This comprehensive analysis delves into the exploration of key factors influencing airline passenger satisfaction. By conducting a robust exploratory data analysis, we aim to uncover and understand the various elements that contribute to the level of satisfaction experienced by passengers during their air travel journeys.

The analysis encompasses a wide range of factors, including departure and arrival time convenience, ease of online booking, check-in service, online boarding, gate location, on-board service, seat comfort, leg room service, cleanliness, food and drink quality, in-flight service, in-flight Wi-Fi service, in-flight entertainment, baggage handling etc.

Ultimately, this analysis aims to provide a comprehensive understanding of the factors that influence passenger satisfaction, empowering airlines to make data-driven decisions and optimize the quality of their services to meet and exceed passengers expectations.

```
In [41]: #importing libraries
   import pandas as pd
   import seaborn as sns
   import matplotlib.pyplot as plt
   import numpy as np
   from pandas import set_option
```

```
In [5]: #displaying all the columns and features in the data
pd.set_option('display.max_columns', None)
df.head()
```

Out[5]:

	ID	Gender	Age	Customer Type	Type of Travel	Class	Flight Distance	Departure Delay	Arrival Delay	Departure and Arrival Time Convenience	Ease of Online Booking
0	1	Male	48	First-time	Business	Business	821	2	5.0	3	3
1	2	Female	35	Returning	Business	Business	821	26	39.0	2	2
2	3	Male	41	Returning	Business	Business	853	0	0.0	4	4
3	4	Male	50	Returning	Business	Business	1905	0	0.0	2	2
4	5	Female	49	Returning	Business	Business	3470	0	1.0	3	3

```
RangeIndex: 129880 entries, 0 to 129879
Data columns (total 24 columns):
    Column
                                            Non-Null Count
                                                            Dtype
---
    ----
                                            -----
                                            129880 non-null int64
 0
    ID
 1
                                            129880 non-null object
    Gender
 2
                                           129880 non-null int64
    Age
 3
    Customer Type
                                           129880 non-null object
    Type of Travel
                                           129880 non-null object
 5
    Class
                                           129880 non-null object
                                            129880 non-null int64
 6
    Flight Distance
 7
                                           129880 non-null int64
    Departure Delay
                                           129487 non-null float64
    Arrival Delay
 8
 9
    Departure and Arrival Time Convenience 129880 non-null int64
 10 Ease of Online Booking
                                           129880 non-null int64
 11 Check-in Service
                                           129880 non-null int64
 12 Online Boarding
                                           129880 non-null int64
                                           129880 non-null int64
13 Gate Location
 14 On-board Service
                                           129880 non-null int64
 15 Seat Comfort
                                           129880 non-null int64
 16 Leg Room Service
                                           129880 non-null int64
 17 Cleanliness
                                           129880 non-null int64
 18 Food and Drink
                                           129880 non-null int64
 19 In-flight Service
                                           129880 non-null int64
 20 In-flight Wifi Service
                                           129880 non-null int64
 21 In-flight Entertainment
                                           129880 non-null int64
 22 Baggage Handling
                                           129880 non-null int64
 23 Satisfaction
                                           129880 non-null object
dtypes: float64(1), int64(18), object(5)
memory usage: 23.8+ MB
```

In [7]: #dropping the ID column ds = df.drop('ID', axis=1)

In [8]: ▶ ds.describe()

In [6]: ► df.info()

<class 'pandas.core.frame.DataFrame'>

Out[8]:

	Age	Flight Distance	Departure Delay	Arrival Delay	Departure and Arrival Time Convenience	Ease of Online Booking	
count	129880.000000	129880.000000	129880.000000	129487.000000	129880.000000	129880.000000	1298
mean	39.427957	1190.316392	14.713713	15.091129	3.057599	2.756876	
std	15.119360	997.452477	38.071126	38.465650	1.526741	1.401740	
min	7.000000	31.000000	0.000000	0.000000	0.000000	0.000000	
25%	27.000000	414.000000	0.000000	0.000000	2.000000	2.000000	
50%	40.000000	844.000000	0.000000	0.000000	3.000000	3.000000	
75%	51.000000	1744.000000	12.000000	13.000000	4.000000	4.000000	
max	85.000000	4983.000000	1592.000000	1584.000000	5.000000	5.000000	

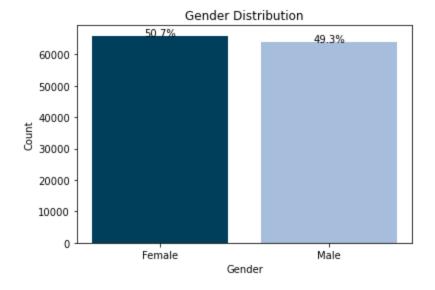
◀ |

```
In []: N

'''

from the above descriptive statistics we can see that the average age of the passenge The average depature delay time is about 38 minutes whilst the maximux is about 26 ho The average arrival delay time is 15 minutes whilst the maximum is about 26 hours and The average miles traveled 1,190 whilst the maximum was 4,983.
```

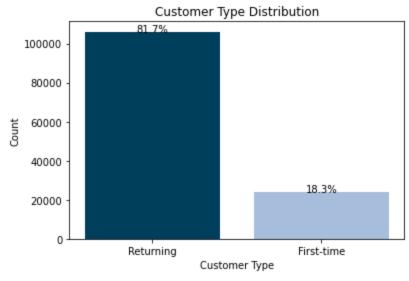
```
In [9]:
         # Count the occurrences of each gender category
            gender_counts = ds['Gender'].value_counts()
            # Set the color palette for the bar chart
            colors = ['#003f5c', '#a6bddb'] # Deep blue and light blue colors
            # Create the bar chart
            plt.bar(gender_counts.index, gender_counts.values, color=colors)
            # Calculate the percentage values
            total = gender_counts.sum()
            percentages = (gender_counts / total) * 100
            # Annotate each bar with its percentage value
            for i, count in enumerate(gender_counts.values):
                plt.text(i, count + 0.5, f'{percentages.values[i]:.1f}%', ha='center')
            # Set the chart title and labels
            plt.title('Gender Distribution')
            plt.xlabel('Gender')
            plt.ylabel('Count')
            # Display the chart
            plt.show()
```



```
In [ ]: ▶
             We can safely say that we have close to equal dsitribution in terms of gender of the

    | counts = df['Customer Type'].value_counts()

In [10]:
In [11]:
          counts
   Out[11]: Returning
                           106100
             First-time
                            23780
             Name: Customer Type, dtype: int64
          # Count the occurrences of each customer category
In [12]:
             customer_counts = ds['Customer Type'].value_counts()
             # Set the color palette for the bar chart
             colors = ['#003f5c', '#a6bddb'] # Deep blue and light blue colors
             # Create the bar chart
             plt.bar(customer_counts.index, customer_counts.values, color=colors)
             # Calculate the percentage values
             total = customer_counts.sum()
             percentages = (customer_counts / total) * 100
             # Annotate each bar with its percentage value
             for i, count in enumerate(customer_counts.values):
                 plt.text(i, count + 0.5, f'{percentages.values[i]:.1f}%', ha='center')
             # Set the chart title and labels
             plt.title('Customer Type Distribution')
             plt.xlabel('Customer Type')
             plt.ylabel('Count')
             # Display the chart
             plt.show()
```



Most of the passengers are returning passengers with approximately 82% this is why it's highly paramount to understand thier satisfaction levels.

```
In [13]:
         #renaming the Type of travel column to "Travel Type"
            ds.columns = ds.columns.str.strip().str.replace('Type of Travel', 'Travle Type')
<class 'pandas.core.frame.DataFrame'>
            RangeIndex: 129880 entries, 0 to 129879
            Data columns (total 23 columns):
                 Column
                                                       Non-Null Count
                                                                       Dtype
                 -----
                                                       -----
             0
                 Gender
                                                       129880 non-null object
             1
                                                       129880 non-null int64
                 Age
             2
                 Customer Type
                                                       129880 non-null object
                 Travle Type
                                                       129880 non-null object
             4
                                                       129880 non-null object
                 Class
             5
                Flight Distance
                                                       129880 non-null int64
                                                       129880 non-null int64
                 Departure Delay
                 Arrival Delay
             7
                                                       129487 non-null float64
                 Departure and Arrival Time Convenience 129880 non-null int64
             9
                 Ease of Online Booking
                                                       129880 non-null int64
             10 Check-in Service
                                                       129880 non-null int64
             11 Online Boarding
                                                       129880 non-null int64
             12 Gate Location
                                                       129880 non-null int64
                                                       129880 non-null int64
             13 On-board Service
             14 Seat Comfort
                                                       129880 non-null int64
             15 Leg Room Service
                                                       129880 non-null int64
             16 Cleanliness
                                                       129880 non-null int64
             17 Food and Drink
                                                       129880 non-null int64
             18 In-flight Service
                                                       129880 non-null int64
             19 In-flight Wifi Service
                                                       129880 non-null int64
             20 In-flight Entertainment
                                                       129880 non-null int64
             21 Baggage Handling
                                                       129880 non-null int64
             22 Satisfaction
                                                       129880 non-null object
            dtypes: float64(1), int64(17), object(5)
            memory usage: 22.8+ MB
        h travle = ds['Travle Type'].value_counts()
In [15]:
```

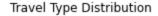
travle

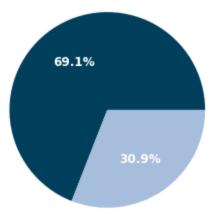
Personal

89693

40187 Name: Travle Type, dtype: int64

Out[15]: Business





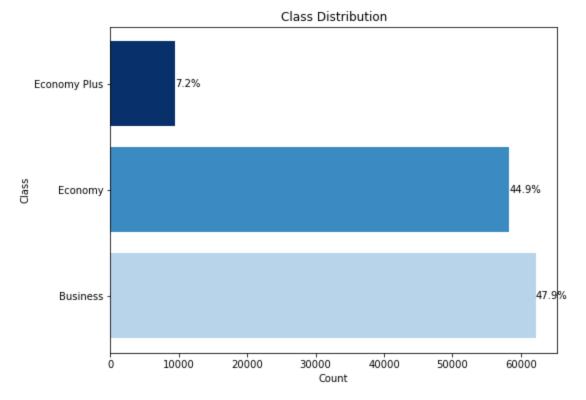
we can clearly see that we have a high percentage of the passengers traveling for business related purpose with about 69%

```
In [17]:  \mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb{\mathbb
```

Out[17]: Business 62160
Economy 58309
Economy Plus 9411
Name: Class, dtype: int64

```
# Count the occurrences of each class
   class_counts = ds['Class'].value_counts()
  # Calculate the percentage values
  total = class_counts.sum()
  percentages = (class_counts / total) * 100
  # Set the colormap for the bars (light blue to dark blue)
  cmap = plt.cm.get_cmap('Blues')
   colors = cmap(np.linspace(0.3, 1.0, len(class_counts)))
  # Set the size of the bar chart
  plt.figure(figsize=(8, 6))
  # Create the horizontal bar chart with colored bars
  plt.barh(class_counts.index, class_counts.values, color=colors)
  # Annotate each bar with its percentage value
  for i, count in enumerate(class_counts.values):
       plt.text(count + 1, i, f'{percentages.values[i]:.1f}%', va='center')
  # Set the chart title and labels
  plt.title('Class Distribution')
  plt.xlabel('Count')
  plt.ylabel('Class')
  # Display the chart
  plt.show()
```

In [18]:



Upon analyzing the class distribution of the passengers, we observe that a significant proportion, approximately 48%, opt for the Business class. This finding provides valuable insights into the passenger demographics and suggests that a considerable number of passengers fall into the high net worth category. The preference for Business class aligns with the assumption that a notable portion of the passengers are likely traveling for business-related purposes. The higher level of comfort, amenities, and services offered in Business class may be attracting professionals, executives, and individuals with a higher financial capacity

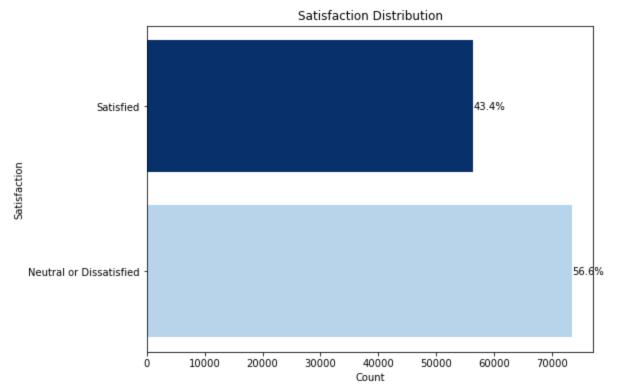
who prioritize convenience and luxury during their travels. Understanding the distribution of passenger classes sheds light on the diverse travel preferences and socio-economic profiles of the individuals on

In [19]: N satisfaction = ds['Satisfaction'].value_counts()
satisfaction

Out[19]: Neutral or Dissatisfied 73452 Satisfied 56428

Name: Satisfaction, dtype: int64

```
In [20]: ▶ # Count the occurrences of each class
             sat_level = ds['Satisfaction'].value_counts()
             # Calculate the percentage values
             total = sat_level.sum()
             percentages = (sat_level / total) * 100
             # Set the colormap for the bars (light blue to dark blue)
             cmap = plt.cm.get_cmap('Blues')
             colors = cmap(np.linspace(0.3, 1.0, len(sat_level)))
             # Set the size of the bar chart
             plt.figure(figsize=(8, 6))
             # Create the horizontal bar chart with colored bars
             plt.barh(sat_level.index, sat_level.values, color=colors)
             # Annotate each bar with its percentage value
             for i, count in enumerate(sat_level.values):
                 plt.text(count + 1, i, f'{percentages.values[i]:.1f}%', va='center')
             # Set the chart title and labels
             plt.title('Satisfaction Distribution')
             plt.xlabel('Count')
             plt.ylabel('Satisfaction')
             # Display the chart
             plt.show()
```

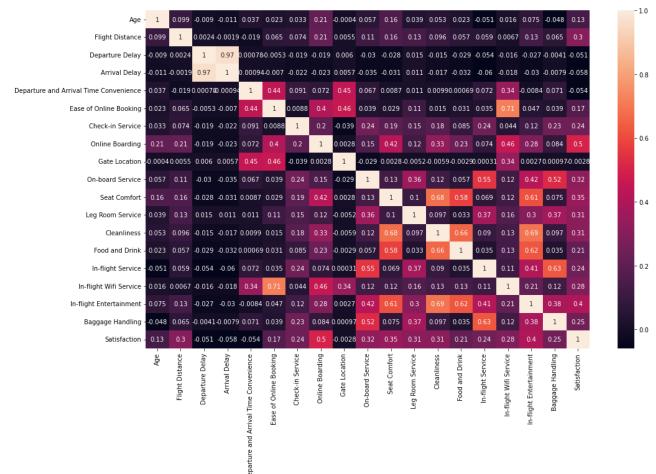


Analyzing the satisfaction distribution among passengers, we observe a significant proportion of approximately 57% expressing dissatisfaction with the services offered while traveling or some sort of indifference. This finding highlights a substantial segment of passengers who did not meet their expectations or encountered issues during their journey. To provide a comprehensive understanding of this dissatisfaction, a deeper analysis is required to identify the factors contributing to this sentiment. By carrying out a bivariate analysis delving into specific aspects such as check in services, in-flight service, in-flight entertainment, check-in-service, baggage handling, food and drink, or overall travel experience, we can gain insights into the specific pain points and areas for improvement. Understanding the drivers of dissatisfaction will be crucial in addressing these issues and enhancing the overall satisfaction of passengers. By addressing these concerns, we can understand what makes a passenger have an enjoyable and satisfactory travel experience which can ultimately fostering customer loyalty.

In [21]: #converting the target column which is satisfied to do some corellation analysis ds1= ds['Satisfaction'] = ds['Satisfaction'].replace({'Satisfied': 1, 'Neutral or Distriction'}].

Out[22]:

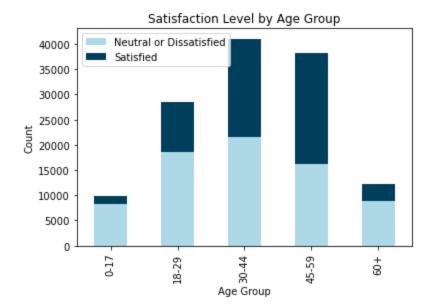
	Gender	Age	Customer Type	Travle Type	Class	Flight Distance	Departure Delay	Arrival Delay	Departure and Arrival Time Convenience	Ease of Online Booking	Ch Ser
0	Male	48	First-time	Business	Business	821	2	5.0	3	3	
1	Female	35	Returning	Business	Business	821	26	39.0	2	2	
2	Male	41	Returning	Business	Business	853	0	0.0	4	4	
3	Male	50	Returning	Business	Business	1905	0	0.0	2	2	
4	Female	49	Returning	Business	Business	3470	0	1.0	3	3	



This heatmap reveals strong correlations among several features in the dataset, indicating significant relationships between them. These correlations provide valuable insights into the underlying patterns and connections within the data. By identifying these relationships, we can gain a deeper understanding of how different variables interact and potentially influence one another. This initial analysis highlights the need for further exploration and investigation into these correlated features. By delving deeper into these relationships, we can uncover hidden dependencies, discover causal connections, and extract meaningful insights that can aid in decision-making and problem-solving. Exploring and understanding these correlations will pave the way for more comprehensive analysis and enable us to make more informed interpretations of the data

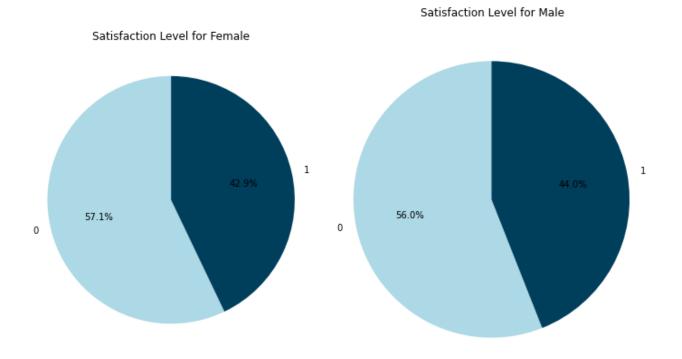
```
In [24]: ▶
            #Define the age bins
             age_bins = [0, 18, 30, 45, 60, 100] # Define the age ranges for each bin
             # Define the labels for the age bins
             age_labels = ['0-17', '18-29', '30-44', '45-59', '60+'] # Labels for each age bin
             # Create a new column with the age group
             ds['Age Group'] = pd.cut(ds['Age'], bins=age_bins, labels=age_labels, right=False)
             # Group the data by age group and satisfaction and count the occurrences
             age_satisfaction_counts = ds.groupby(['Age Group', 'Satisfaction']).size().unstack()
             # Set the colors for the chart
             colors = ['#ADD8E6', '#003f5c'] # Light blue, blue colors
             # Set the size of the chart
             plt.figure(figsize=(15, 10)) # Increased size: 10 inches wide, 6 inches high
             # Create the column chart
             age_satisfaction_counts.plot(kind='bar', stacked=True, color=colors)
             # Set the chart title and labels
             plt.title('Satisfaction Level by Age Group')
             plt.xlabel('Age Group')
             plt.ylabel('Count')
             # Show the Legend
             plt.legend(['Neutral or Dissatisfied', 'Satisfied'])
             # Display the chart
             plt.show()
```

<Figure size 1080x720 with 0 Axes>



'From the above chart, we can observe a notable trend in passenger satisfaction based on age groups. Among the different age segments, passengers aged 30-44 appear to have the highest number of dissatisfied individuals. This finding suggests that a significant proportion of passengers within this age range experienced dissatisfaction with the services provided. It would be beneficial to further investigate the factors contributing to this higher dissatisfaction rate among passengers in the 30-44 age group, as addressing these concerns could help improve overall customer satisfaction and enhance the travel experience for this particular demographic.'

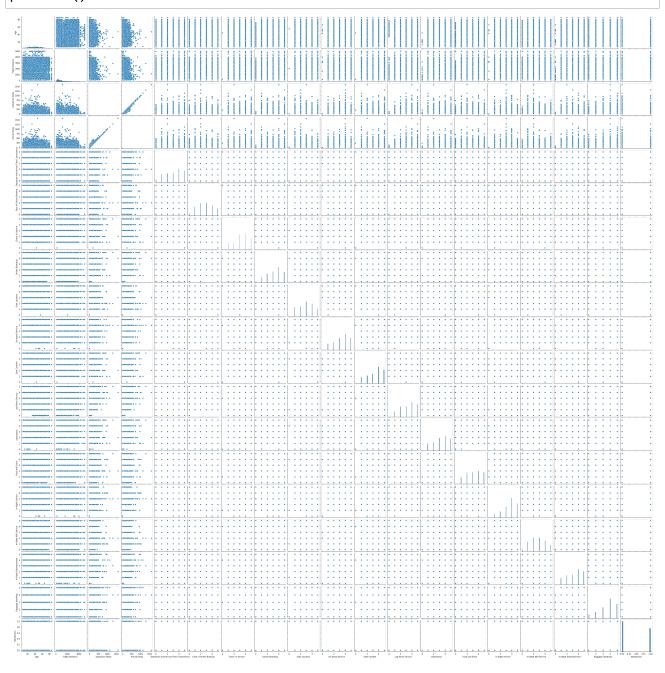
```
In [41]: ▶ # Group the data by gender and satisfaction and count the occurrences
             gender_satisfaction_counts = ds.groupby(['Gender', 'Satisfaction']).size().unstack()
             # Calculate the total counts for each gender
             gender_totals = gender_satisfaction_counts.sum(axis=1)
             # Calculate the percentages of satisfaction within each gender
             gender_satisfaction_percentages = gender_satisfaction_counts.divide(gender_totals, a)
             # Set the colors for the chart
             colors = ['#ADD8E6', '#003f5c'] # Light blue, blue colors
             # Set the size of the chart
             plt.figure(figsize=(10, 6))
             # Create a pie chart for each gender
             for i, gender in enumerate(gender_satisfaction_counts.index):
                 plt.subplot(1, 2, i+1)
                 plt.pie(gender_satisfaction_counts.loc[gender], labels=gender_satisfaction_counts
                 plt.title(f'Satisfaction Level for {gender}')
             # Set the aspect ratio to be equal for all pie charts
             plt.axis('equal')
             # Adjust the spacing between the subplots
             plt.tight_layout()
             # Display the chart
             plt.show()
```



The male tend to be slightly more satisfied than the female with the services received but we can not say for a fact based on the chart that gender has a crucial role to play in the satisfaction rating of the services

In [36]: N sns.pairplot(data=ds)

Display the plot
plt.show()



```
# Create the contingency table
contingency_table = pd.crosstab(ds['Class'], df['Satisfaction'])

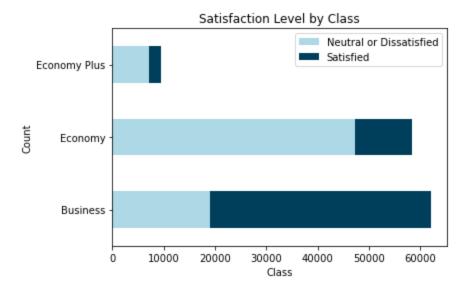
# Set the colors for the chart
colors = ['#ADD8E6', '#003f5c'] # Light blue, blue colors

# Plot the bivariate analysis
contingency_table.plot(kind='barh', stacked=True, color=colors)

# Set the chart title and labels
plt.title('Satisfaction Level by Class')
plt.xlabel('Class')
plt.ylabel('Count')

# Show the Legend
plt.legend(['Neutral or Dissatisfied', 'Satisfied'])

# Display the chart
plt.show()
```



In [26]:

The clustered column chart provides valuable insights into the satisfaction levels among different travel classes. The analysis reveals that business class passengers tend to have the highest satisfaction level, while economy class and economy plus passengers exhibit higher levels of dissatisfaction.

This finding indicates that the services and amenities provided in the business class are meeting or even exceeding the expectations of the passengers, resulting in a higher satisfaction level. On the other hand, the dissatisfaction observed among economy class and economy plus passengers suggests that there might be certain areas where improvements can be made to enhance their overall experience.

```
# Create the contingency table
contingency_table = pd.crosstab(ds['Customer Type'], ds['Satisfaction'])

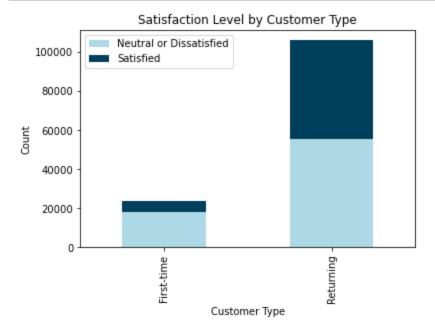
# Set the colors for the chart
colors = ['#ADD8E6', '#003f5c'] # Light blue, blue colors

# Plot the bivariate analysis
contingency_table.plot(kind='bar', stacked=True, color=colors)

# Set the chart title and labels
plt.title('Satisfaction Level by Customer Type')
plt.xlabel('Customer Type')
plt.ylabel('Count')

# Show the Legend
plt.legend(['Neutral or Dissatisfied', 'Satisfied'])

# Display the chart
plt.show()
```



In [27]:

From the chart, it is evident that there are notable patterns in the satisfaction levels among different types of travelers. Specifically, the analysis reveals that both first-time travelers and returning travelers tend to exhibit lower levels of satisfaction with the services.

This finding implies that there may be certain challenges or discrepancies in meeting the expectations of these two traveler groups. For first-time travelers, their lower satisfaction levels might be attributed to unfamiliarity with the travel experience, lack of prior knowledge or expectations, or potential difficulties in navigating through various aspects of the journey. On the other hand, the presence of dissatisfied returning travelers suggests that there might be recurring issues or persistent factors impacting their satisfaction despite their previous travel experience.

```
# Create the contingency table
contingency_table = pd.crosstab(ds['Travle Type'], df['Satisfaction'])

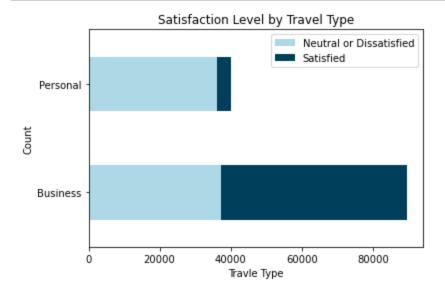
# Set the colors for the chart
colors = ['#ADD8E6', '#003f5c'] # Light blue, blue colors

# Plot the bivariate analysis
contingency_table.plot(kind='barh', stacked=True, color=colors)

# Set the chart title and labels
plt.title('Satisfaction Level by Travel Type')
plt.xlabel('Travle Type')
plt.ylabel('Count')

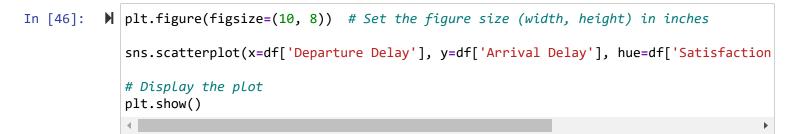
# Show the Legend
plt.legend(['Neutral or Dissatisfied', 'Satisfied'])

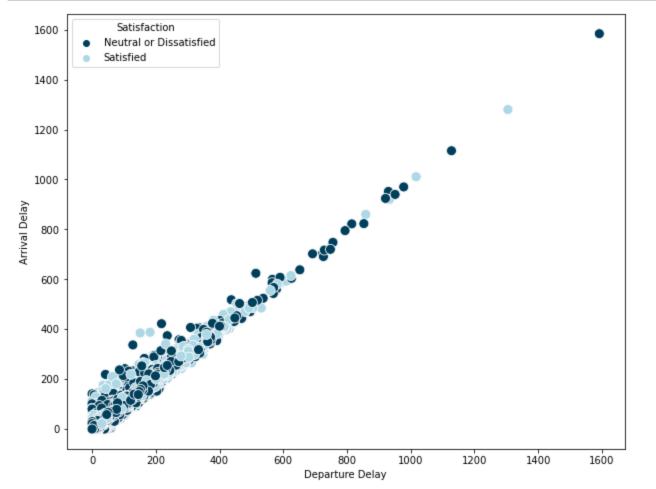
# Display the chart
plt.show()
```



In [28]:

Based on the visual, it is evident that there is a clear distinction between personal travelers and business travelers in terms of satisfaction with the services. The data indicates that personal travelers generally tend to be less satisfied compared to business travelers. This finding suggests that there might be specific factors or aspects of the services that are more aligned with the needs and expectations of business travelers, leading to a higher satisfaction level among this group.



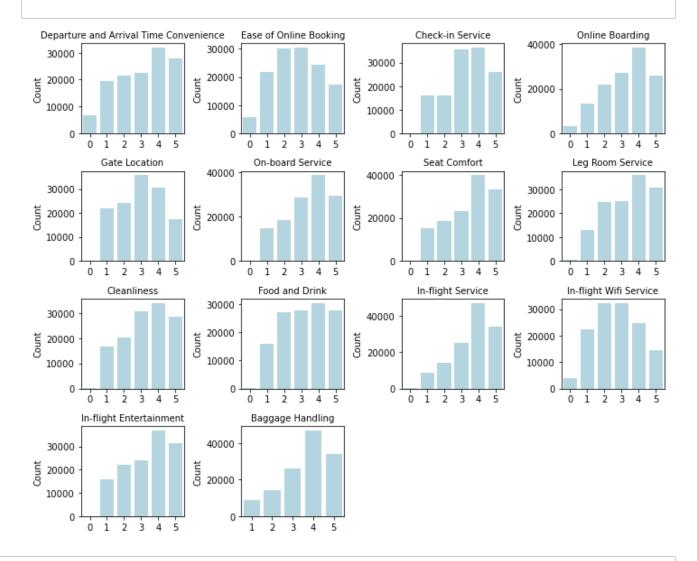


The scatter plot analysis reveals a strong positive correlation between departure delay and arrival delay, indicating that as the departure delay increases, the corresponding arrival delay also tends to increase. This finding suggests that delays in the departure process have a direct impact on the timeliness of arrivals.

Furthermore, the scatter plot also demonstrates an interesting relationship between the delay variables and passenger satisfaction. It shows that as both departure delay and arrival delay increase, there is a noticeable decrease in the satisfaction level of the passengers. This implies that prolonged delays in the travel process have a negative effect on the overall satisfaction of passengers.

```
# Set the light blue color
  color = '#ADD8E6'
  # Set the size of the chart
  plt.figure(figsize=(10, 8))
  # List of features
  features = ['Departure and Arrival Time Convenience', 'Ease of Online Booking', 'Che
               'Gate Location', 'On-board Service', 'Seat Comfort', 'Leg Room Service',
               'In-flight Service', 'In-flight Wifi Service', 'In-flight Entertainment'
  # Iterate over each feature and plot
  for i, feature in enumerate(features):
      plt.subplot(4, 4, i+1)
       sns.countplot(x=feature, data=df, color=color)
      plt.xlabel('')
      plt.ylabel('Count')
      plt.title(feature, fontsize=10)
  # Adjust the spacing between subplots
  plt.tight_layout()
  # Show the chart
  plt.show()
```

In [49]:



Through a meticulous analysis of passenger ratings, we gained valuable insights into the level of satisfaction with various services offered by airlines. The ratings shed light on the aspects that left passengers dissatisfied and highlight areas that require attention and improvement.

It is evident from the ratings that services such as in-flight Wi-Fi and ease of online booking received lower satisfaction scores. This indicates that passengers faced challenges or encountered issues while accessing Wi-Fi during their flights and found the online booking process less convenient than expected. Addressing these concerns and enhancing the reliability and accessibility of in-flight Wi-Fi as well as streamlining the online booking system could significantly improve the overall passenger experience.

Furthermore, the ratings also indicate some dissatisfaction with aspects such as food and drink quality, gate location, and cleanliness. These factors play a crucial role in shaping passengers' perceptions and overall satisfaction with their travel experience. Enhancing the quality and variety of food and beverages offered, ensuring convenient gate locations for smoother boarding experiences, and maintaining a high level of cleanliness throughout the aircraft can greatly contribute to creating a more satisfying journey for passengers.

Findings:

Age Group: Passengers aged 30-44 have the highest number of dissatisfied individuals, suggesting a need to address their specific concerns to improve overall satisfaction within this age range.

Gender: The chart does not provide conclusive evidence regarding the role of gender in satisfaction ratings, as both male and female passengers exhibit varying levels of satisfaction without a clear pattern.

Travel Class: Business class passengers tend to have the highest satisfaction levels, while economy class and economy plus passengers show higher levels of dissatisfaction, highlighting the need for improvements in these classes.

Traveler Type: Both first-time travelers and returning travelers tend to exhibit lower satisfaction levels, indicating the existence of challenges and recurring issues that impact their overall satisfaction.

Departure and Arrival Delays: There is a strong positive correlation between departure delay and arrival delay. Prolonged delays have a negative impact on passenger satisfaction, emphasizing the importance of timely and efficient travel operations.

Service Ratings: Passengers expressed dissatisfaction with in-flight Wi-Fi, ease of online booking, food and drink quality, gate location, and cleanliness. Addressing these areas can significantly enhance passenger satisfaction.

Conclusion:

Based on the findings, it is evident that various factors contribute to passenger satisfaction. Airlines should focus on addressing specific areas such as in-flight Wi-Fi availability and reliability, streamlining the online booking process, improving food and beverage quality, optimizing gate locations, and maintaining high standards of cleanliness throughout the aircraft.

Additionally, catering to the unique needs and expectations of different age groups, such as the 30-44 age range, can further enhance overall satisfaction levels. Airlines should strive to improve the travel experience for first-time travelers and address any recurring issues faced by returning travelers.

Efforts should be made to minimize departure and arrival delays, as they have a direct impact on passenger satisfaction. Timeliness and efficiency in operations are essential for ensuring a positive travel experience.

Overall, by addressing the identified areas of improvement and tailoring services to meet passenger expectations, airlines can enhance passenger satisfaction, foster loyalty, and establish a reputation for delivering a rewarding and enjoyable travel experience.

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