Chatbot Service Quality in Banking : Analyzing Indian Banking Customer Perceptions and Influence on Customer Satisfaction and Value

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Abstract

Purpose : The study has two objectives : first, to determine the quality of chatbot services provided by Indian banks; second, to assess the influence of chatbot service quality variables on customer satisfaction and customer value.

Research Methodology : The study used a quantitative methodology, selecting individuals at random from a group of Indian banking clients. We used a questionnaire to collect data from the selected sample as part of a causal research investigation. We made use of SPSS and Python for this analysis. Customer satisfaction and value were taken into account as the dependent variables in our study. The seven elements of service quality—functionality, convenience, security, design, customization, enjoyment, and assurance—made up the independent variables.

Findings : According to this study, client satisfaction and value were significantly shaped by the quality of the services provided. Customers' value was significantly impacted by functionality and enjoyment, and their satisfaction was greatly influenced by assurance, design, and personalization. The unexpected negative impact assurance had on customer value is noteworthy and calls for more research.

Practical Implications : In the highly competitive banking industry, this research has important ramifications for banks. It highlighted how important service quality is, which led banks to give priority to customer pleasure and think about making strategic changes. Banks could obtain a competitive advantage by improving the quality of their services, improving chatbot services, and implementing a customer-centric strategy by utilizing the research findings that have been presented. Our research helped banks evolve with the needs of their customers in mind, enabling them to gain credibility, repeat business, and long-term success in the ever-changing banking services market.

Originality/Value : This study examined how consumers in Indian banks perceive the value and satisfaction of chatbot services and how they use them. The study provided useful recommendations and concepts to improve the general consumer experience.

Keywords : **chatbot services, banks, customer value, customer satisfaction, service quality**

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The banking industry in India has undergone significant development changes since 1990 due to a strong emphasis on cutting-edge advanced technology and innovative approaches. Indian banks started utilizing

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advanced technology to offer consumers better services faster than in the past. Online and mobile banking are available from a variety of geographic regions. The creative capacity of humans has greatly increased over time. The impact of this technology may be felt in almost every part of our lives. Man has progressed to the point where his desire to understand the mysteries has been working to create intellect like his own. This desire has led to the creation of artificial intelligence (AI) (Vieira & Sehgal, 2018). AI is a collection of techniques that enable robots to conduct advanced cognitive operations typically performed by humans (Chung et al., 2020). AI encompasses various technologies, like automatic chatbots resembling human conversion and intelligent algorithms that can accurately anticipate complicated phenomena like stock prices and weather. The financial sector is now included in the sphere of innovation. Recent advances in artificial intelligence indicate that chatbots will be a big part of customer service.

Developers created chatbots and virtual helpers using AI and machine learning technologies. Artificial conversational entities (ACEs) also go by the names chatbots, talkbots, instant messaging bots, chatterboxes, and interactive agents. Chatbots are able to respond to different phrases in different ways, learn from their interactions, and modify their responses to suit different situations. These qualities enable chatbots to help businesses with customer questions, real-time interactions, and other areas where they can increase overall customer satisfaction (Pahari et al., 2023). Chatbots provide individualized services, shorter wait times for users, continuous customer support, and a channel for client feedback. The advancement of technology has led to the introduction of chatbots in a few Indian languages. HDFC Bank, ICICI Bank, SBI Bank, YES Bank, City Union Bank, Andhra Bank, AXIS Bank, Kotak Mahindra Bank, Bank of Baroda, and Union Bank of India are a few banks that have used chatbots. The services provided by chatbots and virtual assistants in Indian banks are displayed in Table 1 (Pal & Singh, 2019).

Customer service is one area where digital transformation has caused organizations to sustainably shift more tasks to technology (Prabhavathi & Dinesh, 2023). Compared to traditional customer service, chatbots offer adequate substitutes that reduce the need for human chat operators while empowering them to respond to various consumer requests (Sanny et al., 2020). This research holds paramount importance in the contemporary Indian banking landscape. This research is important because it sheds light on how chatbot services affect customer value and satisfaction in terms of functionality, convenience, security, enjoyment, personalization, assurance, and design. The banking sector in India is undergoing fast change, with chatbot adoption rates rising.

Table 1. ***List of a Few Banks in India Offering Chatbots and Virtual Assistants***

S. No.	Name of the Bank	Chatbots Name	Type of Bank
1	HDFC	EVA	Private
2	ICICI	iPAL	Private
3	Yes Bank	Yes Robot	Private
4	IndusInd Bank	IndusAssist	Private
5	Andhra Bank	ABHi	Public
6	Axis Bank	Axis Aha	Private
7	Canara Bank	Mitra and Candi Robot	Public
8	Union Bank of India	UVA	Public
9	Bank of Baroda	ADI	Public
10	SBI	SIA	Public
11	Kotak Mahindra Bank	Keya	Private
12	City Union Bank	CUB Lakshmi Robot	Private

This study investigates how customer value and happiness are affected by a number of chatbot service quality factors, including functionality, ease of use, security, enjoyment, customization, assurance, and design. The following important questions are the focus of the study: in the context of Indian banking, how do these factors both separately and collectively impact client views and interactions? How much do these factors influence the value and satisfaction of customers? Additionally, the goal of this study is to provide Indian banking institutions with useful information and a thorough understanding of the dynamics so they may optimize their chatbot services and improve client experiences overall.

Our study's uniqueness lies in its dedicated focus on the Indian banking landscape. While chatbot services have been explored globally, there remains a conspicuous gap in understanding their impact within the specific cultural, technological, and regulatory framework of the Indian banking sector. This research adds to the growing body of knowledge on chatbots and provides insightful information on a market that is expected to grow significantly.

The impact of chatbot services on customer experiences is the subject of an expanding corpus of literature. Still, academics haven't done much to identify the particular characteristics of the Indian banking sector. Previous research has often overlooked the unique nuances of this field, leaving uncharted territory for further investigation. Our study aims to bridge this information gap and meet a knowledge gap by providing insight into how Indian banking customers perceive and interact with chatbots.

Literature Review

Chatbot Services

Information technology is being used by society more and more in practically every field (Hardi et al., 2020). Since language is central to the human-machine conversation as a technology, computational techniques let people and machines communicate in natural language. Chatbots have been used in a number of industries, including entertainment, education, customer service, and internet support (Shawar & Atwell, 2007). In the tech-savvy world of today, banks use chatbots to enhance customer service (Trivedi, 2019). According to Shawar and Atwell (2007), a chatbot is a software program that can have a conversation or communicate with a human user in a natural language like English. Since Eliza, the initial conversational AI system developed in the 1960s, chatbots have come a long way. They can respond to practically any query since they have experience with enormous amounts of data. Recurrent neural networks for text creation constitute the foundation of chatbot technology, and developers can train them end-to-end. Chatbots are a cutting-edge form of communication that is quickly gaining traction in other financial institutions, as claimed by Vieira and Sehgal (2018). Convenience and increased productivity are the main factors influencing chatbot adoption, according to Brandtzaeg and Følstad (2017). Modern technology that supports NLP is used in the development of customer service chatbots (Kvale et al., 2021). Even if their content is mostly written or spoken, chatbots may provide often-requested options like buttons or quick replies, as well as content in the form of photos, videos, and links to other websites (Zhang et al., 2023).

Previous research on chatbots has been done by researchers utilizing a range of techniques, looking at user characteristics, function usability, and chatbot adoption. The factors affecting the chance of a customer connection, trust, commitment, and intention to repeat IT services were investigated by Park et al. (2012). Chung et al. (2020) examined whether retail businesses could uphold their fundamental principle of offering personalized care using e-services compared to more conventional face-to-face interactions, mainly through chatbots. Studies on chatbots as a kind of information system are conducted (Trivedi, 2019). How do the information system success model's three quality dimensions impact the experience of customers?

Meyer-Waarden et al. (2020) aimed to investigate consumer approval and readiness to use a chatbot again in the context of automated customer care in the airline industry. Sanny et al. (2020) surveyed to ascertain the extent

of the customer satisfaction elements that successfully affected chatbot acceptability in Indonesia. The study provided a new perspective on the crucial variables influencing customer satisfaction and chatbot adoption in Indonesia. Still, they also assisted Indonesian organizations in considering those variables when preparing to build chatbots for their organizations. Three factors influenced customers' intentions to keep using the bank's chatbot services: perceived utility, satisfaction, and trust, with trust being the most important (Nguyen et al., 2021). Low empirical evidence is found in the literature review to support customers interacting with banks through chatbots. The users' desire to interact with AI systems that can learn from them, predict their emotions, and make decisions that resemble those made by people is unclear. Consequently, the study will concentrate on the impact of chatbot service quality on customer value and happiness in the banking industry.

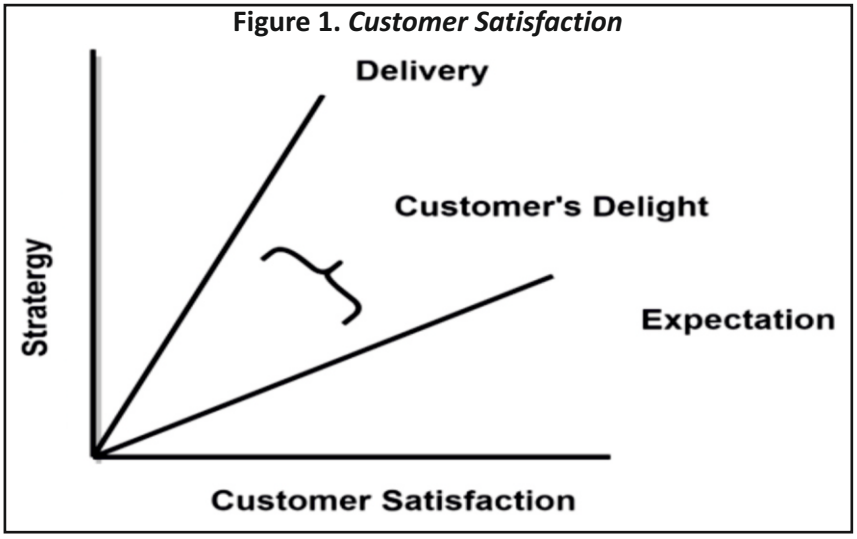
Customer Satisfaction and Service Quality

In today's competitive market, organizations should strive to focus on the needs and desires of their consumers and meet their expectations. Empirical studies have demonstrated that service quality has a greater influence on customer satisfaction and loyalty than product/service attributes (Rashid & Rokade, 2023; Zaibaf et al., 2013). The quality of services is closely linked to customer satisfaction. Customer satisfaction is a term that is important in marketing literature. The degree to which a consumer is satisfied with a product or service is determined by how well it meets their expectations. Perceived service quality raises customer satisfaction and vice versa. It is established that the degree of service quality affects customer satisfaction based on an empirical study examining the relationship between perceived service quality and customer satisfaction. The perceived performance-based paradigm, which takes into account how customers believe a product or service to perform, is used to quantify customer satisfaction (George & Kumar, 2014). A formula that can be used to gauge the quality of services (Pandey, 2012) is :

$$Satisfaction = \frac{Perceived\,Service}{Expected\,Service}$$

It is better than the formula satisfaction equals perception minus expectation (refer to Figure 1). In the current competitive market environment, when firms are fighting for survival, cultivating and maintaining customer relationships is essential. The foundation of any successful long-term partnership is customer satisfaction. The

Figure 1. ***Customer Satisfaction***



degree of a person's felt state in relation to a product's perceived performance is known as customer satisfaction (Kotler et al., 2018). The consumer chooses a specific time to purchase goods or services. When a product's perceived performance is evaluated in relation to one or more standards, a comparison process is started. The three possible outcomes are confirmation, positive disconfirmation, and negative disconfirmation (Mahadevan & Joshi, 2022). A neutral perception of successful outcomes is produced when the performance is judged satisfactory. Positive disconfirmation is when a performance either meets or exceeds the customers' expectations and results in their satisfaction. When performance is subpar and results in unhappiness, negative disconfirmation happens (Chandel & Vij, 2019).

A number of previous studies have shown customer satisfaction to be a useful indicator of service quality. These studies include Bolton and Drew (1991), Boulding et al. (1993), Chenet et al. (1999), Ennew and Binks (1999), Sweeney et al. (1999), and Wang and Shieh (2006). Parasuraman et al. (1988) asserted that service quality is influenced by customer satisfaction. However, in his conceptual work, Gronroos (1978) proposed that service quality directly leads to consumer happiness. Taylor and Baker (1994) validated the suggested route after establishing a causal relationship between customer satisfaction and service quality. The research shows that customer satisfaction is highly influenced by the quality of the service (Afthanorhan et al., 2019; Joshi & Dabas, 2022). The findings, which demonstrate a pattern of customer happiness and perceived quality over time, lend credence to the concept of a cycle of satisfaction (Jeon & Choi, 2017). Customer satisfaction is a benchmark for every business organization to attain success and is the key to the growth of any firm. In the highly competitive banking industry, attracting new customers, maintaining existing ones, and developing enduring relationships with them to optimize satisfaction are the main challenges (Gulati & Shankar, 2023; Nambiar et al., 2019).

- **H01 :** Chatbot service quality of banks does not significantly influence customer satisfaction.
- **Ha1 :** Chatbot service quality of banks significantly influences customer satisfaction.

Customer Value and Service Quality

Hapsari et al. (2016) made the implication that the banking sector has to prioritize its customers more. How much the business values its customers will determine its capacity to attract and keep them. Perceived value refers to how customers perceive a company or its offerings in terms of cost, quality, social psychology, and benefits. Thus, customers' view of a company's value depends on their level of loyalty (Zameer et al., 2014). Purchasing the intended goods or services always makes clients satisfied.

Service quality, conversely, integrates various fundamental service elements to ensure the efficient delivery of services. Nonetheless, a substantial correlation exists between understanding customer value and providing high-quality service. It is not always the case that superior service translates into a higher perceived value. Customer involvement in the banking sector, with a high degree of perceived value and quality, is a major contributor to customer satisfaction (Hapsari et al., 2016). If customers feel they are getting value for their money, they will be happy and won't want to transfer banks (Auka, 2012). We identified the importance of perceived quality for service business. Studies reveal that by providing higher levels of perceived service quality and perceived value, businesses can increase customer happiness, loyalty, and performance outcomes. In retail banks, the ideas of service quality, customer value, and customer happiness are interconnected, sometimes nebulous, and strategically crucial (Korda & Snoj, 2010; Pandey et al., 2020). Instead of enforcing expectations, businesses should gauge consumer happiness by learning about their opinions. In light of this, pleasure and perceived value are highly correlated (Malik, 2012; Panigrahi et al., 2021). The relationship between customer happiness and service quality is partially mediated by perceived value, according to this study. It is thus the case that the following hypotheses were developed in light of the literature :

- **H02 :** Chatbot service quality of banks does not significantly influence customer value.
- **Ha2 :** Chatbot service quality of banks significantly influences customer value.

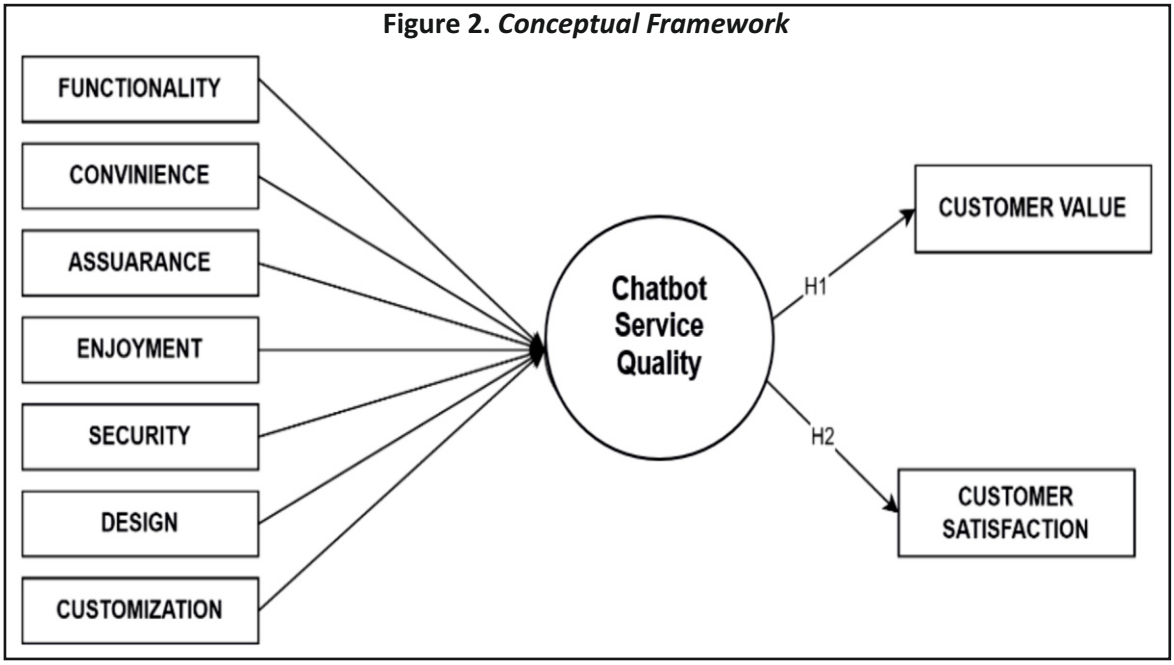
Research Gap and Objectives

Despite the ongoing development of new financial services, customers express discontent, believing they do not obtain enough value from these services (Lähteenmäki & Nätti, 2013; Sharma et al., 2022). This could be due in part to the fact that financial services are predominantly focused on service providers. They thus concentrate on bank procedures and practices. The use of AI-enabled customer services by banks is not well supported by research. Even while the banks push their clients to communicate with AI, it's unclear if these clients find this engaging. Therefore, it is essential to view services from the customer's context. Banks need to understand how customers see AI-enabled customer services like chatbots in their everyday value-creation process and whether they are satisfied. The following research problems are tackled in this study: What steps may banks take to raise the caliber of their Chatbot services? In what ways may chatbot services improve client happiness and values? Which aspects of chatbot service quality have an impact on users' happiness and value? The study's objectives are to measure the service quality of the banks' chatbot services and determine how the banks' chatbot service quality elements affect customer happiness and value, all based on the aforementioned research question.

Conceptual Framework

The conceptual framework of the study is shown in Figure 2, which also presents the theories about the connections between the constructs. In this paradigm, client happiness and value are the dependent variables. Concurrently, the independent variables have been recognized as the seven service quality factors: functionality, convenience, security, design, customization, enjoyment, and assurance.

Figure 2. ***Conceptual Framework***



Research Methodology

This study uses a quantitative research methodology to examine how customer happiness and perceived value are affected by chatbot service quality in the banking industry. A non-rigorous study design is used to accomplish this goal. The main technique for gathering data for this study is the survey approach, which is made possible via a structured questionnaire.

The questionnaire is the principal instrument for gathering data, featuring questions meticulously designed to measure various facets of chatbot service quality, customer satisfaction, and customer value. This approach enables the study to understand the underlying factors and their impact comprehensively. Using statistical software tools, notably Python and SPSS, we evaluate and test the hypothesis regarding the impact of independent variables (functionality, convenience, security, enjoyment, design, customization, and assurance) on the dependent variables (consumer value and customer satisfaction). The study's geographic focus was Bangalore for five months.

Sampling and Data Collection

The diversity and representativeness of the sample are guaranteed by using a basic random sampling procedure. The sample unit is an individual client, and the sample frame consisted of Indian banking customers who actively used chatbot services. For this study, 200 responders were selected as the sample size. The study's generalizability is enhanced, and bias is mitigated by using simple random sampling, which has an equitable distribution that gives every client in the population an equal chance of inclusion. The rationale behind selecting this sampling framework is to reduce selection bias and increase the reliability and validity of the findings. The reliability values of the scales are used in the questionnaire to assess the internal consistency of the measurement items. The study participants will comprise a diverse group, including self-employed individuals, working professionals, business owners, and Ph.D. scholars, ensuring a broad representation of perspectives and experiences. We had adequate time to look into the topics we chose to research over the five months of the study, which ran from February to June 2022. By showing the proportion of participants who had completed their graduate study, Table 2 illustrates the high level of education of the participants.

Table 2. ***Demographic Characteristics***

Characteristics	Frequency	Percentage
Gender		
Female	87	43.5
Male	113	56.5
Occupational Status		
Business	8	4.0
Other	9	4.5
Self-employed	8	4.0
Student	84	42.0
Working Professional	91	45.5
Educational Qualification		
Degree/Diploma	53	26.5
Other	17	8.5

Post-Graduation	129	64.5
Schooling	1	5
Tech-Savvy Individual		
No	74	37.0
Yes	126	63.0
Total	**200**	**100.0**

Moreover, a significant portion (63%) demonstrated proficiency in technology. The largest group of participants, comprising 45.5% of all participants, were working professionals. It was notable that around 84% of the participants were students.

Measurement Scales

The customer value, customer satisfaction, and service quality measurement measures were modified from earlier research. The service quality of chatbot services is assessed using the SSTQUAL scale (Lin & Hsieh, 2011). A scale derived from the American Customer Satisfaction Index, a three-item measure, has been used to gauge customer satisfaction (De Leon et al., 2020; Fornell et al., 1996). In this study, the customer value was measured using the scale from Ivanauskienė et al. (2012) and Sweeney and Soutar (2001). All items are measured by using the 5-point Likert-type scale.The point ranges from 1 = *strongly disagree*, 2 = *disagree,* 3 = *neutral*, 4 = *agree*, and 5 = *strongly agree*.

Analysis and Results

Reliability Analysis

The Cronbach's alpha values for each variable are shown in Table 3, demonstrating their acceptance and reliability (Hazilah Abd Manaf et al., 2012; Nunnally, 1978). Specifically, $\alpha = 0.833$ for functionality, $\alpha = 0.646$ for convenience, $\alpha = 0.649$ for enjoyment, $\alpha = 0.778$ for security, $\alpha = 0.713$ for design, $\alpha = 0.787$ for customer satisfaction, and $\alpha = 0.683$ for customer value. These values adhere to established reliability standards, confirming the robustness of the variables in this study.

Table 3. ***Reliability Analysis***

Variables	Cronbach's Alpha
Functionality	α = 0.833
Convenience	α = 0.646
Enjoyment	α = 0.649
Security	α = 0.778
Design	α = 0.713
Customer Satisfaction	α = 0.787
Customer Value	α = 0.683

Factor Analysis

The findings of the factor analysis performed on the independent variables are shown in Tables 4 and 5. Functionality (having seven items with three removed), enjoyment (having three items with two removed because of high cross-loading), assurance (having two items with one removed), convenience (having two items with one drawn), design (having two items), security (having two items), and customization (having three items with two removed) are some of these variables.

The KMO rating of 0.868 for this study suggests that the data are very good for factor analysis. The variables are suitable for more study based on this value, which indicates a significant shared variance among them. In factor analysis, one of the most important metrics is the total variance explained, which shows how much of the

Table 4. ***Exploratory Factor Analysis of Service Quality***

Independent Variables							
KMO = 0.868							
Total Variance Explained = 82.566 %							
	Functionality	**Convenience**	**Enjoyment**	**Security**	**Design**	**Assurance**	**Customization**
Functionality 1	0.765						
Functionality 2	0.705						
Functionality 3	0.750						
Functionality 4	0.513						
Convenience 2		0.768					
Enjoyment 2			0.855				
Security 1				0.693			
Security 3				0.871			
Design 1					0.712		
Design 2					0.833		
Assurance						0.982	
Customization							0.751

Table 5. ***Exploratory Factor Analysis of Customer Value (CV) and Customer Satisfaction (CS)***

Dependent Variables							
	KMO = 0.778				KMO = 0.602		
	Total Variance Explained = 63.581 %				Total Variance Explained = 66.67 %		
	CV2	***CV3***	***CV4***	***CV7***	***CS1***	***CS2***	***CS3***
CV2	0.665						
CV3		0.864					
CV4			0.759				
CV5				0.695			
CS1					0.792		
CS2						0.897	
CS3							0.753

overall variance in the data is explained by the components that were extracted. The components derived from the data in this study account for a considerable and acceptable fraction of the overall variance explained, as indicated by the study's total variance of 82.566%. These outcomes corroborate the validity and dependability of the factor analysis conclusions, demonstrating the significance of the factors and variables selected to represent the underlying structures.

Descriptive Analysis

The descriptive statistics for the dependent variables (customer value and customer satisfaction) and independent variables (functionality, convenience, assurance, design, security, customization, and enjoyment) pertaining to customers' perceptions of the level of service quality provided by chatbot services are shown in Table 6. The mean value of 2.44 suggests that users perceive the functionality of chatbot services negatively. The mean scores of 2.79 and 2.74 indicate that users have a neutral stance toward the convenience and enjoyment aspects of the chatbot services provided by their banks. On the other hand, the mean value of 2.48 implies that customers tend to disagree with the security of the chatbot services. Notably, the mean value of 1.31 reveals that users strongly disagreed with the assurance provided by these services.

Table 6. ***Descriptive Statistics***

	N	Mean	Std. Deviation
Functionality	200	2.44	0.686
Convenience	200	2.79	0.902
Enjoyment	200	2.74	0.952
Security	200	2.48	0.738
Assurance	200	1.31	0.462
Design	200	2.76	0.763
Customization	200	2.84	0.912
Customer Value	200	2.32	0.577
Customer Satisfaction	200	2.73	0.694

Furthermore, the mean values of 2.33 and 2.73 indicate that customers generally disagreed with the notion that they received significant customer value from the chatbot services. Additionally, they strongly disagreed that they were satisfied with the services provided by the chatbot. These findings collectively offer insights into customers' perceptions and attitudes toward various facets of chatbot service quality.

Regression Analysis

A multiple regression study looks at how customer happiness and value are affected by the quality of the chatbot services. Tables 7 and 8 display the results of the regression model. To examine the relationship between the independent variables (service quality factors, x) and the dependent variable (customer value, y), we performed a multiple regression analysis.

$$CV = 0.821 + Convenience * 0.164 + Security * 0.118 + Assurance - 0.163 + Design * -0.141 + Customization * 0.177 \quad \ldots..(1)$$

Regression analysis uses customer value in Table 7 as the dependent variable. It uses an approach called ordinary

Table 7. *OLS Regression Results (Customer Value as a Dependent Variable)*

Dependent variable		Customer Value		*R*-Square		0.415
Model		OLS		Adj. *R*-Square		0.394
Method		Least square		*F*-Statistics		19.45
No. of observations		200		Prob. (*F*-statistics)		1.46e–19
Df residuals		192		Log-Likelihood		119.74
Df model		7		AIC		255.5
Covariance type		Non-robust		BIC		281.9
	Coef.	**Std. Err.**	***t***	***p*>|t|**	**[0.025**	**0.975]**
Intercept	0.821	0.178	4.611	0.000	0.470	1.173
Functionality	0.124	0.073	1.711	0.089	0.089	0.267
Convenience	0.164	0.051	3.121	0.002	0.002	0.261
Enjoyment	0.069	0.054	1.279	0.203	0.203	0.176
Security	0.118	0.059	2.015	0.045	0.045	0.234
Assurance	–0.163	0.078	–2.104	0.037	0.037	–0.010
Design	0.141	0.063	2.242	0.026	0.026	0.266
Customization	0.177	0.050	3.564	0.000	0.000	0.276
Omnibus		10.566		Durbin–Watson		2.181
Prob. (Omnibus)		0.005		Kurtosis		3.650
Skew.		–0.478		Prob.		0.003

least squares (OLS). OLS is based on the idea that errors are less than their square. The sample size that matters has 200 observations in it. As a result of calculating (No. of observations *(n)* – Number of variables *(k)* +1), or [200 – (1+1)], the degree of freedom (*Df*) of the residuals is 198 and (*k*–1 = 2–1), where *k* is certain variables, is used to build the *Df* model. Non-robust is the listed covariance type. The *R*-squared value, 0.415, in percentage terms, means that the model explains 41.5% of the change in customer value. The adjusted *R*-Square value is 0.394. The likelihood of the *F*-statistics is 1.46e–19, and the *F*-statistics is 19.45. A numerical indicator of the likelihood that generates a model from the provided data is log-likelihood (–119.74). The model is compared using Bayesian Information Criteria (BIC) (281.9) and Akaike's Information Criteria (AIC) (255.5). The kurtosis is 3.650 and –0.478, and the omnibus has a skew of 10.566. Customer value, customer happiness, and independent variables are the dependent variables used in SPSS's multicollinearity analysis, together with tolerance and variance inflation factor (VIF). Because tolerance values, which range from 0.465 to 0.963, and VIF values, which range from 1.039 to 2.149, are more significant than 0.01, the analysis is unable to identify multicollinearity.

Table 7 shows that customization has the highest beta coefficient (0.177), closely followed by convenience (0.164), design (0.141), and assurance (–0.163). The coefficients of all the factors of service quality, with the exception of functionality and enjoyment, show statistical significance ($p<0.05$) and positively influence the following independent variables: convenience (0.002), security (0.045), assurance (0.037), design (0.026), and customization (0.000). However, there is an inverse relationship between assurance and customer value, which has a detrimental impact on the latter. The other variable will decrease if one increases. Since quality and enjoyment have *p*-values of 0.089 and 0.203, which are higher than the typical significance level and have no effect on customer value, they are not statistically significant. The *p*-value is compared to the previously established alpha value of 0.05. Hence, functionality and enjoyment are removed from the regression model due to their low significance at the 5% level (functionality = 0.089, enjoyment = p = 0.203). Customer value is a

Table 8. *OLS Regression Results (Customer Satisfaction as a Dependent Variable)*

Dependent variable		Customer Satisfaction		*R*-Square		0.505
Model		OLS		Adj. *R*-Square		0.487
Method		Least square		*F* - Statistics		27.95
No. of observations		200		Prob. (*F*-statistics)		2.676e–26
Df residuals		192		Log-Likelihood		139.89
Df model		7		AIC		295.8
Covariance Type		Non-robust		BIC		322.2
	Coef.	**Std. Err.**	***t***	***p*>|t|**	**[0.025**	**0.975]**
Intercept	0.801	0.161	4.973	0.000	0.482	1.119
Functionality	0.157	0.066	2.399	0.017	0.028	0.287
Convenience	0.227	0.046	4.914	0.000	0.136	0.319
Enjoyment	0.007	0.049	0.142	0.887	0.104	0.090
Security	0.118	0.053	2.244	0.026	0.014	0.224
Assurance	0.012	0.070	0.170	0.865	0.151	0.127
Design	0.098	0.057	1.732	0.085	0.014	0.211
Customization	0.012	0.045	0.286	0.775	0.102	0.076
Omnibus		0.973		Durbin–Watson		2.134
Prob. (Omnibus)		0.615		Skew.		–0.124
Kurtosis		2.738		Prob. JP		0.583

dependent variable that is favorably and strongly impacted by the chatbot service quality characteristics of convenience, security, design, and customization, according to the study's findings. On the other hand, assurance significantly reduces the value of the consumer. In our dataset, the values (0.025 and 0.975) further provide the 95% confidence interval for the coefficient estimations.

In Table 8, customer satisfaction is the dependent variable. In this multiple regression analysis, *Y* represents the dependent variable, customer satisfaction, and *X* denotes the independent variable, representing various service quality factors. This analysis assesses how these service quality factors *(X)* influence customer satisfaction *(Y)*.

$$CS = 0.801 + Functionality * 0.157 + Convenience * 0.227 + Security * 0.118 \quad \text{.....(2)}$$

There are 200 observations, and OLS is the method employed. The computed *Df* of residuals is 198, and the *Df* model is 1. The covariance type is listed as non-robust. In percentage terms, the *R*-squared value, 0.505, indicates that the model can explain 50.5% of the variation in customer satisfaction. The *R*-squared adjusted is 0.487. The *F*-statistics is 27.95, and the probability of *F*-statistics is 2.67e–26. Log-likelihood (–139.89), AIC (295.8), and BIC (322.2) are used to compare the model. The omnibus is 0.973 skew, and the kurtosis values are 0.124 and 2.783. Multicollinearity is analyzed in SPSS through tolerance and VIF for dependent customer satisfaction and independent variables. Tolerance values above 0.01, ranging from 0.465 to 0.963, and VIF values below 10, ranging from 1.039 to 2.149, confirm the absence of multicollinearity in the analysis. The condition number is 36.2. Table 8 shows that convenience (0.227) has the highest coefficient, followed by enjoyment (0.007), functionality (0.157), security (0.118), design (0.012), and customization (0.012). With the exception of fun, assurance, design, and customization, all of the independent variables have statistically significant ($p < 0.05$) coefficients that positively affect the dependent variable, consumer satisfaction. However, enjoyment, assurance,

design, and customization are deemed insignificant at the 5% significance level and excluded from the regression model (assurance = 0.865, enjoyment = 0.887, design = 0.085, and customization = 0.775). The findings imply that customer satisfaction, the dependent variable, is positively and significantly influenced by the chatbot service quality elements of functionality, convenience, and security.

Hypotheses Testing

The data of this investigation confirms the predictions made by the hypotheses Ha1 and Ha2, which are accepted. The results of hypothesis testing are given in Table 9, where H01 investigates the substantial impact of service quality on client value. Test hypothesis Ha1 is performed by performing a regression analysis between the dependent variable (customer value) and the independent variable (service quality). The analysis reveals a substantial predictive relationship between service quality and customer value [F (184.1) = 184.1, p-value < 0.000], underscoring the noteworthy impact of chatbot service quality on customer value (beta coefficient = 0.617, $p < 0.000$). This result signifies a direct positive effect on customer value. Thus, H01 is rejected, and Ha1 is accepted. Furthermore, the model's $R^2 = 0.354$ indicates that it accounts for 35.4% of the variance in customer value.

Ha2 explores how customer pleasure is impacted by service quality. Customer happiness, the dependent variable, is regressed against service quality, the independent variable, in order to test hypothesis Ha2. The results depicted in Table 9 emphasize the considerable impact of chatbot service quality on customer satisfaction (beta coefficient = 0.843, $p < 0.000$) by showing a significant predictive link between service quality and customer happiness [F (170.1) = 170.1, p-value < 0.000]. Based on this outcome, customer value is positively impacted directly. Hence, we reject H02 and embrace Ha2. Additionally, the $R^2 = 0.462$ of the model indicates that 46.2% of the variance in customer satisfaction can be explained by it.

Table 9*. Hypotheses Results*

Hypotheses	Regression Weight	Beta Coefficient	R^2	*F* - statistics	*p*-value	
H1	Service Quality → Customer Value	0.617	0.354	108.4	0.000	Accepted
H2	Service Quality → Customer Satisfaction	0.843	0.462	170.1	0.000	Accepted

Discussion and Managerial Implications

Based on the analysis results, it is clear that service quality significantly and positively impacts both customer value and customer satisfaction. These findings indicate that an improvement in the service quality of chatbots will lead to an increase in customer value and satisfaction. The results show that consumers were not entirely satisfied and did not think that the banks' chatbot services were beneficial. As such, banks need to focus on particular chatbot service quality factors in order to improve their offerings and ultimately achieve higher levels of client satisfaction and value. Customization has a large impact on consumer value among the many service quality characteristics, while convenience has a major impact on customer happiness. Because these two factors have a significant impact on the dependent variables, banks should give them priority. It is important to note that the single factor that lowers customer value is assurance.

On the other hand, convenience, security, and design all significantly influence customer value, while

functionality, security, and convenience positively and significantly affect customer satisfaction. The current study, which assesses the service quality of chatbots in Indian banks, reveals that customers were not highly satisfied with the service experiences compared to their expectations. In order to address this issue, banks need to closely monitor certain aspects in order to guarantee customer satisfaction and increase customer value by providing high-quality service. In addition, banks need to think about how their clients view their services in day-to-day interactions and whether or not they are happy with the function that chatbot services play. Customers still feel they aren't getting enough value out of novel banking services like chatbots, even after they were introduced. One potential reason for this is that banks maintain a producer-centered approach that prioritizes their internal practices and procedures. If banks fail to address these concerns promptly, they risk losing their competitive edge. Customer attrition may arise from dissatisfied consumers looking into alternative banking options. Studies conducted recently revealed that about 25% of clients think about changing banks, highlighting the gap between client expectations and present banking procedures that cause discontent.

For professionals in the field, this study has a number of important ramifications, especially for managers and marketers in the Indian banking sector. Above all, banking managers may benefit greatly from the insights we gathered from our study as a good guide to improving their chatbot services. Actionable data are provided to fine-tune chatbot products by understanding the unique aspects driving customer value and satisfaction: functionality, convenience, security, enjoyment, customization, assurance, and design. Moreover, the findings illuminate the importance of a customer-centric approach. Managers can prioritize aspects that matter most to customers, ensuring their chatbot services align with customer expectations. For example, emphasizing security and customization can be critical drivers of customer satisfaction.

Additionally, this study highlights the need for continuous monitoring and improvement of chatbot services. Banks can find opportunities for improvement by regularly evaluating these aspects, which will boost client satisfaction and loyalty. Furthermore, by guiding marketing initiatives with a grasp of the distinct dynamics of the Indian banking industry, banks can customize their chatbot services to target particular consumer categories.

Theoretical Implications

This study offers two theoretical implications. Because it focuses on the Indian banking context, it first adds to the larger body of literature on chatbots. In-depth knowledge of a particular and quickly changing market is provided by our study, whereas the majority of previous research had a global emphasis. By emphasizing cultural and contextual considerations while adopting developing technology, this regional focus adds to the body of information already in existence. Second, our study examines the dimensions of chatbot service quality and their impact on customer perceptions. We improve on current models and theories, like the customer satisfaction-related theories and the technological acceptance model, by determining and assessing these characteristics. Although we did not create any new scales, our research can help modify current scales better to fit the specifics of the Indian banking sector. Moreover, this research serves as a commentary on existing models and theories, shedding light on their applicability in chatbot services. It underscores the importance of considering multiple dimensions of service quality and their interplay in shaping customer perceptions, potentially prompting revisions or extensions of current theoretical frameworks.

Conclusion and Suggestions

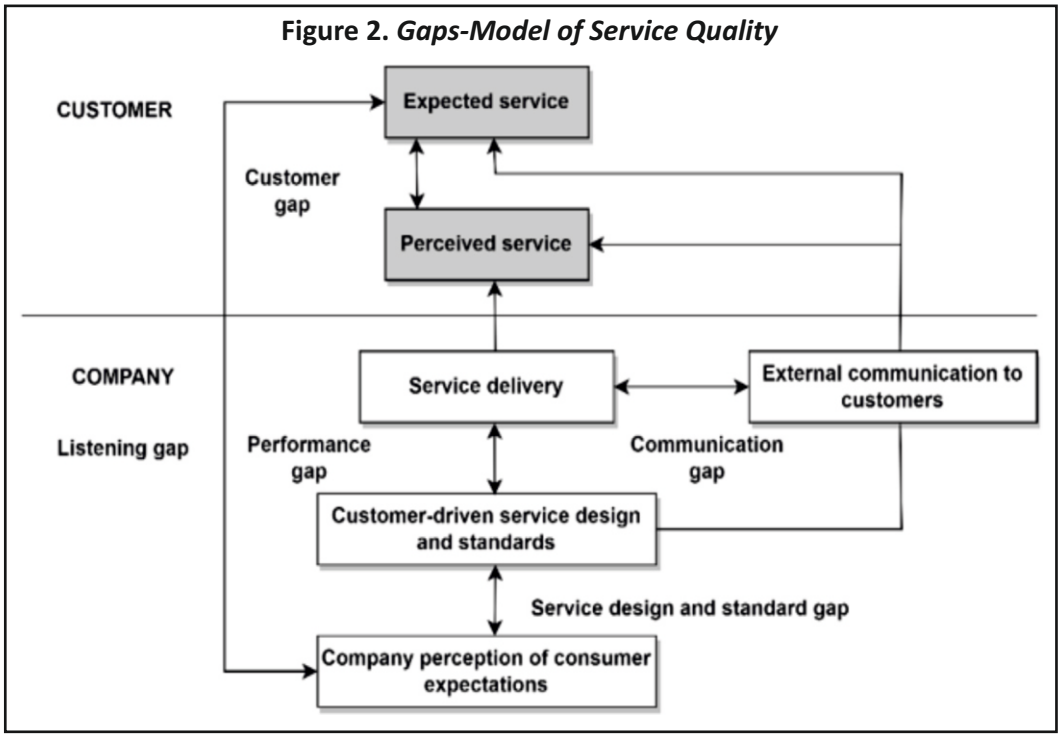
Since online banking is a relatively recent development in the Indian banking sector (not exceeding more than two decades or so), the intersection of customer experience with chatbot services may be an underserved research area. Nearly 75% to 80% of the audience that participated in the survey disagreed with the claim that the chatbot's

current existence had significantly exceeded their expectations. The user interface/user experience (UI/UX) of the chatbots, as well as their accessibility, were also criticized. It makes sense that banks would need to invest in sophisticated design in order to make AI infrastructure relevant to improving customer experience. Banks need to not only look at structured marketing information systems (MIS), customer satisfaction (CSAT) surveys, and unstructured sources of data (social media and other non-traditional sources) but also invest in data lakes, data processing, insights delivery layer, and a consistent UI/UX if these statistics are to be reversed in favor of chatbots. The AI platform used for customer engagement is independent of the customer experience. A thorough grasp of the bank's database, including its geography, demographics, psychographics, spending patterns, and other details, as well as an awareness of potential future client preferences, is essential for its architectural design. Giving the consumer the correct experience at the right moment is crucial in the modern world. And if banks implement a few of the recommendations listed below, that could happen :

- Deployment of regional bots who can chat/converse in the language of preference of the customers to avoid gaps in service quality.
- A robust centralized technology architecture that is self-learning and can dynamically upgrade customer understanding based on transaction history.
- A strong, cohesive, and multi-functional team to orchestrate the experience and understand and execute meaningful strategies that enhance customer experience at every digital interaction point.

The banks can improve the caliber of their services by utilizing the conceptual model shown in Figure 2. The gaps model of service quality servers provides a framework for banks looking to improve the quality of their services. Understanding the scope and nature of the customer gap is the first step in the model's process of

Figure 2. ***Gaps-Model of Service Quality***



improving service quality, as banks need to focus on their clients and use customer data to shape their business strategies (Narasimhan, 2004).

The listening gap is between what consumers expect and what banks or other companies perceive of customer expectations. The service design and standard gap is between management's perception and actual customer specification. Banks should ensure customers receive the service they believe, which creates value. The difference between the specified and actual service quality is known as the performance gap. It's important to comprehend how the degree of service provided is reached through service delivery. The service offered (communicated to clients), and the actual customer experience differ from one another in terms of communication.

Banks should inform clients about their services straightforwardly and concisely without overstating their advantages. Expectations and experience separate the client base. Hirvonen (2014) suggested conducting a transactional survey once the service reaches the customers to reduce the gap. Another major deal-breaker is security, and it's crucial to inform the client that communicating with the bank's AI assistant is safe and secure. This would greatly facilitate customers interacting with the bots and providing pertinent information aimed at improving their experiences. Another area where banks can consolidate various systems of "client truth" and guarantee that customers receive a comprehensive experience is through the integration of their online and offline interactions. The future of banking will depend more and more on digital involvement, just like all other services do. Banks should keep making investments in this crucial area of consumer experience and connection. When all else is equal, the length of a client's loyalty or willingness to switch at the first unpleasant encounter depends entirely on the level of customer service provided. This is an urgent, actionable charter that all banks must follow, not a matter of choice.

Limitations of the Study

Although this study provides insightful information, it is important to recognize its limits. First of all, our study is cross-sectional, taking a momentary picture of consumer attitudes. A longitudinal study could provide a deeper understanding of how these perceptions evolve. Second, our data collection relies on self-reported responses, which may introduce response bias. Additionally, it is worth noting that we restricted our sample size to 200 respondents due to constraints of time and relatively limited awareness of chatbot services among the population.

Scope for Future Research

The field of researching chatbot services in the context of Indian banking is always changing. To get more focused insights, future research can explore more particular client segments, such as banking habits or demographics. A comprehensive understanding of this dynamic landscape can also be obtained by looking into the impact of outside events, such as changes in regulations or technology breakthroughs, on chatbot adoption and customer views. In addition, comparative research is warranted to compare how other banking institutions' or sectors' customers view chatbot services. These studies could highlight industry-specific quirks and excellent practices. As a result, this study lays the groundwork for future investigations, encouraging researchers to build on the findings and investigate fresh directions for comprehending chatbot services and client interactions in the Indian banking industry. It is also possible to do future research only for international, private, or public banks. Moreover, other factors like trust and consumer loyalty may be included in related studies in the future. Additionally, future research in this field could examine client satisfaction with alternative offerings like robot advisers.

Authors' Contribution

The principal author of the paper was Poornima Kapadan Othayoth, who also oversaw the rigorous collection, evaluation, and interpretation of the study's data, as well as the creation of the research framework through a comprehensive literature review. Dr. Shivi Khanna made a substantial contribution by evaluating the information and providing insightful commentary. Dr. Shivi Khanna also proofread the article to verify accuracy and clarity and helped structure the paper to ensure a compelling and unified presentation.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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Appendix

VARIABLES	STATEMENT
Functionality 1	I can get my banking service done within a short time with the help of chatbot services.
Functionality 2	The chatbot of my bank answers queries promptly.
Functionality 3	To finish the service, the robo-advisors and chatbot gave me thorough information.
Functionality 4	My bank offers chatbot services with convenient hours of operation.
Convenience 2	The chatbot services of my bank have a clear and easy operational service to follow and are easy to understand.
Enjoyment 2	If there are chatbots and robo-advisors available to me, I don't need assistance from anyone.
Security 1	I feel safe while using my bank's chatbot service applications.
Security 3	My personal information and details are treated confidentially by the chatbot services of my bank.
Design 1	The layout of my bank's chatbot is aesthetically appealing.
Design 2	As an individual, are you familiar with the bank's chatbot features?
Assurance	My bank's chatbot services use highly updated technology, and it's convenient to reach requirements.
Customization	The banking robo-advisors and chatbots understand my specific needs; they have features that are personalized for me.
CV2	I feel trust and confidence in my bank's chatbot services.
CV3	In general, the overall value I get from using this banking chatbot services of my bank is worth my time and effort.
CV4	This bank and its chatbot services strive to establish long-term relationships with customers.
CV5	I want to recommend AI banking services to relatives and friends.
CS1	In general, I am satisfied with the bank's banking chatbot services.
CS2	The bank's banking chatbot services are similar to my concept.
CS3	The bank's banking chatbot services far exceed my expectations.

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