ANALYSIS ON AIRLINE PERFORMANCE IN THE UNITED STATES OF AMERICA

10th December 2023

Executive Summary

This report uncovers actionable insights and strategic decision-making, delves into a comprehensive analysis of airline performance. Our primary objective is to provide valuable perspectives on airline operations, with a focus on optimizing route planning, addressing weather-related disruptions, and ensuring operational excellence. The extensive exploration of flight volumes, delays, and passenger trends within this timeframe offers actionable insights for route optimization, weather resilience, and strategic positioning. We will be delving into the specifics of our findings, we aim to provide targeted recommendations on optimizing low-volume route strategies, enhancing weather-resilient operations, strategic positioning for competing airlines to enhance overall operational efficiency and elevate the airline's competitive standing in a dynamic industry landscape.

Introduction

In an era marked by dynamic shifts and evolving consumer demands, the aviation industry stands at the intersection of challenges and opportunities. In our pursuit of operational excellence and strategic foresight, this report endeavors to dissect key facets of airline performance based on a dataset sourced from the US Department of Transportation, Bureau of Transportation Statistics. As we navigate through the intricate tapestry of flight data, our goal is to unravel insights that transcend mere numbers – insights that can inform and inspire strategic decisions. It's essential to acknowledge that our exploration is confined to January 2023, limiting certain aspects of analysis, notably the correlation between aircraft age and delays. Nevertheless, within this temporal frame, our examination spans critical dimensions: route optimization, weather resilience, and strategic positioning. Through this report, we aim to offer a nuanced perspective that empowers executives with actionable recommendations, fostering a trajectory of success and resilience amid the ever-evolving dynamics of the aviation landscape.

Business objective

The objective is to enhance scheduling precision, minimize delays, and elevate the overall travel experience for passengers, ultimately contributing to increased customer satisfaction and the airline's competitive edge in the market.

Actionable Insights on Airline Industry

The airlines with the most flights by year

Upon analyzing the airline rankings for total flights in 2023, it is evident that Southwest Airlines (WN) holds the top position, having operated 112,430 flights, followed closely by Delta Air Lines (DL) and American Airlines (AA) with 75,174 and 74,999 flights, respectively as seen in the Exhibit A. This data indicates a substantial market dominance by Southwest Airlines in terms of flight volume. Moreover, the relative positions of major carriers such as Delta and American suggest potential changes in market dynamics. To devise effective strategies, airline executives must examine the factors influencing these rankings, including route expansions, partnerships, and customer demand. Conducting a year-over-year analysis would also provide valuable insights into evolving trends, enabling airlines to optimize their operations and maintain a competitive edge in the ever-changing aviation industry.

Airlines with the Most Total Flights
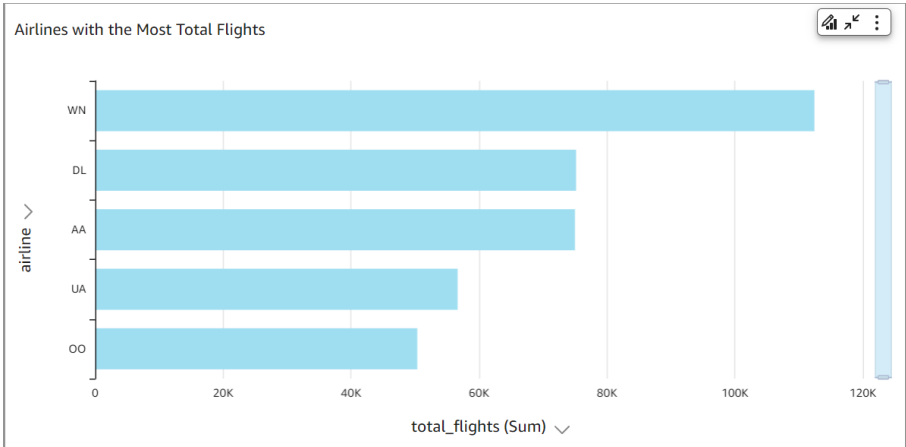
The best time of day/day of week/time of year to fly to minimize delays.

The chart reveals a noteworthy trend for flights scheduled during the early morning hours, specifically at 4 AM on Thursdays in January. It is worthy to note that early departures show negative numbers as seen in Exhibit B. These flights demonstrate an impressive average delay of -14 minutes, indicating a consistent pattern of departures occurring ahead of schedule. Similarly, flights at 4 AM on Saturdays in January and at 2 AM on Tuesdays in January showcase average delays of -9 and 0.45 minutes, respectively. These findings suggest a preference for prompt departures during these specific time slots. This information highlights a potential strategic advantage for the airline in planning flights during these observed time periods, capitalizing on the demonstrated patterns to enhance overall operational efficiency. It is crucial for executives to explore similar patterns across various months and days of the week to optimize scheduling and reduce delays systematically, ultimately contributing to improved customer satisfaction and operational excellence.

Exhibit B

Best time of day/day of week/time of year to fly to minimise delays
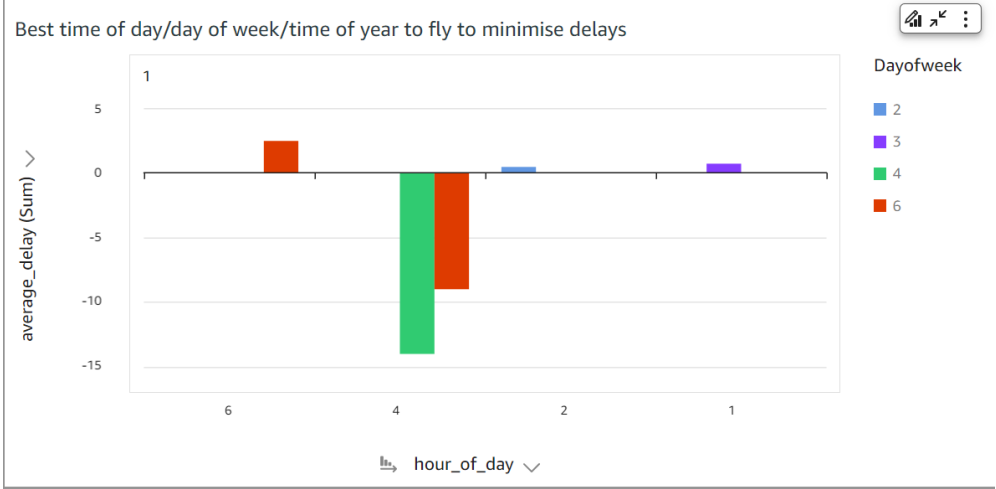
Delays caused by old planes

Per the data received it is almost impossible to figure out if any old planes caused more delays.

The number of people flying between different locations over time

The dataset analyzing the number of individuals flying between various locations presents intriguing patterns. In January 2023, the route from Lehigh Valley International Airport (ABE) to Hartsfield-Jackson Atlanta International Airport (ATL) stands out with a substantial flight count of 81, reflecting a high demand for this connection. Conversely, routes to destinations such as Fort Lauderdale-Hollywood International Airport (FLL) and Myrtle Beach International Airport (MYR) display lower flight counts of 10 and 9, respectively. These variations highlight dynamic passenger preferences and suggest potential opportunities for strategic route planning. Executives should focus on understanding the factors influencing the popularity of specific routes, such as business connections, seasonal trends, or promotional initiatives, to optimize resources and tailor services to meet evolving customer demands. Moreover, conducting a monthly and yearly trend analysis would provide deeper insights into changing travel patterns, enabling the airline to proactively adapt its operations to capitalize on emerging opportunities and ensure sustained growth.

Exhibit C

Year	Month	Origin	Dest	Flight_Count
2023	1	ABE	ATL	81
2023	1	ABE	BNA	17
2023	1	ABE	CLT	86
2023	1	ABE	FLL	10
2023	1	ABE	MYR	9

Percentage of flights delayed by weather per airport

The examination of weather-related flight delays per airport provides valuable insights into operational challenges and opportunities for improvement. Notably, Bemidji Regional Airport (BJI) experienced a significant proportion of its total 61 flights delayed due to weather, amounting to 13.11%. This highlights the airport's vulnerability to adverse weather conditions, which calls for strategic attention. A similar trend is observed at Pellston Regional Airport (PLN) and Brainerd Lakes Regional Airport (BRD), both of which experienced a 11.54% weather-related delay rate. These statistics emphasize the impact of local climate conditions on flight punctuality and underscore the need for tailored mitigation strategies at these specific airports. To address this issue, executives should prioritize investments in weather forecasting technologies, contingency planning, and staff training to minimize disruptions and enhance overall service reliability. Furthermore, exploring the correlations between seasonal variations and weather-related delays can facilitate proactive measures, ensuring that the airline is well-equipped to navigate adverse weather conditions and maintain operational excellence at each airport.

Exhibit D

Percentage of flights delayed by weather per airport
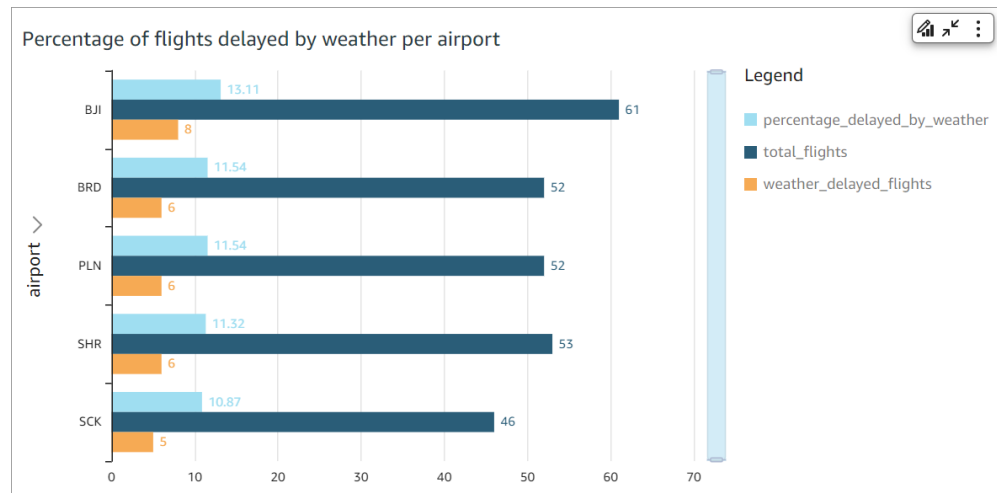
Recommendations

We have tried as much as possible to give recommendations based on the data provided as we have data on only January 2023. On this premise, below are the recommendations suggested to the business and the stakeholders.

Optimizing Low-Volume Route Strategies

Routes such as ABE to FLL and ABE to MYR have relatively low flight counts of 10 and 9, respectively. To improve the performance of these routes, it is recommended that a comprehensive market analysis be conducted to find the factors contributing to lower demand. This can be followed by the implementation of targeted marketing campaigns, seasonal promotions, and exploring code-share agreements to stimulate demand and optimize resource efficiency on these routes.

Enhancing Weather-Resilient Operations

Airports like BJI, PLN, and BRD experience a notable percentage of weather-related delays (13.11%, 11.54%, and 11.54% respectively). To increase operational resilience, it is suggested that advanced weather forecasting technologies be invested in for real-time decision-making. Robust contingency plans and training programs should be developed to minimize the impact of adverse weather conditions. Collaboration with meteorological services to create predictive models will help proactive scheduling adjustments during periods of heightened weather-related disruptions.

Achieving Operational Excellence on High-Volume Routes

Southwest Airlines (WN) leads in flight volume with 112,430 flights, showing significant market presence. To capitalize on this strength, it is recommended that operational efficiency be continually perfected, plane turnaround times be minimized, and schedules be aligned with peak demand periods. Data analytics can be used to find patterns in customer preferences on high-volume routes, enabling tailored service enhancements and potential ability expansions.

Strategic Positioning for Competing Airlines

Delta Air Lines (DL) and American Airlines (AA) follow Southwest with 75,174 and 74,999 flights, respectively. It is suggested that a thorough competitive analysis be conducted to show differentiating factors and areas of improvement for DL and AA. Potential route expansions or collaborations can be explored to enhance market share. Considering customer-centric initiatives such as loyalty programs, unique in-flight services, or targeted pricing strategies can keep and grow their competitive positions.