A Comprehensive Data Analysis Using Power BI

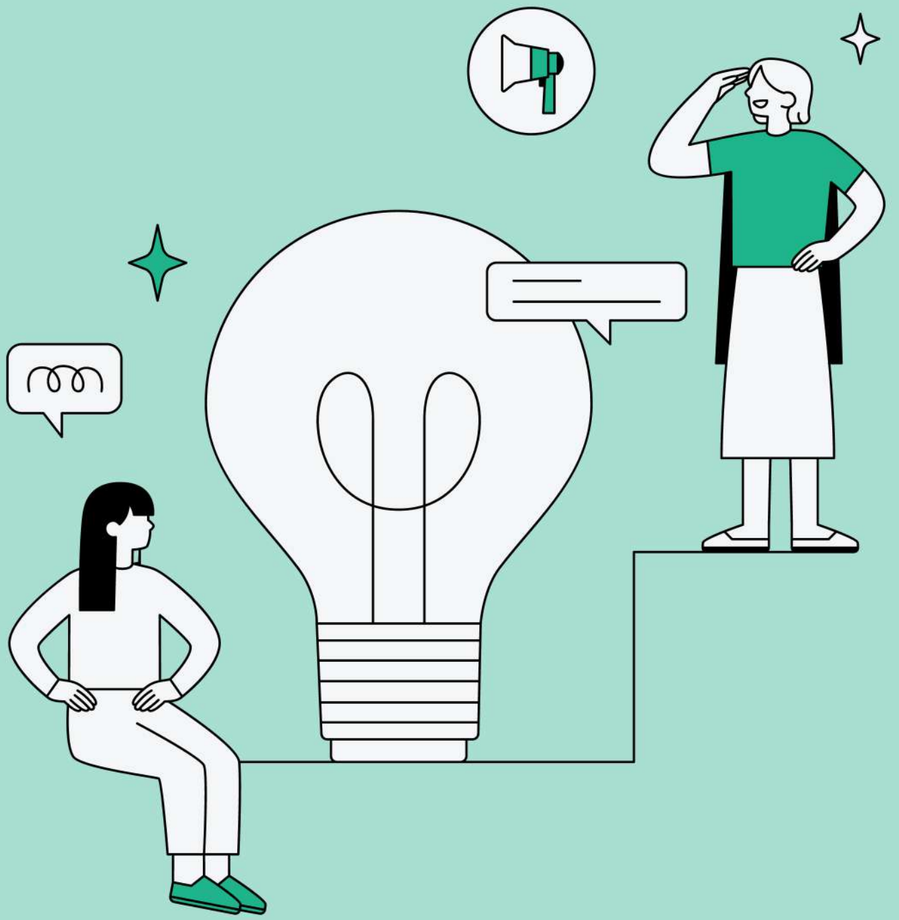
AIRLINE AUTHORITY ANALYSIS

To uncover patterns in flight delays and cancellations, enabling airlines to enhance operational efficiency and improve on-time performance across the week.

SUMIT RATHEE

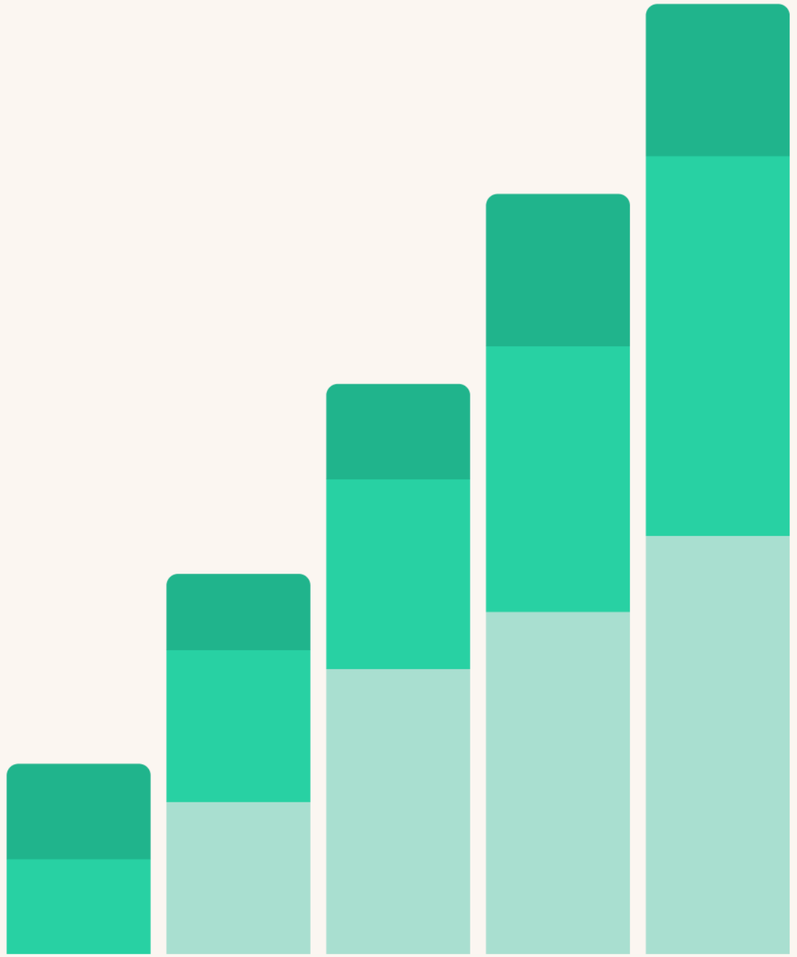
Data Introduction

This dataset captures key aspects of airline operations, including flight schedules, delays, cancellations, and on-time performance. It provides detailed insights into how various airlines perform across different days and times, offering a foundation for strategic analysis to enhance efficiency and customer satisfaction.



Methodology :

Data was cleaned and preprocessed to remove inconsistencies. Key metrics like delays, cancellations, and on-time performance were analyzed using Power BI's visualization tools. Trends were identified by comparing airline performance across different days and times, enabling actionable insights for operational improvements.



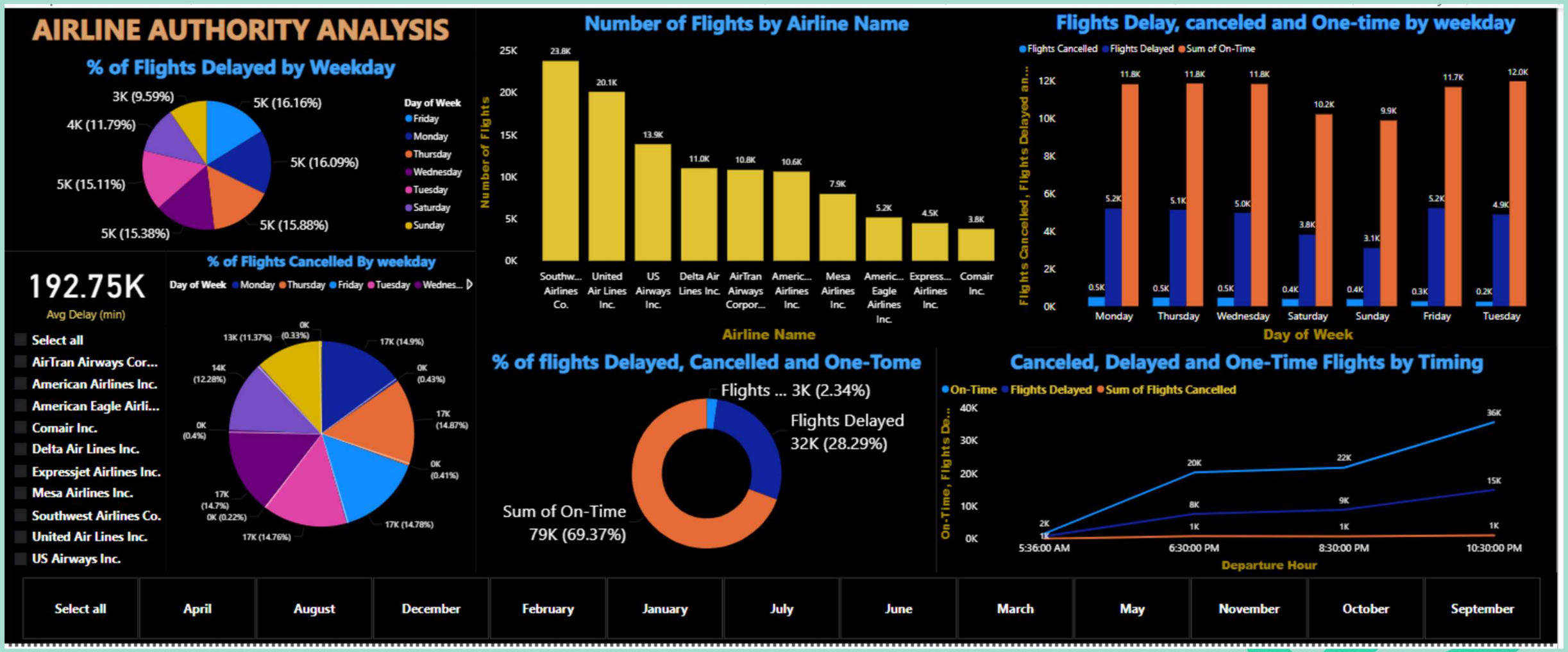
Analysis :

The analysis focused on key metrics such as flight delays, cancellations, and on-time performance across various airlines and days of the week. Patterns emerged, showing that weekends had higher delay rates, while weekdays generally saw more on-time flights. Notably, specific airlines consistently outperformed others in maintaining schedules, highlighting areas for potential operational improvements. Additionally, late evening flights were more prone to delays, indicating a need for better time management and resource allocation during these hours.

Visualization :

To represent the findings, I created a series of impactful visualizations including bar charts to compare the number of flights by airline, pie charts showing the percentage of delayed and canceled flights by day of the week, and line graphs tracking delays over time. A comprehensive dashboard was designed to provide an at-a-glance view of airline performance metrics, making it easy to identify trends and areas for improvement.

Dashboard :


AIRLINE AUTHORITY ANALYSIS
% of Flights Delayed by Weekday
3K (9.59%)
5K (16.16%)
4K (11.79%)
5K (16.09%)
5K (15.11%)
5K (15.88%)
5K (15.38%)
Day of Week
Friday
Monday
Thursday
Wednesday
Tuesday
Saturday
Sunday
Number of Flights by Airline Name
Number of Flights
25K
20K
15K
10K
5K
0K
23.8K
20.1K
13.9K
11.0K
10.8K
10.6K
7.9K
5.2K
4.5K
3.8K
Southw... Airlines Co.
United Air Lines Inc.
US Airways Inc.
Delta Air Lines Inc.
AirTran Airways Corpor...
Americ... Airlines Inc.
Mesa Airlines Inc.
Americ... Eagle Airlines Inc.
Express... Airlines Inc.
Comair Inc.
Airline Name
Flights Delay, canceled and One-time by weekday
Flights Cancelled
Flights Delayed
Sum of On-Time
Flights Cancelled, Flights Delayed an...
12K
10K
8K
6K
4K
2K
0K
11.8K
5.2K
0.5K
11.8K
5.1K
0.5K
11.8K
5.0K
0.5K
10.2K
3.8K
0.4K
9.9K
3.1K
0.4K
11.7K
5.2K
0.3K
12.0K
4.9K
0.2K
Monday
Thursday
Wednesday
Saturday
Sunday
Friday
Tuesday
Day of Week
192.75K
Avg Delay (min)
% of Flights Cancelled By weekday
Day of Week
Monday
Thursday
Friday
Tuesday
Wednes...
0K (0.33%)
17K (14.9%)
13K (11.37%)
14K (12.28%)
0K (0.43%)
17K (14.87%)
0K (0.4%)
0K (0.41%)
17K (14.7%)
0K (0.22%)
17K (14.78%)
17K (14.76%)
Select all
AirTran Airways Cor...
American Airlines Inc.
American Eagle Airli...
Comair Inc.
Delta Air Lines Inc.
Expressjet Airlines Inc.
Mesa Airlines Inc.
Southwest Airlines Co.
United Air Lines Inc.
US Airways Inc.
% of flights Delayed, Cancelled and One-Tome
Flights ... 3K (2.34%)
Flights Delayed
32K (28.29%)
Sum of On-Time
79K (69.37%)
Canceled, Delayed and One-Time Flights by Timing
On-Time
Flights Delayed
Sum of Flights Cancelled
On-Time, Flights De...
40K
30K
20K
10K
0K
2K
1K
20K
8K
1K
22K
9K
1K
36K
15K
1K
5:36:00 AM
6:30:00 PM
8:30:00 PM
10:30:00 PM
Departure Hour
Select all
April
August
December
February
January
July
June
March
May
November
October
September

Weekday Delays:

Friday and Thursday experience the highest percentage of flight delays, indicating potential operational bottlenecks.

Flight Cancellations:

Cancellation rates are relatively low across all days, with minimal disruption to overall flight schedules.

Airline Performance:

Southwest Airlines leads in total flights, but also shows significant delays, highlighting areas for potential improvement.

On-Time Performance:

Despite delays, the majority of flights across airlines are on time, demonstrating effective schedule management.

Peak Delay Times:

Delays peak around 10:30 PM, suggesting late-night flights are more susceptible to disruptions.

Dashboard :


AIRLINE TRAFFIC
Select all
AirTran Airways ...
American Airline...
American Eagle ...
Comair Inc.
Delta Air Lines Inc.
Expressjet Airlin...
Mesa Airlines Inc.
Southwest Airlin...
United Air Lines ...
US Airways Inc.
Select all
BWI
DCA
IAD
Select all
Friday
Monday
Saturday
Sunday
Thursday
Tuesday
Wednesday
Select all
April
August
December
February
January
July
June
March
May
November
October
September
Number of Flights by Departure Hour
Sum of Number of Flights
50K
40K
30K
20K
10K
0K
2K
28K
31K
51K
5:36:00 AM
6:30:00 PM
8:30:00 PM
10:30:00 PM
Departure Hour
Number of Flights by Month
Sum of Number of Flights
14K
12K
10K
8K
6K
4K
2K
0K
13.1K
9.7K
9.5K
9.3K
9.3K
9.2K
9.0K
8.8K
8.7K
8.5K
8.3K
7.9K
January
July
June
August
May
March
April
October
December
November
September
February
Month
Number of Flights by Origin Airport
32K
(28.81%)
46K
(41.36%)
33K (29.83%)
Origin Airport
BWI
DCA
IAD
Number of Flights by Day of Week and Departure Hour
Departure Hour
5:36:00 AM
6:30:00 PM
8:30:00 PM
10:30:00 PM
Number of Flights
20K
15K
10K
5K
0K
7.4K
4.8K
4.3K
7.4K
4.8K
4.4K
7.1K
3.4K
3.2K
6.8K
3.2K
2.9K
7.4K
4.8K
4.4K
7.3K
4.8K
4.4K
7.3K
4.8K
4.3K
Friday
Monday
Saturday
Sunday
Thursday
Tuesday
Wednesday
Day of Week

Peak Flight Times:

The highest number of flights depart at 10:30 PM, highlighting a critical window for managing airport traffic.

Monthly Flight Distribution:

January sees the highest flight traffic, suggesting a seasonal peak in airline operations.

Airport Comparison:

DCA handles the largest share of flights, dominating the air traffic among the three major airports.

Daily Flight Patterns:

Flight volume remains consistently high across weekdays, with notable peaks on Fridays and Mondays.

Origin Airport Insights

BWI, DCA, and IAD airports contribute almost equally to the total flight volume, with slight variations.

Thank you very much!