

AIRLINE PERFORMANCE REPORT

1. Introduction

In the modern aviation industry, flight analysis plays a critical role in enhancing safety, efficiency, and overall operational performance.

This report aims to provide a comprehensive overview of flight data, examining key metrics such as flight duration, flight delay, aircraft performance, and adherence to scheduled routes. By analyzing these factors, we can identify trends, pinpoint areas for improvement, and develop strategies to optimize flight operations.

The primary focus of this analysis is to assess the effectiveness of current flight practices and explore potential enhancements that could lead to cost reductions, improved punctuality, and a better passenger experience. Through detailed examination of the collected data, this report will offer insights into how airlines can leverage flight analysis to achieve their strategic goals.

2. Data processing

- REQUIREMENT GATHERING

The dataset provided was the Flight dataset which has 15 columns and 1,000 rows.

- DATA CLEANING

Data was checked to ascertain the data quality. Checks for duplicates were done and checks for blanks. The data was ascertained for completeness and no inconsistencies were found. The data types were also checked, and the departure, arrival column date and time were merged, was corrected using the Text to columns to separate each field.

- DATA MODELING

New Columns were created (Duration, Turnaround time, Departure and Arrival hour). Afterwards, New arrival and departure Date was linked to the actual arrival and departure Date on the Airline dataset

- DATA ANALYSIS

One (1) Visualization Dashboard was created showing the Revenue by Airline across different Origin Airports for January and February 2023

- INSIGHTS AND RECOMMENDATIONS

From the visualized dashboard, data driven decisions and insights were drafted

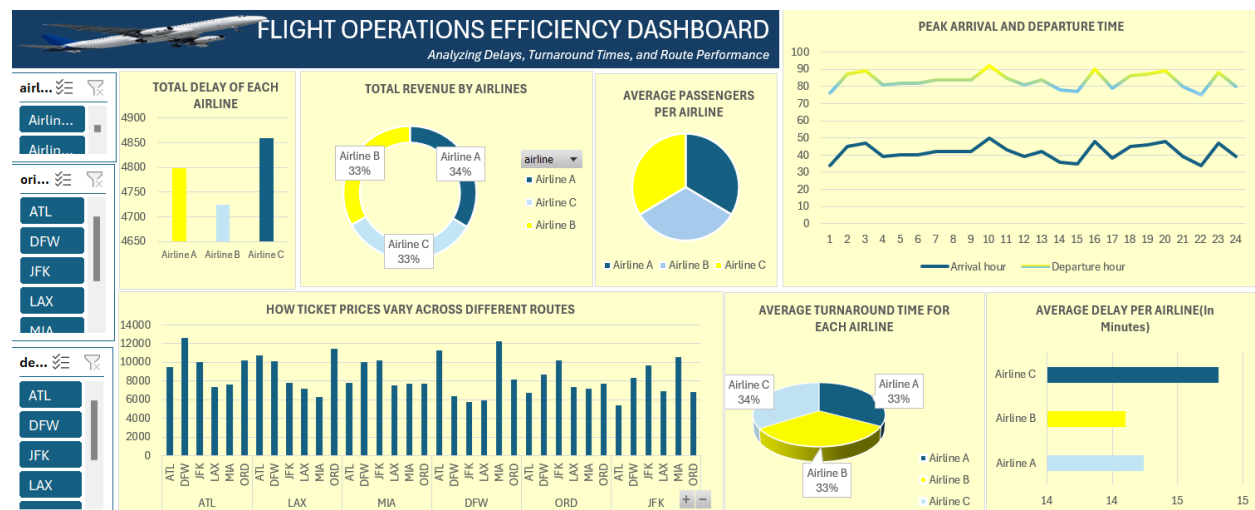
Row Labels	Count of airline	Row Labels	Count of originAirport	Row Labels	Count of destinationAirport
Airline A	337	ATL	185	ATL	166
Airline B	335	DFW	156	DFW	183
Airline C	328	JFK	164	JFK	174
Grand Total	1000	LAX	167	LAX	149
		IA	162	MIA	162
		RD	166	ORD	166
		Grand Total	1000	Grand Total	1000

CORRELATION BETWEEN TICKET PRICE AND FLIGHT DURATION
0.030194
A correlation coefficient close to 0, such as 0.030194

CORRELATION BETWEEN TICKET PRICE AND DELAY TIME
0.01912

Row Labels	Count of destinationAirport	Row Labels	Average of ticketPrice
Airline A	166	ATL	309
Airline B	183	DFW	307
Airline C	174	JFK	308
Grand Total	14382	LAX	284
		MIA	318
		ORD	314
		Grand Total	307

Row Labels	Sum of revenue	Row Labels	Sum of Flight duration(minutes)
Airline A	12690094		
Airline C	12661543		
Airline B	12466576		



3. INSIGHTS AND RECOMMENDATIONS

The total number of flights was 1000 across the month of January and February generating a total revenue of \$37,818,213. The average delay time for flights was about 14 minutes. The following insights and recommendations were generated from the dataset:

➤ REVENUE

- **Insights**

Top performing routes: The route between ATF and DFW generated the highest revenue, contributing 4.5% of the total revenue. This is largely driven by high passenger volume and premium ticket sales.

Low revenue periods: Revenue tends to drop significantly during the second month (February), which could be due to reduced travel after the holiday season.

- **Recommendations**

Focus on High-Performing Routes: Increase marketing and promotional efforts on top-performing routes to maximize revenue. Consider introducing additional flights during peak times on these routes.

Seasonal Promotions: Implement targeted promotions or discounts during low-revenue periods to stimulate demand and increase bookings during these off-peak months.

➤ FLIGHT DELAYS

- **Insights**

Frequent Delays: Flights departing from (ATL) have the highest average delay, with an average delay time of 14 minutes. This is likely due to high traffic congestion and frequent weather-related disruptions.

- **Recommendation:**

Operational Improvements at High-Delay Airports: Collaborate with airport authorities ATL to improve operational efficiency and reduce delays. Consider adjusting schedules to allow for more buffer time between flights.

➤ ROUTES

- **Insights**

Underutilized routes: Certain routes, such as from DFW to JFK has the lowest passenger loads (2167) and generated second to the lowest revenue (\$657,080) even though it had one of the lowest ticket prices.

High density routes: Routes such as from ATL to DFW had the highest no of passengers with a total of 5622 passengers consequently generating the highest revenue.

- **Recommendations**

Route Optimization: Consider reducing the frequency of flights of underperforming routes to improve overall network efficiency. Redirect resources to more profitable or emerging routes.

Optimizing high-density routes: The focus should be on maximizing efficiency, enhancing customer experience, and optimizing profitability.

➤ PASSENGERS

- **Insights**

Choice of Airline: Most passengers preferred to use airline A and B as they both had an average of 124 passengers across the various airports when compared to airline C.

Peak arrival time: The peak arrival time for most passengers across the various airports was 9 am, as that seemed to be the most convenient time for passengers.

- **Recommendations**

Enhancing reliability: Differentiate the airlines by enhancing customer loyalty programs, offering competitive pricing, and improving in-flight services. Focus on reliability and on-time performance, as these are critical factors influencing passenger choice.

Managing peak arrival time: Optimize staffing, gate assignments, and ground services during peak arrival times to ensure efficient handling of passengers and baggage.

SUMMARY

- Overall Statistics:
Average Delay: ~14.38 minutes
Average Ticket Price: \$307.18
Total Revenue: \$37,818,213
Total Passengers: 123,173
- Flight Details:
The dataset contains 1,000 unique flights.
There are 3 different airlines operating the flights.
Flights originate from and arrive at 6 different airports.
- Revenue and Passengers:
The minimum revenue for a flight is \$5,700, while the maximum revenue is \$96,330.

The number of passengers on each flight ranges from 50 to 199.
- Airline focus: Enhance operational efficiency, improve customer satisfaction, and maximize profitability.
- Routes: Optimize route network by focusing on high-demand routes and streamlining underperforming ones.
- Monthly performance: Stabilize revenue across the year by addressing low-performance months with targeted initiatives
- Key revenue-generating routes: Maximize profitability on top revenue routes by improving services and optimizing schedules.
- Passenger segment: Tailor services to meet the diverse needs of key passenger segments.