IMPACT OF AI-DRIVEN CHATBOTS ON CUSTOMER SATISFACTION

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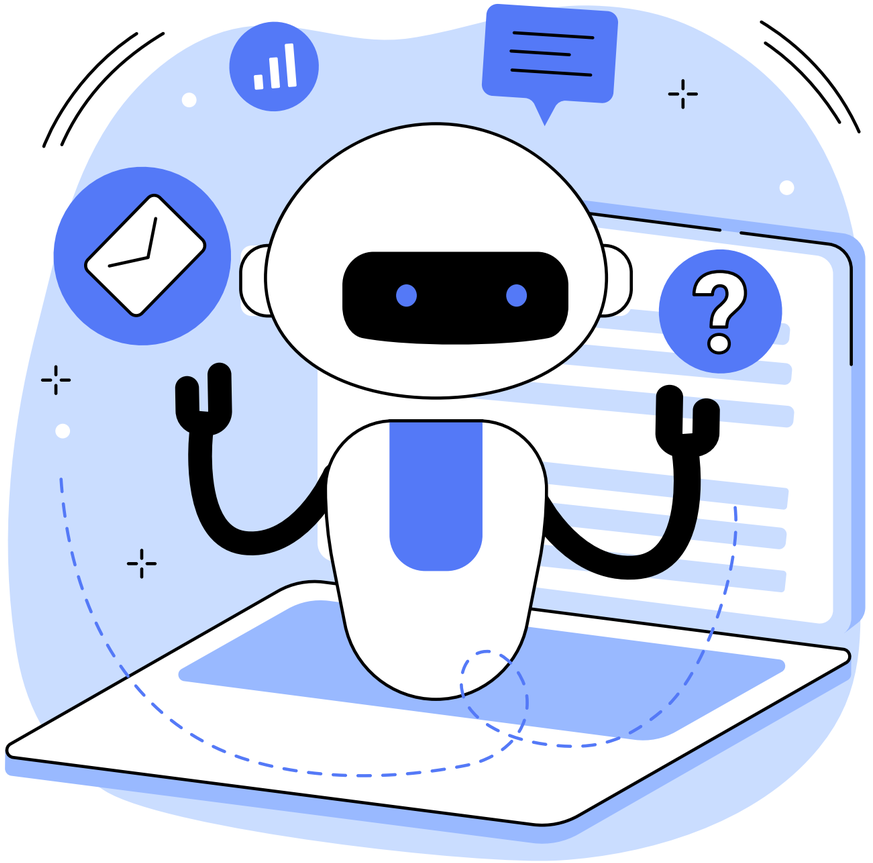
INTRODUCTION

Customer service has evolved dramatically in this technologically advance world, where AI-powered chatbots play a major role. These chatbots can handle queries, address issues, and even make product suggestions, but questions remain on how they affect customer satisfaction compared to human agents. Our study seeks to explore this dynamic and uncover what truly influences customer satisfaction in chatbot interactions.

Chatbots are becoming increasingly popular in industries like retail, banking, and healthcare due to their ability to enhance customer experience. However, their efficiency and capabilities also come with some limitations, especially when handling complex or emotionally sensitive queries.

The goal of our study is to understand how these chatbots influence customer satisfaction—specifically their strengths, limitations, and areas where they can be improved to better meet customer expectations."



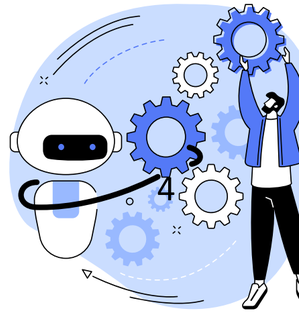
REVIEW OF LITERATURE (RESEARCH GAP)

What studies reveal:

- Chatbots offer immediate responses, reduce costs, and handle high volumes
- Chatbots improve efficiency but struggle with complex queries.
- Personalization is key to customer satisfaction.

Research Gaps:

- Limited understanding of emotional intelligence in chatbots and struggle with complex or emotional queries (Smith et al., 2021; Brown & Williams, 2020).
- Insufficient data on industry-specific variations in satisfaction.
- Few studies explore long-term satisfaction through personalization.

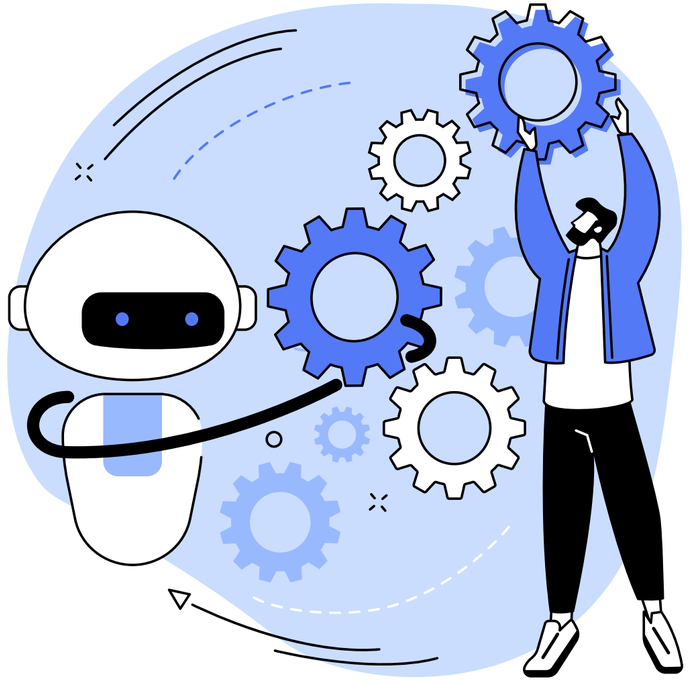


Study 1: Hill, Ford, and Farreras (2015)

- Focus: Comparison of human-human vs. human-chatbot interactions.
- Key Findings:
  - Chatbots perform well for basic queries but lack conversational depth.
  - Customers reported lower satisfaction when complex scenarios required nuanced responses.

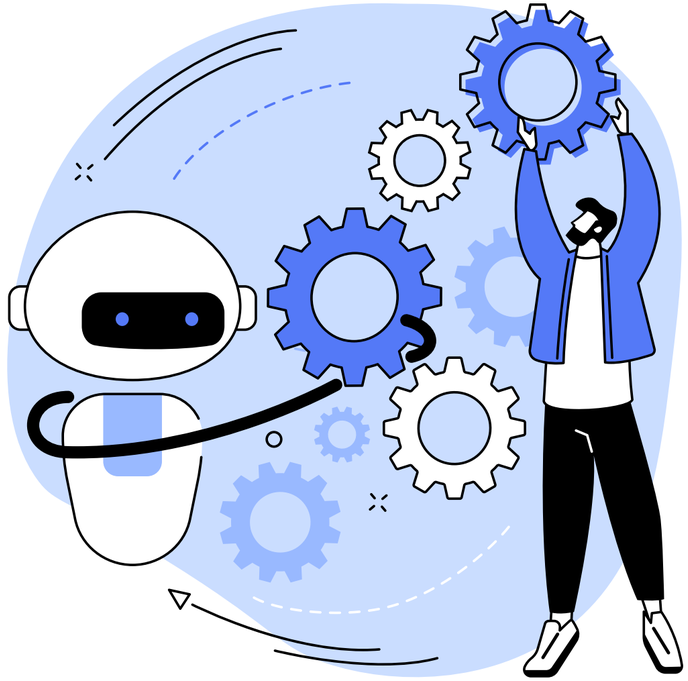
Study 2: Adamopoulou and Moussiades (2020)

- Focus: Overview of chatbot technologies in various industries.
- Key Findings:
  - Chatbots improve efficiency and reduce wait times, enhancing engagement.
  - Significant gap in personalization, which impacts overall customer satisfaction.



OBJECTIVES

- To identify the strengths and limitations of chatbots compared to human agents.
- Analyze how AI-driven chatbots influence customer satisfaction
- Identify factors contributing to effective chatbot-customer interactions.
- Assess customer preferences for chatbots vs. human agents.
- Investigate personalization and emotional intelligence in chatbot interactions.
- To evaluate trustworthiness of chatbots in customer service.



RESEARCH QUESTIONS

- What are the current levels of customer satisfaction with AI-driven chatbots?
- Which factors contribute most to customer satisfaction or dissatisfaction with chatbots?
- How do chatbot interactions compare with human agents in key performance areas, such as response time and empathy?
- What are the primary areas where chatbots fall short compared to human agents?
- How does trust in chatbot accuracy impact overall customer satisfaction?

Data Collection Techniques/Methods

The data for this research was collected through an online survey distributed to participants who had recent interactions with AI-driven chatbots. The survey included a mix of multiple-choice and open-ended questions to gather both quantitative and qualitative data. Key sections of the survey were designed to capture the following aspects:

- **Demographic Information:** Age group, gender, and online shopping frequency.
- **Interaction Frequency:** How often respondents interacted with AI-driven chatbots for customer suppo**rt.**
- **Purpose of Interaction:** Common reasons for using chatbots, such as product inquiries, order tracking, or technical **support**
- **Satisfaction Metrics:** Ratings of response time satisfaction, helpfulness, ease of navigation, and overall **experience.**
- **Personalization and Trust:** Levels of perceived personalization and trust in chatbot respon**ses.**
- **Comparison with Human Agents:** Direct comparisons between user experiences with chatbots and human customer service representatives.

Sampling

To ensure the statistical validity of the study, G Power analysis was used to calculate the minimum sample size needed to detect meaningful differences:

- Effect Size (d): Medium (0.5), representing moderate differences in customer satisfaction.
- Significance Level (α): 0.05, corresponding to a 5% chance of a Type I error.
- Power (1-β): 0.8, providing an 80% probability of detecting an actual effect.
- Sample Size Outcome: The analysis indicated a minimum sample size of 64 participants would be sufficient to detect moderate differences. The study exceeded this recommendation, enhancing the reliability of its findings.

Sampling Techniques

Convenience sampling was used to effectively gather data and record a variety of experiences. Convenience sampling has drawbacks, including possible biases and decreased generalisability, even while it enables quick data collecting. To guarantee a more thorough understanding of user experiences, the sample was created to include respondents from a range of age groups and chatbot usage rates.

Descriptive Statistics-

· Response Time Satisfaction: Predominantly rated as "Neutral" by 34 out of 74 respondents.

· Helpfulness: 26 out of 72 participants marked their experience as "Neutral," indicating mixed opinions.

· Personalization: 22 respondents described the chatbot interactions as "Neutral" in terms of personalization.

· Overall Satisfaction: 31 out of 72 respondents reported being "Satisfied" with their chatbot interaction.

· Trust in Accuracy: The most common response was "Somewhat trusting," with 32 out of 73 respondents indicating this level of trust.

HYPOTHESIS DESIGNING

Null Hypothesis (H0)

There is no significant difference in customer satisfaction between interactions with AI-driven chatbots and human customer support.

Alternative Hypothesis (H1)

There is a significant difference in customer satisfaction between interactions with AI-driven chatbots and human customer support.

TESTING HYPOTHESIS

Mann-Whitney U Test

Purpose: The Mann-Whitney U test was selected to compare customer satisfaction levels between chatbot interactions and human agent interactions. This non-parametric test is appropriate when the assumption of normality cannot be made for the data distribution.

Steps:

1. Rank the Data: Satisfaction scores from chatbot and human agent interactions were ranked together.

2. Calculate U Values:

$U = n1\ n2 + n1(n1+1)/2 – R1$

where n1 and n2 are the sample sizes for chatbot and human interactions, and R1 is the sum of ranks for the chatbot group.

3. Compare with Critical Value: The smaller U value is compared to the critical value to determine significance.

Results:

- Calculated U Values: U1=80, U2=70
- Critical Value Check: The critical value for a sample size of 64 at $\alpha = 0.05$ was found to be 91.
- Conclusion: U2=70 is less than the critical value (91), leading to the rejection of the null hypothesis. This indicates that customer satisfaction differs significantly between chatbot and human interactions, with human agents preferred for more complex or empathetic situations.

CHI-SQUARE TEST

Purpose: The Chi-Square test was used to assess whether there is a significant association between trust in chatbot accuracy and overall customer satisfaction.

1. Construct a Contingency Table:

Trust Level	Satisfied	Dissatisfied	Total
High	12	4	16
Low	8	12	20
Total	20	16	36

2. Calculate Expected Frequencies:

Eij = Row total. Column total/ Grand total

Example for E11: E11= 16.20/36 ≈ 8.89

3. Calculate χ2:

$$\chi 2=\sum(Oij - Eij)2/Eij$$

where Oij is the observed frequency and Eij is the expected frequency

4. Degrees of Freedom:

$$df=(r-1)(c-1)$$

For a 2×2 table, df=1

Results:

- Calculated χ2 Value: 9.87.
- Critical χ2 Value: 3.841 at α=0.05.

Conclusion: Since 9.87 > 3.841, the null hypothesis is rejected, indicating a significant association between trust in chatbot accuracy and customer satisfaction

ANALYSIS OF DATA

The data analysis revealed several key insights:

- Descriptive Statistics:
  - A significant portion of respondents rated their satisfaction with chatbots as "Neutral" or "Satisfied," indicating that while chatbots perform well for basic interactions, they may not excel in providing personalized or empathetic support.
  - Trust levels were varied, with "Somewhat trusting" being the most common response, aligning with the finding that trust influences satisfaction levels.
- Inferential Statistics:
  - The Mann-Whitney U test showed a significant preference for human interactions when users required more empathy or complex problem-solving.
  - The Chi-Square test highlighted a significant relationship between trust in chatbot responses and customer satisfaction, confirming that higher trust leads to better satisfaction.

FINDINGS AND RECOMMENDATIONS

Strengths:

Chatbots are reliable for quick, straightforward interactions and provide continuous availability

Weaknesses:

Chatbots often lack the ability to handle complex or nuanced issues that require human empathy.

Trust Factor

Trust in the chatbot's ability to provide accurate and relevant information is closely linked to higher satisfaction levels.

Recommendations:

- **Enhance Personalization:** Invest in AI algorithms that offer tailored responses and adapt to user preferences.
- **Implement Hybrid Support Models:** Use a combination of chatbots for basic queries and human agents for more complex cases to enhance customer satisfaction.
- **Build Trust:** Increase transparency in chatbot operations by clearly outlining their capabilities and limitations to users. Regularly update chatbots with more refined datasets to improve their reliability and build confidence among users.
- **User Feedback Integration:** Collect and analyze user feedback regularly to identify recurring pain points and improve chatbot interactions accordingly. This will help businesses create a feedback loop that continuously enhances the chatbot's learning and adaptability.
- **Training for Complex Queries:** Implement mechanisms where chatbots can recognize when an issue is beyond their programmed capabilities and seamlessly escalate the conversation to a human agent. This will prevent user frustration and ensure that complex queries receive appropriate attention.

Conclusion

According to the report, while AI-driven chatbots are a useful complement to customer service initiatives because of their speed and availability, they require considerable improvements in personalisation and trust-building to be as effective as human customer care overall. The findings of the Chi-Square test verified that customer satisfaction levels are directly impacted by faith in chatbot accuracy, and the Mann-Whitney U test showed that customers typically preferred human contacts when resolving difficult situations. This suggests that companies should give top priority to chatbot dependability and the smooth integration of human agents for delicate or complicated enquiries.

To give wider generalisability, future research should concentrate on increasing the sample size and using randomised sampling procedures. Furthermore, studies conducted in particular industries may provide information about how user happiness and chatbot performance varies in other domains.

Businesses may improve customer happiness and trust in AI-driven help by putting the suggested techniques into practice and bridging the gap between chatbot capabilities and user expectations.

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Link: Real Conversations with AI
Summary: This study compares human-chatbot interactions with human-human interactions, highlighting the limitations in chatbot responses and their impact on user satisfaction.

2. Adamopoulou, E., & Moussiades, L. (2020). An overview of chatbot technology
Link: Overview of Chatbot Technology
Summary: This paper provides an extensive overview of chatbot technologies and their applications in various industries, discussing how they influence customer engagement.

3. Chung, M., Ko, E., Joung, H., & Kim, S.J. (2020). Chatbot e-service and customer satisfaction regarding luxury brands
Link: Chatbot e-Service
Summary: The study examines how chatbots influence customer satisfaction in the luxury brand sector and highlights potential gaps in service quality.

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Summary: This research delves into how anthropomorphic features in chatbots affect user adoption and satisfaction.

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Link: Are Chatbots Useful?
Summary: The study questions the overall usefulness of chatbots in customer service and highlights areas where they fail to meet expectations.

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Link: Chatbot for Social Media
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Link: Chatbots in HCI
Summary: This paper explores the role of chatbots in Human-Computer Interaction (HCI), emphasizing their potential to enhance user experiences.

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Link: Service Robots
Summary: The research highlights how service robots like chatbots are transforming frontline services and their implications for customer satisfaction.

THANK YOU FOR LISTENING!