the chatbot positively impacts the customer's experience.

2.1.2. Chatbot Personalization and Customer Experience (H1b)

Personalization is another important characteristic of chatbot-based services.

Personalization refers to a chatbot's capacity to adapt its responses or services based on individual user characteristics, such as using the customer's name or recalling previous interactions (Ait Baha et al., 2023). It involves customizing the interaction or service outputs to the customer's needs and preferences. Personalized chatbots may address customers by name, remember prior interactions, or tailor recommendations based on user data (Ma et al., 2021). Such personal touches can make the service encounter feel more human and customer-centric, enhancing the user's experiential value. According to customer experience theory, personalization adds emotional and social value to service delivery, which is particularly important in otherwise impersonal digital environments. Surprenant and Solomon's (1987) classic work on service personalization demonstrated that even "programmed personalization," like friendly greetings and small talk, can significantly boost customer satisfaction.

Recent research on chatbots has shown that adopting a socially oriented communication style characterized by a more personalized and informal tone enhances customers' sense of being valued, resulting in greater satisfaction compared to a standardized, task-focused approach (Cai et al., 2024). Furthermore, when a chatbot engages in a warm, personalized manner, it generates more positive feelings and a better service experience for the customer. Furthermore, personalization helps bridge the gap between human and AI services by infusing interactions with a sense of personal attention (Wang et al., 2023). Research on AI customer service finds that humanizing cues and customized chatbot responses create a more engaging and satisfying encounter. For instance, Bleier et al. (2019) called for calibrating chatbot communication styles to optimize customer experience, noting that personal, human-like language can trigger social connectedness with the bot. These insights suggest that customers respond favorably when chatbots provide personalized service. The customer's cognitive and affective

experience improves by feeling recognized and understood. **We therefore propose the following:**

H1b: Personalization with the chatbot positively impacts the customer experience.

2.1.3. Interaction Quality and Customer Experience (H1c)

Interaction quality refers to how well interacting with the chatbot meets customer needs regarding ease, responsiveness, and conversational flow (Rhim et al., 2022). High interaction quality means the chatbot is easy to use (intuitive interface, simple language), responds promptly, and maintains a coherent, natural dialogue. In service literature, this aligns with the functional quality of the service encounter–essentially, how the service is delivered (Grönroos, 2006). Functional quality is reflected in usability, responsiveness, and interactivity with chatbots. Trivedi et al. (2019) note that users expect chatbot systems to be user-friendly and quick in their responses, as these factors contribute to performing tasks effectively via the technology. If the chatbot takes too long to reply or produces disjointed conversations, the experience will likely suffer.

Empirical evidence supports the importance of interaction quality on user perceptions. Jenneboer et al. (2022) concluded that a chatbot's system and service quality are crucial for delivering a good customer experience. A smooth and conversationally competent chatbot tends to make the interaction more engaging and enjoyable for consumers. By contrast, any friction in the interaction can lead to frustration. Recent research on chatbot humanness suggests that features like message interactivity, natural turn-taking, and conversational skills significantly enhance the customer's comfort and positive feelings in the exchange (Jiang et al., 2023). High-quality interactions help narrow the psychological gap between users and AI chatbots, making the experience feel more similar to engaging with a supportive human assistant. **Therefore, we expect**

H1c: Interaction quality with the chatbot positively impacts the customer experience.

2.1.4. Service Quality and Customer Experience (H1d)

Service quality reflects the user's overall assessment of the chatbot's performance, typically including dimensions such as reliability, assurance, and the perceived empathy in its responses (Chen et al., 2022). It is a comprehensive concept that represents the customer's evaluation of the service's overall excellence or superiority. In the chatbot context, perceived service quality can encompass the bot's reliability, responsiveness, and assurance/empathy. Essentially, it is the aggregate outcome of the chatbot's attributes discussed above, as experienced by the user. High service quality means the customer feels the chatbot performed tasks correctly and provided a satisfactory resolution to their inquiry competently and courteously (Shahzad et al., 2024).

Service quality has long been recognized as a key factor influencing customer experience and loyalty in both traditional and digital service environments. For instance, van Vuuren et al. (2012) demonstrated that overall perceived service quality is closely associated with customer experience, which in turn promotes continued use of the service. When applied to AI chatbots, this suggests that users who perceive high service quality are more likely to report a positive interaction experience. Supporting this view, Hsu and Lin (2023) found that the fundamental service quality of chatbots significantly impacted user loyalty and, through increased satisfaction, contributed to a more favorable evaluation of the chatbot. Furthermore, when chatbots effectively handle service recovery (e.g., addressing problems or complaints in the chat), it boosts satisfaction levels. This indicates that beyond routine interactions, the quality of service a chatbot provides in more complex situations is crucial to customer experience. In sum, we posit that if customers judge a chatbot's service delivery as high quality, their experience will be correspondingly positive.

H1d: Service quality with the chatbot positively impacts the customer experience.

2.2. Customer Experience and Customer Satisfaction (H2)

Customer experience is the cumulative impression and feeling a customer takes away from a service encounter (Kushwaha et al., 2021). Customer satisfaction is a post-experience evaluative judgment–a summary affective state reflecting whether the experience met or exceeded expectations (Oliver, 1980). When customers perceive a service experience as pleasant, seamless, and worthwhile, they are more likely to express satisfaction with the service provider.

Experience and satisfaction are closely related but not identical experience is often seen as a process, while satisfaction is the outcome of that process in terms of fulfillment (Han et al., 2021). Moreover, a seamless and pleasant customer experience should lead to higher satisfaction with the service encounter. Prior studies imply this

relationship, even if not always measured explicitly. For instance, McLean and Wilson (2016) note that improving online customer experience can raise customer satisfaction. Similarly, research on brand experience finds that favorable experiences directly increase consumer satisfaction and loyalty. A strong positive impression from the chatbot interaction often leads to higher overall customer satisfaction with the service. Conversely, a poor experience will diminish satisfaction (Jiang et al., 2023). **Therefore, we hypothesize**

H2: Customer experience with the chatbot positively impacts customer satisfaction.

2.3. Customer Experience and Customer Loyalty (H3)

A highly positive experience with a chatbot can foster loyalty even if measured independently of explicit satisfaction ratings (Ait Baha et al., 2023). This is because a memorable, superior experience can create an emotional bond or a strong impression of the service quality that directly encourages repeat usage. Some researchers have argued that customer experience quality can directly drive loyalty behaviors, especially in competitive markets where customers seek the best overall experience (Brakus et al., 2009). Brakus et al. (2009) also found that brand experience could affect loyalty directly, not only via satisfaction. In services, a delightful experience may lead customers to bypass rational evaluations and re-engage due to the positive feelings associated with that prior encounter (Jenneboer et al., 2022).

In the chatbot context, a great customer experience with the AI chatbot may cement loyalty to the service or brand (Chung et al., 2020). This means that beyond satisfying the customer at the moment, the experience could leave a lasting favorable impression that makes the customer continue to use the chatbot again. Given that chatbots are often one of several touchpoints in a customer's journey, an excellent chatbot interaction could become a differentiator that keeps customers returning to the same platform. Chung et al. (2020) found that customer experience was linked with future use intentions. For example, if a chatbot resolves an issue, the customer might prefer engaging with that chatbot and the company behind it, thus increasing loyalty. **We formalize this expectation as follows:**

H3: Customer experience with the chatbot positively impacts customer loyalty.

2.4. Customer Satisfaction and Customer Loyalty (H4)

Customer satisfaction is a well-known precursor to customer loyalty in consumer behavior research (Hsu & Lin, 2023). In digital service contexts, satisfaction has been shown to enhance loyalty significantly through reuse and referral (Eren, 2021). The rationale is that satisfaction reflects the customer's approval of the service; when approval is high, the customer sees little reason to switch and may even become an advocate. This satisfaction–loyalty link is grounded in expectancy-confirmation theory (Oliver, 1980) and has been confirmed across numerous studies and industries.

Applying this to AI chatbots, if customers are satisfied with the chatbot-assisted service, they should exhibit stronger loyalty toward the service provider. Loyalty can manifest as continued use of the chatbot for future needs, a preference for the company's service channels, or general commitment to the brand. Hsu and Lin's (2023) findings support this connection in the chatbot realm: user satisfaction with a chatbot service significantly predicted the user's loyalty to that chatbot/service. Jenneboer et al. (2022) also emphasize that prioritizing customer satisfaction is essential, as it serves as a key driver of customer loyalty. In summary, when a chatbot interaction leaves a customer feeling satisfied, that customer is more inclined to remain loyal. **We thus propose**

H4: Customer satisfaction with the chatbot service positively influences customer loyalty.

2.5. Technology Readiness Moderates Customer Experience to Customer Loyalty (H5)

Technology readiness, defined as an individual's tendency to adopt and effectively utilize new technologies to achieve their objectives (Parasuraman, 2000), plays a critical role in influencing customer perceptions and responses to AI-powered services. Within social commerce platforms and AI-based interactions such as DeepSeek, users with higher levels of technology readiness are more inclined to engage actively with technology-enhanced experiences, which can lead to more positive behavioral outcomes (Gao et al., 2022).

When customer experience is enhanced through innovative, personalized, and high-quality AI interactions, it can foster greater customer loyalty (Rane et al., 2024). However, the strength of this relationship may differ depending on users' readiness to adopt and adapt to digital technologies. Individuals with high technology readiness are more comfortable navigating AI-based interfaces, interpreting intelligent feedback, and trusting automation, enhancing their post-experience behavioral responses, such as continued use and

brand loyalty (Wijethilak et al., 2025). Conversely, customers with low technology readiness may feel overwhelmed or uncertain, even if the experience is positive, weakening the experience–loyalty link.

Previous study (Liu et al., 2025) also highlights that personal innovativeness and technology comfort levels significantly influence technology-driven loyalty. The existing literature suggests that technology readiness moderates the effect of customer experience on customer loyalty. **Based on this, the following hypothesis is proposed**

H5: Technology readiness positively moderates the relationship between customer experience and loyalty.

Although previous research has offered valuable insights into the role of AI chatbots in service quality, interaction design, and customer satisfaction, much of this literature has remained either descriptive or focused on Western contexts. Few studies have explored how chatbot characteristics operate within China's digital environment. Furthermore, existing studies often not focus on specific attributes such as intelligence, personalization, interaction quality, and service quality that drive customer experience. Finally, fewer studies emphasize how individual differences, such as technology readiness, moderate the relationship between experience and loyalty. By examining DeepSeek in China, this study fills these gaps by extending established e-service quality and customer experience frameworks into a new cultural and institutional context, while also introducing technology readiness as a critical moderating factor.

Accordingly, we propose the conceptual framework illustrated in Figure 1, which is grounded in key chatbot characteristics intelligence, personalization, interaction quality, and service quality that are expected to enhance customer experience (H1a–H1d). In this model, a superior customer experience is hypothesized to positively influence customer satisfaction (H2), which in turn leads to increased customer loyalty (H3). Additionally, we propose a direct relationship between customer experience and loyalty (H4). Furthermore, technology readiness is examined as a moderating variable that may strengthen the relationship between customer experience and customer loyalty.

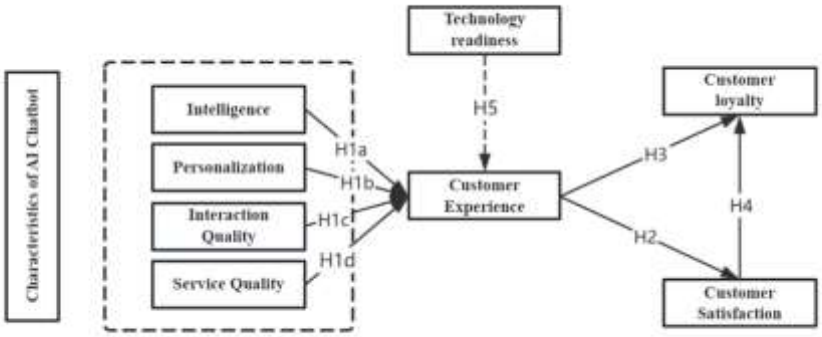

Figure 1: Conceptual Framework of AI Chatbot and Outcomes.

3. METHODOLOGY

3.1. Research Design

This study employs a quantitative approach to investigate the relationships among chatbot characteristics, customer experience, customer satisfaction, and customer loyalty within the context of DeepSeek, a widely used AI chatbot in China. The proposed research model is based on the e-service quality framework and is tested using structural equation modeling (SEM). A quantitative methodology is well-suited for this study, as it allows for hypothesis testing, the measurement of latent constructs through multi-item scales, and the generalization of results from the sample to the broader population.

3.2. Population and Sample

The target population for this study comprises active users who have engaged with DeepSeek via online platforms or service-based applications. A non-probability purposive sampling method is employed to recruit respondents with recent chatbot interaction experience. The sample size was determined in accordance with SEM guidelines, which recommend obtaining at least 10 responses per

observed indicator (Hair et al., 2021). With 32 questionnaire items, the required sample is approximately 320; however, the researchers collected 390 respondents to ensure statistical power and account for missing data. Participants were recruited from social media platforms in China. These platforms were selected because they represent active user bases with frequent chatbot interactions, thereby ensuring respondents had sufficient experience with DeepSeek to evaluate its attributes meaningfully. However, since this approach relied on non-probability purposive sampling, it may introduce bias by overrepresenting younger, more educated, and digitally engaged users. As a result, while the findings provide valuable insights into active user perceptions, they may not be fully generalizable to the entire population of Chinese chatbot users.

3.3. Research Instrument

The primary instrument for data collection is a structured, self-administered questionnaire, developed using validated measurement scales drawn from existing literature. Each construct is assessed through multiple items rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). **The questionnaire comprises sections measuring the following constructs** chatbot intelligence (Gnewuch et al., 2017), personalization (Belanche et al., 2020), interaction quality (McLean & Osei-Frimpong, 2019), service quality (Blut et al., 2024), customer experience (Lemon & Verhoef, 2016), customer satisfaction (Gao et al., 2022), customer loyalty (Anderson & Srinivasan, 2003), and technology readiness (Rigby et al., 2003). All scale items were adapted slightly to reflect the specific context of DeepSeek.

Data was collected online using a Wenjuanxing application. The survey link was distributed via online communities, university networks, and social platforms such as WeChat, Weibo, and Rednote, where DeepSeek is actively used. Participation is voluntary, and confidentiality is assured. Participants are informed that their anonymous responses are used strictly for academic research. This research adheres to ethical research practices. Respondents receive an informed consent form before participation describing the study's purpose, duration, voluntary nature, and confidentiality safeguards. No personal identifiers are collected, and the data is used solely for academic purposes.

3.4. Data Analysis

The data obtained from the structured questionnaire were analyzed using AMOS to assess the robustness of the findings and to test the hypothesized relationships outlined in the conceptual framework. The analysis begins with descriptive statistics summarizing the sample's demographic profile and overall response tendencies, including mean values, standard deviations, and frequency distributions.

To evaluate the reliability and validity of the measurement model, internal consistency is assessed using Cronbach's alpha (Peterson & Kim, 2013). Convergent validity is examined through the computation of Average Variance Extracted (AVE) (Ab Hamid et al., 2017), while discriminant validity is tested using the Fornell–Larcker criterion and cross-loadings to confirm that each construct is empirically distinct from the others.

Confirmatory Factor Analysis (CFA) is performed to validate the measurement model and assess the overall fit of the latent constructs (Brown, 2015). Upon confirmation of the measurement model, Structural Equation Modeling (SEM) is utilized to test the hypothesized relationships (H1 through H4), enabling the examination of both direct and indirect effects among the variables. In addition, a moderation analysis is conducted within the SEM framework to investigate the moderating effect of technology readiness (H5). This analysis aims to determine whether the strength of the relationship between customer experience and customer loyalty significantly differs based on participants' levels of technology readiness.

4. Research Results

The researchers collected 390 valid responses from those with prior experience interacting with DeepSeek, the AI chatbot examined in this research. These responses were obtained through a structured online questionnaire to measure various constructs, including chatbot characteristics, customer experience, customer satisfaction, customer loyalty, and technology readiness.

Table 1 shows the total of 390 valid responses for this study. Regarding gender distribution, 55.1% of the respondents were male (n = 215), while 44.9% were female (n = 175), indicating a relatively balanced gender representation with a slight male majority. Regarding age, the largest age group was between 26 and 30 years old, comprising 39.2% of the sample (n = 153), followed by respondents aged 31 to 35, accounting for 33.1% (n = 129). The age bracket of 36 to 40 years represented 19.0% of participants (n = 74), while younger respondents aged 18 to 25 constituted 5.1% (n = 20). Only 3.6% (n = 14) of

respondents were over 40. This suggests that most DeepSeek users surveyed are young professionals in their late twenties to mid-thirties.

4.1. Respondents' Information

Table 1: The Respondents' Information for Using the AI-Chatbot (N=390).

Item	Category	Frequency	Percentage
Gender	Male	215	55.1%
	Female	175	44.9%
Age	18 to 25	20	5.1%
	26 to 30	153	39.2%
	31 to 35	129	33.1%
	36 to 40	74	19.0%
	More than 40	14	3.6%
Education	Below high school	12	3.1%
	High school	69	17.6%
	Bachelor degree	198	50.8%
	Master degree	101	25.9%
	Doctor degree	10	2.6%
How often do you use Deepseek per week?	Seldom	47	12.1%
	Sometimes	208	53.2%
	Often	109	27.9%
	Always	26	6.6%

Specifically, 50.8% (n = 198) had completed a bachelor's degree, followed by 25.9% (n = 101) with a master's degree and 2.6% (n = 10) with a doctoral degree. High school graduates comprised 17.6% (n = 69) of the sample, while only 3.1% (n = 12) reported having less than a high school education. This indicates a well-educated respondent pool, reflective of the typical user base of technology-oriented services.

Most participants reported using DeepSeek at least occasionally. Specifically, 53.2% (n = 208) indicated they use the chatbot "sometimes," 27.9% (n = 109) reported using it "often," and 6.6% (n = 26) used it "always." Meanwhile, 12.1% (n = 47) of respondents reported "seldom" using DeepSeek. These results demonstrate that the study sample is composed mainly of active or semi-active users of DeepSeek, providing a relevant foundation for assessing user experience, engagement, and loyalty.

4.2. Confirmatory Factor Analysis (CFA)

Table 2 exhibits strong reliability and validity across all constructs. All factor loadings exceed the recommended threshold of 0.70, indicating satisfactory indicator reliability.

Table 2: Convergent Validity and Reliability Analysis.

Constructs	Items	Factor Loading	Mean	AVE	Cronbach's Alpha
Intelligence	INT1	0.857	3.810	0.570	0.841
	INT2	0.985	3.870		
	INT3	0.846	3.916		
	INT 4	0.803	3.837		
Personalization	PER1	0.896	3.717	0.592	0.853
	PER2	0.962	3.651		
	PER3	0.841	3.648		
	PER4	0.939	3.633		
Interaction quality	IQ1	0.882	3.870	0.553	0.832
	IQ2	0.872	3.858		
	IQ3	0.918	3.843		
	IQ4	0.783	3.880		
Service quality	SQ1	0.951	3.735	0.559	0.834
	SQ2	0.888	3.702		
	SQ3	0.947	3.723		
	SQ4	0.792	3.786		
Customer experience	CE1	0.853	3.578	0.596	0.855
	CE2	0.958	3.608		
	CE3	0.802	3.554		
	CE4	0.936	3.584		
Technology Readiness	TR1	0.940	3.813	0.583	0.849
	TR2	0.909	3.720		
	TR3	0.879	3.762		
	TR4	0.875	3.771		
Customer satisfaction	CS1	0.951	3.792	0.575	0.846
	CS2	0.888	3.801		
	CS3	0.947	3.825		
	CS4	0.792	3.804		
Customer Loyalty	CL1	0.930	3.566	0.565	0.839
	CL2	0.867	3.569		
	CL3	0.900	3.602		
	CL4	0.873	3.479		

Table 2 exhibits strong reliability and validity across all constructs. All factor loadings exceed the recommended threshold of 0.70, indicating satisfactory indicator reliability. The Average Variance Extracted (AVE) values range from 0.553 to 0.596, confirming adequate convergent validity. Additionally, Cronbach's alpha values fall between 0.832 and 0.855, surpassing the 0.70 benchmark and demonstrating a high level of internal consistency for all constructs.

Construct means ranged between 3.55 and 3.92, suggesting generally favorable perceptions among respondents toward DeepSeek's intelligence, personalization, interaction and service quality, customer experience, satisfaction, and loyalty. Technology readiness also showed high reliability (α = 0.849, AVE = 0.583), supporting its role as a valid moderating construct in the model.

Table 3: Discriminant Validity.

	Component							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
INT	**0.755**							
PER	0.261	**0.769**						
IQ	0.304	0.330	**0.744**					
SQ	0.322	0.375	0.339	**0.748**				
CE	0.388	0.415	0.407	0.375	**0.772**			
TR	0.338	0.386	0.384	0.375	0.369	**0.764**		
CS	0.394	0.470	0.430	0.441	0.503	0.481	**0.758**	
CL	0.431	0.291	0.338	0.331	0.314	0.394	0.444	**0.752**

Discriminant validity was evaluated using the Fornell–Larcker criterion, which requires that the square root of the AVE for each construct (indicated in bold along the diagonal in Table 3) exceeds its correlations with all other constructs. As shown in Table 3, the square roots of the AVE values, ranging from 0.744 to 0.772, are consistently greater than the corresponding inter-construct correlations. These results confirm that each construct is empirically distinct, thereby supporting the discriminant validity of the measurement model.

Table 4: 'Goodness-of-fit' Statistics for the Structural Model.

Model Fit	Required Values	Model Result	Remarks
'CMIN/DF'	1-3	0.156	Excellent
'RMSEA'	<0.08	0.037	Good
'SRMR'	<0.08	0.037	Good
'GFI'	>0.90	0.968	Excellent
'CFI'	>0.90	0.961	Excellent
'IFI'	>0.90	0.961	Excellent
'TLI'	>0.90	0.955	Excellent

The goodness-of-fit of the structural model was assessed using a range of fit indices, all of which met accepted thresholds. The chi-square divided by degrees of freedom (CMIN/DF) was 0.156, well below the recommended cut-off value of 3.0, indicating an excellent overall model fit. Both the Root Mean Square Error of Approximation (RMSEA = 0.037) and the Standardized Root Mean Square Residual (SRMR = 0.037) were below the 0.08 benchmark, further supporting the model's adequacy.

The model performed strongly, as evidenced by the Goodness-of-Fit Index (GFI = 0.968), Comparative Fit Index (CFI = 0.961), Incremental Fit Index (IFI = 0.961), and Tucker–Lewis Index (TLI = 0.955) all exceeding the recommended threshold of 0.90. Collectively, these indicators confirm that the structural model provides a strong fit to the data, offering a reliable basis for testing the proposed hypotheses.

4.3. Structural Equation Modelling (SEM).

The structural model was tested to evaluate the hypothesized relationships among chatbot characteristics, customer experience, satisfaction, loyalty, and the moderating effect of technology readiness. As illustrated in the model (Figure 2), all path coefficients were statistically significant at the $p < .001$ level, providing strong empirical support for the proposed framework.

Among the chatbot characteristics, personalization emerged as the most influential predictor of customer experience (β = 0.271, p < .001), followed by intelligence (β = 0.196, p < .001), service quality (β = 0.167, p < .001), and interaction quality (β = 0.159, p < .001). These results indicate that all four chatbot attributes significantly contribute to enhancing the user's experience, with personalization playing the most critical role.

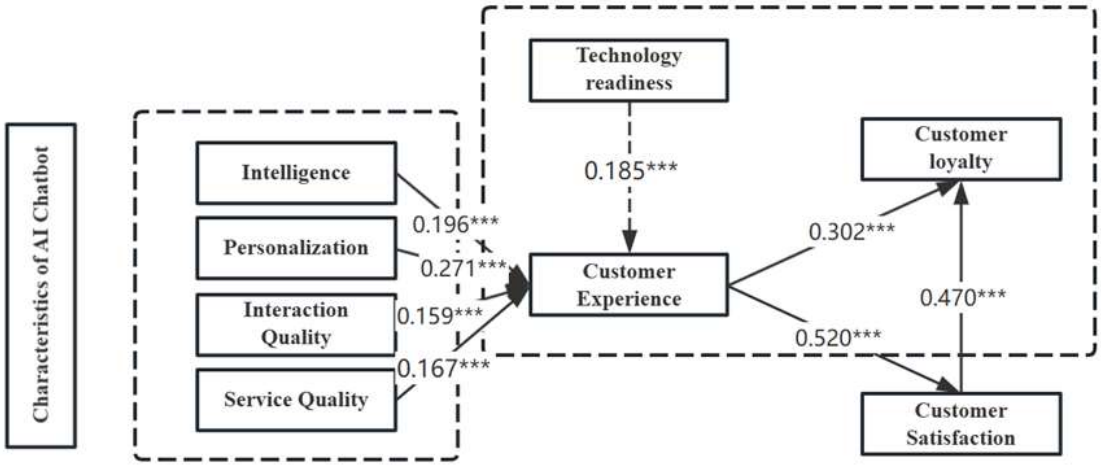

Figure 2: The Research Results of Using an AI Chatbot.

Customer experience, in turn, demonstrated a positive effect on both customer satisfaction (β = 0.520, p < .001) and customer loyalty (β = 0.302, p < .001), supporting its mediating role within the model. Furthermore, customer satisfaction exerted a strong direct influence on loyalty (β = 0.470, p < .001), suggesting a dual pathway to loyalty that operates through both experiential and satisfaction-driven mechanisms.

4.4. Moderation Analysis.

Table 5: The Moderator Test Result.

Model	S.E.	Beta	*t*	*p*	Result
H5 Technology readiness positively moderates the relationship between customer experience and customer loyalty.	0.05	0.185	3.70	<0.01	Supported
Note: S.E.=Standard Error					

The moderation analysis indicated that technology readiness significantly moderated the relationship between customer experience and customer loyalty (β = 0.185, SE = 0.05, t = 3.70, p < .01), supporting Hypothesis H5. This suggests that the positive effect of customer experience on loyalty is stronger among users with higher levels of technology readiness.

5. DISCUSSION AND CONCLUSIONS

5.1. Discussion

This study aimed to examine how specific characteristics of AI chatbots namely intelligence, personalization, interaction quality, and service quality influence customer experience and how that experience subsequently impacts customer satisfaction and loyalty, using DeepSeek as the focal platform. Additionally, the moderating role of technology readiness was explored.

The results indicate that all four chatbot characteristics significantly contribute to enhancing customer experience, with personalization identified as the most impactful factor (β = 0.271, p < .001). This aligns with previous studies suggesting that personalized services delivered by AI agents increase users' perceived relevance, emotional attachment, and overall satisfaction [9]. The effects of intelligence (β = 0.196), interaction quality (β = 0.159), and service quality (β = 0.167) were also significant, reinforcing the view that user experience is shaped by both the chatbot's functional intelligence and its communication effectiveness (Gnewuch et al., 2017).

Customer experience emerged as a strong predictor of both customer satisfaction (β = 0.520) and customer loyalty (β = 0.302). These findings align with prior research in digital service contexts, highlighting that well-designed and meaningful

interactions with AI technologies can lead to positive attitudinal and behavioral outcomes (Lemon & Verhoef, 2016). Moreover, customer satisfaction significantly influenced customer loyalty ($\beta = 0.470$, $p < .001$), reinforcing the widely supported view that satisfaction plays a pivotal role in driving loyalty. This result is consistent with evidence from both traditional and digital service environments, confirming that satisfaction remains a key determinant of customer loyalty in AI-enabled settings.

A significant contribution of this study is the confirmation of the moderating role of technology readiness ($\beta = 0.185$, $p < .001$), which notably influenced the strength of the relationship between customer experience and customer loyalty. This finding reinforces that individual differences in users' openness to and confidence in using technology shape how they perceive and respond to AI-mediated interactions (Parasuraman, 2000). Users with high technology readiness are more likely to recognize the value of their interactions with AI systems and to convert those positive experiences into enduring loyalty (Blut et al., 2024). This insight holds particular relevance for platforms such as DeepSeek, suggesting that user-specific technological traits should be considered when designing and optimizing chatbot engagement strategies.

5.2. Theoretical Implications

This research contributes significantly to the academic literature on AI-enabled service delivery by advancing our understanding of how chatbot-specific characteristics influence customer experience. By focusing on intelligence, personalization, interaction quality, and service quality, the study offers a refined, multidimensional view of chatbot effectiveness that extends prior frameworks (Chen et al., 2022). It moves beyond treating AI chatbots as a monolithic construct and instead shows how distinct technical and service-related features uniquely shape the user experience.

Moreover, the study empirically validates the link between customer experience and satisfaction and loyalty, reaffirming existing theories (Bleier et al., 2019; Chung et al., 2020). This supports the broader theoretical claim that positive service encounters especially in digital and AI-enhanced environments are a foundation for enduring customer-brand relationships. Significantly, including technology readiness as a moderator broadens the theoretical lens to incorporate user-level psychological traits. This integration aligns with prior work in digital service adoption (Hsu & Lin, 2023; Parasuraman, 2000) and offers new insights into how customer dispositions shape technology-enabled experiences.

Thus, this research adds to the service marketing by illustrating how AI chatbot design features interact with individual differences in technology acceptance to influence behavioral outcomes like satisfaction and loyalty.

5.3 Practical Implications

For practitioners, the findings offer clear, data-driven insights into optimizing chatbot design and deployment. First, personalization emerged as the strongest predictor of customer experience, indicating that brands must prioritize personalized communication in chatbot systems. This includes using customers' names, remembering previous queries, and offering context-aware responses (Ait Baha et al., 2023; Ma et al., 2021).

Secondly, interaction and service quality play critical roles in shaping user perceptions. Brands should ensure that chatbots are technically accurate, fast, engaging, and conversational. This supports the growing need for more human-like, emotionally intelligent AI to simulate relationships. Investing in natural language processing, responsive flow design, and empathy-driven dialogue systems will be essential for maintaining positive engagement.

Thirdly, the significant moderating effect of technology readiness suggests that chatbot deployment strategies should be differentiated based on user segments. Tech-savvy users might prefer advanced chatbot features with less need for human backup, whereas users with lower technology readiness may benefit from simplified interfaces and the option to escalate to a human agent (Blut et al., 2024). Thus, user segmentation and adaptive design are key for maximizing the inclusivity and effectiveness of AI-driven service systems.

Lastly, this study is especially relevant in Chinese digital service markets, where platforms like DeepSeek operate under unique regulatory, linguistic, and user-behavioral constraints (Gupta & Singh, 2024). Understanding user expectations and tailoring chatbot responses to the local digital ecosystem is essential for success. Unlike many chatbot studies that assume a cultural setting, our findings demonstrate how chatbot characteristics and technology readiness interact in a context shaped by large-scale digital adoption, strict content moderation, and distinct consumer behavior patterns. This contextualization expands the applicability of e-service quality and customer experience frameworks, showing that the influence

of chatbot attributes on satisfaction and loyalty may vary depending on the cultural and regulatory environment.

5.4. Conclusions

Firstly, this study investigated the impact of AI chatbot characteristics on customer experience, satisfaction, and loyalty while exploring the moderating role of technology readiness. Results confirm that chatbot attributes especially personalization and intelligence positively influence customer experience. Besides, customer experience significantly drives both satisfaction and loyalty. The findings further demonstrate that technology readiness amplifies the experience–loyalty link, providing nuanced insight into how user-level traits shape service outcomes.

Secondly, this study expands the chatbot and service literature by understanding the nature of chatbot service quality and introducing user readiness as a moderating factor. Practically, it underscores the importance of adaptive, human-like, and personalized chatbot designs that cater to the diversity of users' technological comfort.

Lastly, in a rapidly evolving AI service environment, businesses must balance technical precision with emotional intelligence while accounting for individual customer readiness. As AI chatbots become a core assistant in the customer journey, strategic investments in user-centric, personalized AI systems will enhance satisfaction and loyalty and differentiate brands in a competitive digital marketplace.

5.5. Future Study

Although this study offers meaningful insights into how AI chatbot characteristics influence customer experience and loyalty, it also opens several opportunities for future research. On the one hand, future research could apply this model across different platforms or industries to enhance external validity. Comparing AI chatbot experiences across healthcare, education, or banking sectors may reveal industry-specific dynamics and user expectations.

On the other hand, future research may adopt longitudinal approaches to examine how user perceptions and behaviors evolve with continued chatbot interaction. This would offer richer insights into the sustainability of chatbot-induced loyalty. Additional user traits such as digital trust, perceived risk, or innovation resistance can be studied except for the moderating effect of technology readiness. These psychological and demographic moderators could yield a deeper understanding of customer segmentation and personalized AI service strategies.

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