Flight Delay Analysis Report

Introduction

Flight delays are a major challenge in the aviation industry, affecting passenger experience, airline operations, and economic performance. This report examines flight delays in the U.S. aviation sector for 2023, analyzing their causes, patterns, and impact using a dataset visualized in Power BI.

Dataset Description

The dataset used in this analysis contains information on flight schedules, delays, and contributing factors. Key attributes include:

- Flight number
- Airline
- Departure and arrival times
- Delay duration
- Causes of delays (weather, airline operations, security, etc.)
- Airport locations

The dataset provides a comprehensive view of delays across various airlines and airports in the U.S.

Data Cleansing Process

To ensure data accuracy and consistency, the following cleansing steps were performed:

1. Handling Missing Values: Rows with significant missing data were either removed or imputed where possible.
2. Removing Duplicates: Identical records were identified and removed.
3. Standardizing Data Formats: Dates, times, and categorical variables were formatted consistently.
4. Outlier Detection: Unusual delay durations were analyzed and corrected if necessary.
5. Categorization: Delays were classified based on causes to facilitate better analysis.

Insights from Visualizations

1. Absorption of In-Flight Delays:
   - Highlights how airlines manage in-flight delays and their impact on arrival times.

- Reveals trends in how often delays are absorbed, reducing passenger impact.

2. Civil Aviation in the U.S. (2023 Context):

- Overview of flight operations and delays across the country.
- Highlights busiest airports and their delay statistics.
- Compares airline performance in managing on-time departures.

3. Focus on Delays:

- Breaks down delays by different causes (weather, security, operational issues).
- Identifies peak delay periods and most affected regions.
- Analyzes delay durations and their frequency.

4. Power BI Dashboard Insights:

- Dynamic dashboards provide real-time insights into flight delays.
- Filters allow users to explore data by airline, airport, and delay type.
- Time-series analysis reveals seasonal trends in flight delays.

Final Conclusion

The analysis of flight delays in 2023 provides valuable insights into patterns and causes affecting airline punctuality. Key findings include:

- Weather-related delays are more frequent during winter months.
- Major hub airports experience higher delays due to congestion.
- Some airlines consistently perform better in on-time departures.

By understanding these trends, airlines and aviation authorities can implement better strategies to minimize delays and enhance passenger experience. Power BI dashboards facilitate deeper insights, helping stakeholders make data-driven decisions.