**Services and Quality in Qatar Airways: A Project Focusing on Qatar Airways Quality and Pinpointing Areas That May Require Improvement**

**Abstract**

*This study investigates the changes in Qatar Airways’ service quality and passenger perceptions before and after the COVID-19 pandemic. Qatar Airways, renowned for its multiple accolades, including being named the world's best airline for eight consecutive years, has faced challenges in maintaining its high service standards amidst the pandemic's global disruptions. Using customer feedback extracted from Reddit's r/QatarAirways thread, this research employs sentiment analysis, keyword comparisons, Ngram language modeling, and word embeddings to analyze pre- and post-pandemic feedback. The analysis aims to uncover shifts in passenger sentiment, frequently discussed topics, and recurring service-related issues. Insights derived from this study will aid Qatar Airways in understanding customer expectations, identifying service gaps, and maintaining its competitive edge in the aviation industry.*

**Keywords:** Qatar Airways, Passenger, Airline, Services, Quality

**1. Introduction**

Qatar Airways is a prominent airline serving over 170 destinations across five continents [3]. Headquartered in Doha, Qatar, and operating from Hamad International Airport, the airline boasts a fleet of approximately 200 aircraft. Qatar Airways is widely recognized as a “multiple award-winning airline,” holding the distinction of being named the world’s best airline for eight consecutive years. In addition to this prestigious title, the airline has earned accolades such as ‘World’s Best Business Class,’ ‘World’s Best Business Class Airline Lounge,’ and ‘Best Airline in the Middle East’ [3]. Beyond its commitment to luxury and quality service, Qatar Airways is also dedicated to environmental sustainability. The airline became the first in the Middle East to achieve certification under IATA’s Environmental Assessment Programme, securing the highest level of certification. Furthermore, Qatar Airways was the first airline globally to commit to preventing illegal wildlife trafficking in the aviation industry [2].

To reward its loyal customers, Qatar Airways introduced the Privilege Club, a program allowing passengers to earn Avios points for every flight. These points can be redeemed for flight upgrades, luggage purchases, or even booking return trips, provided sufficient points are available. Additionally, members can gift their points to others for a discounted fee, offering a unique way to share benefits.

Qatar Airways also engages with its customers through strategic partnerships with various sports organizations. During major games or special events, the airline frequently offers discounted flights to enhance accessibility for fans. Currently, Qatar Airways collaborates with soccer organizations like UEFA and FIFA and directly sponsors teams such as the Brooklyn Nets (NBA), FC Internazionale Milano, and Paris Saint-Germain (soccer), as well as Formula 1. Its sponsorship portfolio extends to other sports, including rugby and bowling, further solidifying its global presence and connection with diverse audiences.

**2. Purpose**

This project examines the quality and services provided by Qatar Airways, with a focus on understanding passenger perceptions and identifying key areas for improvement. Qatar Airways, known for its exceptional service and numerous accolades, including being named the world’s best airline eight times, has faced scrutiny regarding a potential decline in service quality. This study analyzes customer feedback collected from social media platforms such as Reddit to evaluate passenger sentiment and highlight areas where the airline can enhance its offerings. While one analysis will compare feedback from pre- and post-COVID-19 periods, the overall aim is to assess current sentiment trends and recurring themes in customer experiences. The insights generated will provide Qatar Airways with valuable information to maintain its reputation and continue delivering high-quality service in a competitive industry.

COVID-19, caused by the SARS-CoV-2 virus, was a global pandemic that profoundly impacted the aviation sector. Declared a pandemic on March 11, 2020, it disrupted air travel worldwide, leading to significant changes in customer expectations and airline operations. By understanding how Qatar Airways navigated these challenges, this project seeks to offer actionable insights for sustaining and improving service standards in a post-pandemic era.

**3. Literature Review**

Academic references are essential for understanding the scope and implications of the challenges discussed in this project. They provide valuable insights into the broader effects of the COVID-19 pandemic on the aviation industry, offering a more comprehensive perspective on the struggles airlines like Qatar Airways may have faced. These references serve to contextualize the research and highlight key factors influencing service quality and operational adjustments.

Xiaogian Sun, Sebastian Wandelt, and Anming Zhang, in their research paper titled *“COVID-19 Pandemic and Air Transportation: Summary of Recent Research, Policy Consideration and Future Research Directions,”* focus on the significant disruptions caused by COVID-19 and its far-reaching impacts on the aviation industry [4]. They reveal that passenger numbers dropped by 60.2% in 2020, with international flights experiencing an even sharper decline of 75.6% [4]. This data is critical to understanding how Qatar Airways, like many other airlines, faced unprecedented challenges during this time, which may have contributed to perceived declines in service quality compared to pre-pandemic standards. Additionally, jobs directly related to aviation, including airline staff, airport personnel, manufacturers, and air traffic managers, declined by 43% [4]. An illustration from the International Air Transport Association (IATA), included in their paper, vividly depicts the drastic reduction in air travel passengers during global crises, emphasizing that no prior event disrupted the aviation industry as severely as COVID-19 [4].

A graph with numbers and text

Description automatically generatedThe accompanying graphic offers a visual representation of how passenger numbers have historically fluctuated during significant global events and underscores the profound and unique impact of the COVID-19 pandemic on the industry [5].

Further insights are provided in an article by McKinsey & Company, which examines the global aviation sector's recovery and resilience following the pandemic [6]. They highlight the extensive financial losses incurred across all sectors of the aviation industry, with airlines suffering the most. In 2020 alone, airlines reported a staggering $167.9 billion in losses, compared to $31.6 billion for airports, the second most-affected sector [6]. Despite increased demand for cargo aircraft and freight forwarding services, the financial impact on passenger airlines was overwhelming. The article also notes that even during the relatively stable economic conditions of 2012–2019, many airlines were operating at a loss [6]. This context helps explain why Qatar Airways may have needed to adjust its operations and service quality during the pandemic’s peak. These adaptations, though potentially necessary for financial stability, could have contributed to customer perceptions of declining service standards.

The International Civil Aviation Organization (ICAO) further underscores the pandemic's impact by reporting a worldwide decrease of 2.7 billion passengers in 2020, alongside a 50% reduction in seat availability on flights [7]. Government-imposed restrictions forced many airports to shut down temporarily, limiting the number of flights available. Even when flights operated, seat availability often could not meet the skyrocketing demand, leading to inflated ticket prices. These factors discouraged many individuals from traveling, further exacerbating the challenges faced by airlines [7].

Such disruptions inevitably strained airline operations. With revenue falling and costs rising, many airlines, including Qatar Airways, likely had to downsize their workforces to mitigate losses. A reduced workforce, combined with increased operational demands, often leads to a decline in service quality as customer expectations exceed what the limited workforce can deliver. This context highlights the intricate balance between maintaining financial stability and upholding service standards, offering insight into potential causes of customer dissatisfaction during the pandemic and beyond.

**4. Research Questions**

In order to develop a strong conclusion in regard to the topic of this project guiding questions to further my analysis are listed here. Questions directly relate to each deductive and inductive techniques that will be used to have a clear understand of what is expected to be derived from the analysis.

They are:

* What were key words regarding Qatar Airways before Covid-19 and how have they differed?
  + This question focuses on the use of inductive and deductive techniques. Key words frequency and sub-group comparisons with key variables will be used.
* What are frequent phrases used for Qatar Airways?
  + This question focuses on Ngram Language Models.
* Based on information derived from customer service remarks, how do passengers feel about Qatar Airways Services?
  + This question will derive its output through sentiment analysis.
* What are some words most similar to “experience” based on the Reddit comments?
  + Word Embeddings will be used to create the output for this question.

**4.1 Conceptual Framework**

This section outlines the overall concept of the project to provide a clearer understanding of its objectives. The conceptual framework breaks down each research question and subtopic, emphasizing their importance and linking them back to the overarching analysis. This structured approach ensures that each element of the project contributes meaningfully to the final insights.

**4.2 Keyword Comparisons Pre and Post Covid**

The first research question focuses on identifying key words derived from various Reddit threads where users shared feedback about their experiences with Qatar Airways. This section employs both inductive and deductive techniques to analyze these keywords. Specifically, it examines how key terms from pre-COVID reviews differ from those in recent feedback after the pandemic ceased to be a global threat. The inductive technique involves analyzing keyword frequency using TF\*IDF, while the deductive technique incorporates subgroup comparisons with key variables. This analysis is vital, as it provides insight into customer sentiment and operational changes over time. By examining keywords instead of full reviews, a clearer picture emerges of whether customers currently feel positively about Qatar Airways’ services or not. Additionally, this approach helps determine if there has been a noticeable shift in how the company operates compared to its pre-COVID era.

**4.3 Frequent Phrases and Terminology**

In addition to analyzing individual keywords, identifying frequently used phrases can offer valuable insights into customer perceptions of the airline's services and quality. This involves processing textual data to pinpoint common word combinations such as "bad seat," "good food," or "messy cabin." By visually representing these frequent phrases, recurring concerns or commendations can be easily identified. This analysis, conducted using Ngram language models, helps highlight consistent trends in customer feedback, enabling Qatar Airways to address prevalent issues effectively.

**4.4 Customer Sentiment and Emotional Response**

Understanding customer sentiment is a more advanced technique for analyzing feedback, as it goes beyond surface-level observations. Sentiment analysis classifies feedback as positive, negative, or neutral, providing a holistic view of how customers perceive Qatar Airways’ services. This analysis lays a strong foundation for evaluating customer satisfaction and identifying potential areas for improvement. A custom Qatar Airways-specific lexicon is created, featuring terms such as “in-flight entertainment,” “cleanliness,” “seat comfort,” and “cancellation.” By using this tailored lexicon, the sentiment analysis can pinpoint common areas of appreciation or frustration, allowing Qatar Airways to leverage these insights to enhance specific aspects of its service quality.

**4.5 Word Similarity and Language Trends**

Examining words that are closely related to "experience" offers another opportunity to gather valuable insights from customer feedback. This analysis identifies terms commonly associated with “experience” in Reddit comments from r/QatarAirways, providing a deeper understanding of customer priorities and concerns. For instance, words like "entertainment" (referring to in-flight entertainment), "food," or "agent" might suggest positive experiences linked to specific services. This analysis not only highlights areas where customers express satisfaction but also reveals trends in language that could guide Qatar Airways in refining its service offerings.

**5. Methodology**

In this section, the website for data collection specific to my topic is listed. Social media is a platform where customers and passengers tend to leave the most feedback or comments. People are quick to share their opinion of the service they received. The site used for data collection was Reddit. The Qatar Airways sub thread provided substantial feedback regarding consumer experience with the airline [1].

**5.1. Name of Data Set**

The name of the data set in R is *Qatar Airways Data Extraction and Analysis*. The data is comprised of reddit comments extracted into RStudio. However, the original data site name is r/Qatar Airways.

<https://www.reddit.com/r/qatarairways/>

**5.2. Genre of Data Set**

The data set will be widely comprised of information from Reddit. Information to retrieve past data was derived from Kaggle.

**5.3. Description of Data Set**

The dataset for this study comprises Reddit threads from the subreddit r/qatarairways, which serves as a platform for users to share their experiences with Qatar Airways. This subreddit has a notable presence of individuals who discuss various aspects of their journeys, providing both positive and negative feedback. Some posts highlight the enjoyable moments and exceptional service passengers have experienced, while others focus on challenges or areas of dissatisfaction. There are also posts that balance both perspectives, offering a nuanced view of the airline’s performance.

These discussions offer a rich source of data to address the research questions formulated for this project. By analyzing these user-generated comments, we can gain deeper insights into customer perceptions of Qatar Airways’ service and operational standards. This analysis will be instrumental in understanding how the airline’s interactions with its passengers and overall operations have evolved over time.

While the study includes an examination of changes before and after the COVID-19 pandemic in one analysis, the broader focus is on identifying key trends, recurring issues, and positive highlights in customer experiences. The dataset will allow for a detailed exploration of how customers view Qatar Airways today compared to their perceptions in the past. By leveraging this data, the aim is to uncover insights into the airline’s strengths and areas for improvement, contributing to a better understanding of passenger expectations and how they align with the airline's service delivery.

**5.4. Size of Data Set**

The r/QatarAirways has 1400 members. Posts range from 40 minutes ago as of November 12, 2024, to further than 300 days ago. There are possibly posts that occurred further back in the past, however, with the large volume of daily posts, it is something that will need to be analyzed to be understood. For a more concise understanding of the data sets size, the subthread was created June of 2018.

**5.5. Disposition**

This data set is publicly available. Everything can be found online on each respective website or via its smartphone applications. There is no data relating to this topic that will be private unless their post is hidden for other reasons – but even then, it will be noted.

**5.6. Data Cleaning**

Data for this project was collected from Reddit, with an initial focus on identifying the most effective method for extracting relevant information. The primary tool for this task was the **RedditExtractoR** package in RStudio, which provided the functionality to access and gather data from Reddit threads. Specifically, the find\_thread\_urls() function was utilized to extract data from the r/qatarairways subreddit. This function allowed for the identification and aggregation of threads related to Qatar Airways, which were then stored in a data frame named qatar for further analysis.

To enhance the data analysis process, several additional R packages were downloaded and used, including **rtoot**, **word2vec**, **text2vec**, **keras**, **stringi**, **stringr**, **rJava**, **ggthemes**, **tm**, **tidytext**, **tidyr**, **dplyr**, **ggplot2**, **scales**, **readr**, **tidyverse**, **tokenizers**, and **magrittr**. These packages facilitated various stages of data cleaning, transformation, and visualization, ensuring a streamlined workflow.

Once the data was successfully extracted and stored in the qatar data frame, the first step in preprocessing was data cleaning. This involved removing irrelevant elements such as URLs, numbers, and extraneous characters that might have been extracted during the collection process. To achieve this, the data was first converted to character format using the as.character() function. Regex patterns such as "http[s]?://\\S+|www\\S+" and "[^a-zA-Z\\s]" were employed to systematically strip out hyperlinks, symbols, and other unnecessary text. Additionally, all text was converted to lowercase to standardize the data, simplifying subsequent analysis. Whitespace and empty rows were also removed to ensure the dataset was clean and uniform.

After the cleaning process was complete, the next step was tokenization. Tokenization involved breaking down the text data into smaller units, such as individual words or phrases, to facilitate more granular analysis. This step was crucial for enabling advanced techniques such as sentiment analysis, keyword extraction, and text modeling. By preparing the data in this way, the foundation was set for more meaningful and accurate insights to be derived from the subsequent analyses.

**5.7 Techniques Used**

This project employs a variety of analytical techniques to extract meaningful insights from the collected data. These techniques are carefully chosen to address the research questions and provide a comprehensive understanding of customer feedback regarding Qatar Airways. Each method outlined below leverages different aspects of textual data analysis to deliver robust and actionable results.

**5.7.1 Key Phrase Frequency**

Key phrase frequency is an inductive technique used to break down and analyze how customers perceive Qatar Airways in a simplified yet effective manner. The process begins by taking the qatar data frame and tokenizing the text to separate it into smaller components, specifically bigrams (two-word combinations). Tokenization is achieved using the unnest\_tokens() function, which facilitates the extraction of meaningful bigrams.

Once the bigrams are generated, the next step is to remove stop words—common words like "and," "the," or "of"—that do not contribute to the analysis. This ensures that only significant phrases are retained, providing a more accurate depiction of the feedback. After filtering out stop words, the bigrams are recombined and visualized using a bar chart to highlight the most frequent phrases. By focusing on these common phrases, this technique identifies recurring themes in customer feedback, enabling a better understanding of their sentiments and experiences with Qatar Airways.

**5.7.2 Key Word Frequency using TF\*IDF**

Keyword frequency using TF\*IDF (Term Frequency–Inverse Document Frequency) is another powerful method used to analyze the significance of specific terms within the dataset. This technique begins with splitting and filtering the data into subgroups to facilitate subgroup comparisons. For this analysis, the data is divided into three categories: feedback explicitly referencing pre-COVID times, feedback related to COVID-19, and feedback from more recent, post-COVID times.

Tokens are created for each subgroup using the unnest\_tokens() function, and stop words are removed to ensure only meaningful words are retained. To calculate TF*IDF, a document column is added to each subgroup to distinguish them during analysis. The TF*IDF values for each token are then computed, revealing the relative importance of terms within each subgroup.

The resulting TF\*IDF data for pre-COVID and post-COVID feedback is merged to allow for direct comparisons. Differences in keyword significance between the subgroups are calculated and visualized using a word cloud. This visualization highlights the most prominent terms within each period, providing insights into how customer priorities or concerns have shifted over time.

**5.7.3 Sentiment Analysis and Lexicon Use**

Sentiment analysis is a key technique for evaluating the emotional tone and underlying sentiment of customer feedback. In this project, sentiment analysis is used to classify feedback as positive, negative, or neutral and to identify specific areas of concern or praise. This approach ensures that Qatar Airways can better understand customer experiences and refine its services. Several R packages, including **tm**, **tidytext**, **dplyr**, **ggplot2**, and **quanteda**, are employed to facilitate this process.

The analysis begins with the creation of a custom lexicon tailored to the context of airline feedback. This lexicon is divided into five sentiment categories: **positive**, **negative**, **services**, **technical**, and **support**. Each category contains relevant terms. For instance, the "positive" category includes words such as “comfortable” and “amazing,” while the "technical" category contains terms like “delay” and “cancellation.” The comprehensive lexicon allows for precise mapping of words to their corresponding sentiment categories.

To implement this, the lexicon is converted into a tidy data frame using the bind\_rows() function, which aggregates terms from each sentiment category. The resulting custom sentiment dictionary provides a structured reference for mapping words from the dataset to their respective sentiment categories.

The cleaned qatar dataset is then processed to count word frequencies and map them to the custom sentiment lexicon. Using the inner\_join() function, each word is matched with its corresponding sentiment category, and the total frequency of words in each category is calculated. This process highlights the overall distribution of sentiments within the dataset. The resulting sentiment distribution is visualized through a bar chart created with **ggplot2**, providing a clear depiction of the emotional tone across customer feedback.

In addition to overall sentiment distribution, a more granular analysis is performed to identify the most frequent words within each sentiment category. The word frequencies are sorted and grouped by sentiment, and the top 10 words for each category are selected. These frequent terms are visualized using a faceted bar chart, offering insights into the most discussed aspects of customer experiences. For example, words such as “delicious” or “friendly” may dominate the positive sentiment category, while terms like “delayed” or “uncomfortable” may appear prominently in the negative category.

This dual-layered sentiment analysis—both at the aggregate and word-specific levels—ensures a comprehensive understanding of the feedback. By identifying patterns and trends in customer emotions, this method provides actionable insights for Qatar Airways to address negative experiences, enhance positive aspects, and optimize service offerings tailored to customer expectations.

The approach described here leverages advanced text analysis techniques and visualizations to uncover the nuances of passenger sentiment, contributing valuable insights to support data-driven decision-making.

**5.7.4 Word Embeddings**

Word embedding is a machine learning technique used to uncover words that are contextually or semantically similar to a specified vector of interest. In this project, word embeddings are employed to explore the context surrounding the word “experience” as mentioned in customer feedback.

The process begins by tokenizing the data and constructing a vocabulary along with a term co-occurrence matrix. This matrix captures the relationships between words based on their co-occurrence within the same context. Next, the Global Vectors (GloVe) model is fitted to the term co-occurrence matrix to generate vector representations of words. A 50-dimensional vector is created for the word "experience," capturing its nuanced associations within the dataset.

Finally, the words most similar to "experience" are identified based on their proximity in the vector space. For example, terms like "entertainment," "food," or "agent" may emerge as closely related, suggesting specific aspects of the customer journey that are linked to overall experiences. These findings provide valuable insights into the key factors shaping passenger perceptions and help identify areas where Qatar Airways can improve or build upon its existing services.

**6. Findings**

**6.1 Word Vector of All Words Similar to “Experience”**

The key word “experience” was used to create a conclusion regarding possible words used in conjunction to or that were similar to the word “experience”. A focus of possibly seeing other positive or negative words was the goal, however, the returned similar words did not necessarily have a similar relation to the focus key word as seen below.

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**6.2 Frequent Phrases**

A bar plot was created to visualize all words that appeared on a frequent basis within the data set. The reasoning for this approach was to have a strong understanding what phrases were repeatedly mentioned by those that decided to either create their own subreddits and voice their frustrations or from those that left comments in response to the few subthreads they felt they resonated with. The point of this analysis was to understand what phrases came up and see what category they typically fell in. Phrases that had a frequency of five or more in the data set were business class, hour layover, transit accommodation, personal item, and hour flight. Although these phrases may not have any sentiment attached to them it is a beneficial analysis for Qatar Airways as they are able to see what ‘buzz phrases’ are and dive in deeper to see what discussion surround these key words. Some other key areas that were beneficial pinpoints for Qatar Airways would be to look at the comments or subthreads surrounding their privilege club. The specific word popped up frequently, with different spellings, and subtopics regarding the airline’s privilege club were also present as frequent words – these words were student club and silver status. Another frequent word that emerged was ‘airways website’ this would suggest that consumers may have experienced repeated issues with the website that they felt it was necessary to comment about it. These are few areas that the the airline can consider reviewing to ensure those that remain loyal to Qatar Airways and others that decide to try the airline remain consistent in using the brand when a journey need arises.

**A graph with a bar graph

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**6.4 Frequent Words Post-COVID**

An analysis was produced to visualize frequent words that were present before the pandemic emerged and analyze how they may have altered since the global pandemic was considered no longer a threat. There is an understanding that airlines will have declined in the service quality during the pandemic, therefore, this area was omitted in the analysis. After the introduction of custom stop words, top words that were repeated 30 or more times post COVID were airport, business, ticket, and check. The words airport, ticket, and check(-in) are possible indicators that people may have had issues at the airport with agents or with

**A graph of a number of words

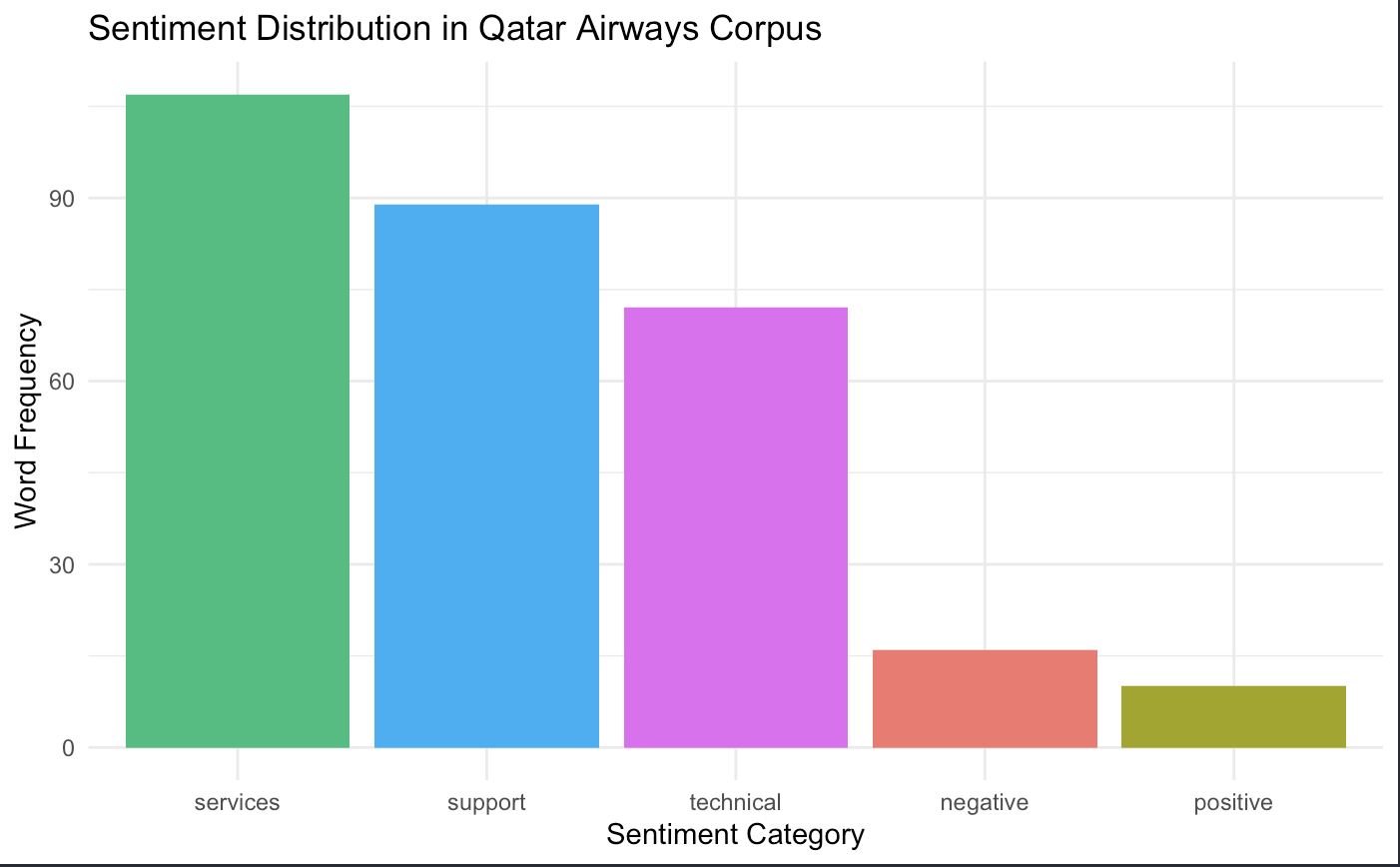
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**6.5 Word Cloud of Frequent Words**

**A close-up of words

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**6.6 Sentiment Analysis**

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**6.6.1 Analysis by Sentiment Categories**

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1. **Recommendations**
2. **Future Research**
3. **References**

List all Bibliographical references in 9-point Times, single-spaced, at the end of your paper. When referenced in the text, enclose the citation number in square brackets, for example [1]. Where appropriate, include the name(s) of editors of referenced books.

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