



# Airline Passenger Satisfaction Dataset

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# OUR TEAM

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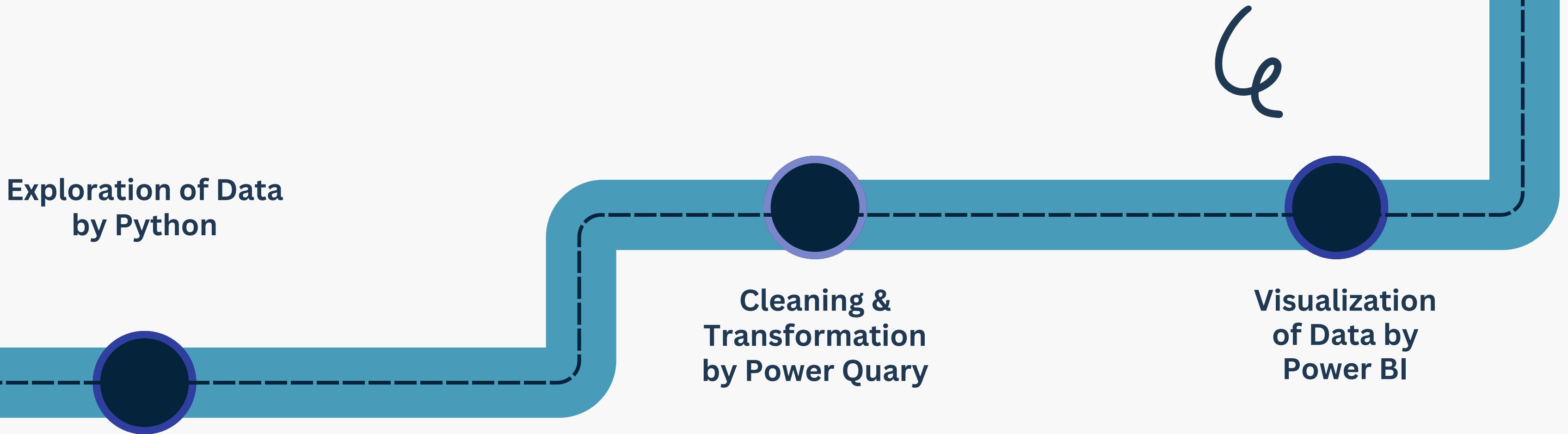
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# ROAD TO ANALYZE DATA



# ABOUT

1. This dataset contains information about

- airline passengers
- their experiences during flights.

2. It aims to analyze customer satisfaction and the factors that influence it, such as type of travel, travel class, in-flight services, flight delays, and overall flight experience.

3. The data helps in evaluating service quality and identifying areas for improvement to enhance passenger satisfaction and optimize airline performance.



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# DATASET DESCRIPTION



ID	Gender	Customer Type
Age	Type of Travel	Class
Flight Distance	Satisfaction	Departure Delay in Minutes
Arrival Delay in Minutes		



# DATASET DESCRIPTION

EVALUATION



Inflight wifi service	Departure/Arrival time convenient	Ease of Online booking
Gate location	Food and drink	Online boarding
Seat comfort	Inflight entertainment	On-board service
Leg room service	Baggage handling	Checkin service
Cleanliness	inflighr Services	





# EXPLORATION OF DATA

## THE FIRST FIVE ROWS OF THE DATA

ID.	Gender	Customer Type	Age	Type of Travel	Class	Flight Distance	Inflight wifi service	Departure/Arrival time convenient	Ease of Online booking	...	Inflight entertainment	On-board service	Leg room service	Baggage handling	Checkin service	Inflight service	
0	19556	Female	Loyal Customer	52	Business travel	Eco	160	5	4	3	...	5	5	5	5	2	5
1	90035	Female	Loyal Customer	36	Business travel	Business	2863	1	1	3	...	4	4	4	4	3	4
2	12360	Male	disloyal Customer	20	Business travel	Eco	192	2	0	2	...	2	4	1	3	2	2
3	77959	Male	Loyal Customer	44	Business travel	Business	3377	0	0	0	...	1	1	1	1	3	1
4	36875	Female	Loyal Customer	49	Business travel	Eco	1182	2	3	4	...	2	2	2	2	4	2



# EXPLORATION OF DATA

## THE LAST FIVE ROWS OF THE DATA

ID.	Gender	Customer Type	Age	Type of Travel	Class	Flight Distance	Inflight wifi service	Departure/Arrival time convenient	Ease of Online booking	...	Inflight entertainment	On-board service	Leg room service	Baggage handling	Checkin service
78463	Male	disloyal Customer	34	Business travel	Business	526	3	3	3	...	4	3	2	4	4
71167	Male	Loyal Customer	23	Business travel	Business	646	4	4	4	...	4	4	5	5	5
37675	Female	Loyal Customer	17	Personal Travel	Eco	828	2	5	1	...	2	4	3	4	5
90086	Male	Loyal Customer	14	Business travel	Business	1127	3	3	3	...	4	3	2	5	4
34799	Female	Loyal Customer	42	Personal Travel	Eco	264	2	5	2	...	1	1	2	1	1



# EXPLORATION OF DATA

- Column data types are ready for analysis.

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 25976 entries, 0 to 25975
Data columns (total 24 columns):
 #   Column           Non-Null Count Dtype  
 ---  -- 
 0   ID.              25976 non-null  int64  
 1   Gender            25976 non-null  object  
 2   Customer Type    25976 non-null  object  
 3   Age               25976 non-null  int64  
 4   Type of Travel   25976 non-null  object  
 5   Class              25976 non-null  object  
 6   Flight Distance  25976 non-null  int64  
 7   Inflight wifi service  25976 non-null  int64  
 8   Departure/Arrival time convenient  25976 non-null  int64  
 9   Ease of Online booking  25976 non-null  int64  
 10  Gate location    25976 non-null  int64  
 11  Food and drink   25976 non-null  int64  
 12  Online boarding  25976 non-null  int64  
 13  Seat comfort     25976 non-null  int64  
 14  Inflight entertainment  25976 non-null  int64  
 15  On-board service  25976 non-null  int64  
 16  Leg room service  25976 non-null  int64  
 17  Baggage handling  25976 non-null  int64  
 18  Checkin service   25976 non-null  int64  
 19  Inflight service  25976 non-null  int64  
 20  Cleanliness       25976 non-null  int64  
 21  Departure Delay in Minutes  25976 non-null  int64  
 22  Arrival Delay in Minutes  25893 non-null  float64 
 23  Satisfaction      25976 non-null  object  
dtypes: float64(1), int64(18), object(5)
```



# EXPLORATION OF DATA

	ID.	Age	Flight Distance	Inflight wifi service	Departure/Arrival time convenient	Ease of Online booking	Gate location	Food and drink	Online boarding	Seat comfort	Inflight entertainmen
<b>count</b>	25976.000000	25976.000000	25976.000000	25976.000000	25976.000000	25976.000000	25976.000000	25976.000000	25976.000000	25976.000000	25976.000000
<b>mean</b>	65005.657992	39.620958	1193.788459	2.724746	3.046812	2.756775	2.977094	3.215353	3.261665	3.449222	3.357753
<b>std</b>	37611.526647	15.135685	998.683999	1.335384	1.533371	1.412951	1.282133	1.331506	1.355536	1.320090	1.338299
<b>min</b>	17.000000	7.000000	31.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	1.000000	0.000000
<b>25%</b>	32170.500000	27.000000	414.000000	2.000000	2.000000	2.000000	2.000000	2.000000	2.000000	2.000000	2.000000
<b>50%</b>	65319.500000	40.000000	849.000000	3.000000	3.000000	3.000000	3.000000	3.000000	4.000000	4.000000	4.000000
<b>75%</b>	97584.250000	51.000000	1744.000000	4.000000	4.000000	4.000000	4.000000	4.000000	4.000000	5.000000	4.000000
<b>max</b>	129877.000000	85.000000	4983.000000	5.000000	5.000000	5.000000	5.000000	5.000000	5.000000	5.000000	5.000000

The table shows that the dataset contains

- 25,976 records.
- The average passenger age is about 40 years, with a minimum of 7 years and a maximum of 85 years.
- The average flight distance is around 1,194 miles, ranging from 31 miles to nearly 5,000 miles, showing a wide variation between short and long flights.
- Most service ratings fall between 3 and 4, indicating that passengers generally find the services satisfactory.
- Inflight Wi-Fi, Ease of online booking, and Gate location receive relatively lower scores
- The average departure and arrival delays are about 14–15 minutes, with most flights experiencing no delay, but a few exceptional cases reaching delays of over 1,100 minutes.



# EXPLORATION OF DATA

- The dataset is almost complete with no missing values in most columns.
- Only the Arrival Delay in Minutes column has 83 missing records (about 0.3% of the data), which is a very small portion and can be easily handled."

```
df.isnull().sum()
```

Column1	0
id	0
Gender	0
Customer Type	0
Age	0
Type of Travel	0
Class	0
Flight Distance	0
Inflight wifi service	0
Departure/Arrival time convenient	0
Ease of Online booking	0
Gate location	0
Food and drink	0
Online boarding	0
Seat comfort	0
Inflight entertainment	0
On-board service	0
Leg room service	0
Baggage handling	0
Checkin service	0
Inflight service	0
Cleanliness	0
Departure Delay in Minutes	0
Arrival Delay in Minutes	83
satisfaction	0
dtype: int64	



# EXPLORATION OF DATA

- There are no duplicated values

```
df.duplicated()  
  
0      False  
1      False  
2      False  
3      False  
4      False  
      ...  
25971    False  
25972    False  
25973    False  
25974    False  
25975    False  
Length: 25976, dtype: bool
```

# CLEANING DATA



<u>id</u>	<u>Gender</u>	<u>Customer Type</u>	<u>Age</u>	<u>Type of Travel</u>	<u>Class</u>	<u>Flight Distance</u>	<u>Inflight wifi service</u>	<u>Departure/Arrival time convenient</u>	<u>Ease of Online booking</u>	<u>Gate location</u>	<u>Food and drink</u>	<u>Online boarding</u>	<u>Seat comfort</u>	<u>Inflight entertainment</u>	<u>On-board service</u>	<u>Leg room service</u>
0,19556	Female	Loyal Customer	52	Business travel	Eco	160	5,4,3,4,3,4,3,5,5,5,5,2,5,5,50,44.0	satisfied								
1,90035	Female	Loyal Customer	36	Business travel	Business	2863	1,1,3,1,5,4,5,4,4,4,3,4,5,0,0.0	satisfied								
2,12360	Male	disloyal Customer	20	Business travel	Eco	192	2,0,2,4,2,2,2,2,4,1,3,2,2,2,0,0.0	neutral or dissatisfied								
3,77959	Male	Loyal Customer	44	Business travel	Business	3377	0,0,0,2,3,4,4,1,1,1,1,3,1,4,0,6.0	satisfied								
4,36875	Female	Loyal Customer	49	Business travel	Eco	1182	2,3,4,3,4,1,2,2,2,2,2,4,2,4,0,20.0	satisfied								
5,39177	Male	Loyal Customer	16	Business travel	Eco	311	3,3,3,5,5,3,5,4,3,1,1,2,5,0,0.0	satisfied								
6,79433	Female	Loyal Customer	77	Business travel	Business	3987	5,5,5,5,3,5,5,5,5,5,4,5,3,0,0.0	satisfied								
7,97286	Female	Loyal Customer	43	Business travel	Business	2556	2,2,2,2,4,4,5,4,4,4,4,5,4,3,77,65.0	satisfied								
8,27508	Male	Loyal Customer	47	Business travel	Eco	556	5,2,2,2,5,5,5,5,2,2,5,3,3,5,1,0.0	satisfied								



<u>Gender</u>	<u>Customer Type</u>	<u>Age</u>	<u>Type of Travel</u>	<u>Class</u>	<u>Flight Distance</u>	<u>Inflight wifi service</u>	<u>Departure/Arrival time convenient</u>	<u>Ease of Online booking</u>	<u>Gate location</u>	<u>Food and drink</u>	<u>Online boarding</u>	<u>Seat comfort</u>	<u>Inflight entertainment</u>	<u>On-board service</u>	<u>Leg room service</u>
56 Female	Regular Customer	52	Business travel	Eco	160	Excellent	Good	Average	Good	Average	Good	Average	Excellent	Excellent	Excellent
35 Female	Regular Customer	36	Business travel	Business	2863	Bad	Bad	Average	Bad	Excellent	Good	Excellent	Good	Good	Good
60 Male	Irregular Customer	20	Business travel	Eco	192	Fair	Very Bad	Fair	Good	Fair	Fair	Fair	Fair	Good	Bad
59 Male	Regular Customer	44	Business travel	Business	3377	Very Bad	Very Bad	Very Bad	Fair	Average	Good	Good	Bad	Bad	Bad
75 Female	Regular Customer	49	Business travel	Eco	1182	Fair	Average	Good	Average	Good	Bad	Fair	Fair	Fair	Fair
77 Male	Regular Customer	16	Business travel	Eco	311	Average	Average	Average	Average	Excellent	Excellent	Average	Excellent	Good	Average
33 Female	Regular Customer	77	Business travel	Business	3987	Excellent	Excellent	Excellent	Excellent	Average	Excellent	Excellent	Excellent	Excellent	Excellent
86 Female	Regular Customer	43	Business travel	Business	2556	Fair	Fair	Fair	Fair	Good	Good	Excellent	Good	Good	Good
08 Male	Regular Customer	47	Business travel	Eco	556	Excellent	Fair	Fair	Fair	Excellent	Excellent	Excellent	Excellent	Fair	Fair
82 Female	Regular Customer	46	Business travel	Business	1744	Fair	Fair	Fair	Fair	Average	Good	Good	Good	Good	Good
83 Female	Regular Customer	47	Business travel	Eco	1235	Good	Bad	Bad	Bad	Excellent	Bad	Excellent	Average	Average	Good
50 Female	Regular Customer	33	Business travel	Business	325	Fair	Excellent	Excellent	Excellent	Bad	Average	Good	Fair	Fair	Fair
87 Female	Regular Customer	46	Business travel	Business	1009	Excellent	Excellent	Excellent	Excellent	Good	Excellent	Excellent	Excellent	Excellent	Excellent
41 Female	Regular Customer	60	Business travel	Business	451	Bad	Bad	Good	Bad	Excellent	Excellent	Good	Excellent	Excellent	Excellent
74 Female	Regular Customer	52	Business travel	Business	925	Fair	Fair	Fair	Fair	Excellent	Excellent	Good	Good	Good	Good
70 Male	Regular Customer	50	Personal Travel	Eco	83	Average	Good	Very Bad	Average	Fair	Very Bad	Fair	Fair	Good	Fair
15 Female	Regular Customer	31	Business travel	Eco	728	Fair	Excellent	Excellent	Excellent	Fair	Fair	Fair	Fair	Good	Average
36 Male	Regular Customer	52	Personal Travel	Eco Plus	1075	Excellent	Good	Excellent	Average	Good	Excellent	Good	Good	Average	Excellent
72 Female	Regular Customer	43	Personal Travel	Eco	1927	Average	Good	Average	Bad	Good	Good	Excellent	Excellent	Excellent	Average
87 Female	Regular Customer	50	Business travel	Business	3799	Excellent	Excellent	Excellent	Excellent	Good	Excellent	Good	Good	Good	Excellent
95 Male	Regular Customer	60	Business travel	Business	612	Good	Good	Good	Good	Fair	Good	Excellent	Excellent	Excellent	Excellent
55 Male	Regular Customer	43	Personal Travel	Eco	1437	Average	Good	Average	Good	Fair	Average	Fair	Fair	Good	Fair
81 Male	Regular Customer	55	Personal Travel	Eco	302	Bad	Fair	Good	Average	Good	Good	Good	Good	Bad	Average

# CLEANING BY POWER QUARRY



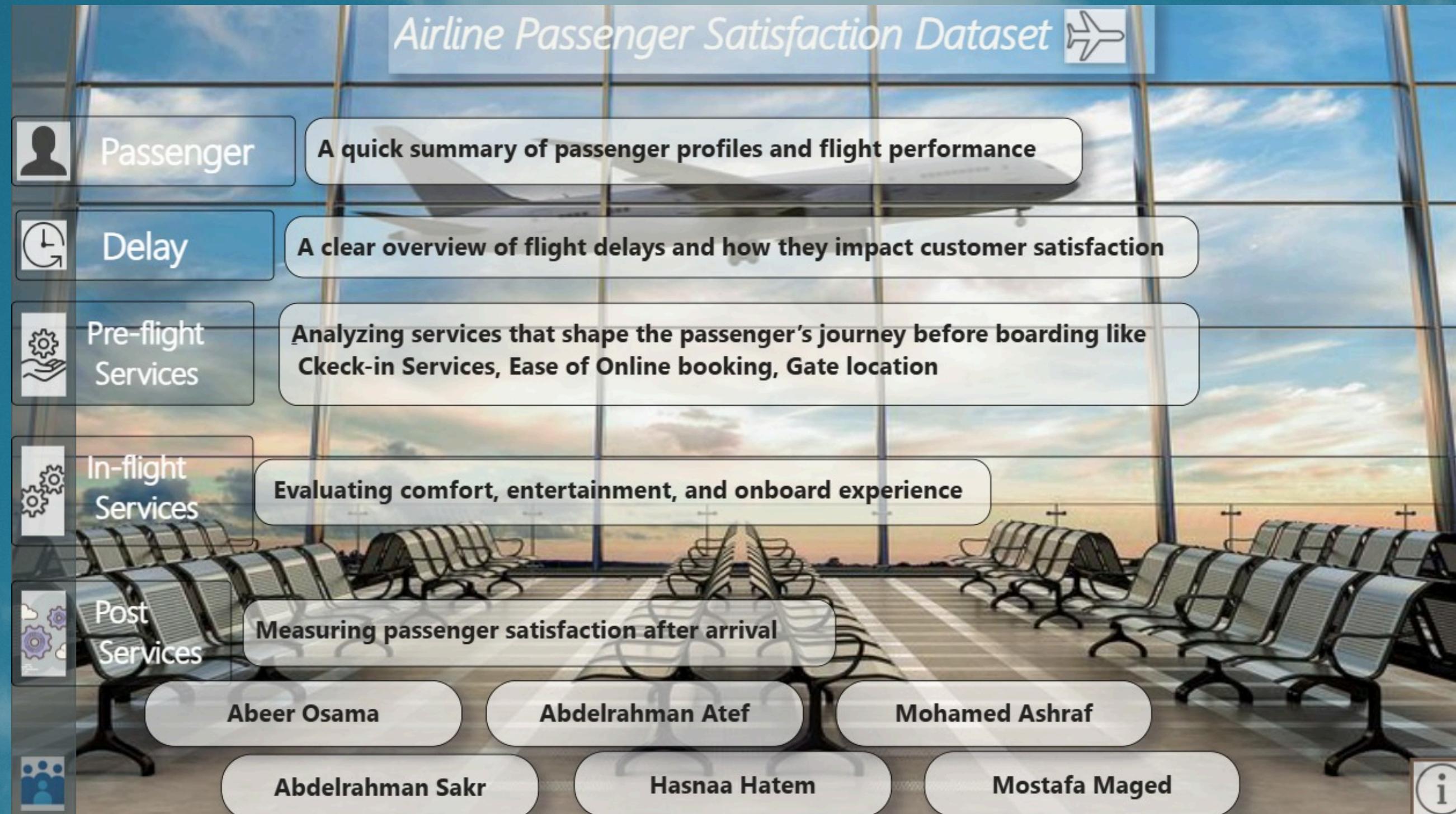
## Data Cleaning

- Handled 83 missing values using mean imputation.
- Removed the Inflight Services column because it was a general summary and detailed service ratings were already available.
- Standardized text fields:
  - Converted Loyal / Disloyal → Regular / Irregular.
  - Fixed the Satisfaction column, which originally included an inconsistent label (“Neutral or Dissatisfied”).
- Reclassified Satisfaction into Satisfied – Neutral – Dissatisfied based on the average Overall Rating = 42.

## Data Transformation

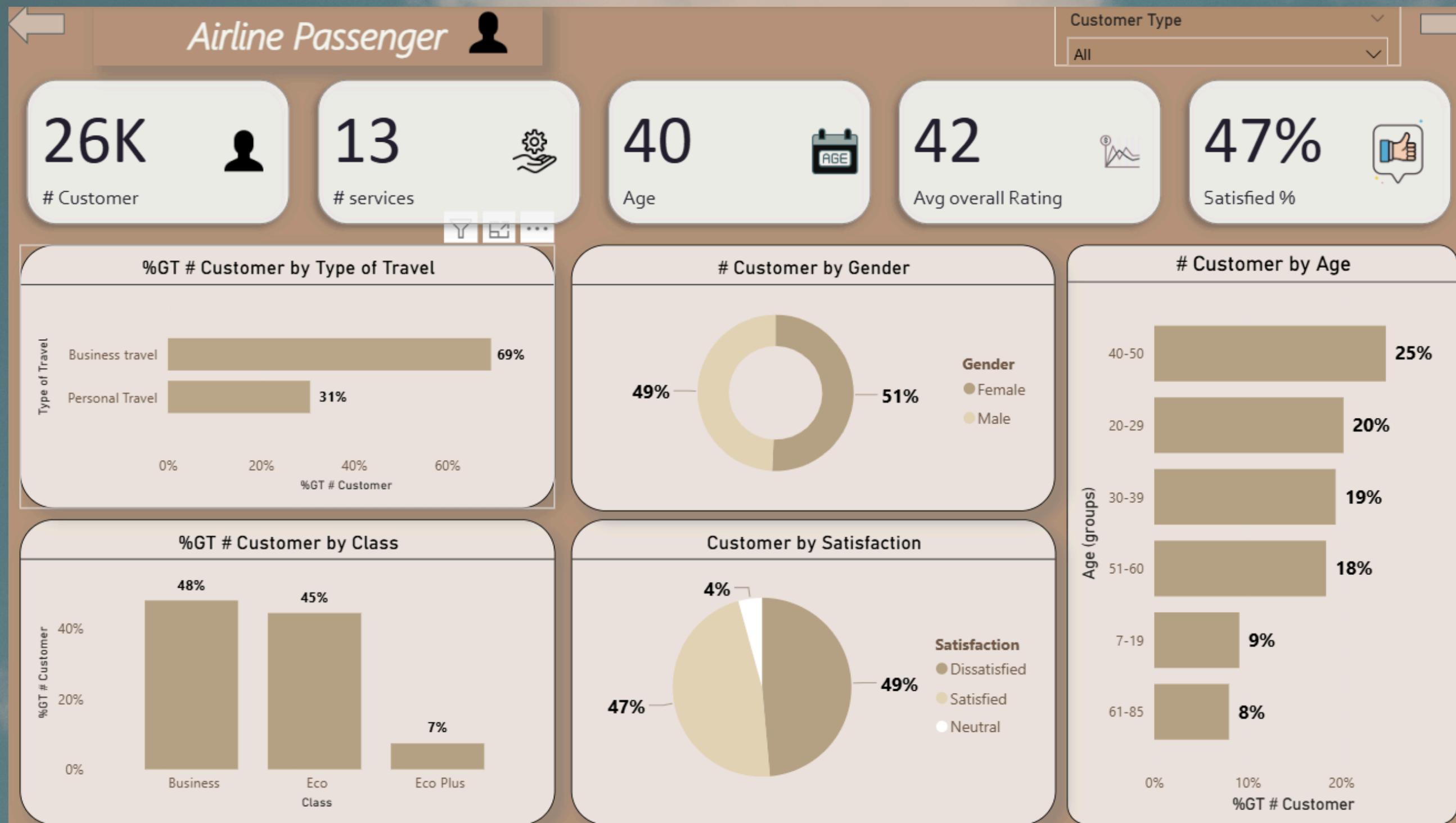
- Created an Overall Rating column based on the Sum of all service ratings.
- Created an Overall Delay column by combining Arrival Delay + Departure Delay.
- Converted service ratings from numeric (1–5) into clear descriptive labels: Excellent – Good – Average – Fair – Bad – Very Bad.





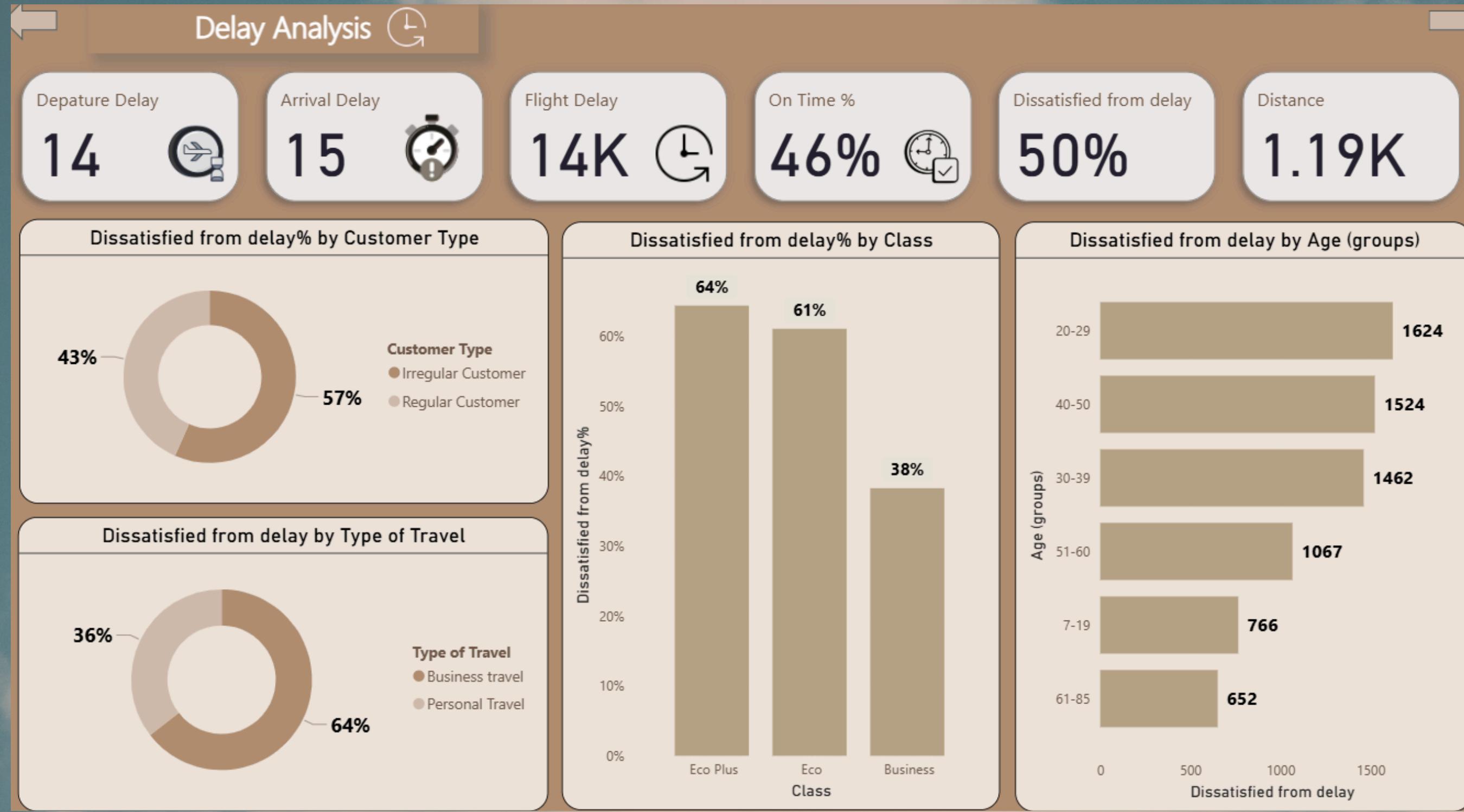
## This is the first page of the dashboard

- Providing a quick overview of the Airline Passenger Satisfaction Dataset.
- It summarizes Passenger Profiles, Flight Delays, Pre-Flight Services, and In-Flight Services, highlighting the impact of service quality and delays on overall satisfaction.
- The dashboard also includes an interactive icon to explore team details or data interactively.



This section provides a detailed analysis of airline customers, highlighting:

- Customer Type: Distribution by type of travel and class (e.g., Economy, Business).
- Demographics: Insights by age and gender.
- Satisfaction Levels: Percentage of satisfied, neutral, and dissatisfied customers.
- Average Ratings: Overall customer feedback summarized for quick understanding.
- It helps identify key customer segments and understand how different groups perceive the airline services.

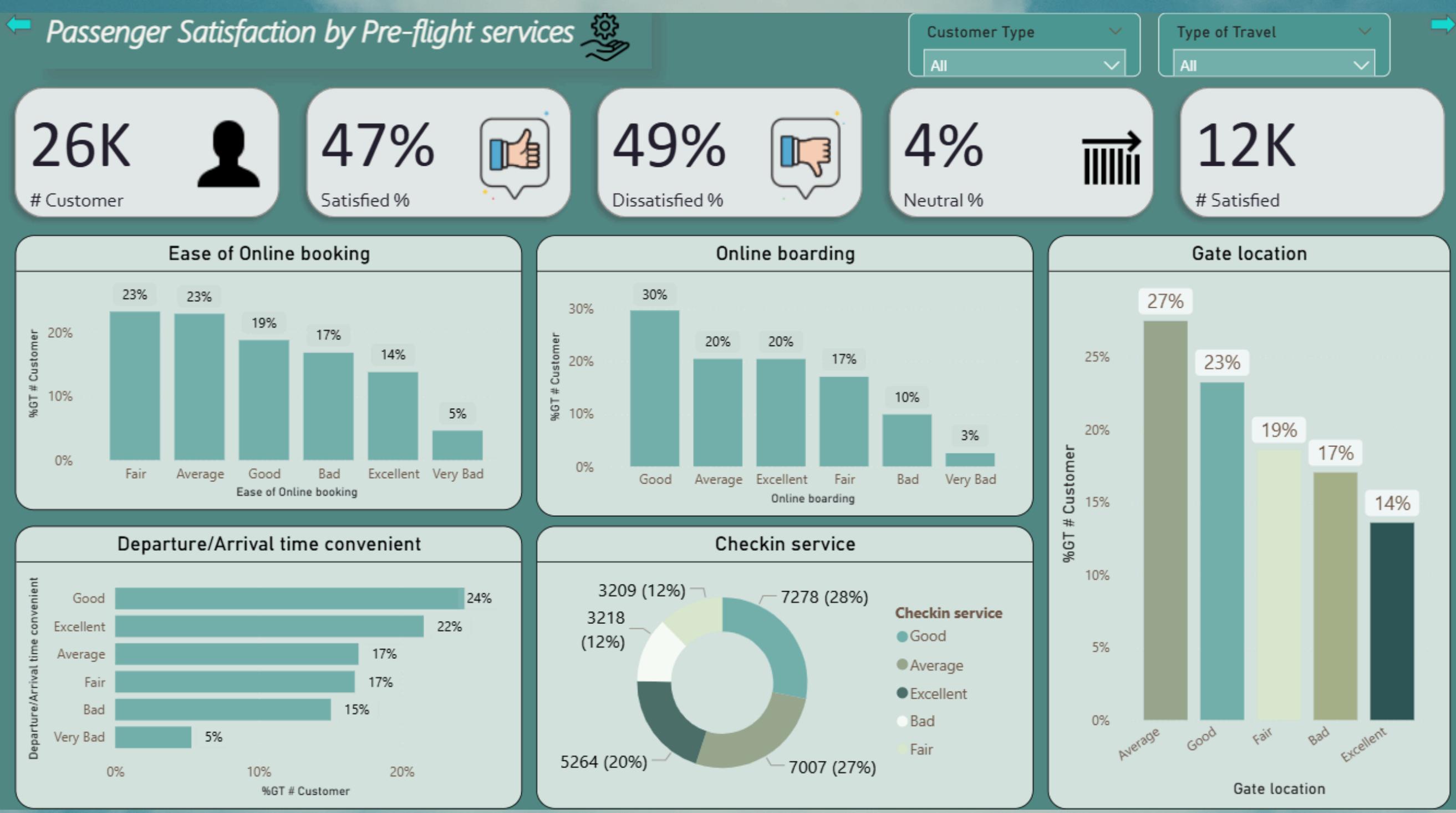


This page presents key insights about flight delays and how they affect passengers.

It highlights:

- Departure vs. Arrival Delays
- Dissatisfaction levels by Customer Type, Travel Type, Class, and Age Groups
- On-Time Performance and how delay distance influences satisfaction

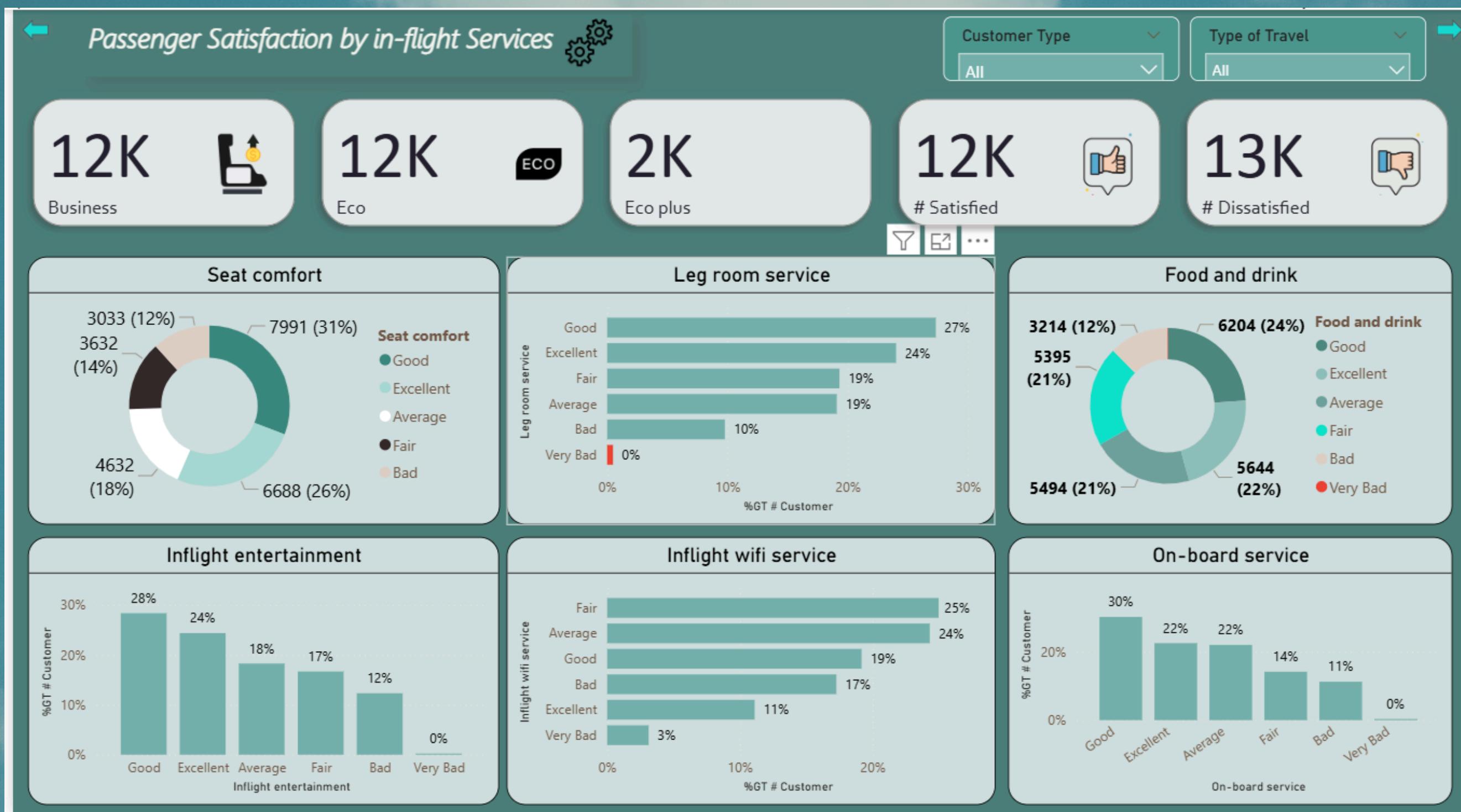
A clear view of how different passenger groups react to delays and which segments are most impacted.



This page highlights passenger satisfaction with pre-flight services, including:

- Ease of Online Booking
- Departure/Arrival Time Convenience
- Online Boarding
- Check-in Services
- Gate Location

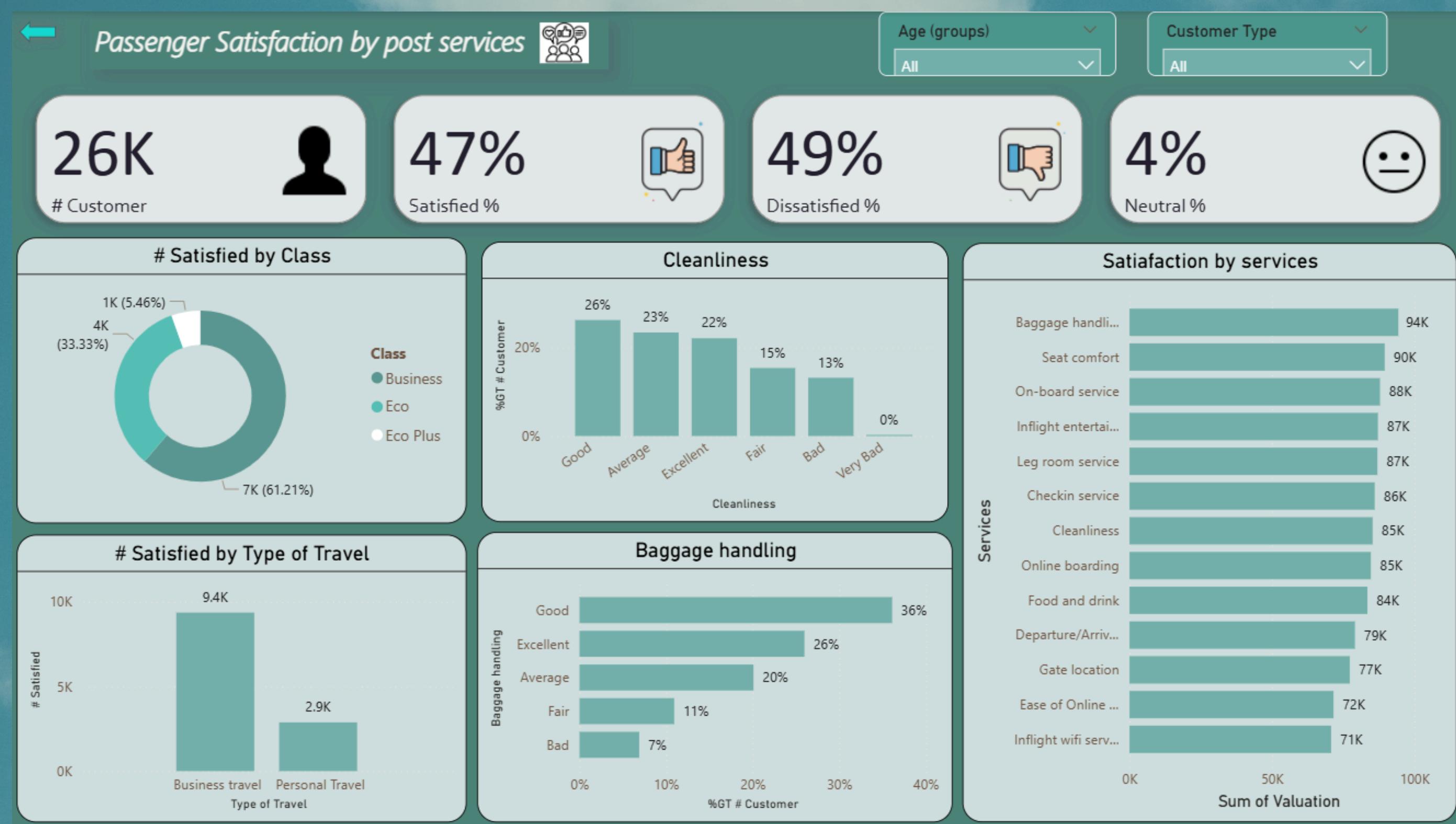
It shows satisfaction levels across different customer types and travel categories, giving a clear view of how pre-flight service quality affects the overall passenger experience.



This page presents passenger satisfaction with key in-flight services, including:

- Seat Comfort
- Leg Room
- In-Flight Entertainment
- Food & Drink
- On-Board Service

It highlights satisfaction and dissatisfaction levels across different classes and travel types, showing how the onboard experience shapes overall customer satisfaction.



This page shows passenger satisfaction with post-flight services, including:

- Baggage Handling
- Cleanliness
- Overall Post-Flight Experience

It highlights satisfaction levels across classes, age groups, and types of travel, giving a clear picture of how post-flight services impact overall passenger satisfaction.

## Recommendations

### Reduce flight delays

- ◆ Improve scheduling and operations.
- ◆ Communicate quickly and clearly with passengers during delays.

### Enhance digital services

- ◆ Upgrade online booking and Wi-Fi (weakest services).
- ◆ Make digital platforms easier to use, especially for young and irregular passengers.

### Focus on the most affected segments

- ◆ Pay special attention to Economy travelers and young passengers (20–29).
- ◆ Offer support or simple compensation during delays.

### Strengthen loyalty of regular customers

- ◆ Provide priority services and loyalty program benefits.
- ◆ Support them during disruptions to protect future loyalty

### Improve moderate-performing services

- ◆ Simplify online boarding procedures.
- ◆ Enhance coordination between check-in and gate processes.

### Maintain strong-performing services

- ◆ Continue to invest in safety and security measures.



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