Loyal and Disloyal Customer Satisfaction in Aviation Industry

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Abstract

The aviation sector is highly competitive and customer-focused. Because of its client-centric nature, the industry's profitability depends upon customer satisfaction. The entry of more companies into the aviation industry has increased competition and the necessity to maintain service quality. Prior studies have identified seat comfort and cleanliness as the most important elements in determining customer satisfaction among airline passengers. The goal of this study is to identify factors that influence customer satisfaction among loyal customers and disloyal customers. Seat comfort, departure/arrival convenience, food and drink, inflight wifi service, inflight entertainment, online support, ease of online booking, onboard services, leg-room services, baggage handling, cleanliness are taken into account as the factors influencing customer satisfaction. Probit regression is used to find out the influence of various factors on customer satisfaction. After conducting the study, it was discovered that the impact of factors on customer satisfaction varies depending on whether the client is loyal or disloyal. Seat comfort, departure/arrival convenience, food and drink, inflight wifi service, inflight entertainment, online support, ease of online booking, onboard services, leg-room services, and baggage handling all have an impact on customer satisfaction in loyal customers, with inflight entertainment having the greatest impact. Seat comfort, departure/arrival convenience, ease of online booking, onboard services, legroom services, baggage handling and cleanliness all influence customer satisfaction among disloyal customers, with seat comfort having the greatest impact.

Keywords
Customer satisfaction, Airline industry, Loyal customers, Disloyal customers, Probit regression

1. Introduction
Customer satisfaction is given top priority in the aviation industry, which is a highly competitive industry. The aviation industry could be described as customer-centric. New companies in this sector are being forced to provide more satisfying experiences and services to their customers as a result of their growth and development. Because of its customer-centric nature, the industry's profitability is dependent on satisfying customers and meeting their needs (Gures et al. 2014). There are two types of customers in the aviation industry: loyal customers and disloyal customers. Customers who are loyal to a company are more likely to use the company's services again over competitors. This devotion to the company stems from their previous positive experiences with it. Customers who are dissatisfied with a company's service are more likely to actively seek out better alternatives. This could be due to a previous negative experience with the company or a negative attitude toward the brand (Rowley and Dawes 2000). Brand loyalty of customers depends upon customer satisfaction and service quality provided by the company (Hussain 2016). Companies should cultivate their loyal customer base while also attempting to please disloyal customers in order to change their attitudes towards the company. As a result, it's critical to investigate the factors that influence customer satisfaction in both loyal and disloyal customers. The goal of this study is to discover important factors that influence customer satisfaction in both loyal and disloyal customers. Ranking these factors in order of their impact on customer satisfaction will give us an idea of which factors should be considered in order to cater to both loyal and disloyal customers. A dataset containing a total of 129880 observations from the Kaggle website was used for this study. Customers are asked to record whether they are satisfied or dissatisfied with the services provided after the journey. They are asked to rate 11 factors that are found to affect satisfaction on a 5-point likert scale, with 0 being the lowest and 5 being the highest score. These factors include seat comfort, departure/arrival convenience, food and drink, inflight wifi service, inflight entertainment, online support, ease of online booking, onboard services, leg-room services, baggage handling, and cleanliness.

This study aims to identify the most important factors influencing customer satisfaction among loyal customers and disloyal customers so that aviation companies can provide a better customer flying experience.
A comparison is also made between factors that influence customer satisfaction in loyal customers and disloyal customers to see if there are any common factors that influence satisfaction in both types of customers. If common factors are found, see if they have the same impact on both types of customers.
The study is also intended to determine whether any factors found to be insignificant in one type of customer have an impact on determining satisfaction in the other type of customer.

2. Literature Review

The majority of previous studies in the field of customer satisfaction in the aviation industry scraped information from customer review websites. If your dependent variable is binary, some studies use logistic regression or variations such as binary or probit regression. Because most survey data is in the form of a Likert scale, which is discrete data, the most appropriate method is logistic regression. However, even when the data is not nominal, studies with linear or multiple regression have been conducted. Surprisingly, these also produced results that were very similar to those obtained using logistic regression.

Park et al. (2020) investigated the factors affecting customer satisfaction. They retrieved airline review data from TripAdvisor, a consumer review website. They created an automated crawl program in Python to collect customer reviews directly from social media websites. The methodology used to analyse the determinant factors of rating (satisfaction) deviations was based on the Tobit model. According to the researchers, customers' satisfaction is influenced by seat comfort and cleanliness. Ban and Kim (2019) examined the relationship between satisfaction and factors affecting satisfaction. The impact of each factor on customer satisfaction is determined using linear regression analysis. They came to the conclusion that seat comfort has a big influence on customer satisfaction. Chow (2014) while studying the Chinese airline industry, found that customer complaints increased with damaged baggage handling. The study also pointed out that customer complaints decreased with a decrease in temperature, where flight cancellations are common at low temperatures.

Sudhakar and Gunasekar (2020) found that foreign customers place a higher value on service quality than on price. They investigated the factors that influence customer satisfaction in their journal. They gathered raw data from TripAdvisor and converted satisfaction into binary data; that is, a rating of 1, 2 or 3 indicates dissatisfaction, whereas a rating of 4 or 5 indicates a satisfied customer. They used logistic regression to determine the impact of each factor on customer satisfaction.

Chow (2014) investigated the relationship between customer satisfaction and service quality in the Chinese airline industry through customer complaints. He concluded that customer satisfaction increases with customer service at a declining rate. There is a link between the quality of service, passenger satisfaction, and loyalty (Walia et al. 2021). They investigated the relationship between service quality and customer satisfaction.

Gures et al. (2014) researched customer expectation, satisfaction, and loyalty relationships in the Turkish airline industry. They used three survey questionnaires to conduct the research. The first questionnaire gathered information on airline customers' expectations. Customer satisfaction is measured in the second questionnaire. The third survey was created to understand customer loyalty. Customers were asked to rate on a five-point likert scale in every survey. They came to the conclusion that customer satisfaction and customer loyalty have a positive relationship. Hussain (2016) investigated the importance of customer satisfaction in the United Arab Emirates' airline industry. He concluded that the two major drivers of brand loyalty are customer satisfaction and service quality.
Rowley and Dawes (2000) investigated the reasons for customers' disloyalty behaviour in their journal. They came to the conclusion that disloyalty to a company stems from an inherent negative attitude toward the company or from previous negative experiences with the company.

Gleim and Gleim (2003) in their conference paper, Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales, Midwest Research to Practise studied Cronbach's alpha level reliabilities for Likert scale. They came to the conclusion that Cronbach alpha values greater than 0.90 are highly reliable, while values greater than 0.70 are also reliable.

Two types of customers are seen in the aviation industry such as loyal customers and Disloyal customers. A company will try to retain their existing loyal customers, at the same time try to add disloyal customers to the loyal list by providing them with good flying experience. Factors affecting satisfaction in both these types of customers may vary. So it is imperative that we know what factors affect the satisfaction of loyal customers and what are the factors that influence satisfaction in disloyal customers.

3. Methods

The study is conducted by analysing the responses of airline passengers to questions regarding customer satisfaction and factors that affect customer satisfaction. The methodology shown in Figure 1 is used for this study.

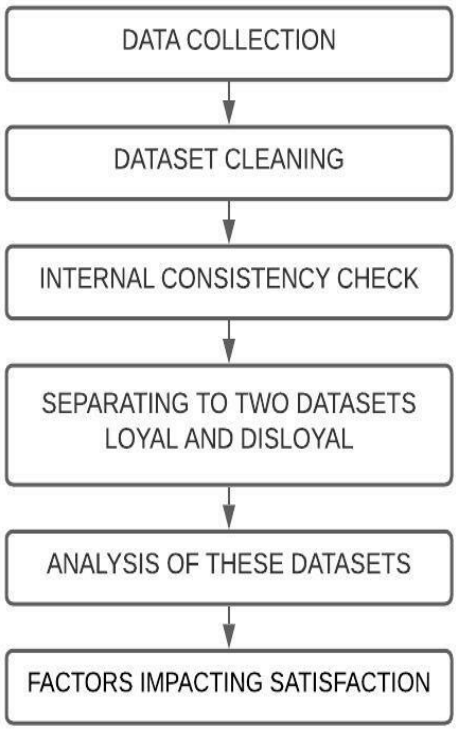

Figure 1. Methodology Flow Chart

3.1 Data Collection

The information is gathered from the Kaggle website (Jana 2020). The data collected has 129880 entries. Seat comfort, departure/arrival convenience, food and drink, inflight wifi service, inflight entertainment, online support, ease of online booking, onboard services, leg-room services, baggage handling, cleanliness, travel destination, travel class, travel type, travel distance, satisfaction, name, age and gender of the customer etc were included in the dataset.

3.2 Data Cleaning

Type of travel, class, gate location, checking service, online boarding etc were removed from the database because they were either irrelevant or out of the scope of the study. Rows with missing values in any of the variables were completely removed from the database.

The first anomaly discovered was that many entries had the 'food and drink' factor given as 0. This could be due to their short journey or the fact that the service is not made available to them. As a result, the first condition was added to ensure that customers had travelled a distance of 1000 kilometres, had a travel time of close to one hour, or had a non-zero rating for 'food and drink' service.

(Travel distance>1000 km) OR (food and drink>0) (1)

The average flight delay is 11.4 minutes for departure and 11.3 minutes for arrival (eurocontrol, 2020). Situations in which the arrival and departure delays were greater than the average were removed.

(Departure delay in minutes <12) AND (Arrival delay in minutes<12) (2)

A bar chart is used to create a gender-based distribution. A 50/50 split of males and females will be an ideal representation, indicating that our population is not skewed towards one gender. The histogram is used to determine whether the given data resembles the actual population by looking at the age distribution of the data. A population will be well represented by a distribution with nearly equal densities on both sides of the mean.

3.3 Internal Consistency Check

It is considered reliable if the Cronbach alpha value is greater than 0.6. (Gleim 2003). A value of greater than 0.7 is considered quite good in most practical applications. The level of reliability will be very high if Cronbach's alpha is close to 1, but there is a chance that one or more independent variables are representing the same entity. This duplication in representation may result in a high level of internal consistency. MS Excel is used to calculate Cronbach's alpha.

3.4 Obtaining Two Sub-Datasets

Customers who are loyal and those who are disloyal are divided into two subsets: loyal customers and disloyal customers. Both subsets were analysed separately, with the Loyal customers dataset coming first, followed by the Disloyal customers dataset.

3.5 Probit Regression - Loyal Customers and Disloyal Customers

Probit regression analysis is used because the dependent variable 'satisfaction' is a binary variable. This analysis was performed in MS Excel with a significance level of 0.05 using the logistic regression add-on.
'Seat comfort', 'departure arrival time', 'food and drinks', 'wifi service', 'in-flight entertainment', 'online support', 'ease of online booking', 'onboard services', 'legroom services', 'baggage handling' and 'cleanliness' are independent variables, while 'satisfaction' is the dependent variable.

Independent variables with a P value greater than 0.05 were removed from the table, starting with the one with the highest P value. Due to their correlation, removing variables from the table may cause changes in regression coefficients of other variables; these variations are noted.
This process is repeated until the p values of all independent variables are less than 0.05. The accuracy of predicting the dependent variable may change after all insignificant variables are removed from the table. This shift in customer satisfaction prediction accuracy is noted. A correlation matrix is found to explain the changes in the regression coefficients of the independent variables caused by the removal of insignificant factors. This procedure is carried out in SAS software. On the basis of corresponding regression coefficients, the top five factors influencing customer satisfaction in both loyal and disloyal customers are ranked. If any factors are discovered to affect customer satisfaction in both loyal and disloyal customers, they are noted.

4. Results and Discussion

The data required for this study is extracted from the dataset. Information not required is removed from the dataset to obtain the required dataset for analysis.

4.1 Data Cleaning

The 129880-entry dataset was reduced to 128692 after data cleaning.
Male and female distribution is almost 50 percent as shown in Figure 2, indicating that our population is not skewed towards one gender.

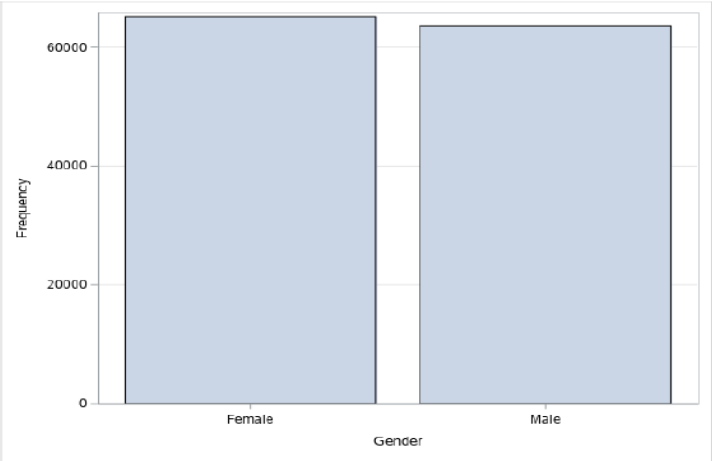

Figure 2. Gender Distribution Bar Chart

The youngest person in the database is 7 years old, and the oldest is 85 years old. The age group demonstrates that customers were indeed capable of forming their own opinions about the airline's services. The average age is 39.32 years old. There are no passengers in the age group of 2 to 7. The age group between 0 to 2 can be neglected since they are classified as infants by airlines.

4.2 Internal Consistency

Cronbach alpha is found to be $\alpha = 0.7598$.
Since $0.60 < \alpha < 0.8$, it is found to be reliable (Gleim 2003).

4.3 Loyal Customers

Loyal customers' regression table consists of eleven independent variables initially as shown in Table 1. P values of ten independent variables were below 0.05 and only 'cleanliness' has a P value greater than 0.05.

Table 1. Loyal Customers' Regression Table before Iteration

Sl No	Variable	Regression Coefficient	Standard error	Wald	P Value
1	Seat Comfort	0.098	0.005	354.365	0.000
2	Departure/Arrival time convenient	-0.140	0.004	1247.766	0.000
3	Food and drink	-0.053	0.005	107.432	0.000
4	Inflight wifi service	-0.030	0.005	37.450	0.000
5	Inflight entertainment	0.419	0.005	8146.974	0.000
6	Online support	0.175	0.005	1146.666	0.000
7	Ease of online booking	0.224	0.006	1277.876	0.000
8	On-board service	0.201	0.005	1551.462	0.000
9	Leg room service	0.170	0.004	1483.528	0.000
10	Baggage handling	0.028	0.006	24.819	0.000
11	Cleanliness	0.003	0.006	0.331	0.565

The independent variable 'cleanliness' is deleted from the regression table since its P value is greater than 0.05. All the other ten variables were found to be significant since all of their P values were less than 0.05. So after the first iteration we obtained a regression table containing ten significant independent variables as shown in Table 2.

Table 2. Loyal Customers' Regression Table after First Iteration

Sl No	Variable	Regression Coefficient	Standard error	Wald	P Value
1	Seat Comfort	0.098	0.005	354.136	0.000
2	Departure/Arrival time convenient	-0.140	0.004	1251.749	0.000
3	Food and drink	-0.053	0.005	107.683	0.000
4	Inflight wifi service	-0.030	0.005	38.174	0.000
5	Inflight entertainment	0.419	0.005	8149.168	0.000
6	Online support	0.174	0.005	1153.872	0.000
7	Ease of online booking	0.225	0.006	1360.802	0.000
8	On-board service	0.202	0.005	1656.567	0.000
9	Leg room service	0.170	0.004	1502.975	0.000
10	Baggage handling	0.030	0.005	31.830	0.000

After cleanliness was removed from the regression table, the accuracy of predicting the result increased slightly from 0.811732 to 0.811818. Out of eleven factors considered, ten of them affect the customer satisfaction in Loyal customers. The five most important factors affecting satisfaction in loyal customers are 'inflight entertainment', 'ease of online booking', 'onboard services', 'online support' and 'legroom service'. Previous studies regarding customer satisfaction in the airline industry also pointed out that customer satisfaction is positively affected by inflight service quality and pre-flight service quality (Namukasa 2013).

After the removal of 'cleanliness' from the regression table, a slight change in the coefficients of the other variables were observed as shown in Table 3.

Table 3. Loyal Customers' Change in Regression Coefficients

Sl No	Independent Variables	Regression coefficient before deletion	Regression coefficient after deletion
1	Baggage handling	0.028	0.030
2	Onboard services	0.201	0.202
3	Online support	0.175	0.174

This change in regression coefficient is observed because of the correlation 'cleanliness' has with other independent variables. The highest change in regression coefficient is observed in 'Baggage handling. This is because 'cleanliness' variable has the highest correlation (0.674) with 'Baggage handling' compared to other independent variables.

4.4 Disloyal Customers

Disloyal customers' regression table consists of 11 independent variables initially, as shown in Table 4. The P values of six independent variables were all below 0.05. P values of independent variables 'Food and drink',

'inflight wifi service', 'inflight entertainment', 'online support' and 'ease of online booking' were greater than 0.05 in the initial regression table (Table 4).

Table 4. Disloyal Customers' Regression Table before iteration

Sl No	Variable	Regression Coefficient	Standard error	Wald	P Value
1	Seat Comfort	0.450	0.026	293.449	0.000
2	Departure/Arrival time convenient	-0.047	0.006	53.250	0.000
3	Food and drink	-0.004	0.030	0.019	0.889
4	Inflight wifi service	-0.021	0.031	0.471	0.492
5	Inflight entertainment	-0.010	0.020	0.237	0.626
6	Online support	-0.007	0.011	0.379	0.538
7	Ease of online booking	0.045	0.030	2.168	0.141
8	On-board service	0.164	0.009	360.063	0.000
9	Leg room service	0.030	0.008	15.336	0.000
10	Baggage handling	0.164	0.010	245.586	0.000
11	Cleanliness	0.145	0.010	199.193	0.000

The independent variables 'food and drinks', 'online support', 'inflight entertainment' and 'inflight wifi service' were removed from the regression table after four iterations because P values were found to be greater than 0.05 in each subsequent iteration. P value of variable 'Ease of online booking', which was initially 0.141 (Table 4) reached below 0.05 after four iterations, so it is included in the final regression table. So after the fourth iteration we obtained a regression table containing 7 significant independent variables as shown in Table 5.

Table 5. Disloyal Customers' Regression Table after Fourth Iteration

Sl No	Variable	Regression Coefficient	Standard error	Wald	P Value
1	Seat Comfort	0.437	0.008	3218.886	0.000
2	Departure/Arrival time convenient	-0.048	0.008	55.896	0.000
7	Ease of online booking	0.019	0.007	6.739	0.009
8	On-board service	0.164	0.009	360.489	0.000
9	Leg room service	0.031	0.008	15.653	0.000
10	Baggage handling	0.165	0.010	246.791	0.000
11	Cleanliness	0.145	0.010	199.670	0.000

The accuracy of predicting the outcome increased slightly from 0.865991 to 0.866411 after four iterations. Out of eleven factors considered, seven of them affect the customer satisfaction in Disloyal customers. The five most important factors affecting disloyal customers' satisfaction are 'seat comfort', 'baggage handling', 'onboard service', 'cleanliness' and 'legroom service'. Literature indicates that customer satisfaction in the airline industry is influenced by seat comfort and cleanliness (Park et al. 2020). Ban and kim (2019) also reported that seat comfort plays a major role in customer satisfaction in the airline industry.

Following the removal of 'food and drinks', 'online support', 'inflight entertainment' and 'inflight wifi service' changes in the coefficients of other independent variables were observed as shown in Table 6.

Table 6. Disloyal Customers' Change in Regression Coefficients

SL No	Independent Variables	Regression coefficient before deletion	Regression coefficient after deletion
1	Seat comfort	0.450	0.437
2	Ease of online booking	0.045	0.019
3	Legroom services	0.030	0.031
4	Baggage handling	0.164	0.165

This change in regression coefficient is observed because of the correlation that the deleted variables have with other independent variables. Highest change in regression coefficient is observed in 'Ease of online booking'. This is because 'inflight wifi service' and 'online support' variables have high correlation (0.507 and 0.569 respectively) with 'Ease of online booking' compared to other independent variables.

4.5 Important Factors

The contribution of each factor in predicting satisfaction is represented by the regression coefficient. The greater the regression coefficient, the greater the impact that independent variable has in determining customer satisfaction. Five most important factors affecting customer satisfaction in Loyal customers and Disloyal customers are listed in Table 7 based on their regression coefficient.

Table 7. Important Factors

Sl No	Loyal customers	Regression Coefficient	Disloyal customers	Regression Coefficient
1	Inflight entertainment	0.419	Seat comfort	0.437
2	Ease of online booking	0.225	Baggage handling	0.165
3	Onboard services	0.202	Onboard service	0.164
4	Online support	0.174	Cleanliness	0.145
5	Legroom service	0.170	Leg room service	0.031

'Inflight entertainment' which is insignificant in the case of disloyal customers is found to be a significant factor in determining customer satisfaction in the case of loyal customers. Onboard services and Legroom services were found to be significant in determining satisfaction in both types of customers. This is in accordance with earlier studies which pointed out that customer satisfaction is linked to service quality provided by the airlines company (Walia et al. 2021). Similar studies conducted in other parts of the world also concluded that service quality has a significant positive impact on determining customer satisfaction in the airline industry (Hussain 2016).

5. Conclusion

Customers who are loyal and disloyal have different combinations of factors that influence customer satisfaction. Seat comfort, departure/arrival convenience, food and drink, inflight wifi service, inflight entertainment, online support, ease of online booking, onboard services, leg-room services, and baggage handling are all factors that have an impact on loyal customers' satisfaction. Seat comfort, departure/arrival convenience, ease of online booking, onboard services, leg-room services, baggage handling, and cleanliness are all found to have an impact on the satisfaction of disloyal customers. In order to satisfy both loyal and disloyal customers, airline companies should

focus more on in-flight entertainment and seat comfort factors. Factors such as on board services and leg room services should also be considered because they have been found to influence customer satisfaction in both types of customers. Present study is based on the data collected from the customers of a particular airline company. In future studies the impact of various factors on customer satisfaction based on demography could be considered.

Acknowledgements

We would like to demonstrate our appreciation to Mr. Sayantan Jana for the dataset "Airline customer satisfaction" which is used in this study. We would also like to thank Kaggle website for hosting the data publicly that allowed this research to be completed within the stipulated time.

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Biography

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