

# **Improving Customer Satisfaction for Southeast Airlines**

**Xin (Harper) He**

**Jingxian (Sandra) Sun**

**Dharmik Gautam Kothari**

**Sakshi Raghuvanshi**

## Objective

Perform data analysis and visualization to gain actionable insight on the satisfaction of customers for different airlines and henceforth improve it for our client- Southeast Airlines.

## Business Questions addressed

1. Rank the Airlines and find the Southeast's rank based on the current survey.
2. Find out satisfaction levels of different age groups across airlines.
3. Compare the various classes based on the customer satisfaction.
4. Do people who depart from/to certain cities have a lower satisfaction rate?
5. Which attribute influences the satisfaction of customers the most?

# Cleaning Data

Raw data

129,889 Customers

28 Attributes

## Our Main Object of Study

127,143 Customers

26 Attributes

A flight that is delayed for less than 5 minutes is basically “on time”

Remove 9 data entry error records

Divide customers by flight status

Flight Cancelled

2,400 Customers

Flight Uncancelled

127,480 Customers

Remove 337 records with missing values

On time

Delay

82,641 Customers

44,502 Customers

Remove  
“Airline Code”

“Flight date”  
Attributes

# Grouping of Attributes

**Customers  
Characteristic  
(5 attributes)**

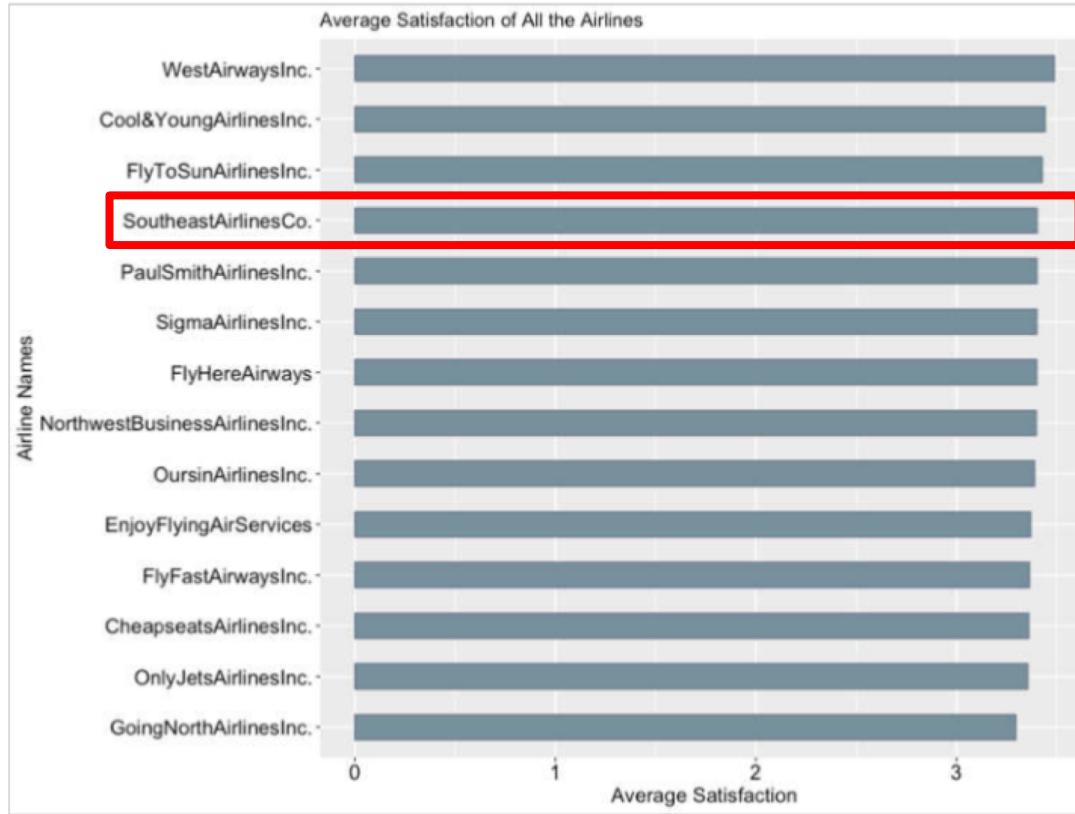
**Flight experience  
Characteristic  
(7 attributes)**

**Flight  
Characteristic  
(12 attributes)**

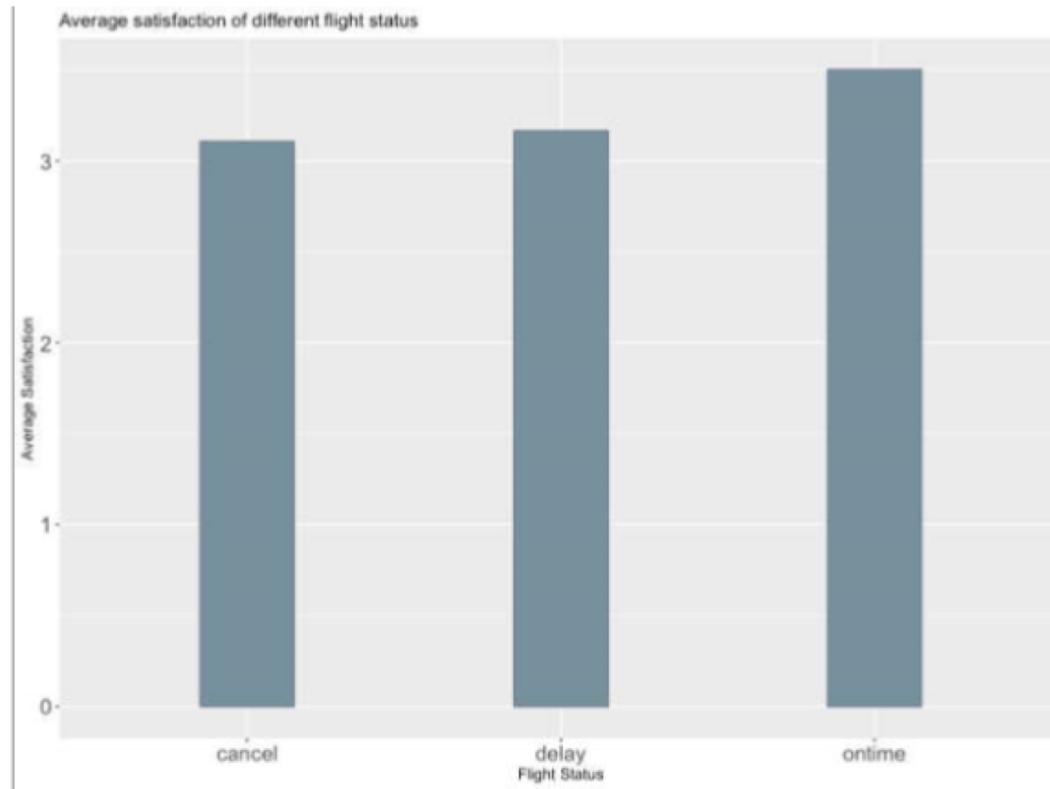
# **Descriptive Statistics and Visualizations**

# Average Satisfaction of All Airline

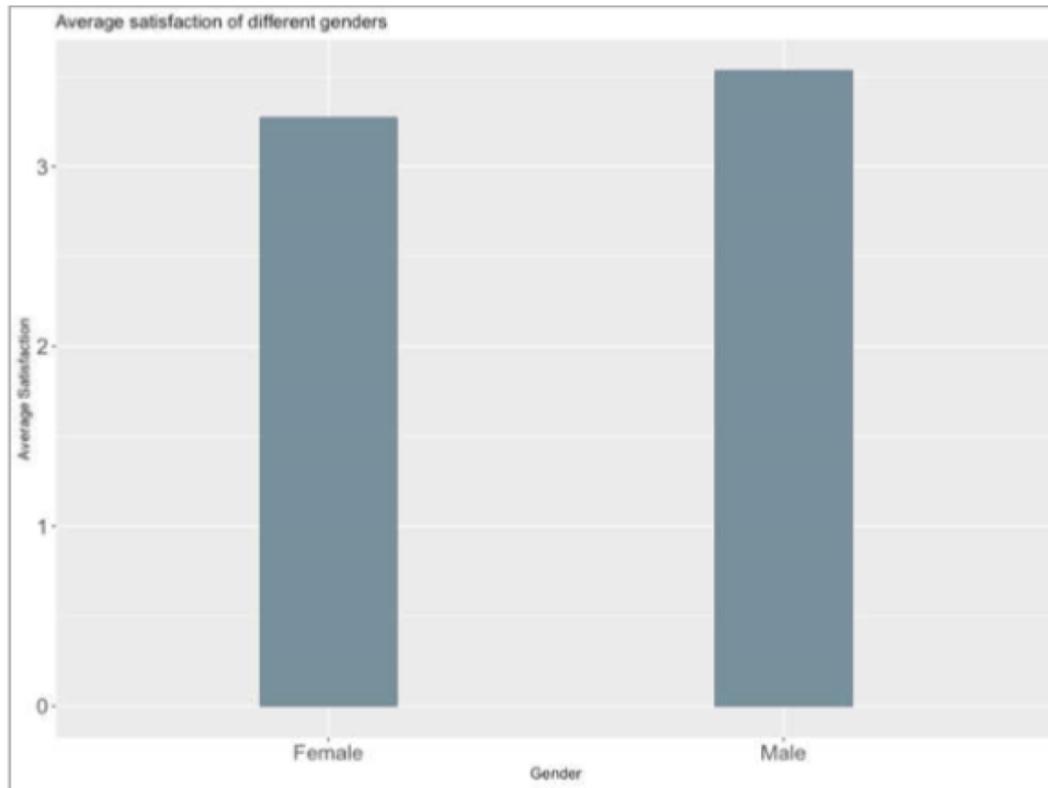
Business  
Question 1



# Flight Status and Customer Average Satisfaction



# Average Satisfaction of different Genders



# Average Satisfaction amongst various age groups

Age Group	Customer Number	Average Satisfaction
15-18	5252	2.864242
18-24	8546	3.282003
25-34	21420	3.601541
35-44	27752	3.710940
45-54	24374	3.644867
55-64	18549	3.331986
65+	21250	2.655153

Business  
Question 2

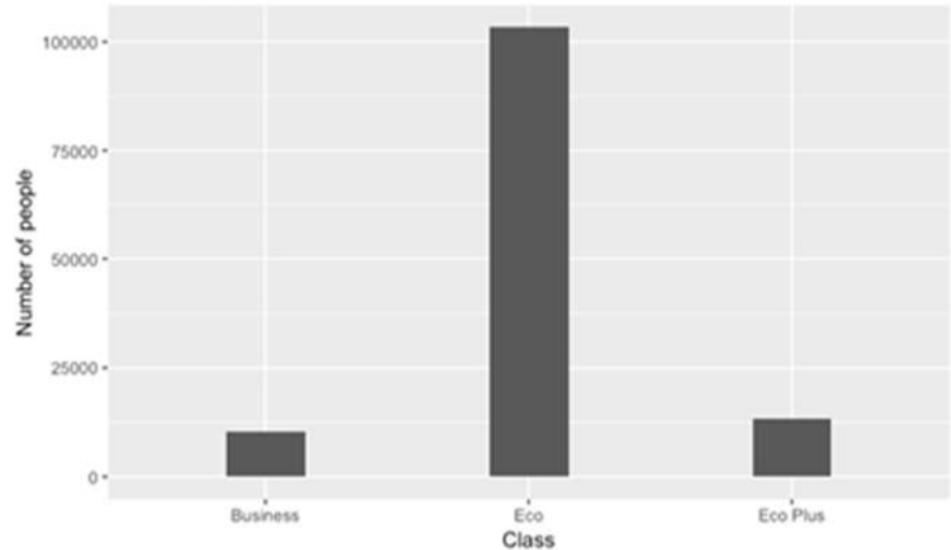


# Travel Class and Customer Satisfaction

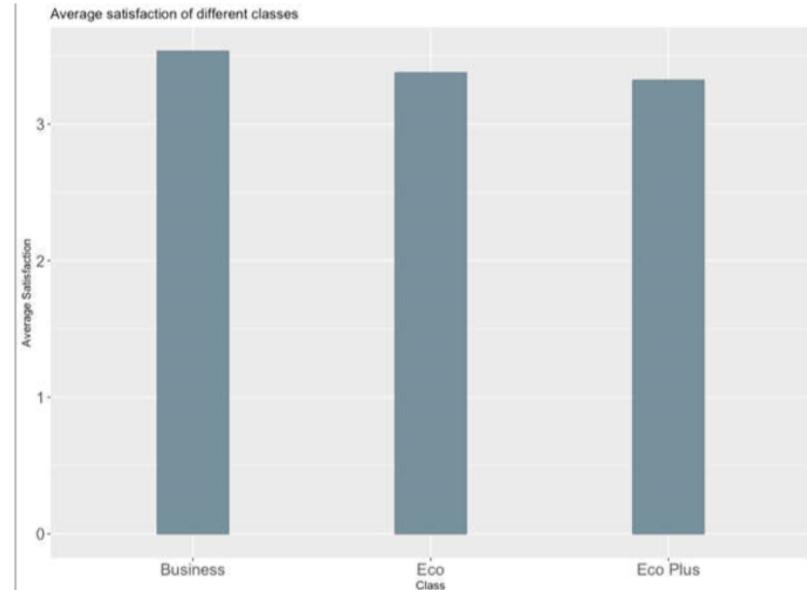
Business  
Question 3

Class	CustomerNumber	AverageSatisfaction
Business	10452	3.535113
Eco	103375	3.377074
Eco Plus	13316	3.321944

Number of people of different classes

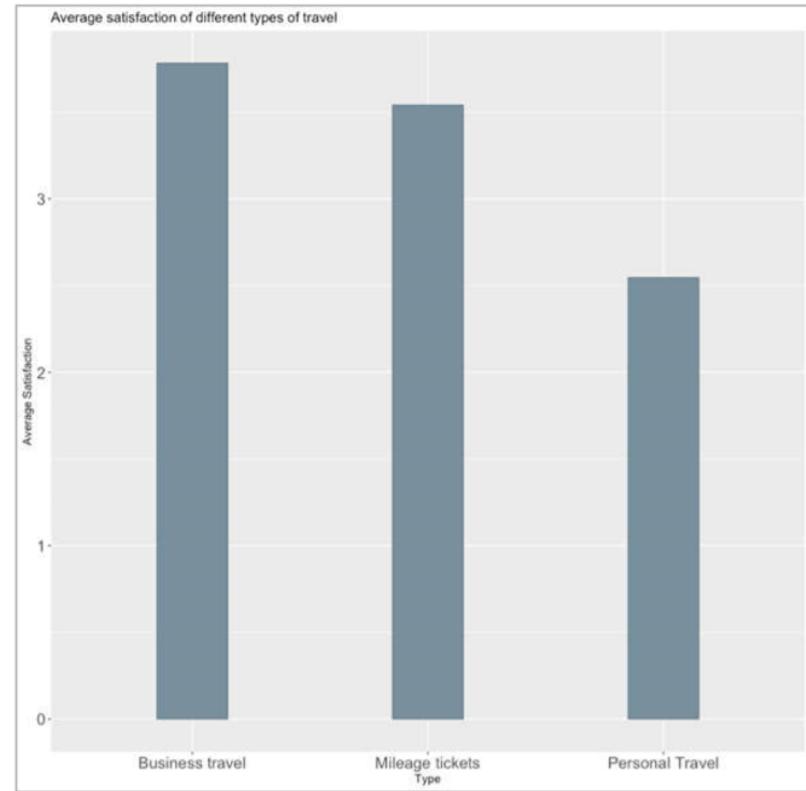


Average satisfaction of different classes



# Type of Travel and Customer Satisfaction

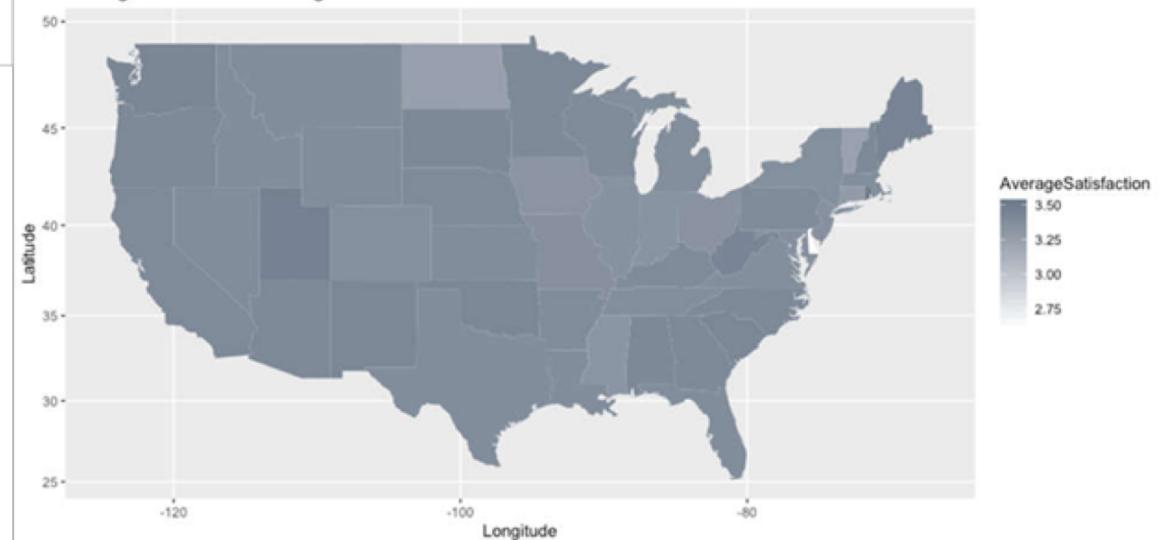
Type.of.Travel	CustomerNumber	AverageSatisfaction
Business travel	78379	3.781600
Mileage tickets	9817	3.541000
Personal Travel	38947	2.545228



# Customer Satisfaction vs Origin States

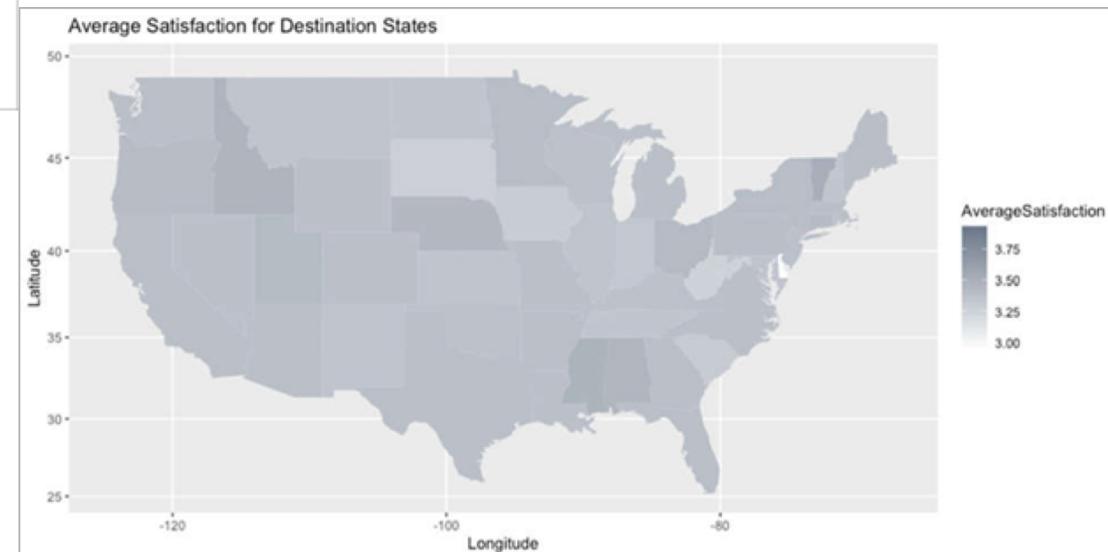
Origin.State	CustomerNumber	AverageSatisfaction
delaware	10	2.600000
vermont	54	3.240741
north dakota	239	3.246862
connecticut	478	3.276151
mississippi	298	3.315436
iowa	374	3.326203
indiana	860	3.333721
ohio	1817	3.336819
illinois	7640	3.341230
new jersey	2387	3.352744

Average Satisfaction for Origin States



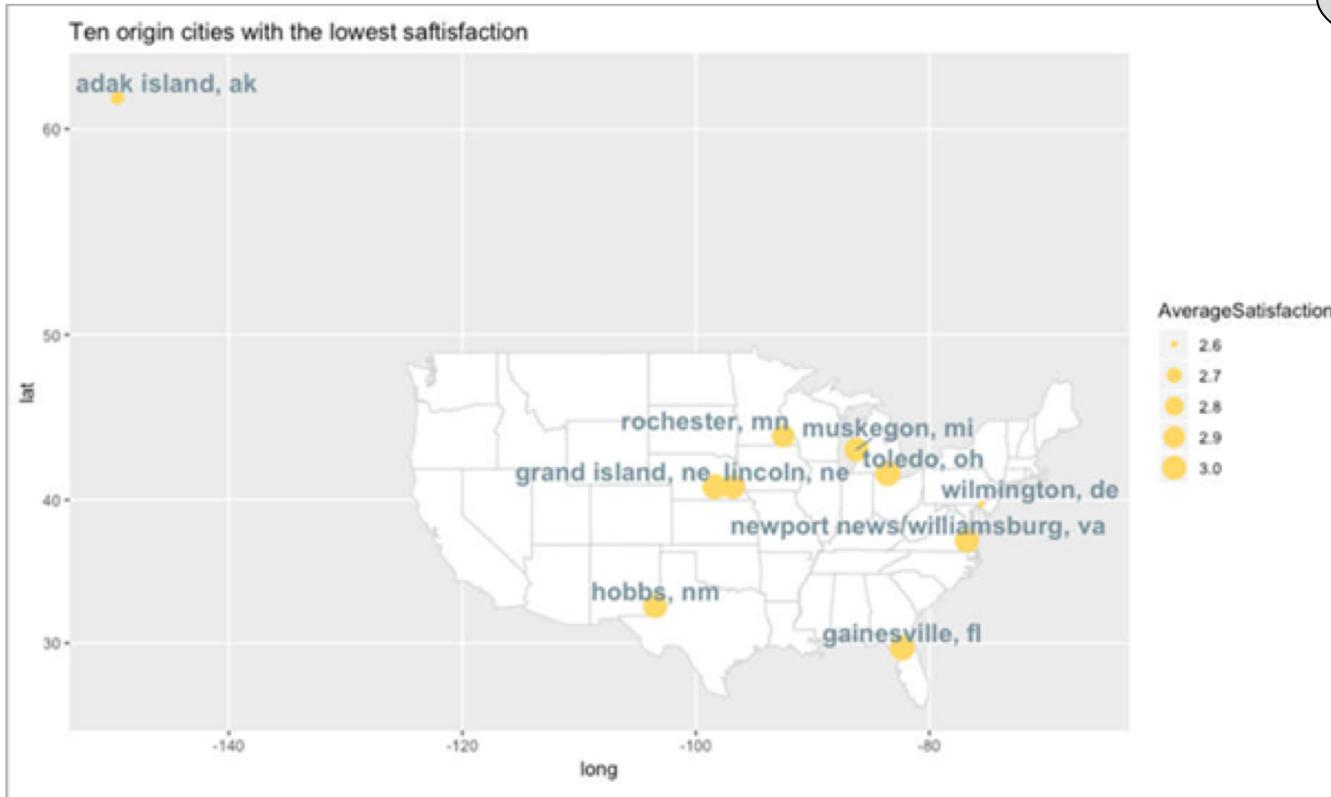
# Customer Satisfaction vs Destination States

Destination.State	CustomerNumber	AverageSatisfaction
Delaware	16	2.937500
West Virginia	60	3.250000
South Dakota	242	3.272727
Iowa	388	3.301546
South Carolina	585	3.307692
Indiana	846	3.330969
Tennessee	1901	3.340347
New Hampshire	140	3.342857
North Dakota	242	3.342975
Montana	358	3.349162



# Customer Satisfaction vs Origin Cities

Business  
Question 4



# Customer Satisfaction vs Destination Cities



# Modeling

# Modeling

- We used Modeling (Simple Linear and Multiple Linear) to understand the relationship between Customer Satisfaction and Customer characteristics like Price Sensitivity, Age, Gender and Shopping at the airport.
- The conclusions drawn from Linear modeling for Satisfaction vs Customer Characteristics are:
  - The elder the customers are, the lower the satisfaction level they have.
  - The higher the price sensitivity the customers have, the lower the satisfaction level will be.
  - The more goods the customers buy in the airport, the higher the satisfaction level will be.
- The conclusions drawn from Linear modeling for Satisfaction vs Flight Experience and Flight Characteristics:
  - The satisfaction level is not changing by the year of the first flight the customers have taken in.
  - The more flights customers have taken, the lower satisfaction level they have.
  - Departure and Arrival delay in minutes contribute to a low satisfaction level in customers.
  - The other characteristics like ‘flight time’, ‘flight distance’ and ‘scheduled departure’ etc, do not affect the satisfaction level of customers.

## Modeling(Contd..)

- The linear modelling and support vector machine modelling indicate that the combination of attributes like- “Airline.Status”, “Gender”, “Price.Sensitivity”, “Year.of.First.Flight.Group”, “Type of Travel”, ”No..of.other.Loyalty.Cards.Group”, ”Class”, ”Departure.Delay.in.Minutes.Group” and “Arrival.Delay.greater.5.Mins” provide the accuracy of almost 80%. The adjusted R square is 0.4432, which means the 44.32% data can be explained by these factors.
- And the error rate of this model to predict of new data 21%. These numbers validate our model’s power to predict the satisfaction of customers.

# Dissatisfaction Factors

FEMALE

Status  
:BLUE

Age Group:  
15-24 and 65

Unsatisfied

HIGH(4-5)  
Price Sensitivity

Not on time  
Arrival

Personal Travel

Not on Time  
Departure

Class:Eco Plus

# Recommendations



# Actionable Insights



From the descriptive analysis, modeling analysis and other quantitative research we have done, we suggest Southeast Airlines to do the following, to increase their overall customer satisfaction rate:

- Most likely, customers having blue status have lower satisfaction level, hence Southeast company can offer them multiple way to upgrade their status, for example, offering double credit points in typical holidays, like Christmas or Thanksgiving Day.
- Customers who have their traveling for personal purpose, Southeast company can corporate with hotels and tourist spots and offer customers discounted accommodations.
- Southeast can improve their services, called “senior citizens privilege” for their elderly customers, for example, offering them fast pass card which decreases the waiting time in lines.



## Actionable Insights(Contd..)



- Southeast airlines can offer Joining discounts or gifts on flights to encourage membership sign up, and hence gain an advantage later with increase in passengers. For other customers who already have our membership and loyalty card, marketing department can send them a targeting survey to get to know the reasons of their dissatisfaction.
- Customers who take Southeast flights frequently are more likely to have lower satisfaction. Therefore, Southeast can upgrade the classes of people who accumulate enough mileage.
- Since people who experience delay tend to have lower satisfaction, our company should offer food and accommodations for the customers whose flights have been delayed.

**THE END**

---