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IMPACT OF AI-POWERED CHATBOTS ON CUSTOMER RETENTION: MODERATING ROLE OF SERVICE QUALITY PERCEPTION

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Abstract

The employment of Artificial Intelligence (AI) for customer service, and even more so through chatbots, is increasingly becoming the standard by which organizations interact with customers. Online services being rapidly expanded in Pakistan too, AI chatbots are increasingly becoming the norm for interacting with customers. The present research investigates the power of AI chatbots to retain customers, as well as whether the perception of customers regarding the general quality of service will impact this relationship. Customers of online shopping and digital banking in Pakistan were surveyed using a systematic quantitative questionnaire. Results reveal that correct, timely, and personalized responses by chatbots play an important role in retaining customers. Also, the feeling of high quality of service—reliability, responsiveness, and assurance—positively affects the role of chatbot performance in customer loyalty. These conclusions propose that chatbot

performance is meaningful but effective achievement in its customer retention is entangled with the general sense of service quality. The study offers practical recommendations for emerging economy companies to supplement technology resources with robust design principles for service in order to build greater customer trust and ensure long-term engagement. The study highlights the imperative of a balance model of combining AI effectiveness and customer-focused delivery of services in Pakistan's digital economy.

Keywords: AI-powered chatbots, customer retention, service quality perception, Pakistan, digital services

Introduction

The last decade has seen technology significantly change the business environment, particularly through the application of Artificial Intelligence (AI) in processes of service delivery. One of the most impactful applications of AI is chatbots—computer software that is capable of having a text or voice conversation with consumers in real time. These technologies now form the core of online customer service, providing a substitute for human agents by mimicking normal interaction, responding in real time, and answering customer questions (Chattaraman et al., 2019). They are spreading fast across the world and are now increasingly being adopted in developing countries, such as Pakistan.

Pakistan is in the process of going digital with rising internet penetration, an info-technology-aware youth, and government efforts towards going digital (Ahmed & Waheed, 2021). The use of smartphones and enhanced access to low-cost data services has majorly boosted the adoption of digital channels for banking, retail, and customer care. With the shift to this new digital landscape, chatbots fueled by AI have become a go-to means of dealing with large volumes of customer interactions across industries such as e-commerce and online banking. The chatbots are programmed to deal with routine questions, aid users in transactions, and make sure there's 24/7 availability, thus alleviating the operational load on the support staff (Gnewuch et al., 2017).

In spite of the increasing uptake of chatbot technologies, customer retention continues to be an ongoing issue within Pakistan's digital service industry.

Inconsistency in chatbot functionality, language constraints, and a lack of tailoring tend to result in user discontent, encouraging users to churn to other service providers (Khan & Jamil, 2022). The functionality of a chatbot thus becomes crucial in user retention and developing long-term brand loyalty. Chatbot effectiveness can be evaluated based on dimensions such as responsiveness, accuracy, relevance of responses, ability to personalize interactions, and overall user satisfaction (Nguyen et al., 2022). These elements collectively determine whether a customer perceives the interaction as valuable and worth continuing.

However, the effectiveness of chatbots does not operate in isolation. Customer perception of the overall service quality acts as a crucial factor in shaping their behavioral responses. According to Parasuraman et al. (1988), service quality comprises five key dimensions: reliability, responsiveness, assurance, empathy, and tangibles. These dimensions influence how customers judge the overall performance of a service provider. In digital contexts, especially in developing countries like Pakistan where digital trust is still evolving, the perceived quality of service becomes even more vital. Users tend to evaluate digital services not just based on technology but also on how reliable, empathetic, and secure they perceive the entire experience to be (Arif et al., 2021).

Research shows that when customers perceive service quality to be high, they are more likely to continue their association with the brand, recommend it to others, and forgive minor service lapses (Zeithaml et al., 1996). Thus, perceived service quality not only has direct impact on retention, but also may moderate the interaction between chatbot effectiveness and loyalty. For example, even if a chatbot is effective in its functionality, a customer who has poor general service quality—e.g., delayed follow-ups or unhelpful escalation options—may yet decide to drop the service.

This dynamic is particularly significant in Pakistan. Cultural closeness to human contact, data protection concerns, and variations in digital literacy all contribute to a complex pattern of customer behavior. Rehman et al. (2023) claim that Pakistani consumers are still far from building faith in total automation. Hence, organizational interventions to reconcile technological endeavors and service quality maintenance need to be undertaken if

customers are to be preserved successfully. The failure to respond to these factors may result in increased churn of customers even with technology spends.

Moreover, the digital divide between urban and rural Pakistan also hinders the easier adoption of AI-based solutions. Digital services are used more and are heavily dependent in larger cities like Karachi, Lahore, and Islamabad. However, in semi-urban or rural markets, lower infrastructure availability and lower digital literacy make consumers less accepting of service interruptions or misinterpretation on the part of chatbots (Shaikh & Khoso, 2020). Under such circumstances, service quality, described in terms of usability, problem-solving, and backup from human support, determines if satisfaction and loyalty are generated among users.

A clear example of the same is the banking sector. The majority of the large banks in Pakistan have introduced chatbots powered by AI to support mobile and internet banking. Even though these bots are designed for routine transactions, such as balance inquiries and money transfers, customer feedback is usually about problems that stem from limitations in language, unability to handle complex queries, and unfeasibility of personalization (Saeed et al., 2021). Consumers faced with unresolved issues or scripted responses from chatbots will view the entire service as inferior and will move to other providers or revert to old ways. Such a scenario emphasizes the need to appreciate how chatbot performance unfolds within broader conceptualizations of service quality to promote customer loyalty.

Previous international research has shown that AI chatbots will enhance customer experience and loyalty. For example, Grewal et al. (2020) point out that automation, designed effectively, can provide smooth and tailored experiences that drive customer engagement. Similarly, Dwivedi et al. (2021) argue that AI-based customer service solutions can generate cost savings while simultaneously improving satisfaction and retention. These studies are, however, generally focused on developed economies with higher digital readiness. There still remains a gap in knowledge on how these technologies operate within developing economies, where infrastructural and psychological bottlenecks could alter their effectiveness.

It is the objective of this study to fill this gap by exploring the relationship between the effectiveness of AI-powered chatbots and customer retention in the Pakistani context. It also explores the moderating role of perceived service quality in this relationship. The following research goals underpin the study:

- To investigate the direct effect of chatbot performance on customer loyalty.
- To identify if perceived service quality reinforces or dilutes the link between chatbot performance and customer loyalty.

Through answering these questions, the study provides actionable lessons to companies that are doing business in Pakistan's digital economy. It emphasizes the need not only to invest in sophisticated AI technologies but also to integrate these tools with larger service quality efforts to produce satisfied customers and keep them engaged in the long run.

Grasping these forces is particularly pertinent as Pakistan transitions toward a more digital economy. Initiatives by government, like "Digital Pakistan," are intended to promote digital inclusion and facilitate innovation in the technology industry (Ministry of IT & Telecom, 2022). As companies react to these changes, the success with which they can retain customers will largely be governed by their capacity to provide good and efficient digital experiences. The results of this study can be used as a blueprint for those organizations looking to adopt or improve on AI-facilitated customer service technologies in a manner that aligns with user demands and establishes trust.

The inclusion of AI-facilitated chatbots in customer care has opportunities as well as challenges. While these technologies can enhance efficiency and lower expenses, their capability to retain customers relies to a large extent on the perception of users regarding the quality of service (Gul et al., 2025). In countries such as Pakistan, where digital maturity continues to develop, the dynamics between chatbot success and perceived service quality become extremely important. Those organizations that are successful in achieving this equilibrium are likely to be more competitive in being able to build stronger customer relationships in a rapidly digitalizing world.

Literature Review

AI-Powered Chatbots and Customer Engagement

The evolution of artificial intelligence (AI) has witnessed the creation of intelligent virtual personal assistants, also known as chatbots, which

communicate with the users as human beings. (Gul et al., 2019). The chatbots are founded on advanced technologies such as natural language processing (NLP), machine learning (ML), and predictive analytics to reach out to customers in real-time (Chattaraman et al., 2019). Their integration into service delivery models has transformed customer interaction through assistance in providing 24/7 support, reducing waiting time, and handling a high volume of customer inquiries efficiently (Arshad et al., 2025).

In today's customer service environments, AI chatbots play a vital role in enhancing the overall customer experience (Khan et al., 2021). They allow organizations to automate standardized responses, route questions to the appropriate departments, and even handle complex queries when properly coded (ul Hassan et al., 2023). According to the observation of Gnewuch et al. (2017), chatbots are most effective in frequently asked questions, order tracking, as well as basic troubleshooting, where consistency and speed are critical. Such qualities enable communication to be made efficient and enable customers to access timely assistance, thus augmenting satisfaction levels (ul Hassan et al., 2020).

Moreover, AI chatbots can be made to align brand tone and personality, offering more enjoyable and personalized experiences (Irshad et al., 2024). This personalization is important because research indicates that customers are more likely to respond positively to services that demonstrate a sense of understanding their personal needs (Nguyen et al., 2022). Sentiment analysis and contextual memory in chatbots enable them to recall past conversations, provide responsive answers, and cut friction in repeated interactions (Rana et al., 2024).

Customer interaction, which is the emotional and behavioral bonding between a customer and a brand, is significantly determined by perceived interactivity, responsiveness, and availability—characteristics that are built into well-constructed chatbot systems (Van Doorn et al., 2010). Therefore, AI-based chatbots not only play a utilitarian function of answering questions but also help in solidifying the relationship between the service providers and customers (Gul et al., 2021). When consumers are given timely, correct, and sympathetic feedback by AI chatbots, their experience with the brand is

enhanced overall, which generates more powerful loyalty and long-term interaction (ul Hassan et al., 2025).

Customer Retention and Chatbot Effectiveness

Customer retention is an important business performance measure for companies in every industry, as it indicates the ability of an organization to retain its customers in the long run (Atif et al., 2024). Described as the process of maintaining active customers and avoiding churn, retention is important in the sense that it directly affects long-run profitability as well as economizes on the costs of acquiring new customers (Oliver, 1999). High levels of retention usually point toward customer satisfaction, high service quality, and sound value delivery mechanisms (Kakakhel et al., 2016).

With the current digital economy in which service channels have moved swiftly to digital platforms, customers are needed to be retained by means other than conventional marketing or loyalty programs (Gul et al., 2024). New avenues for companies to guarantee unbroken, effective service are created by digital tools like AI chatbots (Khan et al., 2020). Strategically placing chatbots makes it possible for companies to be always available, making it more convenient for customers and minimizing occurrences of frustration due to delays or miscommunication (Verma & Singh, 2020).

Chatbot performance, though, is decided by various factors such as their response accuracy, simplicity, personalization of the interaction, and overall problem-solving ability (Mumtaz et al., 2025). Where these factors exist, customers tend to feel that the chatbot interaction is smooth and worthwhile, and this goes a long way in their willingness to continue interacting with the service provider (Grewal et al., 2020). By contrast, subpar chatbot performance—e.g., unrelated answers, lack of empathy, or failure to escalate complicated situations—can create dissatisfaction and cause customers to look for alternatives (Hanif et al., 2023).

It should be noted that retention also doesn't just depend on one interaction. Rather, it is influenced by aggregate experiences, with consistency in service delivery through chatbots being crucial (Alam et al., 2025). Organizations that invest in educating their AI systems on various data sets, periodic updates, and feedback loops are likely to develop systems capable of pre-empting customer expectations and satisfying them. These smart systems

also play a role in establishing trust, which is a condition for retention, particularly in virtual settings where there are limited human touch points (Nguyen et al., 2022).

Perceived Service Quality as a Moderator

Service quality is a complex construct, and it is the customer's perception of the overall superior or excellent nature of a service. Perceived service quality, as it pertains to AI-powered customer services, includes dimensions like the consistency of responses from the chatbot, its ability to understand the customer emotionally, speed of service provision, and certainty customers feel about data security and solution to problems (Parasuraman et al., 1988).

The well-known SERVQUAL model by Parasuraman et al. (1988) suggests five such service quality dimensions: reliability, responsiveness, assurance, empathy, and tangibles. Although these were originally developed for physical services, in digital service contexts, they have been applied to encompass virtual reliability (for example, accuracy of chatbot responses), digital responsiveness (for example, promptness of replies), and perceived digital empathy (for example, tone or ability to recognize frustration of the chatbot). Those customers who have a positive perception of these dimensions are likely to express higher levels of satisfaction and exhibit stronger loyalty (Zeithaml et al., 1996).

Notably, perceived service quality may serve as a moderator—strengthening or weakening the interaction between chatbot effectiveness and customer loyalty. If a chatbot is effective but the customer views the overall service quality as low—e.g., because follow-up services prove unhelpful or data privacy is of concern—their willingness to remain loyal will be low. On the other hand, when the perceived quality of a service is high, positive chatbot effects are magnified, strengthening the trend of sustained usage and word-of-mouth promotion (Arif et al., 2021).

In the context of Pakistan, this moderating function gains more significance. Pakistani consumers tend to prioritize interpersonal trustworthiness, respect, and concern even in online dealings (Rehman et al., 2023). Thus, service quality perception goes beyond functionality to also encompass affective factors like politeness, transparency, and the presence of

human support when necessary. Omission of these factors can lead to unfavorable judgments, irrespective of the technical capabilities of the chatbot. Additionally, the cultural focus on collectivism and community in Pakistan means that poor service experiences will be more likely to be communicated through word-of-mouth, affecting a company's overall reputation. This risk underlines the need for organizations to ensure their AI systems are not just effective but part of a quality service environment that values local expectations and norms (Shaikh & Khoso, 2020).

Research Gaps and Relevance to Pakistan

While there is an increasing volume of published research on AI chatbots and their impact on customer behavior, most existing research has come from developed countries with well-developed technology infrastructure and digitally savvy consumers. The United States, the UK, and Europe have been leading the charge in implementing AI into customer service, and research from these countries tends to take for granted a certain level of digital literacy and acceptance of automated processes (Dwivedi et al., 2021). These assumptions are not necessarily applicable in the emerging economies like Pakistan, whose infrastructural constraints, linguistic diversity, and differential digital competencies pose distinctive challenges.

In Pakistan, the digital environment remains to be developed. Even though internet penetration is increasing and online platforms are on the growth trajectory, the overall acceptance of AI-based solutions is in its infancy stage (Ahmed & Waheed, 2021). In addition, customers usually remain wary of automated systems mainly because they worry about data safety, absence of transparency, as well as impersonal delivery of services. All these points indicate that chatbot performance alone might not be enough to ensure customer loyalty. The relationship between service quality perception and technological performance needs further probing within the Pakistani context. Few empirical studies have been conducted to determine the impact of AI-based chatbot services on customer loyalty across Pakistan's financial and e-commerce industries. While there has been some investigation into overall customer satisfaction with online services, the specific contribution of chatbot interactions and the moderating impact of perceived service quality is less clearly understood (Saeed et al., 2021). This paper seeks to fill this knowledge

gap by examining how the variables interact and impact customer retention in a representative Pakistani sample.

Moreover, the local context-dependent character of customer expectations in Pakistan—e.g., the expectation to communicate in both languages, to have natural conversation flow, and respectful language tone—opens up opportunities for culturally sensitive design of AI. Failure to adapt chatbot services according to local expectations can cause service providers to miss out on the full potential of these solutions to retain customers. Hence, a deeper understanding of technical and experiential factors is essential to inform service design and customer relations programs in this market.

Conceptual Framework and Hypotheses

Based on the existing knowledge and contextual understanding, this study proposes a conceptual framework that relates the effectiveness of chatbots enabled through AI, customer retention, and perceived service quality. The suggested framework indicates that chatbot effectiveness has a direct influence on customer retention, and this is moderated by the customer's perception of service quality.

The conceptual model merges concepts from the Technology Acceptance Model (TAM) and the SERVQUAL model. TAM posits that perceived ease of use and perceived usefulness determine users' adoption of technology (Davis, 1989). When applied to chatbots, effective problem-solving is what is meant by perceived usefulness, while ease of use equates to user interface and intuitive design. On the other hand, SERVQUAL focuses on the service quality effect on user satisfaction and loyalty.

In this framework, chatbot effectiveness is positioned as the independent variable, customer retention as the dependent variable, and perceived service quality as the moderating variable. The interaction between chatbot performance and service quality is hypothesized to influence how strongly chatbot use contributes to customer loyalty.

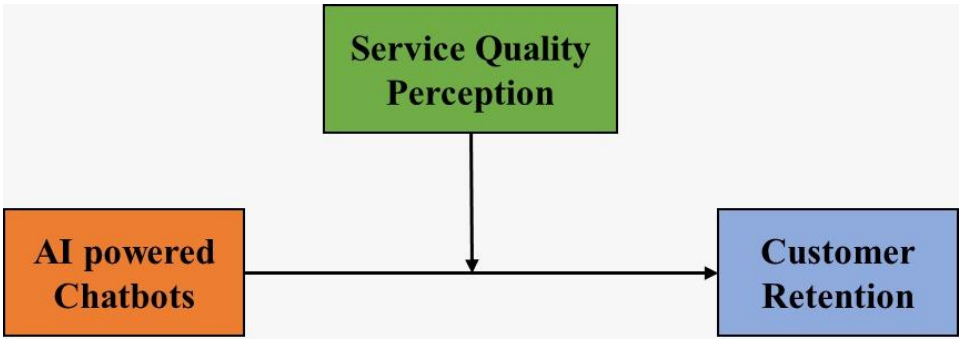

Figure 1: Theoretical Framework

Based on the synthesis of prior research and the gaps identified in the literature, the following hypotheses are proposed:

- **H1**: There is a significant positive relationship between the effectiveness of AI-powered chatbots and customer retention in Pakistan's digital service sector.
- **H2**: Perceived service quality moderates the relationship between chatbot effectiveness and customer retention such that the relationship is stronger when perceived service quality is high.

Methodology

Research Design and Sample

This research employed a quantitative, cross-sectional design to examine the relationship between AI-powered chatbot effectiveness and customer retention, with perceived service quality acting as a moderator. The study targeted individuals who had experience interacting with chatbots through digital banking or e-commerce platforms in Pakistan. A structured questionnaire was distributed both online and in-person across four major urban centers: Lahore, Karachi, Islamabad, and Faisalabad.

A stratified random sampling technique was used to ensure representation across different demographic groups and service usage frequencies. The sample consisted of 384 valid responses, aligning with the minimum required sample size for a medium effect (Cohen's d = 0.5) in social science research using power analysis (Cohen, 1988). The demographic breakdown included 55% male and 45% female respondents, with 68% aged between 20 and 35, reflecting the dominant user base of digital services in Pakistan.

Measures

- Efficiency of AI-Powered Chatbot: This was a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) taken from Gnewuch et al. (2017). The items ranged from responsiveness, problem-solving capability, personalization, to general satisfaction with the chatbot encounter. Examples of items are "The chatbot gave prompt responses" and "The chatbot gave me personalized suggestions."
- • Customer Retention: To evaluate retention, we modified Zeithaml et al.'s (1996) scales to measure the users' propensity to keep using the service and recommend it to others. Example items included "I intend to continue using this platform" and "I would recommend this platform to others."
- **Perceived Service Quality**: Based on the SERVQUAL framework (Parasuraman et al., 1988), the measure was adapted for digital service contexts. The five dimensions (reliability, responsiveness, assurance, empathy, and tangibles) were reinterpreted for chatbot interactions. Items included statements like "The chatbot interaction felt secure" and "The chatbot was empathetic to my concerns."

Data Analysis

Data were analyzed using SPSS (version 26) and AMOS (version 24). Descriptive statistics were computed to profile respondents and their interaction history with chatbots. Cronbach's alpha was used to assess reliability for each construct, with all variables showing acceptable internal consistency (alpha > 0.70).

To test **H1**, a linear regression analysis was conducted with chatbot effectiveness as the predictor and customer retention as the outcome variable. For **H2**, moderation analysis was conducted using Hayes' PROCESS macro (Model 1), which calculates the interaction effect of the independent variable and the moderator.

Results

Descriptive Statistics

Table 1 provides an overview of the demographic characteristics of the respondents.

Table 1: Demographic Profile of Respondents (N = 384)

Demographic Variable	Frequency	Percentage (%)
Gender		
Male	211	55.0
Female	173	45.0
Age Group		
18–25	142	37.0
26–35	118	30.7
36–45	77	20.1
46 and above	47	12.2
Platform Used		
Digital Banking	198	51.6
E-commerce	186	48.4

Hypothesis Testing

Table 2: Regression Analysis for H1

Predictor	β	t	p-value
AI-Powered Chatbot Effectiveness	0.48	9.86	< .001

The regression analysis shows a significant positive relationship between chatbot effectiveness and customer retention (H1 supported). The model accounted for 23% of the variance in customer retention ($R^2 = 0.23$).

Table 3: Moderation Analysis Using Hayes' PROCESS Macro (Model 1)

Variable	β	t	p-value
Chatbot Effectiveness (X)	0.38	6.12	< .001
Perceived Service Quality (M)	0.29	4.98	< .001
Interaction Term (X*M)	0.21	2.74	< .01

The interaction effect is significant, confirming that perceived service quality moderates the relationship between chatbot effectiveness and customer retention (H2 supported).

Figure 1: Simple Slope Analysis

- The slope of chatbot effectiveness is steeper when perceived service quality is high, indicating a stronger impact on retention.

Discussion

The findings support empirically the thesis that chatbots powered by artificial intelligence can play a critical role in customer retention if implemented appropriately. This is in alignment with international studies highlighting chatbot responsiveness, customization, and fault-finding as essential aspects of improving customer loyalty (Nguyen et al., 2022; Grewal et al., 2020).

Additionally, the moderating role of perceived service quality verifies that customer retention is not simply a function of technological capability. Rather, it is also influenced by customers' perceptions of total service quality—how safe, solid, and caring the experience of the service becomes (Arif et al., 2021). This is particularly true in the case of Pakistan. As more and more people go digital, there is greater expectation of quality, sympathy, and confidence in service delivery.

The study underlines that AI technologies must be employed within a broader customer experience strategy. Reliant merely on automation while not having a facilitating, human-centric service environment in place might serve as a dampener to the impact of these technologies. Pakistani businesses must focus on designing AI systems attuned to local language patterns, emotional signals, and cultural dynamics to connect more with user expectations.

Conclusion

This research sustains that customer retention in Pakistan's digital service industries is largely determined by the performance of AI chatbots. Perceived service quality further increases such association, implying that the advantages of chatbot implementation are best obtained if within an effective high-quality service arrangement.

For Pakistani businesses, the above findings create the importance of investment balance—evolution in technological infrastructure as well as in service quality. The companies will have to make efforts to improve their chatbot systems so that they deliver not only functional but emotionally intelligent service experiences as well. This will bring more customer satisfaction, long-term loyalty, and competitiveness in the emerging digital economy.

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