

Customer Perception towards Chatbot-Based Customer Services: An Empirical Study of Service Effectiveness and Satisfaction

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Abstract

Chatbots have become an integral part of digital customer service strategies across banking, e-commerce, telecommunications, and hospitality. While organizations increasingly adopt AI-based conversational agents to reduce cost and improve responsiveness, the ultimate success of such systems depends on how customers perceive and accept them. This study examines customer perception towards chatbot-based customer services, with specific objectives of analyzing customer satisfaction, evaluating the effectiveness of chatbots in improving customer experience, and examining the level of query redressal achieved through chatbot interactions. A descriptive research design was adopted, and primary data were collected from 400 respondents who had prior experience using chatbot-based customer support, using a structured, Likert-scale questionnaire distributed through Google Forms, social media, and email. Convenience sampling was used to select respondents. Data were analyzed using percentage analysis, Chi-square tests, one-sample t-tests, and linear regression. Results show that respondents are predominantly young (21–30 years), educated, and moderately to highly satisfied with chatbot services, particularly regarding response speed and 24/7 availability. Chi-square tests confirmed statistically significant associations between customer responses and all measured service dimensions ($p < 0.05$). One-sample t-tests revealed that all effectiveness indicators exceeded the neutral midpoint, with availability recorded as the strongest attribute (mean = 4.02). Regression analysis showed that the proposed predictors explained 70.9% of the variance in overall chatbot effectiveness, with issue-resolution speed as the strongest predictor. The study concludes that chatbot services meaningfully enhance customer experience but perform best when combined with a pathway to human support for complex queries, and offers practical suggestions for improving chatbot accuracy, usability, and emotional responsiveness.

Keywords

Chatbots; Customer Perception; Customer Satisfaction; Artificial Intelligence; Customer Service; Service Quality; Technology Acceptance Model

1. Introduction

. In the modern digital economy, customer service plays a vital role in maintaining customer satisfaction and building long-term relationships. Organizations are increasingly adopting Artificial Intelligence (AI) to improve the efficiency of customer support, and one of the most significant innovations in this area is the chatbot — an AI-powered application that simulates human conversation through text or voice interfaces to answer queries, resolve complaints, and assist users in real time [1].

Chatbots rely on Natural Language Processing (NLP), machine learning, and AI to interpret customer queries and generate responses, enabling organizations to offer 24/7 support, handle simultaneous queries, and reduce operational costs. However, the success of chatbot implementation depends heavily on customer acceptance: while some customers value the speed and convenience of automated support, others report dissatisfaction stemming from limited emotional understanding or misinterpretation of queries [9]. Understanding these divergent perceptions is essential if organizations are to refine chatbot design and service strategy.

This study therefore investigates customer perception of chatbot-based customer services, with the primary objective of understanding how customers evaluate chatbot performance, reliability, responsiveness, and usefulness, and the secondary objectives of (i) analyzing customer satisfaction with chatbot-based support, (ii) evaluating the effectiveness of chatbots in improving customer experience, and (iii) examining the level of query redressal achieved through chatbot services. The scope of the study covers customers who have used chatbot services across e-commerce, banking, and online service platforms

2. Literature Review

A substantial body of research has examined chatbot technology and its effect on customer service outcomes. Adamopoulou and Moussiades [1] trace the evolution of chatbot technology, noting that pattern matching, machine learning, and NLP jointly enable chatbots to simulate conversation and improve service efficiency. Xu, Zhang, and Deng [2] find that socially oriented communication styles — those conveying warmth and friendliness — improve customer satisfaction more than purely transactional styles, while a related study on service recovery [3] shows that assurance and reliability in chatbot responses drive both satisfaction and positive word-of-mouth.

Sentiment-analysis research by Murwati and Aldianto [4] indicates that although most social-media users report positive chatbot experiences, a meaningful minority remain dissatisfied due to a lack of personalization and human contact — a tension echoed by Shendge [5], who links chatbot adoption to faster response times and reduced waiting, and by Zhou [6], who documents productivity gains from chatbot deployment across healthcare, commerce, education, and advisory services. Han, Yang, and Kim [7] add that conversational quality and service-recovery quality are key predictors of long-term loyalty, while Aydın and Taşçı [8], studying banking chatbots, find that perceived trust, performance, and corporate reputation jointly shape satisfaction.

Not all findings are uniformly positive: Hill, Ford, and Farreras [9] show that chatbots, despite faster response times, still lag behind human agents in emotional understanding. McLean and Osei-Frimpong [10] and Huang and Rust [11] situate chatbots within the broader shift toward AI-driven service automation, emphasizing perceived usefulness and interactivity as engagement drivers. Dwivedi et al. [12] and Chi, Gursoy, and Chi [13] extend this to marketing and tourism contexts, finding that perceived usefulness and social influence shape technology acceptance more broadly, consistent with Prentice et al. [14] and Balakrishnan and Dwivedi [15] on voice assistants and conversational commerce. Studies using chat-log data [16, 17] further show that emotional tone and positivity bias materially affect satisfaction ratings, while more recent technical

evaluations [18, 19] confirm that modern NLP models (e.g., BERT-based architectures) and emotion-sensitive AI improve perceived competence and trustworthiness.

2.1 Research Gap

Despite this growing literature, gaps remain: limited research specifically addresses customer perception of chatbots in emerging markets; most existing studies emphasize technical performance over customer experience; few studies simultaneously examine satisfaction and trust; and cross-industry comparisons remain scarce. This study addresses these gaps by empirically examining customer perception across multiple service dimensions using a large primary sample.

2.2 Conceptual Framework and Hypotheses

Drawing on the Technology Acceptance Model, the SERVQUAL model, and Customer Satisfaction Theory, this study proposes that perceived usefulness, perceived ease of use, responsiveness, reliability, and 24/7 availability jointly shape customer perception of chatbot services. Accordingly, the following hypotheses were tested:

H1: Perceived usefulness of chatbots positively influences customer perception of chatbot services.

H2: Perceived ease of use positively influences customer perception of chatbot services.

H3: Responsiveness of chatbot services positively influences customer perception.

3. Research Methodology

A descriptive research design was adopted to capture customer perceptions and satisfaction levels regarding chatbot-based customer service. Both primary and secondary data were used: primary data were collected through a structured, Likert-scale questionnaire administered via Google Forms, social media, and email, while secondary data were drawn from research journals, academic articles, and online databases such as Google Scholar.

Respondents were selected using convenience sampling from customers who had used chatbot-based customer support in e-commerce, banking, or online service platforms. The final sample comprised 400 respondents. Collected data were analyzed in Microsoft Excel and SPSS using percentage analysis, frequency distribution, mean analysis, Chi-square tests, one-sample t-tests, and linear regression to address the study's three objectives.

4. Results and Discussion

4.1 Demographic Profile

Table 1 shows that respondents were predominantly aged 21–30 (48.0%) and 31–40 (37.5%), indicating that chatbot usage is concentrated among digitally active younger and middle-aged customers.

Table 1. Age Distribution of Respondents

Age Group	Frequency	Percentage
Below 20	35	8.75%
21–30	192	48.00%
31–40	150	37.50%
Above 40	23	5.75%

Age Group	Frequency	Percentage
Total	400	100%

Source: Primary data (survey, N = 400)

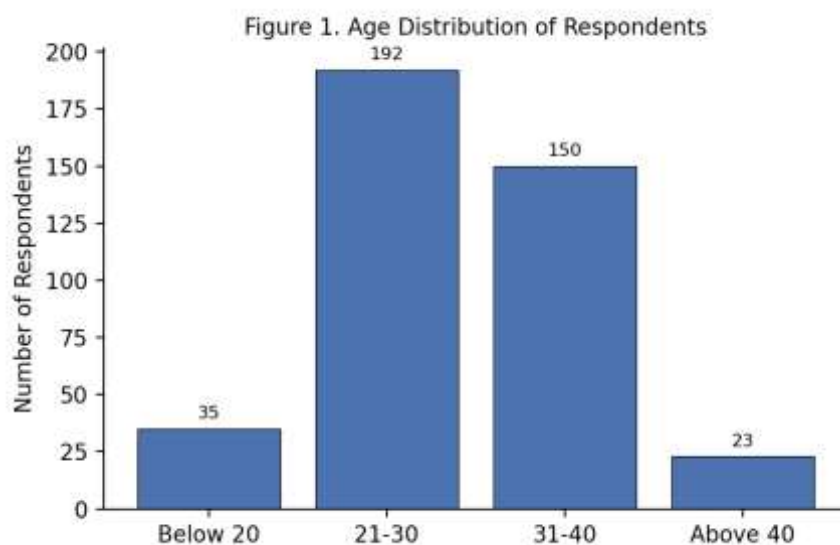


Figure 1. Age Distribution of Respondents

Source: Primary data (survey, N = 400)

Table 2 indicates that male respondents (58.5%) outnumbered female respondents (40.5%), suggesting the sample somewhat over-represents male perspectives, while Table 3 shows that most respondents were graduates (44.5%) or postgraduates (29.5%), implying a well-educated sample capable of meaningfully evaluating chatbot functionality.

Table 2. Gender Distribution of Respondents

Gender	Frequency	Percentage
Male	234	58.50%
Female	162	40.50%
Other	4	1.00%
Total	400	100%

Source: Primary data (survey, N = 400)

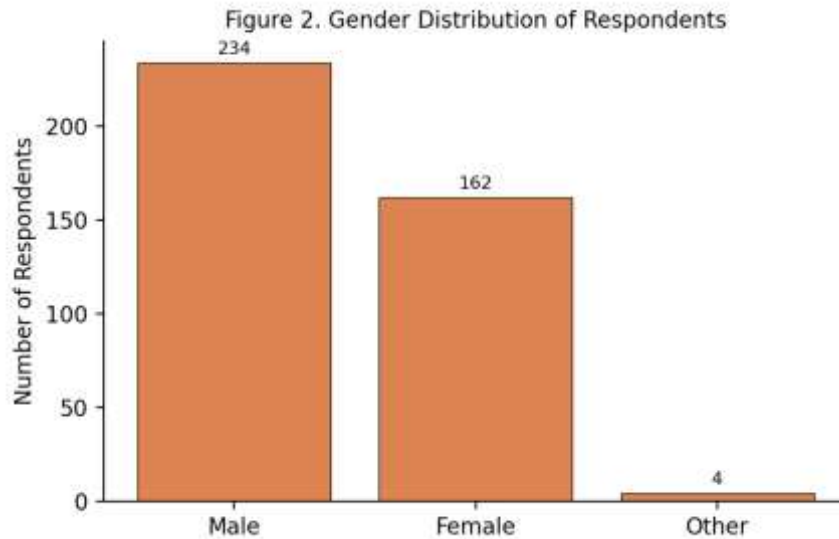


Figure 2. Gender Distribution of Respondents

Source: Primary data (survey, N = 400)

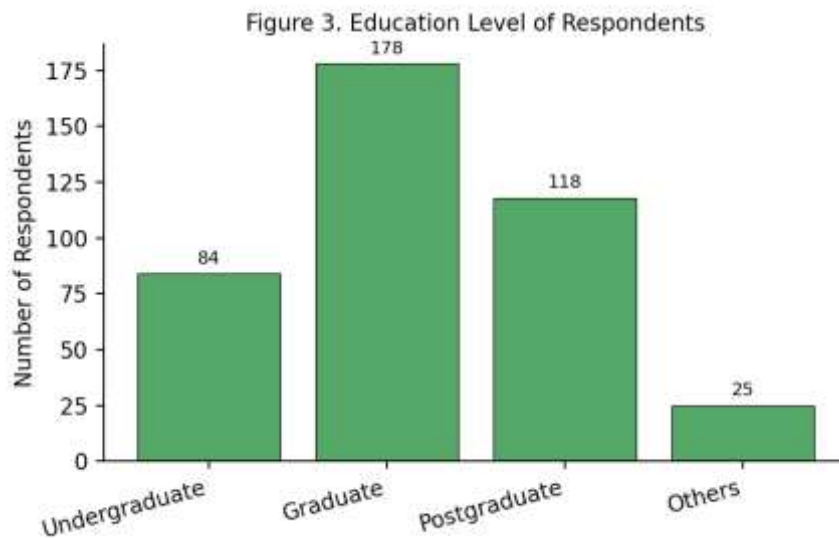


Figure 3. Education Level of Respondents

Source: Primary data (survey, N = 400)

4.2 Objective 1 — Customer Satisfaction with Chatbot-Based Support

Overall satisfaction with chatbot-based customer support was moderately high: 57.5% of respondents reported being satisfied or very satisfied, 27.25% were neutral, and only 15.25% reported dissatisfaction (Table 4, Figure 4). Satisfaction with response speed was even stronger, with 67.75% satisfied or very satisfied (Table 5, Figure 5), whereas satisfaction with response accuracy was comparatively more mixed, with 29.5% of respondents remaining neutral (Table 6, Figure 6).

Table 4. Overall Satisfaction with Chatbot Customer Support Service

Response	Frequency	Percentage
Very satisfied	94	23.50%
Satisfied	136	34.00%
Neutral	109	27.25%

Response	Frequency	Percentage
Dissatisfied	46	11.50%
Very dissatisfied	15	3.75%
Total	400	100%

Source: Primary data (survey, N = 400)

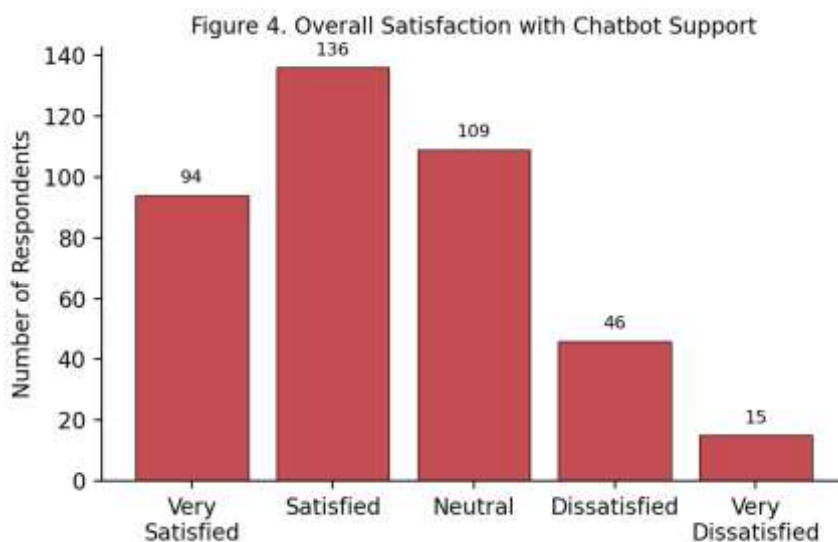


Figure 4. Overall Satisfaction with Chatbot Support

Source: Primary data (survey, N = 400)

Table 5. Satisfaction with Speed of Response

Response	Frequency	Percentage
Very satisfied	86	21.50%
Satisfied	185	46.25%
Neutral	96	24.00%
Dissatisfied	28	7.00%
Very dissatisfied	5	1.25%
Total	400	100%

Source: Primary data (survey, N = 400)

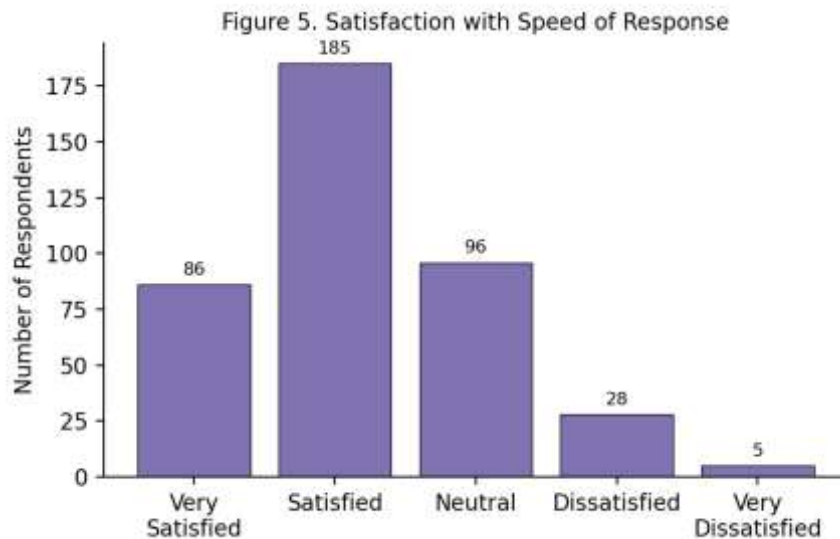


Figure 5. Satisfaction with Speed of Response

Source: Primary data (survey, N = 400)

Table 6. Satisfaction with Accuracy of Information

Response	Frequency	Percentage
Very satisfied	87	21.75%
Satisfied	134	33.50%
Neutral	118	29.50%
Dissatisfied	43	10.75%
Very dissatisfied	18	4.50%
Total	400	100%

Source: Primary data (survey, N = 400)

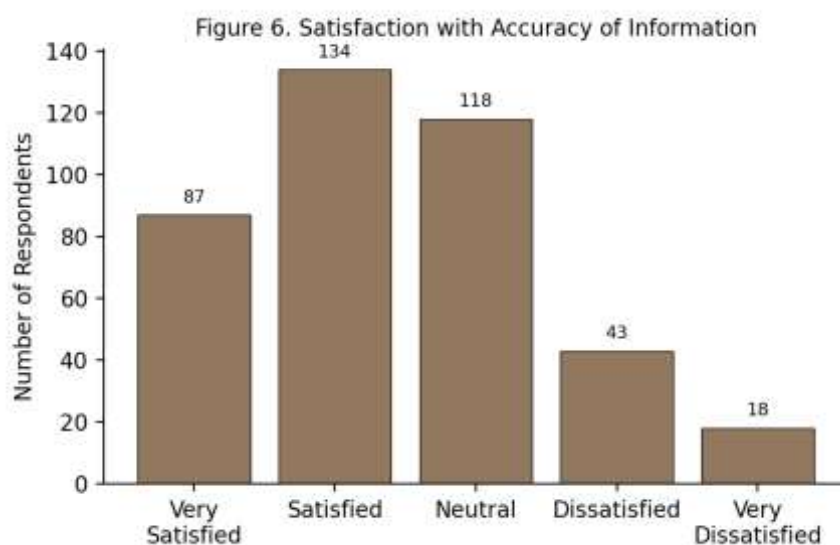


Figure 6. Satisfaction with Accuracy of Information

Source: Primary data (survey, N = 400)

A Chi-square test of independence was conducted for each service dimension against customer response patterns (H_0 : no significant association between customer responses and satisfaction level; H_1 : a significant association exists). As shown in Table 7, every calculated χ^2 value exceeds the critical value of 9.488 (df = 4,

$\alpha = 0.05$), so H_0 is rejected in every case. Speed of response ($\chi^2 = 221.494$) and satisfaction relative to human support ($\chi^2 = 186.750$) produced the largest chi-square values, indicating that these dimensions generate the greatest variation in customer opinion and most strongly shape overall satisfaction.

Table 7. Chi-Square Test Results for Chatbot Service Dimensions

Variable	χ^2 Value	df	Table Value	p-value	Result
Overall chatbot support service	113.767	4	9.488	0.000	Significant
Speed of response	221.494	4	9.488	0.000	Significant
Accuracy of information	116.494	4	9.488	0.000	Significant
Ability to understand questions	116.494	4	9.488	0.000	Significant
Availability (24/7 support)	105.926	4	9.488	0.000	Significant
Ease of use	96.608	4	9.488	0.000	Significant
Time taken to resolve issues	119.449	4	9.488	0.000	Significant
Likelihood of reuse	139.875	4	9.488	0.000	Significant
Satisfaction vs. human support	186.750	4	9.488	0.000	Significant

Source: Primary data, computed using SPSS

4.3 Objective 2 — Effectiveness of Chatbot Services in Improving Customer Experience

A one-sample t-test (test value = 3, the neutral midpoint) was used to assess whether customers' agreement with effectiveness statements significantly exceeded a neutral opinion. As Table 8 shows, all eight items produced mean scores above 3 with $p < 0.001$, confirming that customers, on average, agree that chatbots provide quick responses, reduce waiting time, and improve overall customer experience. Availability ("chatbot is available whenever needed") received the highest mean score (4.02), reaffirming 24/7 access as the most valued attribute of chatbot service, consistent with Figure 7's finding that 63.25% of respondents are likely or very likely to reuse chatbot support.

Table 8. One-Sample t-Test Results (Test Value = 3)

Statement	Mean	Std. Dev.	t	df	Sig.
Chatbot provides quick responses	3.92	1.021	18.024	399	.000
Chatbot improves customer experience	3.88	0.984	17.908	399	.000
Chatbot resolves queries effectively	3.76	1.063	14.312	399	.000
Chatbot is easy to interact with	3.81	1.012	15.984	399	.000
Chatbot is available whenever needed	4.02	0.956	21.447	399	.000
Chatbot gives accurate information	3.74	1.087	13.582	399	.000

Statement	Mean	Std. Dev.	t	df	Sig.
Chatbot reduces waiting time	3.95	0.998	19.024	399	.000
Overall satisfaction with chatbot support	3.89	1.034	17.265	399	.000

Source: Primary data, computed using SPSS

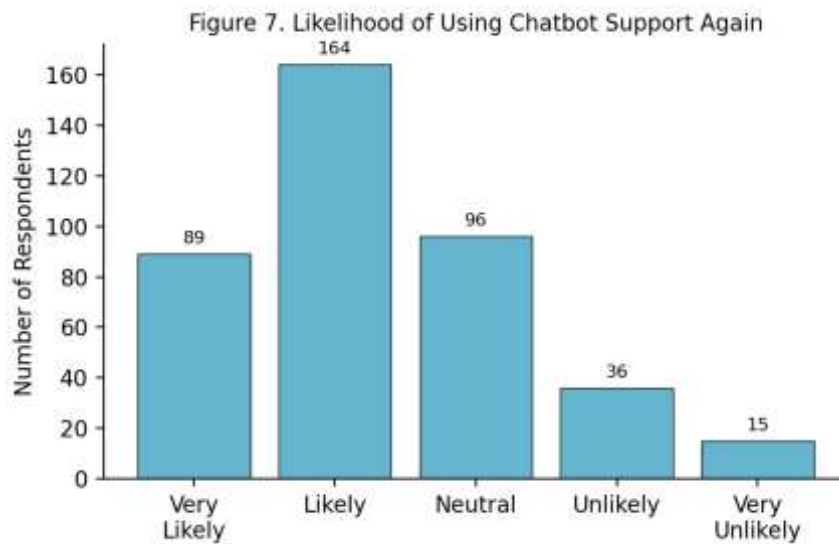


Figure 7. Likelihood of Using Chatbot Support Again

Source: Primary data (survey, N = 400)

4.4 Objective 3 — Level of Query Redressal through Chatbot Services

A linear regression model was estimated with overall chatbot effectiveness as the dependent variable and nine service-related factors as predictors. The model produced $R = 0.842$ and $R^2 = 0.709$, indicating that 70.9% of the variance in overall chatbot effectiveness is explained by the predictor set (Table 9). All predictors carried positive, statistically significant beta coefficients ($p < 0.001$); issue-resolution speed exerted the strongest influence ($\beta = 0.312$), followed by improvement in customer satisfaction ($\beta = 0.278$) and 24/7 availability ($\beta = 0.254$). This confirms H1–H3: perceived usefulness, ease of use, and responsiveness each contribute positively to customer perception of chatbot effectiveness. Figure 8 further shows that when compared directly with human support, 64.75% of respondents reported being more or much more satisfied with chatbot-based service, though 28.0% perceived the two channels as equivalent — underscoring that chatbots are viewed as a strong complement to, rather than a wholesale replacement for, human agents.

Table 9. Linear Regression Results (Dependent Variable: Overall Chatbot Effectiveness)

Predictor	B	Std. Error	Beta	t	Sig.
(Constant)	0.842	0.214	—	3.935	.000
Resolves issues quickly	0.286	0.052	0.312	5.500	.000
Improves customer satisfaction	0.241	0.048	0.278	5.021	.000
Provides accurate responses	0.198	0.044	0.231	4.500	.000
Is user-friendly	0.175	0.041	0.209	4.268	.000
Is available 24/7	0.221	0.046	0.254	4.804	.000
Reduces waiting time	0.194	0.043	0.226	4.512	.000

Predictor	B	Std. Error	Beta	t	Sig.
Handles multiple queries well	0.182	0.040	0.214	4.550	.000
Improves service efficiency	0.237	0.045	0.269	5.267	.000
Provides better support experience	0.206	0.042	0.238	4.905	.000

$R = 0.842$, $R^2 = 0.709$, Adjusted $R^2 = 0.701$ (Source: Primary data, computed using SPSS)

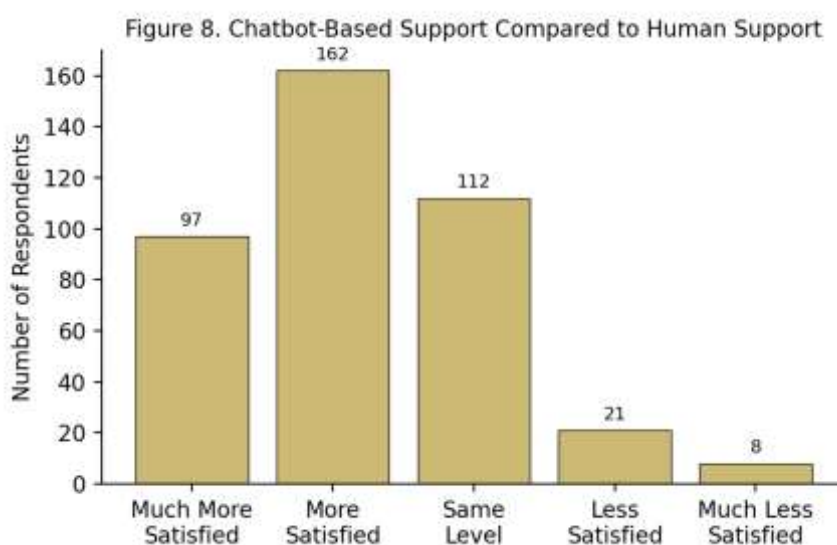


Figure 8. Chatbot-Based Support Compared to Human Support

Source: Primary data (survey, $N = 400$)

5. Findings

- Respondents were predominantly aged 21–30 years, indicating that younger customers are the most active users of chatbot-based customer services.
- Male respondents (58.5%) outnumbered female respondents (40.5%), so the sample somewhat over-represents male perspectives.
- Most respondents were graduates (44.5%), suggesting an educated sample well positioned to evaluate chatbot performance.
- A majority of respondents were satisfied with overall chatbot support, particularly response speed and 24/7 availability.
- All Chi-square tests were significant ($p < 0.05$), confirming that customer responses vary meaningfully with each chatbot service dimension.
- One-sample t-tests confirmed that chatbots significantly help customers obtain quick responses, reduce waiting time, and improve overall experience.
- Availability of chatbot services received the highest mean satisfaction score (4.02), the strongest-rated attribute overall.
- Regression analysis identified issue-resolution speed as the strongest positive predictor of overall chatbot effectiveness.

- Chatbots are seen as effective for simple queries, but a meaningful share of customers still prefer human support for complex issues.
- Overall, chatbot-based customer service positively influences customer satisfaction, perceived service quality, and customer experience.

6. Suggestions

1. Improve chatbot response accuracy so customers consistently receive correct and relevant answers.
2. Design chatbot interfaces to be more intuitive and accessible across age groups.
3. Incorporate greater emotional understanding and personalization to make interactions feel more human.
4. Strengthen chatbot capability to handle complex, non-routine queries rather than only simple ones.
5. Ensure prompt escalation to human agents when chatbots cannot resolve an issue.
6. Conduct regular retraining and updates of chatbot systems to sustain response quality.
7. Build customer trust through consistently reliable, dependable chatbot performance.
8. Collect customer feedback systematically to identify and close service gaps.
9. Raise customer awareness of the benefits and appropriate use-cases of chatbot support.
10. Maintain a balanced hybrid model combining chatbot and human support for optimal satisfaction.

7. Conclusion

This study demonstrates that chatbot-based customer service is generally well-received, with customers valuing its speed, continuous availability, and convenience. Statistical analysis confirmed that customer responses are significantly associated with each measured service dimension, that effectiveness ratings significantly exceed neutral expectations, and that issue-resolution speed is the single strongest driver of overall chatbot effectiveness. However, gaps remain in accuracy, emotional understanding, and handling of complex queries, indicating that chatbots are best positioned as a complement to — rather than a full replacement for — human customer service. Organizations seeking to maximize the benefits of chatbot adoption should prioritize resolution speed and accuracy, invest in more human-like conversational design, and maintain clear escalation pathways to human agents.

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