

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS)**

**COIMBATORE**

**DEPARTMENT OF MATHEMATICS**

**NAANMUDHALVAN COURSE DATA ANALYTICS WITH TABLEAU**

**CLASS: III YEAR B.SC MATHEMATICS-SEMESTER:5**

**PROJECT REPORT**

**(PROJECT DOCUMENTATION)**

**NM TEAM NUMBER : 3**

**NM TEAM ID : NM2023TMID23752**

**NM PROJECT TITLE : Unlocking Insights into the Global Air  
Transportation Network with Tableau**

**Mentor :Dr. Malathy Thangavelu M.Sc., M.Phil.,Ph.D**  
(Associate Professor)

**Submitted by**

**K.Shibi**

**M.Punitha**

**R.Vaishnavi**

**D.Sakthi Priya**

**Submitted to**

**SmartBridge Educational Services Pvt. Ltd.**

## Project Report

# Unlocking Insights into the Global Air Transportation Network with Tableau

---

## *INTRODUCTION*

---

In an increasingly interconnected world, the global air transportation network plays a pivotal role in facilitating economic growth, cultural exchange, and global connectivity. Airlines, airports, and related stakeholders generate massive volumes of data every day, from flight schedules and passenger information to cargo logistics and maintenance records. This wealth of data holds the key to understanding and optimizing the complex web of interactions within the global air transportation system.

Tableau, a leading data visualization and analytics tool, empowers organizations to harness the power of their data and uncover valuable insights. With its user-friendly interface and robust capabilities, Tableau allows us to dig deep into the global air transportation network, revealing patterns, trends, and opportunities that can drive informed decision-making, improve efficiency, and enhance safety.

The global air transportation network is a dynamic and intricate system that connects people, goods, and ideas across the world. In this era of big data, the aviation industry generates

an enormous volume of information, ranging from flight schedules and passenger records to operational data and safety reports. Harnessing the power of this data is crucial for improving the efficiency, safety, and sustainability of air travel.

This project aims to unlock valuable insights into the global air transportation network using Tableau, a powerful data visualization and analytics platform. Through a comprehensive analysis of various facets of the aviation industry, including flight routes, airport operations, airline performance, safety, environmental impact, and economic contributions, we will delve deep into the intricacies of this complex network.

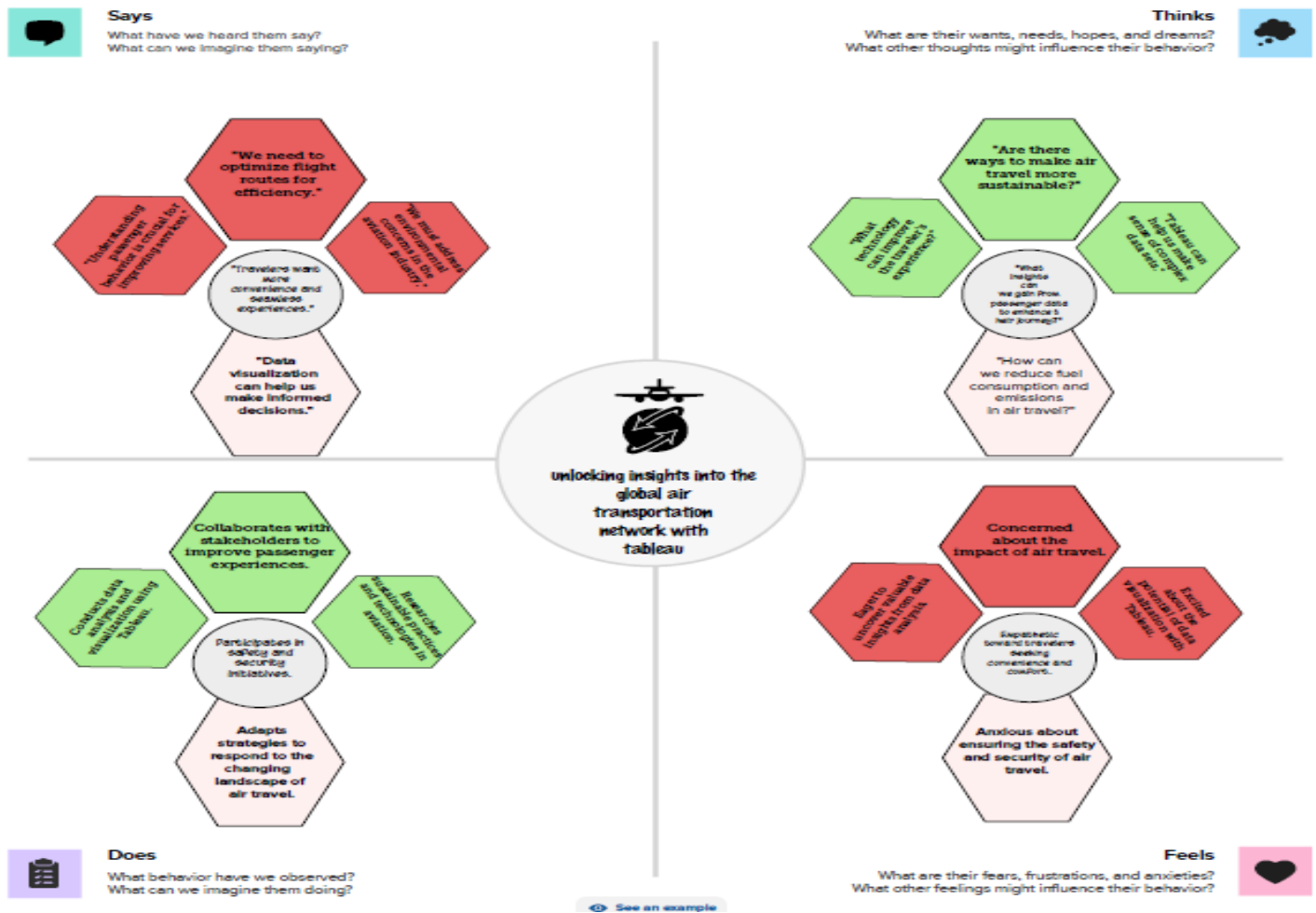
**Social Impact:** By analyzing data related to flight schedules, delays, and passenger feedback, airlines and airports can make data-driven improvements that lead to better on-time performance, reduced wait times, and overall improved travel experiences for passengers. This contributes to greater passenger satisfaction and convenience. Data analytics can help identify safety trends and issues in aviation, leading to proactive safety measures and reduced accidents. This directly benefits passengers and crew members by making air travel even safer. Insights gained from analyzing data on fuel consumption, emissions, and operational efficiency can lead to more sustainable aviation practices. Reducing the carbon footprint of air travel can have a positive social impact by mitigating climate change and reducing air pollution. Data visualization tools like Tableau can make complex aviation data more accessible to a wider audience, including government agencies, researchers,

and advocacy groups. This transparency can lead to better-informed public discussions and policies related to aviation.

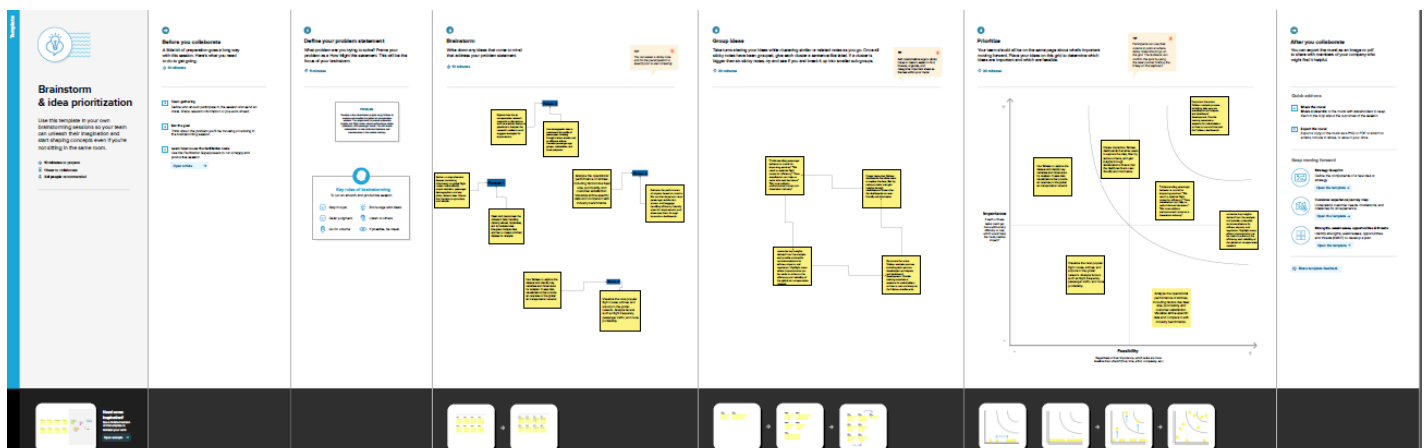
**Business Impact:** Airlines and airports can optimize their operations by using Tableau to analyze data related to flight schedules, resource allocation, and passenger flows. This leads to reduced operational costs, improved resource utilization, and better on-time performance, resulting in higher efficiency. Data-driven insights can help airlines identify cost-saving opportunities, such as fuel efficiency improvements, maintenance optimization, and route optimization. These cost reductions contribute to higher profitability and competitiveness. Airlines can use Tableau to analyze market demand, pricing strategies, and customer preferences, leading to more effective revenue management. This can result in increased revenue from ticket sales and ancillary services. By analyzing customer feedback and preferences, airlines and airports can make data-driven improvements to enhance the passenger experience. Satisfied customers are more likely to become repeat customers and recommend the airline to others.

# EMPATHY MAP & BRAINSTORMING MAP

## Empathy Map



## Brainstorming map



## Result

World map showing details of all Airports within a Country



## Dashboard 1



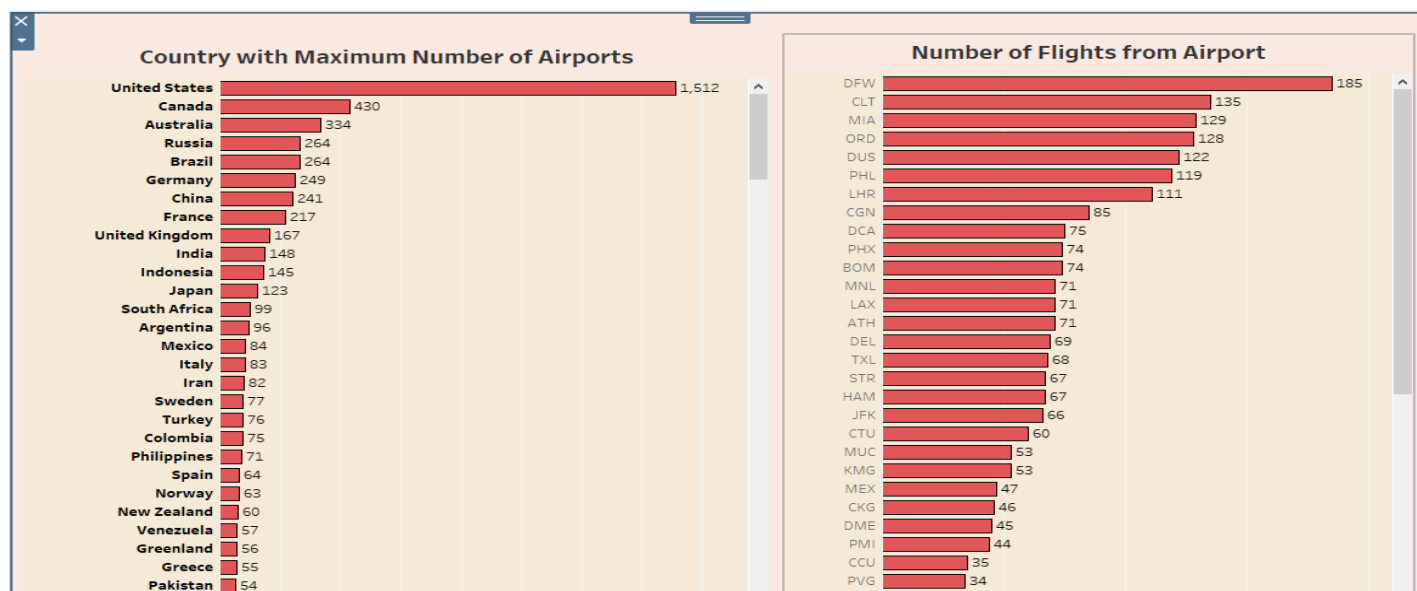
## Dashboard 2

Airports at Higher altitude within a country			
Name (airports.csv)	City	ICAO (airports.csv)	
Belaga Airport	Belaga	WBGC	2.650
Kluang Airport	Kluang	WMAP	2.041
Kuala Lumpur International Airport	Kuala Lumpur	WMKK	2.746
Kuching International Airport	Kuching	WBGG	1.485
Malacca Airport	Malacca	WMKM	2.263
Mukah Airport	Mukah	WBGK	2.906
Pulau Tioman Airport	Tioman	WMBT	2.818
Senai International Airport	Johor Bahru	WMKJ	1.641
Sibu Airport	Sibu	WBGs	2.262

Airports at Higher altitude in the world			
Name (airports.csv)	City	ICAO (airports.csv)	
Qaanaaq Airport	Qaanaaq	BGQQ	77.49
Siorapaluk Heliport	Siorapaluk	BGSI	77.79
Svea Airport	Sveagruva	ENSA	77.90
Svalbard Airport, Longyear	Svalbard	ENSB	78.25
Duramiden Heliport	Duramiden	ENOV	78.65

## Dashboard 3



## Dashboard 4



# Global Air Transportation Network

## Global Air Transportation Network

World Map Showing  
Countries with detail...

Table Showing  
Airports which are at ...

Table showing List of  
All Airlines within the...

Bar Graphs showing  
Countries with Max N...

D2

World map showing details of all Airports within a Country



## Global Air Transportation Network

World Map Showing  
Countries with detail...

Table Showing  
Airports which are at ...

Table showing List of  
All Airlines within the...

Bar Graphs showing  
Countries with Max N...

### Airports at Higher altitude within a country

Name (airports.csv)	City	ICAO (airports.csv)	Altitude (ft)
Belaga Airport	Belaga	WBGC	2740
Kluang Airport	Kluang	WMAP	1485
Kuala Lumpur International Airport	Kuala Lumpur	WMKK	2263
Kuching International Airport	Kuching	WBGG	2906
Malacca Airport	Malacca	WMKM	2818
Mukah Airport	Mukah	WBGK	1641
Pulau Tioman Airport	Tioman	WMBT	2262
Senai International Airport	Johor Bahru	WMKJ	
Sibu Airport	Sibu	WBSG	

### Airports at Higher altitude in the world

Name (airports.csv)	City	ICAO (airports.csv)	Altitude (ft)
Qaanaaq Airport	Qaanaaq	BGQQ	77.49
Siorapaluk Heliport	Siorapaluk	BGSI	77.79
Svea Airport	Sveagruva	ENSA	77.90
Svalbard Airport, Longyear	Svalbard	ENSB	78.25
Pyramiden Heliport	Pyramiden	ENPY	78.65
Ny-Ålesund Airport (Hammerabben)	Ny-Ålesund	ENAS	78.93



## Global Air Transportation Network

World Map Showing  
Countries with detail...

Table Showing  
Airports which are at ...

Table showing List of  
All Airlines within the...

Bar Graphs showing  
Countries with Max N...

D3

### Airlines Within Country

Airline ID	Name	Icao	Callsign
97	Aerofumigaciones Sam	AEG	FUMIGACIONES SAM
171	Aerogala	AGQ	GALASERVICE
200	Alpine Air Chile	AIH	ALPINE CHILE
427	Aeromet Servicios	ARS	METSERVICE
660	Aeropuelche	PUE	PUELCHÉ
752	Aerocardal	CDA	CARDAL
795	Aerovias DAP	DAP	DAP
809	Aerolineas Del Sur	DLU	DEL SUR
852	Aerosec	ERK	AEROSÉC
936	Aerohein	HEI	AEROHEIN
958	Aeroingenieria	ING	AEROINGE
1100	Aeromet Línea Aérea	MTE	AEROMET
1670	Carranza	CRR	CARRANZA
1782	Cirrus	RRU	HELICIRRUS
1950	DAP Helicopteros	DHE	HELIDAP
2026	Didier Rousset Buy	DRB	DIDIER
2190	Empresa Aero-Servicios P...	PRG	ASPAR
2201	Enrique Gleisner Vivanco	EGV	GLEISNER
2552	Gestar	GTR	STAR GESTAR
2727	Helicopteros Agroforestal	HAA	AGROFORESTAL
2746	Heliworks	HLW	HELIWORKS
3200	LAN Airlines	LAN	LAN
3202	LAN Cargo	LCO	LAN CARGO
3204	LAN Express	LXP	LANEX
3268	Línea Aérea Costa Norte	NOT	COSTA NORTE
3270	Línea Aérea SAPSA	LNP	SAPSA
3271	Línea Aérea de Fumig Agu...	NEG	AGUAS NEGRAS

Country

Chile

NO. Of Airlines

7

Country

Denmark

Active

All

## Global Air Transportation Network

World Map Showing  
Countries with detail...

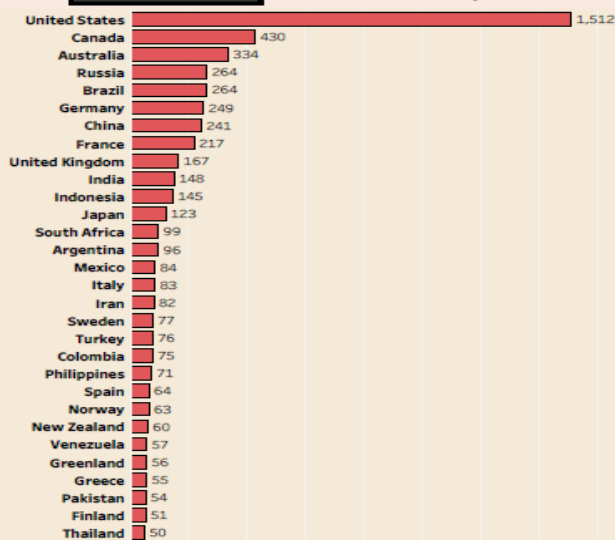
Table Showing  
Airports which are at ...

Table showing List of  
All Airlines within the...

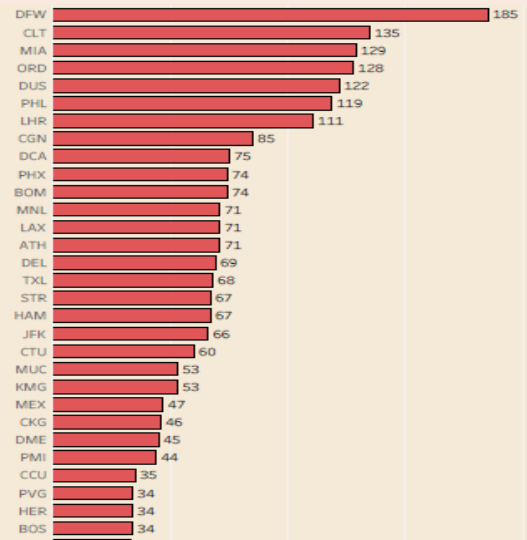
Bar Graphs showing  
Countries with Max N...

D1

### Number of Airports



### Number of Flights from Airport



Story for Global air Transportation Network

---

## *Advantages & Disadvantages*

---

### Advantages:-

- **Real-Time Analysis:** Tableau can connect to real-time data sources, allowing for up-to-the-minute analysis of flight data, passenger information, and other critical metrics.
- **Interactivity:** Tableau dashboards are highly interactive, enabling users to drill down into data, apply filters, and explore different dimensions, enhancing the depth of analysis.
- **Scalability:** Tableau is scalable, allowing organizations to handle large volumes of data as their needs grow.
- **Integration:** Tableau can integrate with various data sources, databases, and APIs, making it versatile for aviation industry data integration.
- **Predictive Analytics:** Advanced features enable predictive modeling and forecasting, helping organizations anticipate trends and plan accordingly.
- **Cost Efficiency:** Tableau offers cost-effective solutions compared to building custom analytics platforms from scratch.

### Disadvantages:-

- **Data Complexity:** Managing and integrating diverse aviation data sources can be challenging, requiring data cleaning and transformation before analysis.

- **Licensing Costs:** Tableau licensing costs can be significant for large-scale deployments, which might be a concern for smaller organizations.
- **Learning Curve:** While Tableau is user-friendly, mastering its full capabilities can take time, especially for complex analyses.
- **Performance on Large Datasets:** Performance may degrade when working with extremely large datasets, requiring hardware upgrades or optimizations.
- **Data Security:** Handling sensitive passenger and operational data requires robust security measures to safeguard against breaches.
- **Customization Limitations:** Tableau's customization options may be limited for highly specialized aviation analytics needs, necessitating additional development.

---

## *Applications*

---

Unlocking insights into the Global Air Transportation Network using Tableau involves applying the capabilities of Tableau to analyze and visualize data from various aspects of the aviation industry. Here's how Tableau can be applied to gain valuable insights into the global air transportation network:

- **Data Integration:**

- Collect and integrate data from diverse sources, including flight schedules, passenger records, airport statistics, safety reports, environmental data, and economic indicators.

➤ **Data Preparation:**

- Cleanse, transform, and structure the data to ensure its accuracy and consistency, making it ready for analysis in Tableau.

➤ **Exploratory Data Analysis (EDA):**

- Use Tableau's drag-and-drop interface to explore the dataset and identify initial insights and trends. Create visualizations such as scatter plots, bar charts, and heatmaps to gain a better understanding of the data.

➤ **Route Analysis:**

- Visualize flight routes, traffic density, and hub airports using maps in Tableau. Analyze the busiest flight corridors, seasonal variations, and emerging trends in air travel.

➤ **Airport Operations:**

- Create dashboards that display key performance metrics for airports, including passenger traffic, delays, and on-time departures. Identify opportunities to optimize airport operations.

➤ **Airline Performance:**

- Analyze airline-specific data, such as on-time arrivals, customer satisfaction scores, and market share. Compare the performance of different airlines and identify areas for improvement.

➤ **Safety and Compliance:**

- Monitor safety records and compliance with aviation regulations. Use Tableau to visualize safety trends, incidents, and areas that require attention.

➤ **Environmental Impact:**

- Assess the environmental impact of air travel by visualizing emissions data, carbon footprint, and fuel efficiency. Explore opportunities to reduce the industry's environmental footprint.

---

## *CONCLUSION*

---

Unlocking insights into the Global Air Transportation Network using Tableau represents a transformative approach to addressing complex challenges within the aviation industry. By harnessing the power of data analytics and visualization, businesses and stakeholders in the aviation sector can gain a deeper understanding of the global air transportation network, leading to informed decision-making, operational efficiency, and improved customer experiences. Through the integration and analysis of vast and diverse datasets, Tableau empowers organizations to uncover hidden patterns, trends, and opportunities within the aviation ecosystem. Airlines and airports can optimize their operations, from scheduling and resource allocation to maintenance and safety management.

This optimization results in reduced costs and improved on-time performance. Data-driven insights lead to proactive safety measures, contributing to the aviation industry's exemplary safety record. Passengers and stakeholders benefit from increased confidence in air travel. Tableau enables airlines to reduce their carbon footprint and adopt more sustainable practices. This aligns with global efforts to address climate change and reduces the industry's environmental impact.

---

### *Future scope:*

---

Unlocking insights into the Global Air Transportation Network using Tableau is an ongoing and dynamic process. To build upon the initial analysis and ensure continued success, organizations and stakeholders should consider several future steps:

- **Data Enrichment:** Continuously enhance the dataset used for analysis. Incorporate new sources of data, such as real-time flight data, weather information, and passenger feedback, to provide more comprehensive insights.
- **Advanced Analytics:** Explore advanced analytics techniques, including machine learning and predictive modeling, to anticipate trends, identify anomalies, and optimize operations proactively.
- **Integration with IoT:** Leverage the Internet of Things (IoT) for real-time monitoring of aircraft, equipment, and airport facilities. This can enhance safety, maintenance, and resource allocation.

*Thank You!!*