Individual Research Paper

# Assessing the Impact of Reduced Waiting Times on Customer Satisfaction and Trust in SMEs

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## Abstract

As chatbots gain popularity in the business sector, they offer significant benefits such as improved operational efficiency and enhanced customer engagement. However, they also face criticism regarding their effectiveness. The study addresses the limitations of traditional customer service models, which often fail to meet the 24/7 support expectations of today's consumers, especially in resource-limited SMEs. By providing immediate assistance, chatbots can significantly reduce perceived wait times, thereby enhancing customer satisfaction. This research paper explores the impact of perceived waiting times on customer satisfaction and trust in Small and Medium-Sized Enterprises (SMEs) through chatbot technology. Employing a mixed-methods approach, the research combines quantitative surveys measuring response perceptions with qualitative interviews that delve into customer experiences with chatbots. Random sampling ensures a diverse participant profile across sectors like retail and hospitality. The analysis utilizes descriptive statistics and t-tests for quantitative data, while thematic analysis identifies key patterns in user experiences. Ethical considerations, including informed consent and data anonymization, are strictly adhered to. Ultimately, this study aims to illuminate the effectiveness of chatbots in enhancing customer satisfaction and trust, highlighting their strategic importance for SMEs in a competitive landscape.


**Keywords:** *Chatbots, AI, SMEs*

## 1. Introduction

In the world of Artificial Intelligence, chatbots have emerged in the business sector, particularly in Small and Medium-Sized Enterprises (SMEs). They have provided numerous benefits, such as improved business workflow and increased customer satisfaction over time. However, these developments have also faced criticism from both SMEs and consumers alike.

This research paper explores how perceived waiting times impact customer satisfaction and trust in SMEs, focusing on the role of chatbots as a solution to bridge the gap left by traditional customer service models. In today's digital landscape, where customers increasingly expect 24/7 support, traditional customer service often fails to meet these demands, especially in resource-limited SMEs. Delays in response times can lead to customer dissatisfaction and potential revenue loss, particularly in competitive sectors where rapid responses are highly valued. Chatbots offer a promising alternative by providing instant, continuous support, thereby reducing perceived wait times and improving overall customer satisfaction.

The study examines both quantitative and qualitative aspects of chatbot use in SMEs. Quantitative data, gathered through surveys, measures perceptions of response speed, satisfaction with waiting times, and escalation to human support. Qualitative insights come from interviews that investigate customer experiences with chatbots in greater detail, including their expectations for response quality, preference for human interaction in complex cases, and overall satisfaction with chatbot interactions.

Random sampling is used to ensure a diverse pool of participants across different sectors, such as retail, hospitality, and services. The quantitative analysis utilizes descriptive statistics and t-tests to analyze trends in satisfaction and perceived wait times, while qualitative thematic analysis identifies key patterns in user experiences, including preferences for language, personalization, and problem resolution capabilities.

Ethical considerations are central to the study, with informed consent and anonymization of data ensuring participant privacy. Through a combined quantitative and qualitative methodology, this research aims to provide a well-rounded understanding of chatbot effectiveness in managing perceived waiting times and enhancing customer satisfaction, highlighting the potential benefits for SMEs that strategically implement chatbot systems to align with user expectations and business needs.

## 2. Research Topic

Optimising Customer Experience Through Chatbots: Assessing the Impact of Reduced Waiting Times on Customer Satisfaction and Trust in SMEs.

### 2.1. Problem Statement

In today's digital age, customers expect 24/7 support, but traditional customer service, often limited to business hours, fails to meet these expectations. This gap leads to frustration and potential business loss, especially for Small and Medium-sized Enterprises (SMEs) with limited resources. Delays in addressing queries can drive customers away, particularly in competitive markets where immediate responses are valued.

Chatbots offer a promising solution by providing instant, automated responses around the clock. They can handle multiple inquiries simultaneously, significantly reducing perceived waiting times. This capability is particularly beneficial for SMEs, which may not have the resources to maintain a large customer service team. By leveraging chatbots, SMEs can ensure that customer queries are addressed promptly, enhancing the overall customer experience.

However, the effectiveness of chatbots in improving customer satisfaction is multifaceted. While chatbots can reduce waiting times, their impact on customer satisfaction also depends on how customers perceive and interact with these automated systems. Some customers may appreciate the efficiency and immediacy of chatbots, while others may prefer human interaction and feel dissatisfied with automated responses.

This research aims to assess the impact of chatbots on response times and customer satisfaction in SMEs. Specifically, it will explore the relationship between chatbots and perceived wait times, and compare the differences in wait time perceptions between customers who interact with chatbots and those who do not. Additionally, it will delve into customer experiences with chatbots through detailed feedback and personal narratives, providing insights into how customers describe their experiences with chatbots in relation to waiting times for human assistance.

### 2.2. Research Question

How do various aspects of chatbot interactions, including personalisation, perceived waiting times, accuracy, and functionality preferences, impact customer satisfaction and trust in SMEs?

### 2.3. Sub-question supporting the Research Question

How do chatbots in SMEs impact customer satisfaction by reducing perceived waiting times for human assistance?

### 2.4. Hypothesis

**Null Hypothesis ($H_0$)**: There is no significant positive relationship between chatbot performance (in terms of response time, issue resolution, and comparison to human support) and overall user satisfaction.

**Alternative Hypothesis ($H_a$)**: There is a significant positive relationship between chatbot performance (in terms of response time, issue resolution, and comparison to human support) and overall user satisfaction.

I will conduct a **one-tailed hypothesis test**, as the alternative hypothesis is specifying the **direction** of the relationship (in this case, a positive effect).

## 3. Literature Study

### 3.1. Customer Satisfaction in Chatbots

1. **Perceived Waiting Time:** One of the primary benefits of chatbots is their ability to provide immediate responses, thereby reducing the perceived waiting time for customers. Research suggests that customers highly value prompt responses, and perceived delays in communication often lead to frustration and dissatisfaction. According to a study by [1], chatbots that engage customers immediately upon contact create a sense of continuous engagement, even if the ultimate solution requires human intervention. Customers who experience reduced waiting times tend to report higher satisfaction levels, as they perceive their concerns are being addressed faster than traditional methods.
2. **Field of Business and Customer Expectations:** Customer expectations for chatbot performance can vary widely depending on the industry. For instance, in sectors like retail and hospitality, where immediate assistance and customer experience are highly prioritised, chatbots tend to be received more favourably when they can address common inquiries quickly [2]. In contrast, industries requiring complex technical support or legal advice may see more dissatisfaction when chatbots are used, as customers expect detailed and human-led interactions for complex queries.

### 3.2. Research Implications

While chatbots can significantly improve customer satisfaction, particularly through reduced waiting times and personalised interactions, their success depends on several key factors, including their capabilities, design, and alignment with customer expectations. For SMEs, the strategic implementation of chatbots can lead to increased efficiency and customer satisfaction, but businesses must ensure that their chatbot systems are advanced enough to handle common customer needs while seamlessly integrating with human support when necessary.

### 3.3. Research Gaps

Traditional customer service models in SMEs often struggle with long waiting times, leading to dissatisfaction. The introduction of chatbots addresses this gap by offering immediate, automated responses, significantly improving the perceived speed of service. This reduces frustration, improves customer satisfaction, and allows human representatives to focus on more complex tasks.

## 4. Methodology

### 4.1. Research Design

This study will use quantitative and qualitative approach to examine how chatbots impact perceived waiting times and their effect on customer satisfaction. For quantitative data analysis, the focus is on collecting measurable data through surveys to analyse the relationship between perceived waiting times and customer experiences in SMEs. For qualitative data analysis, I will use the data that one of my groupmates in this project (Kamil Lega) provided for me after he interviewed a few people about their experiences with chatbots in the past.

### 4.2. Sampling Strategy

Random sampling will ensure diverse customer profiles, with participants selected from different countries and business sectors such as retail, hospitality, and services.

### 4.3. Data Collection Methods

For the quantitative data analysis, an online survey will be distributed to participants who have interacted with a chatbot in the past. Key survey topics related to perceived waiting time include **Perception of Response Time** (how quickly the participant felt their query was addressed by the chatbot), **Comparison with Human Agents** (participants will be asked to rate whether the chatbot provided faster service compared to their experiences with human customer support), **Satisfaction with Waiting Time** (participants will rate their satisfaction with the response time from 1 [very dissatisfied] to 5 [very satisfied]), and **Escalation to Human Agents** (if the issue was escalated, participants will rate how long they waited for human assistance and whether they were satisfied with this hand-off process).

For the qualitative data analysis, Kamil Lega (one of my groupmates in this project) created interviews in which he asks participants about their experience with chatbots.

### 4.4. Data Analysis

1. **Descriptive Statistics (for Quantiative Data Analysis):** Descriptive statistics summarises survey responses about perceived waiting times and satisfaction. This includes:
    - **Means, Medians, and Standard Deviations:** To describe overall trends in perceived waiting times and satisfaction.
    - **Frequency Distribution:** For categorical data (e.g., number of participants reporting faster chatbot responses vs. human agents).

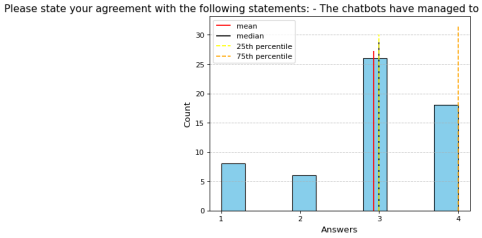


**Figure 1.** Example for Central Tendency and Spread of the question "The chatbots have managed to resolve my issues in a timely manner".

2. **Inferential Statistics (for Quantitative Data Analysis):** **T-tests:** To compare satisfaction levels between participants who only used the chatbot and those who experienced escalations to human agents.item My code for the T-test:
3. **Thematic Analysis (for Qualitative Data Analysis):** I conducted a thematic analysis of interview transcripts provided by one of my groupmates (Kamil Lega), focusing on customer experiences with chatbots. Key themes explored include user experience, language preferences, personalization, problem resolution, and desired features. The findings identify strengths and weaknesses in current chatbot implementations, offering insights for optimizing customer support in SMEs and aligning

chatbot technologies with users' expectations for efficiency and personalization.

### 4.5. Ethical Considerations

1. **Informed Consent:** Participants were fully informed of the study's purpose and their right to withdraw at any time.
2. **Data Protection:** Interaction logs and survey responses were anonymised to protect participant privacy.

### 4.6. Conclusion

This quantitative and qualitative methodology focuse specifically on perceived waiting times in chatbot interactions and their effect on customer satisfaction. The study provides a detailed understanding of how chatbots influence customer perceptions of service speed in SMEs.

## 5. Predicted Outcomes

1. **Reduced Perceived Waiting Time Increases Satisfaction:** It is anticipated that customers who report shorter perceived waiting times when interacting with chatbots will show higher levels of satisfaction compared to those who experience longer waits, especially when the chatbot resolves their issues promptly without escalating to human agents.
2. **Chatbots Viewed as Faster than Human Agents:** A significant portion of respondents will likely perceive chatbots as offering faster service compared to human customer support, particularly in handling routine inquiries. Customers who appreciate speed and efficiency will be more inclined to rate chatbots positively in terms of satisfaction.
3. **Satisfaction Decreases with Escalation to Human Agents:** Customers whose issues require escalation to human agents may perceive an increase in waiting times, leading to a decline in overall satisfaction. This is especially likely if the time between chatbot escalation and human agent response is perceived as too long.
4. **Positive Correlation between Response Accuracy and Perceived Speed:** Respondents who believe that the chatbot provided accurate and relevant information are more likely to perceive waiting times as shorter. This is because accurate responses can enhance the feeling of efficiency in interactions.
5. **Demographic Influence:** Younger, more digitally literate customers may perceive chatbot interactions as faster and more satisfactory compared to older customers, who might prefer human interaction and have a less favourable view of automated systems.

## 6. Quantitative Data Analysis - Variables and Dataset Description

This study examines two primary variables: **Chatbot Performance** and **User Satisfaction**.

**Chatbot Performance** refers to the efficiency and speed at which chatbots operate, including aspects such as timeliness, issue resolution, and their performance in comparison to human support. The analysis of this variable is based on responses to the following questions:

Question 1: The chatbots have reduced the amount of time needed to resolve any requests.

Question 2: The chatbots have managed to resolve my issues in a timely manner.

Question 3: I felt that my query was addressed quickly by the chatbot.

Question 4: The chatbot provided faster service compared to my experience with human customer support.

Question 5: The chatbot efficiently resolved my issue without the need for further assistance.

**User Satisfaction**, on the other hand, pertains to the overall contentment of users with their experience, which includes factors such as response times, human assistance, and the effectiveness of the handoff processes. This variable is evaluated using the following questions:

Question 1: I am satisfied with the chatbot's response time.

Question 2: The waiting time for human assistance was reasonable.

Question 3: I was satisfied with the handoff process when the issue was escalated to a human employee.

## 7. Explanatory Data Analysis and Data Cleaning

### 7.1. Explanatory Data Analysis

Under Explanatory Data Analysis, first I checked basic information about the data by using `df.info()`. Then I asked for some descriptive statistics for numerical data with the df.describe() method. Afterwards I checked the `dytpe` of each column. I also checked the number of rows and columns in the dataset. Lastly I checked for missing values with the `df.isnull().sum()` command.

### 7.2. Data Cleaning

First I created a dataframe containing only the questions which will be used for analysis. These questions are the following:

Question 1: The chatbots have reduced the amount of time needed to resolve any requests.

Question 2: The chatbots have managed to resolve my issues in a timely manner.

Question 3: I felt that my query was addressed quickly by the chatbot.

Question 4: The chatbot provided faster service compared to my experience with human customer support.

Question 5: The chatbot efficiently resolved my issue without the need for further assistance.

Question 6: I am satisfied with the chatbot's response time.

Question 7: The waiting time for human assistance was reasonable.

Question 8: I was satisfied with the handoff process when the issue was escalated to a human employee.

Then, I dropped the rows containing answers 'Neither agree nor disagree' as they do not relevant for my analysis.

Then, I turned the categorical variables to numerical ones. Categorical variables were: Strongly Disagree, Somewhat Disagree, Somewhat Agree, and Strongly Agree. The numerical variables: 1, 2, 3, 4 (respectively).

After this, I checked the `dtype` of each column again to ensure that every value is an integer.

Lastly, I created a Q-Q Plot for each question to check if the data is approximetely normally distributed or not.

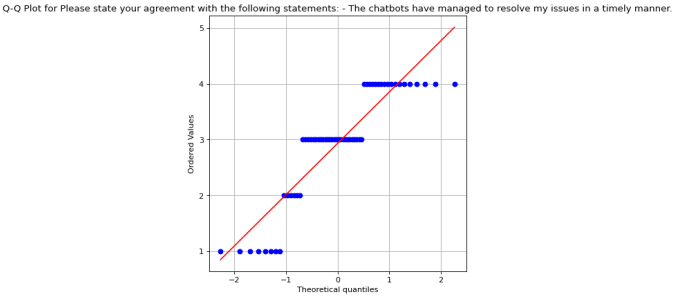


**Figure 2.** Example Q-Q Plot for the question "The chatbots have managed to resolve my issues in a timely manner".

After checking the Q-Q Plots for each question, I was able to decide that the data is **approximetely normally distributed**.

## 8. Correlation Analysis

### 8.1. Introduction

In this analysis, I explore the relationships between various aspects of chatbot performance and user satisfaction using a correlation matrix. The correlation matrix allows us to understand the strength and direction of the relationships between these variables.

The key variables examined include perceptions of the chatbot's ability to reduce resolution time, manage issues in a timely manner, provide faster service compared to human customer support, and effectively handle the transition to human agents when required. Additionally, user satisfaction with response times and waiting times for human support are also analyzed to understand how these factors contribute to the overall user experience.

By examining the correlation coefficients, we can identify which factors are closely linked, and whether certain aspects of chatbot performance tend to influence user satisfaction more strongly than others. This analysis will highlight both significant positive relationships and weak or non-significant associations, helping us better understand the factors that drive user satisfaction in chatbot interactions.

### 8.2. The Correlation Matrix

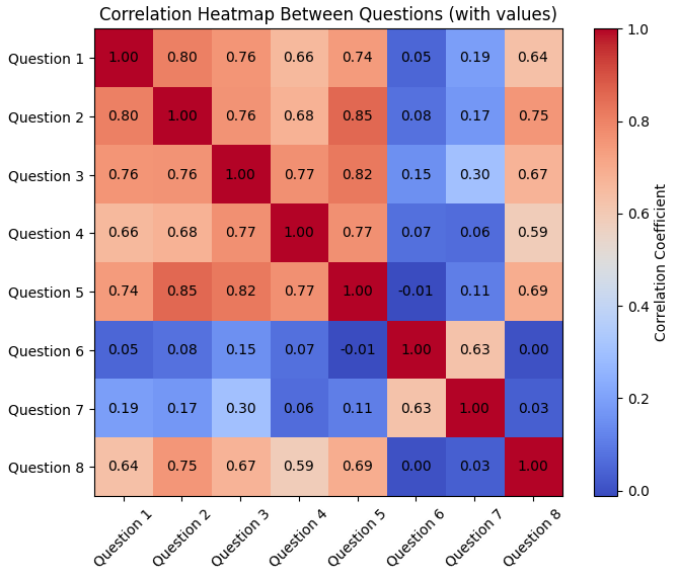


**Figure 3.** Correlation Matrix between the questions (with values).

### 8.3. Key Observations

#### *High Correlations (Strong Positive Relationships)*

**"The chatbots have managed to resolve my issues in a timely manner" (Q2)** and **"The chatbot efficiently resolved my issue without the need for further assistance" (Q5)** have the highest correlation (0.85). This indicates a strong relationship between these two aspects of the chatbot's performance—when users feel the chatbot resolves issues in a timely manner, they are also likely to feel that the chatbot does so without requiring further help.

There is a strong correlation between **"The chatbots have managed to resolve my issues in a timely manner" (Q2)** and **"The chatbots have reduced the amount of time needed to resolve any requests" (Q1)** (0.80). This suggests that users who feel that their issues are resolved quickly also perceive a general reduction in the time needed to handle their requests.

**"I felt that my query was addressed quickly by the chatbot" (Q3)** and **"The chatbot provided faster service compared to my experience with human customer support" (Q4)** are also highly correlated (0.77). This implies that if users believe their queries were handled quickly by the chatbot, they also perceive the chatbot as providing faster service compared to human support.

#### *Low or Negative Correlations (Weak Relationships)*

**"I am satisfied with the chatbot's response time" (Q6)** has very low or even slightly negative correlations with most other questions, such as **"The chatbot provided faster service compared to my experience with human customer support" (Q4)** (-0.01) and **"The chatbot efficiently resolved my issue without the need for further assistance" (Q5)** (0.07). This indicates that satisfaction with response time might not be closely linked to perceptions of how quickly or efficiently the chatbot resolves issues.

**"The waiting time for human assistance was reasonable" (Q7)** shows weak correlations with most other chatbot-specific questions, with its highest correlation being with **"I am satisfied with the chatbot's response time" (Q6)** (0.63). This suggests that users' perceptions of the waiting time for human assistance are somewhat independent of their overall satisfaction with the chatbot's performance.

#### *Moderate Correlations*

**"The chatbots have reduced the amount of time needed to resolve any requests" (Q1)** and **"The chatbot provided faster service compared to my experience with human customer support" (Q4)** have a moderate correlation (0.66). This indicates a reasonable connection between users perceiving faster service with chatbots and reduced overall time spent on resolving issues.

**"I was satisfied with the handoff process when the issue was escalated to a human employee" (Q8)** correlates moderately with other questions, such as **"The chatbot efficiently resolved my issue without the need for further assistance" (Q5)** (0.69) and **"The chatbots have managed to resolve my issues in a timely manner" (Q2)** (0.75). This suggests that satisfaction with the handoff process is linked to the perceived timeliness and efficiency of the chatbot.

### 8.4. Interpretations

#### *Strong Overlap in Timeliness Perception*

The high correlations between questions related to the chatbot's timeliness and efficiency (Q1, Q2, Q3, Q5) suggest that these questions are tapping into similar user experiences. Users who feel the chatbot is timely in resolving their requests also tend to view it as efficient and fast compared to human support.

#### *Independent Measures of Satisfaction*

Satisfaction with the chatbot's response time (Q6) and waiting time for human assistance (Q7) seem to be measuring distinct areas of user experience, as they exhibit weaker correlations with other aspects of chatbot performance. This may indicate that users separate their satisfaction with specific service aspects from the overall perception of the chatbot's efficiency.

#### *Handoff Satisfaction*

The moderate correlation between satisfaction with the handoff process (Q8) and other factors, like timely issue resolution (Q2) and efficiency (Q5), suggests that users who are satisfied with how their cases are escalated to human employees also tend to rate the chatbot's resolution process positively.

## 9. Results from the Quantitative Data Analysis

### 9.1. Confidence Interval for means

I calculated the 95 percent confidence interval (CI) for each question with the method called "Booststrapping".

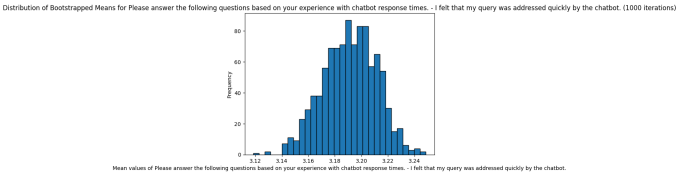


**Figure 4.** Example of the Distribution of Booststrapped Means for the question "The chatbots have managed to resolve my issues in a timely manner".

Interpretation on the Confidence Intervals for every question:

1. **The chatbots have reduced the amount of time needed to resolve any requests**
   **Mean**: 3.086, **95% CI**: [3.043, 3.129]
   The mean suggests that users slightly agree that chatbots reduce the time needed to resolve requests. The narrow CI reflects confidence that the true mean lies near this value, reinforcing a relatively stable perception of chatbots improving time efficiency.
2. **The chatbots have managed to resolve my issues in a timely manner**
   **Mean**: 2.933, **95% CI**: [2.889, 2.973]
   With a mean slightly below 3.0, respondents tend to be neutral to slightly dissatisfied with the timeliness of issue resolution. The CI is narrow, indicating consistency in this neutral-to-slightly-negative perception.
3. **I felt that my query was addressed quickly by the chatbot**
   **Mean**: 3.188, **95% CI**: [3.149, 3.227]
   This shows a more positive perception, as the mean is above 3.0, indicating slight agreement that queries were addressed quickly. The CI reinforces the reliability of this conclusion, as it is tightly centered around the mean.
4. **I am satisfied with the chatbot's response time**
   **Mean**: 3.259, **95% CI**: [3.219, 3.297]
   This is one of the higher means in the dataset, reflecting general satisfaction with chatbot response times. The narrow CI suggests that users consistently rate their satisfaction with response times positively.
5. **The chatbot provided faster service compared to my experience with human customer support**
   **Mean**: 3.14, **95% CI**: [3.092, 3.183]
   This indicates that users lean towards agreement that chatbots offer faster service than human support. The CI, though slightly wider, suggests some variability in perceptions but maintains a positive trend.
6. **The waiting time for human assistance was reasonable**
   **Mean**: 2.707, **95% CI**: [2.670, 2.745]
   With a mean below 3.0, respondents generally disagree that the waiting time for human assistance is reasonable. The narrow CI implies consistent dissatisfaction with this aspect.
7. **I was satisfied with the handoff process when the issue was escalated to a human employee**
   **Mean**: 3.000, **95% CI**: [2.959, 3.041]
   The mean and CI suggest a neutral view of the handoff process. The tight CI around the neutral score indicates that opinions are quite stable and tend to neither lean heavily toward satisfaction nor dissatisfaction.
8. **The chatbot efficiently resolved my issue without the need for further assistance**
   **Mean**: 2.654, **95% CI**: [2.608, 2.698]
   This relatively low mean indicates dissatisfaction with the chatbot's ability to resolve issues independently. The narrow CI shows that this dissatisfaction is shared by most respondents.

### 9.2. T-statistic: 0.1204, P-value: 0.4521

The p-value (0.4521) is much higher than the significance level ($\alpha = 0.05$). This means we **fail to reject the null hypothesis**, indicating there is no significant difference between the means of the `performance` and `satisfaction` groups in my test.

The t-statistic (0.1204) is close to 0, which suggests that the means of the two groups are very similar.

### 9.3. Levene's Test statistic: 1.8430, P-value: 0.1753

Levene's test checks for **homogeneity of variances** (whether the variances of the two groups are equal). In this case, the p-value (0.1753) is greater than 0.05, indicating that we **fail to reject the null hypothesis of equal variances**. Therefore, the assumption of equal variances holds, and the t-test is appropriate under these conditions.

### 9.4. Cohen's d (Effect Size): 0.0115

Cohen's d quantifies the **effect size** or the magnitude of the difference between the two groups. A Cohen's d of 0.0115 is extremely small, indicating that the difference between the means of `performance` and `satisfaction` is almost negligible in practical terms.

### 9.5. Interpretation

The results collectively suggest that there is **no statistically significant difference** between the `performance` and `satisfaction` groups (as indicated by the p-value of 0.4521). The variance between the two groups is similar (as per Levene's test). The **effect size** is nearly zero, meaning the observed difference is trivial.

## 10. Quantitative Data Analysis - Power Analysis

### 10.1. Achieved Power of the Test: 0.0504

With a current sample size of 58 and an effect size of Cohen's d = 0.0115, there is only a **5.04% chance** of detecting a true effect if it exists. This is significantly below the conventional threshold of **0.80 (or 80%)**, indicating insufficient power to detect even a small effect.

### 10.2. Required Sample Size for 0.80 Power: 118698.28

To achieve a power of 80% (generally considered acceptable in research), approximately **118,698 participants** are needed. This exceedingly high number suggests either the effect size is very small or the current sample size is grossly inadequate.

## 11. Visualizations for the final results of Quantitative Data Analysis

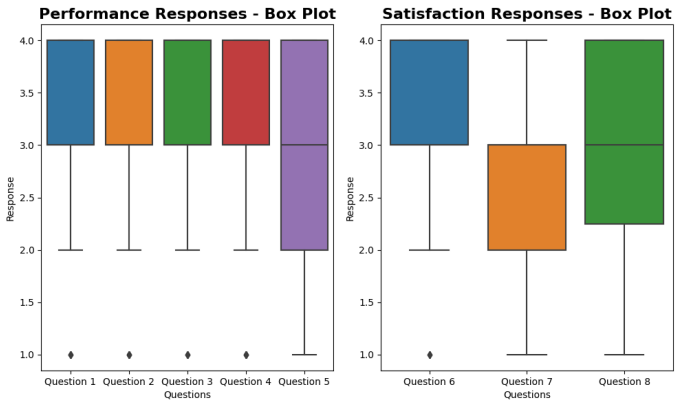


**Figure 5.** Box plot for Performance Responses and Satisfaction Responses.

Each box represents the interquartile range (IQR), indicating the range between the first quartile (Q1, 25th percentile) and third quartile (Q3, 75th percentile). The line inside the box shows the median

(50th percentile). Lines extending from the box show the data range, typically up to 1.5 times the IQR. Points beyond the whiskers are outliers.

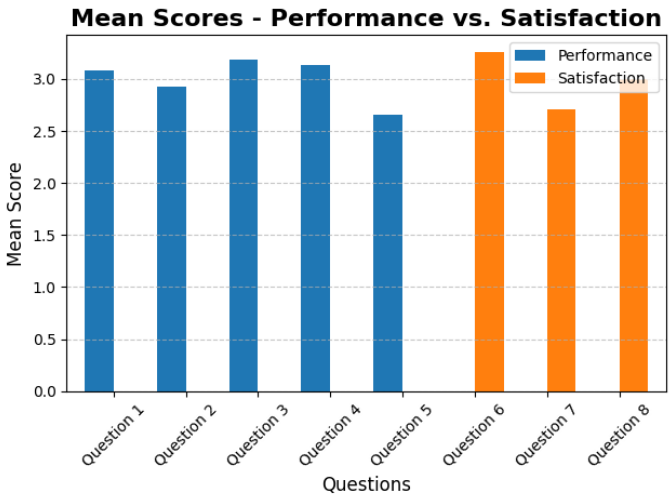


**Figure 6.** Bar plot for Mean Scores - Performance vs. Satisfaction.

This bar plot compares average scores of performance and satisfaction for each question.

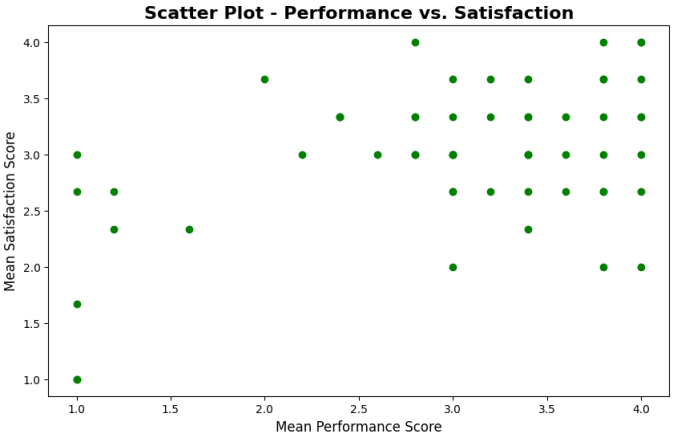


**Figure 7.** Scatter plot for Mean Scores - Performance vs. Satisfaction.

The scatter plot shows the relationship between average performance and satisfaction scores. The upward trend indicates a positive correlation; higher performance may be associated with higher satisfaction.

## 12. Results from the Qualitative Data Analysis

The thematic analysis of customer interviews regarding their experiences with chatbots reveals several key insights across five themes:

**Overall Experience with Chatbots:** Participants expressed frustration with chatbots due to their limitations, often requiring overly simplified language. Some participants recognized the benefits of chatbots for straightforward tasks, such as retrieving order statuses and writing reviews.

**Language and Communication:** Many noted that chatbots do not automatically detect language preferences, often defaulting to the website's language. Participants called for more language options and flexibility, suggesting that chatbots should allow user input rather than relying solely on predefined responses.

**Personalization and Contextual Awareness:** Users emphasized the importance of chatbots accessing past orders or account details, streamlining issue resolution. Some felt that chatbots struggled with contextual understanding, indicating a need for improved natural language processing.

**Problem Resolution and Efficiency:** Participants expected chatbots to provide quick and efficient solutions and preferred those capable of handling inquiries autonomously. They emphasized the importance of a smooth transition to human support when necessary, reflecting a need for effective escalation processes.

**Desired Features and Improvements:** Suggestions for enhancements included better language comprehension and more interactive elements, such as decision trees based on user choices. Participants underscored the need for dynamic and user-friendly interfaces in chatbot design.

Overall, the analysis identifies critical areas for improvement in chatbot functionalities, focusing on user frustrations and expectations.

## 13. Conclusion

**Qualitative Data Analysis**: The thematic analysis reveals that while chatbots are increasingly integrated into customer support services in SMEs, there remain significant opportunities for enhancement. Users experience a spectrum of interactions with chatbots, ranging from frustration due to limitations in understanding and language flexibility to satisfaction in resolving simple queries. The findings underscore the importance of improving contextual awareness, language options, and the overall user experience to better meet customer needs and increase satisfaction in support services. Incorporating user feedback into the development process can lead to more effective and user-friendly chatbot systems that cater to diverse customer preferences.

**Quantitative Data Analysis**: The quantitative data analysis highlights user experiences with chatbots, revealing mixed perceptions regarding performance and satisfaction. While participants expressed general satisfaction with response times, indicated by means above 3.0, significant challenges remain in areas like problem resolution. The mean score of 2.654 for the chatbot's ability to resolve issues independently reflects notable dissatisfaction among users.

Statistical tests support these findings, with a p-value of 0.4521 indicating no significant difference between performance and satisfaction groups. Levene's test confirmed equal variances, and Cohen's d of 0.0115 suggests that observed differences are trivial.

## 14. Recommendations

Based on the insights from both quantitative and qualitative analyses, the following recommendations are proposed to enhance chatbot functionalities and user satisfaction in SMEs:

**Improve Contextual Understanding:** Invest in advanced natural language processing (NLP) technologies to enhance the chatbot's ability to comprehend user queries accurately and contextually. This will help in addressing user requests more efficiently and improving the overall interaction quality.

**Enhance Problem Resolution Capabilities:** Develop more sophisticated algorithms that allow chatbots to resolve a wider range of issues without human intervention. Implementing decision trees and branching scenarios can facilitate better problem-solving.

**Expand Language Options:** Implement multilingual support to cater to a diverse user base. Allow chatbots to detect and adapt to user language preferences automatically, reducing communication barriers.

**Focus on User Experience Design:** Enhance the chatbot interface to be more interactive and user-friendly. Incorporating features such as clickable options or guided pathways can streamline interactions and improve user engagement.

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## References

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