

# ***Enhancing Customer Satisfaction in the Airline Industry: A Case Study of Delta Airlines***

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**Abstract:** Customer satisfaction plays an increasingly important role as it drives customer loyalty, fosters positive brand image, and provides a competitive advantage. Airlines that prioritize customer satisfaction are better positioned to thrive in a highly competitive market, attract and retain customers, and achieve long-term success. This paper focuses on enhancing customer satisfaction in the airline industry, with a specific case study of Delta Airlines. The study utilizes sentiment analysis techniques to analyze customer reviews from Skytrax and conducts a comprehensive SWOT analysis. Based on the analysis, targeted suggestions are provided to Delta, including leveraging technology to reduce the negative impact of delays, establishing uniform service standards, broadening global networks and partnerships, committing to sustainability and ESG initiatives, and ensuring quick responses to policy changes. However, the study acknowledges limitations such as reliance on a single data platform, the subjective nature of sentiment analysis, and the oversimplification inherent in SWOT analysis. In all, this study helps Delta to improve its customer satisfaction and contributes a research example to explore customer satisfaction in the airline industry.

**Keywords:** customer satisfaction, airline industry, Delta Airlines

## **1. Introduction**

Driven by globalization, technological advancements, covid-19 pandemic and changing consumer preferences, the airline industry has experienced significant transformation over the years. As one of the leading players in this industry, Delta Airlines has played a pivotal role in shaping the landscape of air travel. Delta Airlines, founded in 1928, has witnessed and adapted to the changing dynamics of the industry. Through strategic expansions, acquisitions, and technological advancements, Delta has established itself as a prominent global airline, connecting passengers to various destinations worldwide. In Delta's 2023 official guidance, it announced that its anticipated revenue growth between 15 to 20 percent compared to 2022.

Customer satisfaction holds paramount importance in the service industry. In the airline industry, it is also a key driver of success and sustainability, as satisfied customers contribute to a positive brand image and are motivated to behave loyally [1]. Customers tend to be satisfied when airlines meet or exceed the service quality attributes that customers consider most important [2]. On the other hand, unsatisfied passengers may reconsider choosing the same airline for future flights [3].

To analyze and improve customer satisfaction, this paper employs a combination of quantitative and qualitative research methods. The quantitative analysis utilizes text mining techniques to examine

customer reviews on Delta flights. This method allows for a comprehensive exploration of sentiments, identifying trends, and extracting valuable insights from large volumes of customer data. Additionally, the paper employs qualitative analysis, specifically utilizing a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to gain a holistic understanding of Delta's current position in terms of customer satisfaction. According to the identified problems and chances, the study gives targeted suggestions that would help Delta to improve customer satisfaction. In the end, the conclusions and limitations of the study are given.

This study aims to provide a valuable example for companies in the airline industry interested in studying consumer satisfaction using quantitative and qualitative methods. By sharing insights and suggestions derived from the Delta Airlines case study, this paper intends to inspire and guide industry stakeholders in their efforts to enhance customer satisfaction and improve overall service quality.

## 2. Quantitative Research

### 2.1. Research Process

In this section of the quantitative study, a systematic process was conducted to gain insights into Delta Airlines' customer satisfaction. As shown in Figure 1, the reviews and overall ratings along with other variables were collected online. Then, the collected data was processed to ensure a consistent and analytical format. To uncover patterns and gain insights, text mining techniques were employed. Lastly, the results of the text mining analysis were summarized and presented.

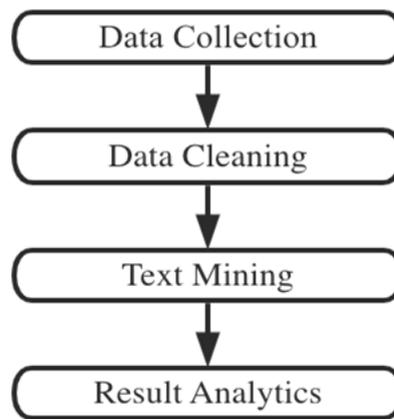


Figure 1: Research process.

### 2.2. Data Description, Process & Text Mining

The data used in the study was provided by Skytrax, an international airline rating organization known for its justified evaluations of airlines worldwide. The study specifically focused on data from Delta Airlines with periods from July 2015 to February 2023. Variables in the dataset included customer ID, overall star rating, date, seat types, traveler types, country, and reviews.

The study leveraged R, a powerful programming tool, to perform data cleaning and text mining. To ensure data quality and consistency, a rigorous process of data cleaning was undertaken. After obtaining raw data from Skytrax, the first step was removing rows with missing values. A new feature used to indicate the year of each review was created, allowing trend analysis. Moreover, seat types and traveler types were categorized into four levels, enabling the smooth use of group function. Extra words and non-essential signs were carefully removed from the review's column.

Text mining, an approach that extracts valuable and undiscovered information from unstructured text, is a commonly recognized method to analyze reviews [4]. Sentiment analysis, as one of the frequently used techniques of text mining, refers to the approach rooted in natural language processing (NLP) which can reflect the emotional tone and evaluations behind the text. The study mainly used sentiment analysis to explore insights [5]. From the start of the analysis, the text of reviews was tokenized. To facilitate sentiment analysis, two widely recognized lexicons, namely the Bing lexicon and the AFINN lexicon, were imported to calculate the sentiment score for these tokenized words. By employing sentiment analysis techniques, this study gained valuable insights into the emotional undertones of customer reviews.

### 2.3. Results

Table 1 illustrated the overall star ratings by year, with a range of ratings between 1 and 5. Feature ‘N’ represents the sample size (Except for additional explanations, the ‘N’ below all have the same meaning). It can be seen that ratings displayed a decreasing trend. The lowest point of the mean rating occurred in 2021, indicating the period of least customer satisfaction.

Table 1: Overall rating by year.

Year	N	Mean Rating	Median Rating
2015	200	4.7250	4
2016	234	4.9402	4
2017	226	4.2876	3
2018	341	3.3167	1
2019	366	3.6667	2
2020	107	4.2430	2
2021	299	2.6388	1
2022	467	2.9058	1
2023	28	3.1786	1.5

Table 2 showed the sentiment score results by year of sentiment analysis using the afinn lexicon. Similar to the findings in Table 1, it becomes evident that the ratings exhibited a noticeable declining trend. Particularly noteworthy is that the lowest point in the mean score occurred in 2021, indicating the lowest level of customer satisfaction during the analyzed period.

The decline in customer satisfaction in 2021 can be attributed to the impact of the Covid-19 pandemic. Although the pandemic began in early 2020, customer satisfaction levels were not significantly affected at that time due to the regulatory limitations on public transportation and widespread fear of contracting the virus. In contrast, by 2021, people had started to recover normal activities while the virus remained a concern. To ensure maximum safety, governments implemented various policies that added inconvenience to the travel process, including ticket booking, security checks, and boarding procedures. Therefore, it is crucial for Delta to have a quick response to the latest regulations and processes, develop the ability to respond to emergencies, and provide up-to-date information to customers.

Table 2: Sentiment score by year.

Year	N	Median Score	Mean Score
2015	1620	1	0.2901
2016	1889	1	0.2721
2017	1881	1	0.2068

Table 2: (continued).

2018	2553	-1	-0.1817
2019	3077	-1	-0.0396
2020	880	1	0.2920
2021	2222	-1	-0.2849
2022	3676	-1	-0.1899
2023	236	-1	-0.1568

The study utilized the Bing lexicon to determine the word valence for each year. Based on the word valence results, negative word ratio and positive word ratio were calculated, as presented in Table 3. The analysis revealed that the negative word ratio was consistently greater than the positive word ratio each year. Notably, the negative word ratio exhibits an increasing trend over time, suggesting a growing dissatisfaction among customers.

Table 3: Word valence by year.

Year	Negative Word Ratio	Positive Word Ratio
2015	52.12%	47.88%
2016	54.47%	45.53%
2017	55.13%	44.87%
2018	66.76%	33.24%
2019	65.03%	34.97%
2020	56.30%	43.70%
2021	68.13%	31.87%
2022	66.36%	33.64%
2023	62.56%	37.44%

The study utilized the AFINN lexicon to calculate the sentiment scores for four different cabin classes, as shown in Table 4. The results indicated that the Economy Class received the lowest sentiment score. A noteworthy finding emerged from the data: the sentiment score of the First Class is lower than both the Business Class and Premium Economy. This presented a significant concern, as customers who are willing to pay for the best services did not appear to receive the expected level of service quality. Given that the First-Class segment typically generates the highest profits in the airline industry, it becomes imperative for Delta to prioritize addressing this issue. By focusing on improving the service quality and experience provided in the First Class, Delta can enhance customer satisfaction and retain high-income customers.

Table 4: Sentiment score by cabin classes.

Cabin Classes	Sentiment Score	N
First Class	0.0802	183
Business Class	0.1189	128
Premium Economy	0.0953	174
Economy Class	-0.0483	1783

Using the AFINN lexicon, the study computed sentiment scores for four distinct cabin classes, as demonstrated in Table 5. The analysis revealed that the Solo Leisure category obtained the highest sentiment score, while the Family Leisure category received the lowest sentiment score. Therefore,

Delta should pay more attention to passengers who travel with their families and ensure the provision of dedicated care services for children and older passengers.

Table 5: Sentiment score by travel types.

Traveler Types	Sentiment Score	N
Business	-0.0201	433
Couple Leisure	-0.0403	531
Family Leisure	-0.0541	548
Solo Leisure	0.0243	756

### 3. SWOT Analysis

This section conducts a SWOT analysis of Delta Airlines' customer satisfaction, in which strengths, weaknesses, opportunities, and threats are assessed. SWOT analysis is an essential tool for performance evaluation, resource allocation, and strategic planning in various industries and organizations [6, 7]. With SWOT analysis, the internal and external factors that affect Delta's customer satisfaction are undiscovered, serving as a foundation of suggestions.

#### 3.1. Strengths

Delta has launched many programs to cultivate customer loyalty and increase customer satisfaction. The SkyMiles program has become an important part of Delta's customer retention strategy. The program is designed to incentivize frequent flyers and provide plenty of benefits. At its core, the program reward customers for their travels based on miles, membership level, and cabin class. Delta ensures customers enjoy meaningful rewards including flight upgrades, free tickets, hotel stays, etc.

Besides, Delta has made efforts to differentiate its strategy. Delta One Suite program offers an extremely exclusive and luxurious experience for premium travelers. Customers who are willing to pay for this program are provided with fully enclosed suites, lie-flat beds, carefully tailored services, and premium amenities. Delta Comfort Plus is a differentiated cabin experience available on select flights, offering extra legroom, priority boarding, and enhanced services. This program caters to customers who cannot afford First Class and Business Class but seek to add comfort with an extra moderate price.

Delta Airlines has placed a strong emphasis on training customer service. It invests about \$500,000 annually in employee training. Moreover, Delta Cares is a program that helps customers who seek special needs, such as customers with disabilities or people requiring medical assistance. Delta is famous for its commitment to exceptional customer service. It was awarded as the No.1 airline among North American airlines by J.D. Power in 2021 [8]. Delta was honored for its professionalism, care, and humanity, which shows its customer-centric approach is effective. Focus on sustainability has made significant strides in environmental sustainability, including taking initiatives to decrease greenhouse gas emissions, invest in fuel-efficient development, and implement recycling programs. These efforts can enhance Delta's reputation and customer satisfaction.

#### 3.2. Weaknesses

Like many airlines, Delta Airlines has to face operational challenges, which significantly affect customer satisfaction. These challenges include but are not limited to delays, cancellations, and baggage loss. Factors such as severe weather conditions, flight maintenance, labor changes, and air traffic congestion can lead to disruptions in flight schedules. Combined with the above quantitative analysis, it can be seen that delay is a serious problem that needs to get more attention. As a leading

airline company based in the USA, Delta operates numerous destinations and routes, bringing huge challenges to maintaining consistently high service quality. Due to differences in local management, infrastructure as well as resource limitation, and many other factors, customers may receive inconsistent in-service experience. Exceptional or subpar experiences may happen in the same situation. The inconsistency in service can lead to customer dissatisfaction and harm the brand image.

Although Delta has an extensive domestic network, its international coverage is limited compared to its strong competitors. Members or frequent users may feel inconvenienced because they cannot have seamless connectivity. The limitation in international coverage potentially affects customer satisfaction. Compared to many competitors such as United Airlines, JetBlue, Southwest Airlines, Spirit Airlines, and Frontier Airlines, Delta encounters a weakness regarding price, which tends to be higher. As customers pay a higher price for Delta's flights, they naturally expect a superior level of service to justify the price. This adds pressure on Delta's services. Failing to match these elevated expectations may result in dissatisfaction and decrease customer loyalty.

### **3.3. Opportunities**

Adopting new technologies presents one of the biggest opportunities for Delta to improve customer satisfaction. By leveraging Artificial Intelligence (AI) tools and data analytics, Delta is able to improve its performance in customer satisfaction. For example, the chatbots based on AI technologies and virtual assistance enable Delta to provide real-time support and realize cost efficiency in the long run. Furthermore, Delta utilized data analytics to gain insights into customer preferences and patterns. Also, pain points and trends can be identified, which allows Delta to address customer concerns, refine services and make informed decisions to improve customer satisfaction. Combined with the result of quantitative analysis that passengers who took First Class did not give relatively positive feedback, providing premium personalized services should be considered seriously by Delta.

### **3.4. Threats**

The economy is an important factor that affects customer satisfaction in the airline industry. During periods of economic downturns and recessions, businesses and individuals tend to reduce living expenditures, including travel, which would lead to reduced demands for flights, lower profitability, and the incapability of maintaining high-quality service. In addition, fluctuations in fuel prices can impact operating costs and add pressure on the cost of maintenance of service quality, thereby affecting customer satisfaction.

Moreover, intensive competition is also a considerable threat. The airline industry is characterized as a fiercely competitive industry, with airlines constantly vying for market share. Delta faces challenges from competitors, especially low-cost carriers who offer more affordable ticket prices. Once those competitors who target price-sensitive segments devote themselves to improving their quality of services, the dissatisfaction may increase for Delta's members and potential customers.

Regulatory and policy also play a crucial role in customer satisfaction in the airline industry [8]. They can impact Delta's customer satisfaction in many aspects. One common area is security measures. Since the increasing security threats, governments may issue stricter regulations regarding security procedures. Even if those regulations aim to ensure the safety of passengers, part of passengers may feel inconvenienced and troublesome, which leads to dissatisfaction. Changes in air traffic controls can affect airlines as well. Delta may adjust its flight plans, coordinate with air traffic control authorities and modify its operational strategies. Any changes may cause delay or cancellation, which results in a less seamless experience.

#### 4. Suggestion

Based on the above results from quantitative analysis and qualitative analysis, the study provides suggestions that Delta should consider adopting, in order to solve current problems and effectively improve customer satisfaction.

**Utilizing Technology to Reduce the negative impact of Delays:** Delta should leverage technology solutions to minimize flight delays and maximize punctuality. Implementing advanced prediction systems and real-time monitoring platforms is necessary, in order to identify problems in time and take proactive measures to mitigate delays [9]. Technology can also be used to ease passengers' anxiety while waiting for a delayed flight. For example, passengers can play games in Delta's Application to earn mileage points, or passengers can have fun chatting with AI.

**Establishing Uniform Service Standards:** Delta should enforce its uniform service standards across all airports and service departments to ensure consistent and high-quality service. Regular training for employees should emphasize customer-centric vision, such as understanding and anticipating customer needs, active listening, and empathy. Effective communication training is crucial to ensure clear message delivery throughout the journey. Establishing communication channels for employees to raise questions and share their experiences should be considered by Delta. Thus, staff in different places could discuss together on specific platforms and have a better service solution towards tricky circumstances.

**Broadening Global Networks and Partnerships:** Delta should actively seek partnerships and alliances with more airlines to expand its global network and offer a wider range of international flight choices to customers. Collaborations with more partners will be able to provide customers with seamless connections, more destination options, and an improved travel experience for passengers. By providing convenient and comprehensive travel solutions, Delta will enhance customer satisfaction and loyalty continuously.

**Commitment to Sustainability and ESG:** Delta should continue its focus on sustainability and invest in Environmental, Social, and Governance (ESG) initiatives. This includes adopting fuel-efficient aircraft, implementing waste reduction programs, and promoting responsible practices throughout the organization [10]. By prioritizing sustainability, Delta demonstrates its commitment to environmental stewardship and social responsibility, appealing to customers who value eco-friendly and socially conscious travel options.

**Quick Response to Policy Changes:** The most important thing for Delta is to make customers understand that the airline can only comply with the policy changes, but it will take remedial measures to the maximum extent possible to reduce the trouble caused to passengers. Delta should inform passengers and members the first time when policy changes, addressing any concerns or questions they may have. Timely notification about policy updates, travel restrictions, or operational changes allows customers to plan in advance and helps alleviate any potential frustration or confusion. Additionally, providing alternative solutions or extra credits to make up for the inconvenience that is brought up by policy changes.

**Tailor Amenities and Services for First Class Customers:** Delta should continuously evaluate and refine the amenities and services provided in the First Class to exceed customer expectations. Upgrading seating comfort, diversifying gourmet menus, offering concierge assistance and dedicated onboard attendants are key solutions that Delta should consider. By offering unique and differentiated experiences, Delta can enhance the perceived value of First Class and leave a lasting impression on passengers.

## 5. Conclusion

In conclusion, this paper has focused on enhancing customer satisfaction in the airline industry, with a specific case study of Delta Airlines. The reviews from Skytrax were analyzed with the appliance of sentiment analysis techniques. Also, a SWOT analysis was given elaborately. Based on the above analysis, targeted suggestions were provided to Delta, including leveraging technology to reduce the negative impact of delays, establishing uniform service standards, broadening global networks and partnerships, committing to sustainability and ESG initiatives, and ensuring quick responses to policy changes.

The limitations of this study include the reliance on only one platform that provides publicly available data, which may not capture the full range of customer experiences, as well as the subjective nature of sentiment analysis. Additionally, the study focused on Delta Airlines as a single case study, and the insights and findings may not be directly applicable to other airlines or industry contexts. Moreover, the SWOT analysis may oversimplify complex situations and fail to capture the nuance and interdependencies between factors. Even though, the insights and suggestions derived from this study can serve as an example and inspiration for companies in the airline industry interested in studying customer satisfaction.

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