Assessing the relationship of Service Quality Factors with Customer Satisfaction and Trust in SMEs

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1 EXECUTIVE SUMMARY

This policy paper investigates how chatbots enhance customer satisfaction and trust in small and medium-sized enterprises (SMEs), focusing on key elements like personalization, reduced waiting times, accuracy, and functionality. Findings show that while chatbots increase efficiency and availability for SMEs, their impact on customer satisfaction is often constrained by challenges in providing accurate responses and personalized interactions.

High personalisation levels positively affect satisfaction, yet customers often prioritize responsiveness and problem-solving capabilities over purely personalized features. Accuracy also emerges as a critical factor, with errors in response accuracy negatively impacting trust. Therefore, SMEs should balance efficiency with personalized engagement, ensuring smooth transitions to human support when needed to maintain customer trust. Recommendations include refining chatbot accuracy, clearly communicating chatbot capabilities, and implementing regular updates based on customer feedback to align chatbot functionalities with evolving customer expectations.

2 INTRODUCTION

In today's fast-paced business environment, small and medium-sized enterprises (SMEs) face significant pressure to deliver high-quality customer service despite limited resources. Customers now expect prompt and efficient support around the clock, which can be challenging for SMEs, particularly outside regular business hours. Addressing this need for constant support is crucial to remain competitive, as delayed responses can lead to customer dissatisfaction and lost business opportunities.

A promising solution to this challenge is the use of chatbots—automated systems capable of simulating conversations and providing instant responses to customer inquiries on platforms like websites and messaging apps. Chatbots offer SMEs a way to provide 24/7 support without additional staff, reducing perceived waiting times and potentially improving customer satisfaction. For example, a chatbot can instantly answer questions even late at night, addressing customer needs that would otherwise go unmet until regular business hours. However, the role of chatbots in enhancing customer satisfaction and trust is still debated. While many customers appreciate the efficiency of chatbot interactions, others may feel frustrated if interactions lack personalization or if responses are inaccurate. Additionally, some users prefer human interaction, underscoring a mix of praise and criticism around chatbot usage. As noted by Aivo (2020), while chatbots can improve functionality, they may fall short in delivering the nuanced customer experiences that some users expect.

The objective of this paper is to provide actionable recommendations for SMEs on effectively integrating chatbots into their customer service strategies. Specifically, this study assesses the impact of key chatbot attributes,personalisation, response time, accuracy, and functionality on customer satisfaction and trust within SMEs. Using a qualitative approach with thematic analysis based on Braun and Clarke (2006), this research explores how these chatbot attributes influence customer trust compared to traditional human support. The study focuses on SMEs within specific sectors, making the findings particularly relevant to businesses that operate in resource-constrained environments. This paper finds that attributes such as personalization and accuracy have distinct effects on customer trust and satisfaction, leading to targeted strategic recommendations. By examining these elements, this policy paper aims to provide SMEs with practical insights into implementing chatbots effectively to enhance customer support while balancing automation with human interaction. has context menu

3 RESEARCH TOPIC

Evaluating the Effects of Personalisation, Reduced Waiting Times, Accuracy, and Functionality of Chatbots on Customer Satisfaction and Trust in SMEs.

3.0.1 ***Problem Statement***

In today's digital age, customers expect 24/7 support from the businesses they interact with. However, traditional customer service, which is often limited to business hours, frequently fails to meet these expectations, leading to frustration and potential business loss, especially for small and medium-sized enterprises (SMEs) with limited resources Harrington (2024). For many SMEs, maintaining a full-time customer service team that can address inquiries at all hours is neither financially feasible nor operationally practical. This creates a significant challenge, as delays in responding to customer queries can result in a poor customer experience and drive potential clients away. In highly competitive markets where immediate responses are crucial, these delays can cause SMEs to lose valuable business to competitors offering quicker support.

Chatbots offer a promising solution to this issue by providing instant, automated responses around the clock. They are capable of handling multiple inquiries simultaneously, reducing the burden on human customer service teams and ensuring that customers receive immediate attention. For SMEs, this can be particularly beneficial, as chatbots allow them to offer a level of support that was previously reserved for larger companies with extensive resources. By reducing perceived waiting times, chatbots can enhance the customer experience, improving satisfaction and potentially increasing customer retention Cordero et al. (2022).

However, the introduction of chatbots brings its own complexities. While many customers appreciate the efficiency and convenience of automated responses, others may find the lack of human interaction dissatisfying. Some customers may feel frustrated when a chatbot fails to fully understand their query or when the interaction feels impersonal. In such cases, the use of chatbots could negatively impact customer satisfaction, eroding the trust that businesses work hard to build. Additionally, chatbots need to be accurate in their responses; otherwise, they risk providing incorrect or incomplete information, which can lead to customer frustration and loss of trust in the business.

The effectiveness of chatbots in improving customer satisfaction and trust in SMEs is not yet fully understood. It is essential to explore how different factors, such as the level of personalisation, perceived waiting times, the accuracy of responses, and the overall functionality of chatbots, influence customer perceptions. This research will assess the relationship between chatbots and perceived wait times, comparing the experiences of customers who interact with chatbots to those who receive traditional human assistance. Furthermore, the study will analyse customer feedback to better understand how ease of use, helpfulness, and issue resolution influence overall satisfaction and trust in SMEs. By examining how chatbot design and functionality impact these factors, the research aims to provide valuable insights into the potential of chatbots to improve customer service in SMEs and address their unique challenges.

3.0.2 ***Research Question***

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

To provide an answer to this research question, we have come up with the following sub-questions:

1. How does the level of personalisation in chatbot interactions (high vs. low) relate to customer satisfaction in SMEs?
2. How do chatbots in SMEs contribute to customer satisfaction by reducing perceived waiting times for human assistance?
3. How does the accuracy of chatbots in SMEs compare to traditional human assistance in terms of customer trust?
4. How do customer preferences for chatbot functionalities affect their overall satisfaction with support services in SMEs?

4 METHODOLOGY

Our study uses a quantitative approach for the first two sub-questions and a qualitative approach for the last two. We begin with the methodology behind our quantitative approaches.

4.1 Quantitative - How does the level of personalisation in chatbot interactions (high vs. low) relate to customer satisfaction in SMEs?

4.1.1 Research Design

The objective of this research is to conduct a quantitative, cross-sectional study aimed at examining the influence of different levels of personalisation (High vs. Low) in chatbot interactions on customer satisfaction. In this design, the level of personalisation serves as the independent variable, while customer satisfaction acts as the dependent variable. The main goal of this research is to assess how varying degrees of personalisation in chatbot communication affect customer satisfaction levels in SMEs.

4.1.2 Participants and Sampling

The target population consists of customers of Small and Medium Enterprises (SMEs) who have recently interacted with a chatbot. Although an initial power analysis recommended a sample size of 200 to 300 participants to achieve robust results with an effect size of 0.5 and a power of 0.8, the final sample size used was 150 participants. The sampling method employed was stratified random sampling, where stratification was based on customer responses to two key categories of variables: **personalisation-related variables** and **overall experience and satisfaction variables**.

In the **personalisation-related group**, questions assessed the degree of personalisation perceived in chatbot interactions, such as how personalized the chatbot's responses were (Question 2) and whether the chatbot remembered customer preferences or past interactions (Question 7). These variables were crucial to testing the hypothesis concerning high versus low personalisation in chatbot experiences.

The **overall experience and satisfaction group** focused on broader aspects of user interaction that affect customer perceptions of chatbots. This included overall satisfaction with the chatbot (Question 1), ease of use (Question 3), problem-solving effectiveness (Question 4), likelihood of recommending the chatbot to others (Question 5), and the responsiveness of the chatbot (Question 6).

4.1.3 Data Collection

Data was collected through a Qualatrics survey that gathered insights on customer satisfaction, perceptions of personalisation, ease of use, and problem resolution during chatbot interactions. Likert-scale questions were employed, with response options ranging from 1 (Not at all personalized) to 5 (Highly personalized).

After the survey questions were reviewed by a supervisor, the survey was distributed, and data collection occurred over two days. No pilot test was conducted as the questions were considered sufficiently reliable after supervisory approval.

4.1.4 Hypothesis

Below is the hypothesis to be tested in this sub-question:

1. **Null Hypothesis (H0):** No meaningful difference in customer satisfaction between high and low personalisation chatbots.
2. **Alternative Hypothesis (HA):** High personalisation chatbots result in noticeably higher customer satisfaction than low personalisation chatbots.

4.1.5 Data Analysis

The data analysis involved several steps, including data cleaning, categorisation, and binary conversion of survey responses for statistical testing. Cochran's Q test was used for non-parametric hypothesis testing since the data did not follow a normal distribution. Post-hoc analyses using McNemar's test were conducted to explore significant differences between high and low personalisation chatbots.

4.1.6 Data Cleaning and Categorising Survey Responses

Survey responses were cleaned by removing missing values and categorising Likert-scale responses into two groups: Agree (including "Strongly Agree" and "Agree") and Disagree (including "Strongly Disagree" and "Disagree"). Neutral responses were excluded from the analysis to focus on clear sentiment distinctions. The data was then converted to a binary format, with Agree = 1 and Disagree = 0, to facilitate hypothesis testing.

4.1.7 Testing the Dataset for Normality

The dataset was tested for normality using Q-Q plots, and the results showed that the data did not follow a normal distribution. Therefore, non-parametric statistical methods were applied. Cochran's Q Test was selected as the primary method to validate differences between groups of related questions in the survey.

4.1.8 Non-Parametric Hypothesis Testing

Cochran's Q Test was used to assess significant differences in customer satisfaction across the survey questions related to personalisation and overall chatbot experience. The test assumptions of having dichotomous data and repeated measures were met. Post-hoc McNemar's test provided more detailed comparisons between specific survey questions, highlighting key differences in customer satisfaction, Kehayias (2024).

4.2 Quantitative - How do chatbots in SMEs contribute to customer satisfaction by reducing perceived waiting times for human assistance?

4.2.1 Research Design

This study uses a quantitative approach to examine how chatbots influence perceived waiting times and their effect on customer satisfaction. The focus is on collecting measurable data through surveys and chatbot interaction logs to analyse the relationship between perceived waiting times and customer experiences in SMEs.

4.2.2 Sampling Strategy

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

4.2.3 Data Collection Method

An online survey has been distributed to participants recruited from Prolific. Key survey topics related to perceived waiting time include: the perception of response time, where participants will indicate how quickly they felt their query was addressed; comparison with human agents, where participants will be asked to rate whether the service provided was faster compared to their experiences with human customer support; satisfaction with waiting time, where participants will rate their satisfaction with the response time from 1 (very dissatisfied) to 5 (very satisfied); and escalation to human agents, where, if the issue was escalated, participants will rate how long they waited for assistance and whether they were satisfied with this hand-off process.

4.2.4 Data Analysis: Descriptive Statistics

Descriptive statistics has been used to summarize survey responses regarding perceived waiting times and customer satisfaction. This analysis will include the calculation of means, medians, and standard deviations to describe overall trends in both waiting times and satisfaction levels. Additionally, frequency distribution will be applied to categorical data, such as the number of participants reporting faster responses from chatbots compared to human agents.

4.2.5 Inferential Statistics

Here are the hypotheses for the t-test comparing chatbot performance and satisfaction levels:

Null Hypothesis (H0): 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 (HA): 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.

4.2.6 Ethical Considerations

Participants were fully informed of the study's purpose and their right to withdraw at any time, ensuring informed consent. Additionally, all interaction logs and survey responses will be anonymised to safeguard participant privacy and adhere to data protection standards.

4.3 Qualitative - How does the accuracy of chatbots in SMEs compare to traditional human assistance in terms of customer trust?

The objective of this study is to examine how chatbot accuracy impacts the level of customer trust in chatbots compared to traditional human assistance in small and medium-sized enterprises (SMEs). A qualitative approach was used, involving semi-structured interviews with five participants who had experience using both chatbots and human agents in customer service contexts. Thematic analysis, as described by Braun and Clarke (2006), was applied to identify recurring themes related to chatbot accuracy and customer trust. You can read more about my methodology in this research paper, Goddijn (2024).

4.4 Qualitative - How do customer preferences for chatbot functionalities affect their overall satisfaction with support services in SMEs?

This study utilised a qualitative research approach to examine customer experiences with chatbots within small and medium-sized enterprises (SMEs). The choice of qualitative methods was based on the need to gain a deep understanding of user perceptions and experiences, which are often complex and not easily quantified through purely quantitative approaches. The primary data collection tool was semi-structured interviews, chosen to allow for flexible yet guided discussions. This format enabled participants to share their thoughts and experiences comprehensively, while the interviewer could still steer the conversation toward specific areas of interest.

Thematic analysis was selected as the data analysis method, following the approach outlined by Braun and Clarke (2006). This method was considered appropriate for the exploratory nature of the study, where the goal was to identify patterns and insights rather than to test a predetermined hypothesis. Thematic analysis facilitated the categorization of data into distinct themes, providing an in-depth understanding of how various chatbot functionalities contribute to customer satisfaction or dissatisfaction.

4.4.1 Sampling and Participant Profile

The study involved interviews with eight participants who had recent experience using chatbots in the context of SMEs. Purporsive sampling was used to ensure diversity across sectors, including retail, healthcare, and financial services. This selection aimed to capture a range of experiences and insights, given the different customer service needs across industries.

Participants were aged between 25 and 55, with varying degrees of familiarity with digital customer service tools. The decision to limit the sample size to eight participants was guided by the depth of qualitative data required for thematic analysis, which emphasizes the richness of insights over acceptability. The focus was on specific chatbot functionalities and their impact on satisfaction, making it essential that each participant had significant experience interacting with chatbots.

4.4.2 Data Collection and Management

The interviews were semi-structured, each lasting between 10 to 15 minutes, and recorded with the participants' consent. The interview questions targeted four main areas: ease of use, language options, personalisation, and the chatbot's ability to handle complex queries.

After the interviews, the recordings were transcribed verbatim and anatomized to protect participant privacy. The transcripts were then coded using Microsoft Word, which helped organiss and analyse the data. Initial codes were generated based on the functionalities being studied—ease of use, language support, personalisation, and complex query handling. Through an iterative process, these codes were refined and grouped into broader themes that captured the essential aspects of customer experiences.

5 FINDINGS

Our study uses a quantitative approach for the first two sub-questions and a qualitative approach for the last two. We begin with the methodology behind our quantitative approaches.

5.1 Quantitative - How does the level of personalisation in chatbot interactions (high vs. low) relate to customer satisfaction in SMEs?

In this section, we look at the findings from our hypothesis testing as seen below in the hypothesis testing, followed by graphs to illustrate these findings more easily.

5.1.1 Cochran's Q Test Results

The application of Cochran's Q Test yielded significant findings, with a Cochran's Q statistic of 93.5284 and a p-value of 5.60×10^{-18}. This indicates meaningful differences in customer satisfaction responses across the different chatbot personalisation and experience-related questions. The test showed that customers respond differently depending on whether the chatbot offers high or low personalisation.

5.1.2 Post-Hoc Analysis with McNemar's Test

To further explore these findings, McNemar's test was applied for pairwise comparisons of questions. The results revealed significant differences between high personalisation (Q1) and overall experience (Q4), with Q1 associated with higher customer satisfaction (McNemar's test statistic = 10.0000, p = 0.0000). This suggests that customers value high personalisation in chatbot interactions more than other aspects, such as general ease of use or responsiveness.

5.1.3 Proportion of Responses with Confidence Intervals

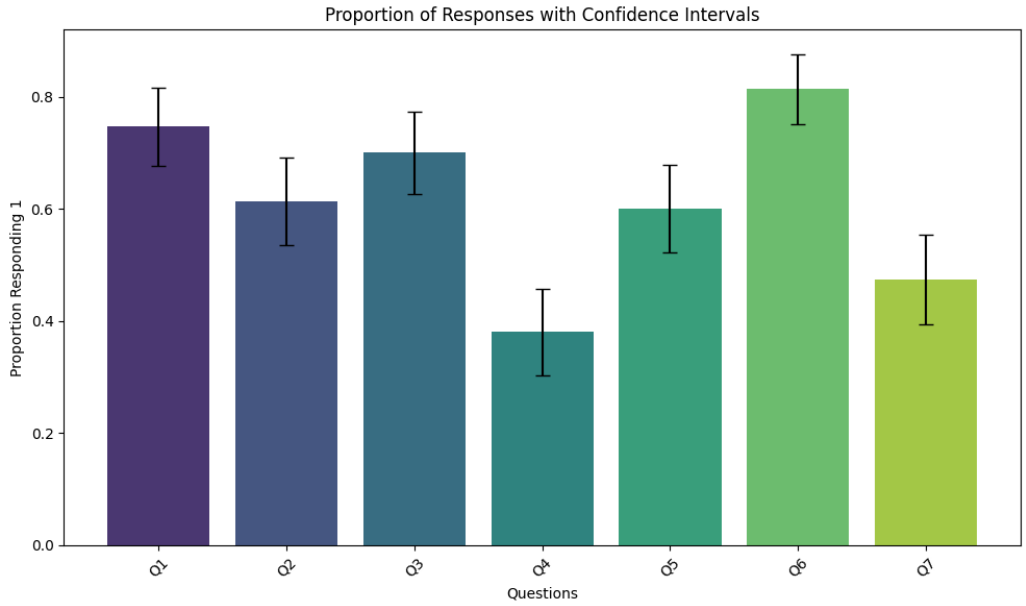

Figure 1. Proportion of Responses with Confidence Intervals

Figure 1 highlights that customers place more importance on the quality of their interactions with chatbots, particularly factors like responsiveness and efficiency, rather than personalisation features such as remembering previous interactions. The higher proportion of affirmative responses for Q6 and Q1 (around 0.8 and 0.7, respectively) suggests that customers value prompt and effective service above all.

In contrast, the lower scores for Q4 (below 0.4) indicate that personalisation plays a less critical role in overall customer satisfaction. This means that while personalisation can enhance the customer experience, businesses would benefit more

from focusing on improving responsiveness, communication, and problem-solving capabilities to better meet customer expectations. Essentially, speed and effectiveness in handling inquiries seem to have a stronger impact on customer satisfaction than personalisation features alone.

5.1.4 ***Power for Comparisons***

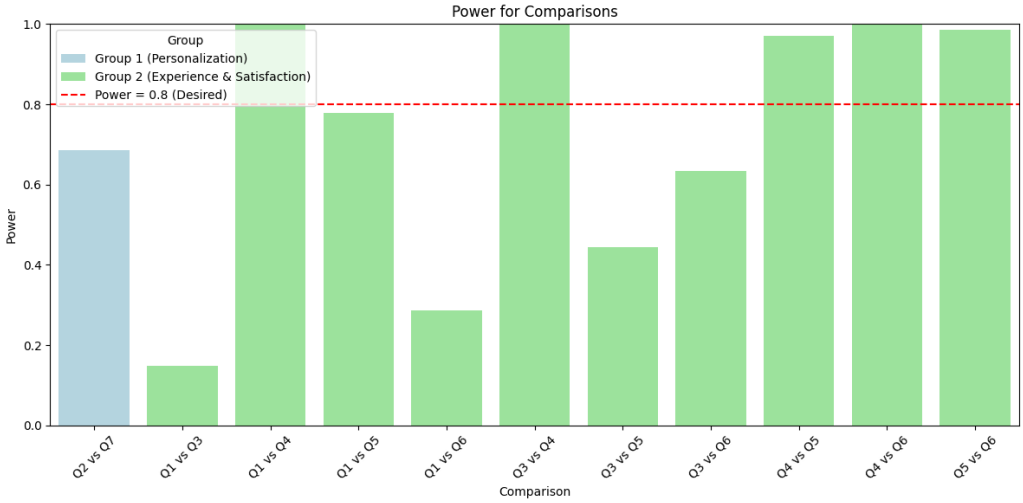

Figure 2. Power For Comparisons

Figure 2 illustrates the statistical power of various comparisons between question pairs, categorised into two groups: ”Personalisation” (Group 1) and ”Experience and Satisfaction” (Group 2). The red dashed line signifies the ideal power threshold of 0.8, which is considered the minimum acceptable level for making reliable statistical comparisons.

In Group 2, which focuses on ”Experience and Satisfaction,” most comparisons surpass the desired power level of 0.8. Notably, comparisons such as Q1 vs. Q4, Q1 vs. Q5, and Q4 vs. Q6 demonstrate particularly high power, indicating a strong level of confidence in the validity and reliability of these findings. This suggests that the results drawn from these comparisons can be trusted to reflect true differences in customer experiences and satisfaction.

On the other hand, Group 1 comparisons related to ”Personalisation” exhibit significantly lower statistical power, particularly for pairs like Q1 vs. Q3, which fall well below the 0.8 threshold. This lack of power suggests that the findings in this group may be less statistically reliable and could potentially be influenced by random variation. Consequently, while insights regarding customer satisfaction and experience are robust, the conclusions drawn about personalisation may require caution and further investigation to strengthen their reliability.

5.1.5 Effect Size (Cohen's h) for Comparisons

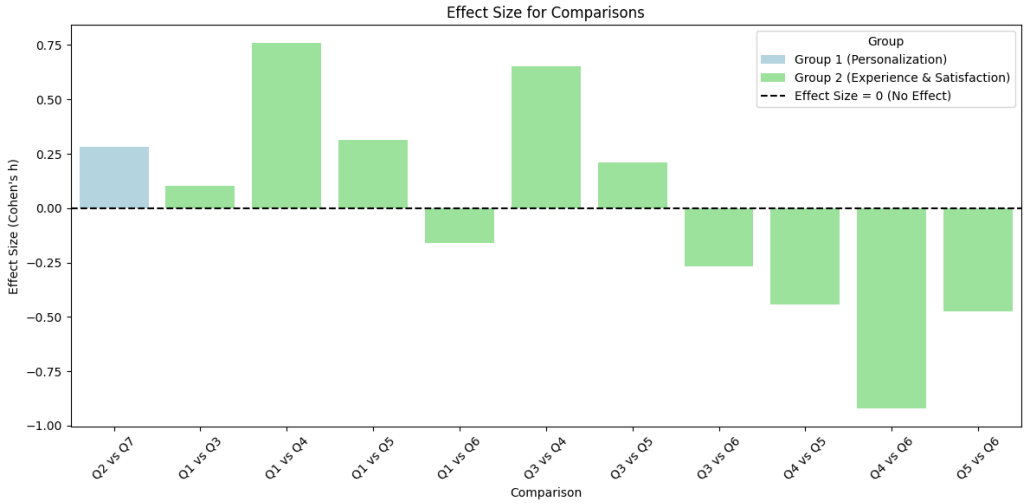

Figure 3. Effect Size For Comparisons amongst Questions

Effect size is a statistical measure that quantifies the strength of the difference between two groups or variables, allowing us to assess how meaningful these differences are. In this context, it is used to compare customer responses across various pairs of questions to better understand the relationships between different aspects of chatbot interactions.

The comparisons yielding the largest positive effect sizes include Q1 vs. Q4 (which examines overall experience versus effectiveness) and Q4 vs. Q5 (effectiveness versus likelihood to recommend). These findings clearly indicate that customers perceive significant differences between the overall experience provided by the chatbot and its problem-solving effectiveness, as well as between how effective they find the chatbot and their likelihood of recommending it to others. This suggests that enhancing either overall experience or effectiveness can strongly influence customer perceptions.

Conversely, some comparisons, such as Q4 vs. Q6 (effectiveness versus responsiveness), yielded negative effect sizes. This implies an interesting trade-off: as users perceive a chatbot as more effective, they may simultaneously feel that it is less responsive, or vice versa. This counter-intuitive relationship suggests that improvements in one area could inadvertently lead to perceived deficiencies in another, highlighting the need for a balanced approach when enhancing chatbot functionalities.

Overall, these effect sizes underscore the importance of understanding how different qualities of chatbot interactions are interrelated. While effectiveness and the likelihood of recommendation are closely tied, there are nuanced trade-offs to consider between various qualities, such as responsiveness and problem-solving ability. Businesses should aim to optimize these aspects holistically to achieve the best customer satisfaction outcomes, further information can be found in Kehayias (2024).

5.2 Quantitative - How do chatbots in SMEs contribute to customer satisfaction by reducing perceived waiting times for human assistance?

5.2.1 Introduction

In the correlation 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.

5.2.2 The Correlation Matrix

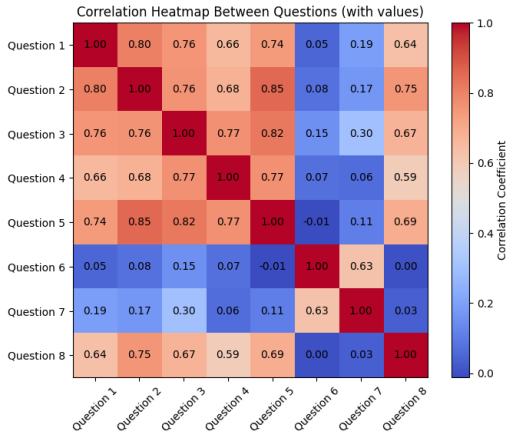

Figure 4. Correlation Matrix between the questions (with values).

5.2.3 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.

*5.2.4 **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.

*5.2.5 **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.

*5.2.6 **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.

*5.2.7 **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.

*5.2.8 **Interpretation***

The results collectively suggest:

- 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.

Read more about my findings in my research paper: Molnár (2024b). My Jupyter notebook with the quantitative data analysis can also be found here: Molnár (2024a).

5.3 Qualitative - How does the accuracy of chatbots in SMEs compare to traditional human assistance in terms of customer trust?

Several themes associated with chatbot accuracy and its impact on customer trust emerged from the interviews.

5.3.1 Accuracy as the Core of Trust

Customer trust is built on chatbot accuracy. Participants consistently mentioned that accurate and relevant responses increased their trust in the company, while inaccurate or irrelevant responses led to frustration and reduced trust in both the chatbot and the business. Participants expected chatbots to be as reliable as human agents for simple inquiries. A strong brand reputation was seen as dependent on chatbot accuracy and overall service quality.

5.3.2 Human Assistance as Backup

While chatbots were effective for straightforward questions, they were less capable of handling complex or nuanced issues. In such cases, a smooth transition from chatbot to human agent was crucial for maintaining trust. Participants noted that quick handovers helped avoid frustration, and human support enhanced the perception of reliability.

5.3.3 Inaccurate or Generic Responses

Inaccurate or generic responses from chatbots negatively affected business reputation. Customers expected to be understood and to receive contextually relevant answers, which chatbots often failed to provide. Participants expressed dissatisfaction with generic responses for both simple and complex queries, highlighting the importance of personalisation in shaping a positive chatbot experience.

5.3.4 Expectations vs. Reality

Customer expectations of chatbot capabilities influenced trust. When chatbots met or exceeded expectations, trust increased, but unmet expectations led to diminished trust. Clear communication about chatbot limitations helped manage dissatisfaction. Transparency about what the chatbot could and could not do, along with the availability of human support for complex issues, was deemed essential.

5.3.5 Speed vs. Personalisation

Chatbots were appreciated for their speed in handling simple tasks, but participants preferred human agents for interactions requiring customisation and empathy. While chatbot efficiency was valued, personalisation was seen as a critical factor in interaction quality. Balancing speed and personalisation presented a conflict of interest between chatbots and human agents.

The accompanying graph (Figure 5) shows the frequency of themes identified in the interviews. ”Accuracy as the Core of Trust” and ”Human Assistance as a Backup” were the most frequently mentioned themes, emphasizing their importance in building customer trust. ”Speed vs. personalisation” was also significant, highlighting the trade-off between efficiency and empathy in customer interactions.

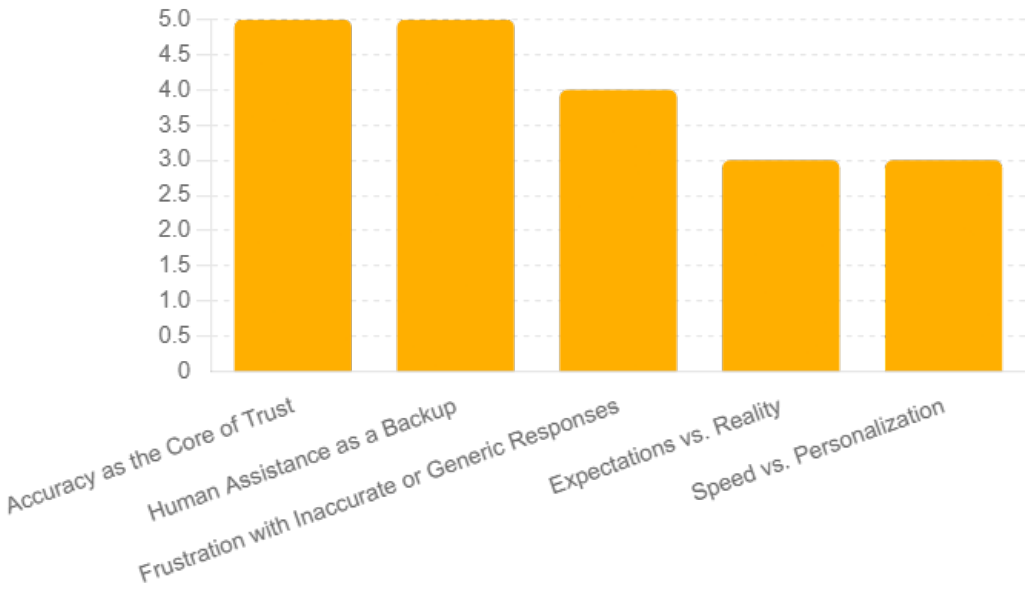

Figure 5. Frequency of Themes Identified in the Interviews.

5.4 Qualitative - How do customer preferences for chatbot functionalities affect their overall satisfaction with support services in SMEs?

5.4.1 Chatbot Role in Enhancing Customer Satisfaction

The study found that chatbots play a crucial role in enhancing customer satisfaction for SMEs by providing fast, accessible, and 24/7 service, particularly for simple inquiries like tracking orders or checking product availability. Participants consistently valued the speed and convenience of chatbot interactions, which was perceived as a major advantage over traditional customer service channels. Additionally, the availability of multiple language options was appreciated, especially by users who preferred interacting in their native language.

5.4.2 Issues Impacting User Satisfaction

Several issues were identified that negatively impacted user satisfaction. One major area of concern was language support, with some chatbots failing to maintain consistent language accuracy or struggling with more complex linguistic needs. This limitation often led to user frustration, especially when chatbots were unable to understand nuanced or multi-part queries. The findings suggest a need for improved natural language processing capabilities to better accommodate diverse customer requirements.

5.4.3 Handling Complex Queries

Another significant factor was the chatbot's ability to handle complex queries. Many participants expressed dissatisfaction when chatbots were unable to resolve intricate issues, especially in industries like banking and healthcare, where accuracy is critical. The lack of a clear or efficient escalation process to human agents was a common frustration, as users expected a seamless transition when the chatbot reached the limits of its capabilities.

5.4.4 Personalisation and Data Privacy

personalisation emerged as both a strength and a challenge for chatbots. While users appreciated chatbots that could remember past interactions to streamline the service process, concerns about data privacy and the ethical use of personal information were also raised. This finding indicates that SMEs need to carefully balance the benefits of personalisation with transparent data practices to maintain customer trust.

5.4.5 Expectations vs. Capabilities

Additionally, a gap was noted between customer expectations and the actual capabilities of chatbots. Many users anticipated that chatbots would manage complex queries as effectively as human agents, leading to disappointment when this

was not the case. This misalignment in expectations suggests that SMEs should set clear communication around what chatbots can and cannot do to avoid user frustration.

6 CONCLUSIONS

6.1 Quantitative Conclusions

6.1.1 Impact of personalisation on Customer Satisfaction in SMEs

The quantitative analysis demonstrates that while personalisation positively affects customer satisfaction, its impact is overshadowed by other critical factors, such as responsiveness and problem-solving capabilities. Customers prioritize quick, effective interactions over personalized features, suggesting that chatbots must strike a balance between these aspects to maximize satisfaction. The null hypothesis, which posited no significant difference in satisfaction between highly and less personalized chatbots, is rejected. Personalized chatbots do improve customer experience, but only when paired with prompt and efficient problem resolution. For SMEs, this means focusing not only on personalisation but also on chatbot responsiveness to foster higher customer satisfaction and loyalty.

6.1.2 Perceived Waiting Times and Customer Satisfaction in SMEs

The data on chatbots reducing perceived waiting times for human assistance provide mixed results. While users expressed general satisfaction with response times, indicated by means above 3.0, issues around problem resolution (mean of 2.654) reveal dissatisfaction. Statistical tests further supported these findings, with a p-value of 0.4521 indicating no significant difference between performance and satisfaction groups, and a negligible effect size (Cohen's d = 0.0115). Therefore, although chatbots show some success in reducing waiting times, there is still room for improvement, particularly in independent issue resolution.

6.2 Qualitative Conclusions

6.2.1 Accuracy and Customer Trust in Chatbots vs. Human Assistance in SMEs

The qualitative analysis indicates that customer trust in chatbots within SMEs is heavily reliant on their accuracy. Accurate responses enhance customer trust and satisfaction, while inaccuracies damage the user experience. When chatbots fall short in personalisation or fail to provide contextually appropriate answers, human intervention becomes essential. While chatbots handle simple queries well, more complex problems require a smooth transition to human support. Trust-building in chatbots depends on their precision and the ability to manage customer expectations, supplemented by timely human assistance when necessary.

6.2.2 Customer Preferences for Chatbot Functionalities in SMEs

Customers appreciate chatbots for their speed and availability, especially for routine tasks and their ability to operate in multiple languages. However, the study also uncovered areas where chatbots could improve, such as better handling of complex queries and enhancing language processing capabilities. Additionally, a more efficient escalation process to human support is crucial for addressing dissatisfaction. Improving these functionalities will likely lead to higher overall satisfaction with support services provided by SMEs.

7 Discussion between Quantitative and Qualitative Insights

The combination of quantitative and qualitative findings presents a nuanced view of chatbot effectiveness in customer satisfaction for SMEs, highlighting both complementary and conflicting insights across four main areas. First, in terms of **personalisation in chatbot interactions**, quantitative results suggest that high personalisation moderately influences customer satisfaction, though other factors like responsiveness and effectiveness are more critical. This aligns with qualitative data where customers valued chatbot efficiency and reliability over personalisation. However, qualitative interviews revealed that while users enjoy tailored interactions, they have reservations when personalisation compromises speed or functionality, emphasising that personalisation alone does not drive satisfaction.

Second, the role of chatbots in **reducing perceived waiting times for human assistance** shows more harmony between research approaches. Quantitative correlation analysis underscores that prompt issue resolution by chatbots has a direct, positive impact on satisfaction, primarily by reducing the need for human intervention. This quantitative result aligns with qualitative insights, where users consistently appreciated the time savings and accessibility of chatbots for straightforward inquiries. However, the qualitative findings reveal that seamless transitions to human agents remain crucial, particularly when dealing with complex or sensitive issues, pointing to a layered approach for SMEs: while chatbots should reduce waiting times, efficient handover protocols are essential to sustain high satisfaction.

Third, in comparing **chatbot accuracy with traditional human assistance for customer trust**, the two research approaches highlight both supportive and divergent points. Quantitative analysis indicates no substantial difference in satisfaction levels between accuracy-focused and general performance-focused factors. However, qualitative findings reveal that customers' trust hinges strongly on accuracy, especially for complex queries where errors can damage business reputation. Although chatbots are efficient for simple queries, users preferred human agents for nuanced issues, and trust faltered with generic or inaccurate responses. This discrepancy suggests that quantitative measures may underestimate the impact of accuracy on trust, underscoring the importance of ensuring chatbot accuracy for maintaining customer confidence.

Lastly, **customer preferences for chatbot functionalities** display some contrast in quantitative and qualitative findings. Quantitative data show that while personalisation and certain chatbot features improve satisfaction, the effect size is generally small, implying that these functionalities are not the primary drivers of customer satisfaction. Qualitative insights, however, suggest a deeper complexity, as users appreciated multi-language options, customization, and continuity in interactions. At the same time, they voiced concerns about data privacy and transparency, especially when chatbots handle personal information. This divergence suggests that while these features are valued, their contribution to satisfaction is often nuanced and context-dependent, with the risk of dissatisfaction if chatbot capabilities fall short of customer expectations.

In summary, while quantitative and qualitative findings often support each other, they also reveal distinct layers of customer expectations. Quantitative data provide broad trends prioritising efficiency, reduced waiting times, and accuracy, while qualitative insights shed light on contextual elements such as the need for clear communication on chatbot limitations and ethical data practices, which are critical for a well-rounded approach to customer satisfaction in SME chatbot support.

8 Recommendations for Small and Medium-Sized Enterprises

Small and Medium Enterprises (SMEs) have a unique opportunity to enhance their customer service by implementing targeted strategies, particularly when utilizing chatbot systems. Below are tailored recommendations for SME owners and managers, considering the typical constraints of limited resources and access to advanced technologies.

8.1 Quantitative Recommendations

8.1.1 Enhance Personalisation Features

Personalisation improves customer interactions but is often underutilized by SMEs. Many chatbots do not remember user preferences. SMEs should explore affordable, AI-driven personalisation solutions that track customer profiles and provide history-based responses. Implementing budget-friendly CRM systems can offer personalized chatbot experiences, which will boost customer satisfaction and loyalty without substantial financial investments.

8.1.2 Improve Problem-Solving Capabilities

A chatbot's ability to solve problems directly impacts customer retention. SMEs can enhance chatbots by incorporating comprehensive FAQs and predefined response pathways. Regularly updating these based on customer feedback improves chatbot effectiveness over time, ensuring timely and relevant assistance without requiring costly machine learning solutions.

8.1.3 Increase Focus on Responsiveness and Speed

Customers highly value quick responses, especially in industries such as e-commerce. SMEs can optimize chatbot response times through efficient coding and streamlined dialogue structures. Incorporating simplified NLP features that anticipate common queries can improve response times, leading to better customer satisfaction without significant financial investments.

8.1.4 Establish Regular Feedback Mechanisms

Collecting customer feedback is essential for identifying areas for improvement. SMEs can implement simple post-chat surveys or use third-party feedback tools to gather insights on chatbot performance. This feedback loop enables data-driven improvements over time, significantly enhancing customer satisfaction.

8.1.5 Reduce Perceived Waiting Times for Human Assistance

1. **Improve Contextual Understanding:** Invest in advanced natural language processing (NLP) technologies to enhance the chatbot's ability to understand and address user queries accurately. This will improve the overall quality of interactions and reduce the need for human escalation.
2. **Enhance Problem Resolution Capabilities:** Develop sophisticated algorithms that allow chatbots to resolve a broader range of issues without human intervention. Implementing decision trees and branching scenarios can improve problem-solving capabilities.
3. **Expand Language Options:** Offer multilingual support to cater to a diverse customer base. Chatbots should be capable of detecting and adapting to user language preferences automatically, reducing communication barriers.
4. **Focus on User Experience Design:** Enhance the chatbot interface by making it more interactive and user-friendly. Features such as clickable options and guided pathways can streamline interactions and increase user engagement.
5. **Monitor Performance Metrics:** Establish key performance indicators (KPIs) to track chatbot effectiveness regularly, including user satisfaction, response times, and successful problem resolution rates.

8.2 Qualitative Recommendations

8.2.1 Enhance Chatbot Accuracy and Build Trust

Improving chatbot accuracy is crucial for building customer trust. SMEs should focus on refining natural language processing capabilities and ensuring the chatbot is always up-to-date with product and service information. Accurate and timely responses are essential to maintaining customer trust in chatbot interactions.

*8.2.2 **Provide Seamless Human Support***

Program chatbots to recognize when they cannot handle a customer's issue and escalate the query to a human agent automatically. This transition should occur without requiring the customer to repeat their problem, ensuring a seamless experience and preventing frustration.

*8.2.3 **Manage Customer Expectations***

Clearly communicate the chatbot's capabilities and limitations to customers. Ensuring that users understand what the chatbot can and cannot do—, nd that human support is available when necessary, helps align expectations and reduces friction in interactions.

*8.2.4 **Balance Speed and personalisation***

While speed is critical for handling simple tasks, personalisation is key to fostering trust. SMEs should employ chatbots for routine interactions, while more personalized and context-sensitive matters are handled by human agents. Striking the right balance between speed and personalisation will improve customer satisfaction and trust.

*8.2.5 **Monitor and Improve Chatbot Performance***

Regularly assess chatbot performance through customer feedback and performance metrics to identify areas for improvement. Frequent updates to the chatbot's algorithm, accuracy, and capabilities will help maintain high customer satisfaction and trust over time.

*8.2.6 **Transparency in Communication***

Ensure that customers are aware of whether they are interacting with a chatbot or a human agent. Clearly outlining the chatbot's scope of support will help set realistic expectations and prevent dissatisfaction from unmet service needs.

*8.2.7 **Enhance Language Processing and Improve Escalation Processes***

SMEs should invest in better natural language processing tools to improve the chatbot's ability to handle complex queries. Additionally, efficient escalation processes should be established to ensure that customers can easily transition from chatbot to human agents when needed. Communicating chatbot limitations and clarifying data usage and privacy practices will also help manage user expectations and build trust.

9 Stakeholder Analysis for Chatbot Implementation

This stakeholder analysis identifies and assesses the key players involved in chatbot implementation, their influence on the process, and their unique needs to ensure effective integration into Small An Medium Enterprises(SME) operations. The analysis also outlines appropriate communication channels and methods for involving stakeholders.

9.1 Purpose and Objectives

The purpose of this stakeholder analysis is to evaluate how various stakeholders perceive the implementation of chatbots in SMEs and to identify their unique needs and concerns. By understanding these perspectives, the research aims to inform strategies that enhance customer satisfaction and trust while ensuring efficient chatbot integration.

9.2 SME Owners and Managers (High Interest, High Influence)

For SME owners and managers, the chatbot's primary goals are to enhance customer service, reduce operational costs, and support overall business growth. Their expectations revolve around the chatbot's ability to streamline processes, reduce response times, and automate routine tasks that currently require human resources. In line with these goals, they expect the chatbot to improve operational efficiency, elevate customer engagement, and reduce labor costs.

Owners and managers also have concerns about the chatbot's alignment with their long-term strategy. They want to ensure that its integration doesn't disrupt existing workflows and that it meets data privacy and regulatory compliance (such as GDPR). From a governance perspective, ensuring data security, user privacy, and ethical use of customer data is a top priority.

Feedback Mechanisms: To monitor and evaluate stakeholder engagement, regular strategic planning meetings will be held, alongside project updates and performance metrics reviews. These stakeholders will receive regular reports on the chatbot's performance, return on investment (ROI), and its impact on customer service Key Performance Indicators(KPIs). Additionally, feedback will be gathered through surveys that specifically assess their satisfaction with the chatbot implementation and its alignment with business goals.

9.3 Employees (High Interest, Moderate Influence)

Employees benefit from the chatbot by reducing the burden of repetitive tasks such as answering frequently asked questions and handling routine customer service inquiries. Their expectations are centered around increased efficiency and being able to focus on more value-added, strategic tasks rather than mundane operations.

One key concern among employees is whether the chatbot will replace their roles or lead to job redundancies. They need reassurance that it is a tool meant to support them and increase productivity rather than one that will reduce their job security. From a social responsibility perspective, it's essential that the implementation is accompanied by appropriate training programs. Employees should be taught how to interact with the chatbot, leverage its capabilities, and transition into more complex roles that require human input.

Involving employees in the process is crucial. Communication with this group will involve training sessions, workshops, and regular feedback loops to ensure that the chatbot integration supports their daily work without causing disruption. Evidence: For example, initial surveys could assess employee concerns regarding job security and the expected benefits of chatbot use. Surveys and one-on-one meetings will be useful to gather employee concerns and address them proactively.

9.4 Customers (High Interest, Low Influence)

Customers are perhaps the end-users most affected by the chatbot, yet they have limited influence over its design and implementation. Their primary expectation is that the chatbot will provide fast, reliable, and convenient responses to their queries. With 24/7 availability, they expect it to solve their issues without having to wait for human intervention. In short, the chatbot is seen as a tool that will improve the customer experience through convenience and efficiency.

A significant concern for customers is data privacy. They want assurance that their personal information and queries are secure, especially when interacting with an automated system. Customers also need to feel confident that they can

escalate more complex issues to human representatives when necessary, ensuring that the chatbot doesn't become a frustrating barrier.

The communication method with customers will be primarily through the chatbot interface itself, along with website updates and customer satisfaction surveys. They should have clear instructions on how to use the chatbot and be given an option to provide feedback on their experience with it. Feedback Mechanisms: Customer satisfaction surveys and feedback forms will be implemented to gather insights into their experiences with the chatbot, helping to identify areas for improvement.

9.5 Competitors (Moderate Interest, High Influence)

Competitors will be influenced indirectly by the implementation of the chatbot, as it creates a competitive advantage by offering faster, more efficient customer service interactions. SMEs implementing chatbots are able to handle higher volumes of customer inquiries and provide quicker responses, positioning themselves as more technologically advanced and customer-friendly.

Competitors, however, will be closely watching these advancements and may respond by implementing similar technologies. There's a strategic need for the SME to stay ahead of the competition by continuously improving the chatbot's capabilities. Ethical practices are critical, and ensuring that the chatbot doesn't make false claims about its abilities will help SMEs maintain a good reputation in the marketplace.

To stay competitive, businesses should monitor industry trends, gather insights through competitor analysis, and adjust the chatbot's functionality accordingly. Policy Recommendations: Regular industry benchmarking reports should be created to help SMEs adjust their chatbot features based on competitive landscape shifts. Communication with competitors occurs indirectly through industry reports, networking events, and market analysis.

9.6 Suppliers (Moderate Interest, Moderate Influence)

Suppliers may interact with the chatbot when it comes to processing orders, handling inquiries, and managing communications. Their primary expectation is that the chatbot will streamline interactions, allowing for more efficient business processes and quicker turnaround times. The chatbot should be capable of handling orders or addressing inquiries without causing delays or misunderstandings.

From a governance perspective, suppliers are concerned with the ethical handling of data and communication. They expect transparency and reliability in all interactions, with minimal disruption to the supply chain. Clear communication is essential to ensure that any technical issues or misunderstandings are resolved quickly and efficiently.

Communication with suppliers will occur through regular updates on the chatbot's capabilities and how it will impact order processing. Supplier meetings and email newsletters will be effective ways to keep them informed, and feedback will be gathered through periodic reviews of service quality. Evidence: For instance, data from supplier feedback surveys can be utilized to ensure that the chatbot meets their expectations for order processing and inquiry resolution.

9.7 Government (Low Interest, High Influence)

The government plays a regulatory role in the chatbot's implementation. The chatbot must comply with laws and regulations regarding data protection, consumer rights, and ethical AI usage. The key expectations from the government's perspective are that SMEs will adhere to legal standards such as General Data Protection Regulation (GDPR) and data security laws, ensuring that no customer data is mishandled or misused.

A major concern for government regulators is ensuring that automated systems like chatbots do not infringe on user privacy or violate consumer protection laws. Additionally, there may be concerns around the ethical use of AI, ensuring that AI technologies do not propagate biases or cause harm.

To ensure compliance, SMEs should stay updated on changes in regulations regarding AI and data protection. Communication with government agencies will involve submitting compliance reports, ensuring data audits, and maintaining open channels for regulatory inquiries. In case of new laws, the SME must be agile in updating the chatbot's functions to remain compliant.

Policy Recommendations: SMEs should implement regular compliance audits and training for staff to ensure that all chatbot interactions adhere to current regulations and best practices.

9.8 Summary and Recommendations

In summary, the stakeholder analysis highlights the diverse needs and concerns of various groups involved in the implementation of chatbots in SMEs. To enhance customer satisfaction and trust while ensuring efficient integration, the following recommendations are proposed:

1. **Establish Regular Feedback Mechanisms:** Implement surveys and feedback forms across all stakeholder groups to gather insights and monitor satisfaction levels.
2. **Provide Clear Communication Channels:** Develop structured communication plans to keep all stakeholders informed and engaged throughout the chatbot implementation process.
3. **Conduct Training and Workshops:** Organise training sessions for employees to facilitate a smooth transition to chatbot usage, addressing any concerns about job security.
4. **Ensure Compliance and Ethical Standards:** Regularly review and update chatbot functionalities to adhere to legal regulations and ethical standards, ensuring user data privacy and security.
5. **Monitor Competitor Activities:** Continuously analyze competitor strategies and customer preferences to refine chatbot features and maintain a competitive edge.

9.9 Stakeholder Analysis Matrix

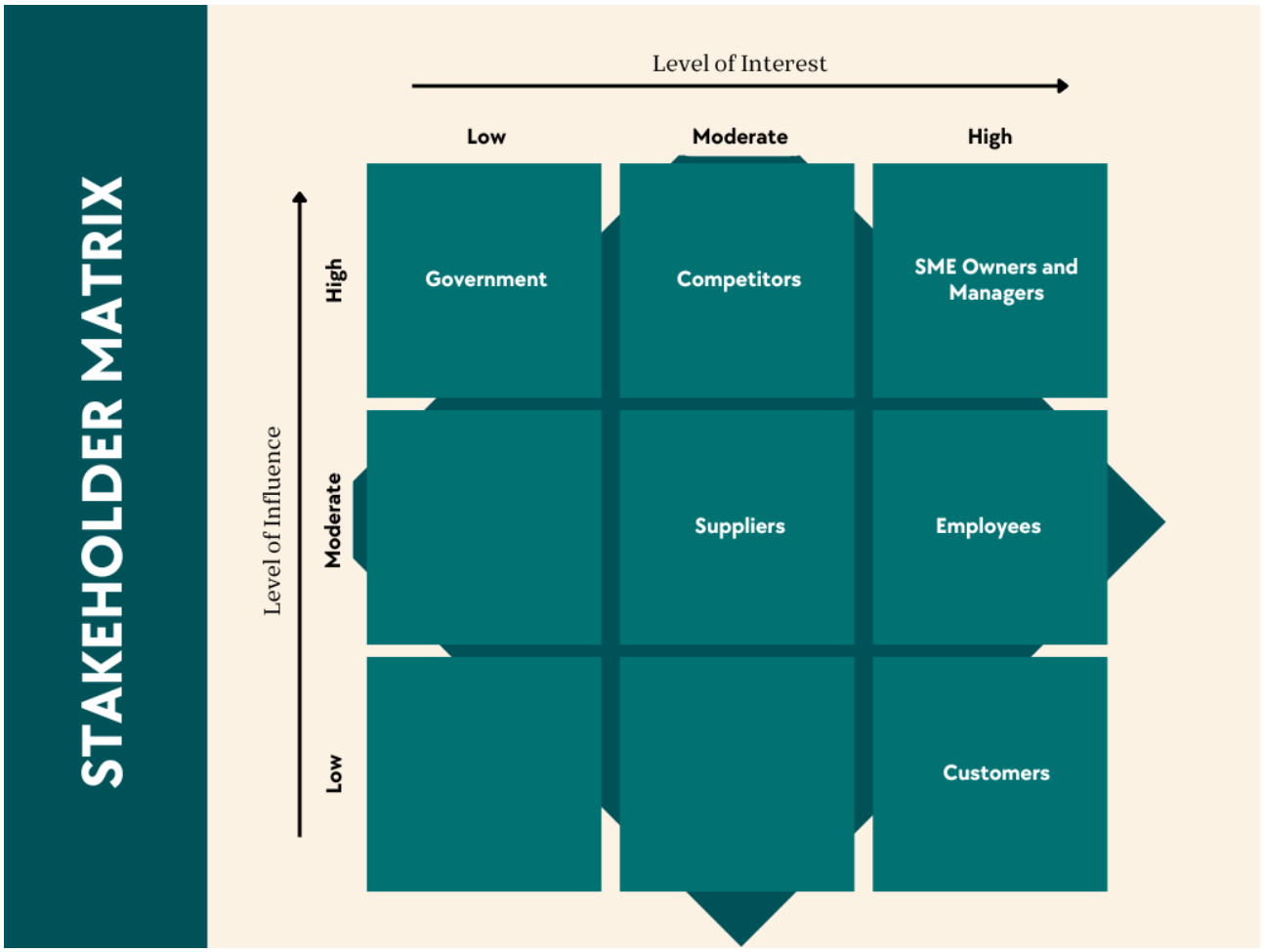

Figure 6. Stakeholder Matrix

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