Project Report

For

Unlocking Insights into the Global Air Transportation Network

1.Introduction

1.1 Overview

Tableau is a powerful data visualization tool that can be used to unlock insights into the global air transportation network. By importing and analyzing relevant data, you can create interactive visualizations and dashboards that provide a comprehensive overview of various aspects of the network. This can include:

1. **Route Analysis**: Visualizing the most common flight routes, hubs, and connections to understand the flow of passengers and goods.

2. **Flight Performance**: Analyzing on-time performance, delays, and cancellations to identify trends and areas for improvement.

3. **Passenger Demographics**: Exploring the demographics of travelers, including nationality, age, and travel purposes, to tailor services and marketing strategies.

4. **Airline and Airport Metrics**: Comparing the performance of different airlines and airports in terms of passenger numbers, revenue, and customer satisfaction.

5. **Fuel Efficiency**: Assessing the environmental impact by visualizing fuel consumption, emissions, and efficiency of different routes and airlines.

6. **Safety and Security**: Monitoring incidents and safety measures across the network to enhance security protocols.

7. **Economic Impact**: Analyzing the economic impact of the air transportation industry on local and global economies.

Tableau's interactive features allow users to filter and drill down into the data, making it easier to discover patterns and insights. By leveraging Tableau's capabilities, you can gain a deeper understanding of the global air transportation network and make data-driven decisions to optimize operations, improve customer experiences, and enhance overall performance.

Purpose:

The purpose of using Tableau to unlock insights into the Global Air Transportation Network could be to:

1. Visualize Data: Tableau allows for the creation of interactive and easy-to-understand visualizations, helping stakeholders gain a better understanding of complex data related to global air transportation.

2. Identify Trends: By analyzing data within Tableau, you can identify trends, patterns, and anomalies in air transportation, which can be valuable for decision-making, planning, and optimization.

3. Improve Efficiency: Insights from Tableau can help airlines, airports, and regulatory authorities improve operational efficiency, reduce delays, and enhance overall air travel experiences.

4. Safety and Security: Analyzing data with Tableau can contribute to enhancing safety and security measures within the global air transportation network.

5. Strategic Planning: Tableau can assist in strategic planning by providing insights into passenger flows, route optimization, and market demand, helping airlines and airports make informed decisions.

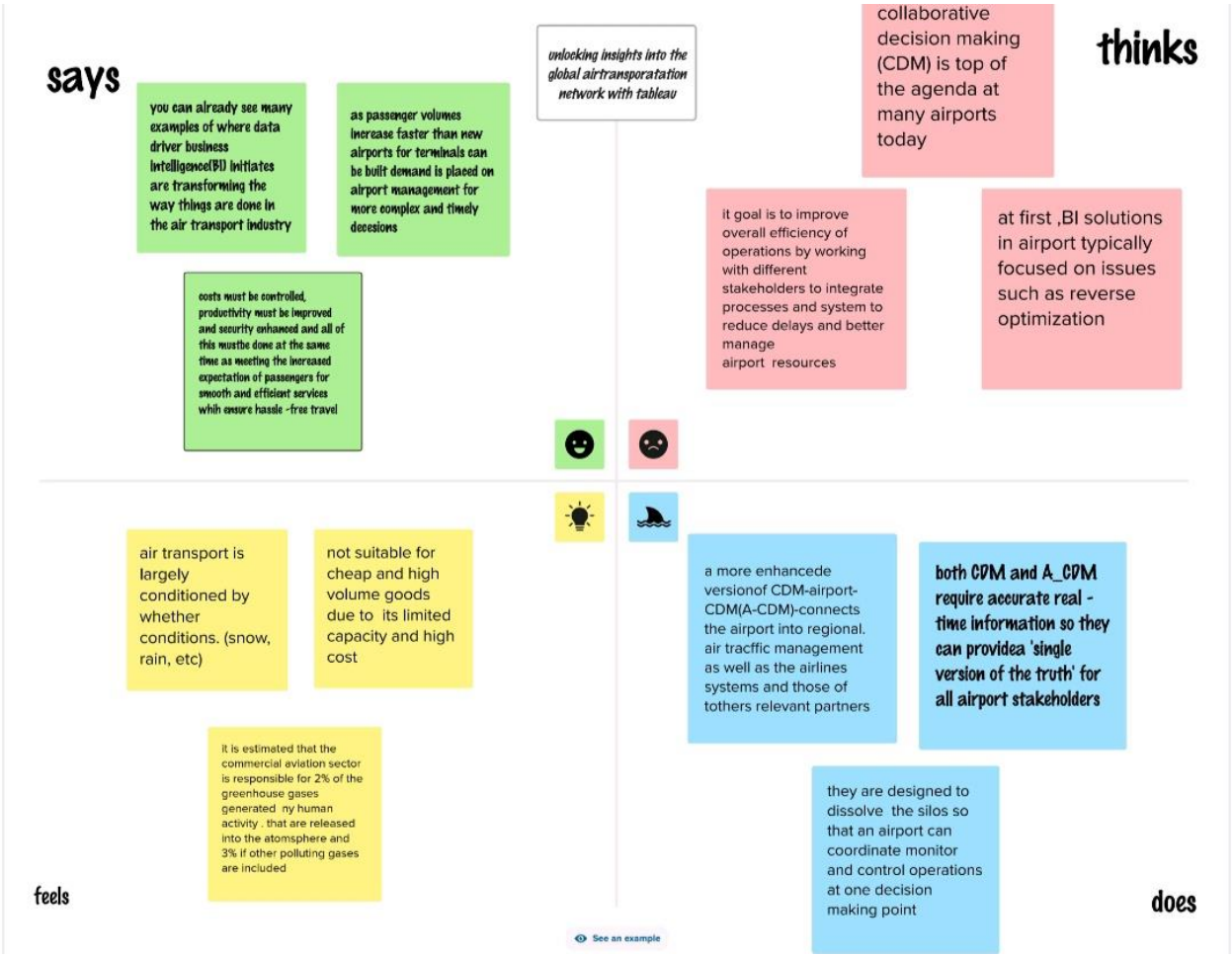
6. Compliance and Regulations: Ensure compliance with aviation regulations and standards by monitoring data within Tableau and identifying areas that may require attention.

7. Customer Experience: Enhance the passenger experience by understanding travel patterns and preferences, enabling airlines to offer more personalized services.

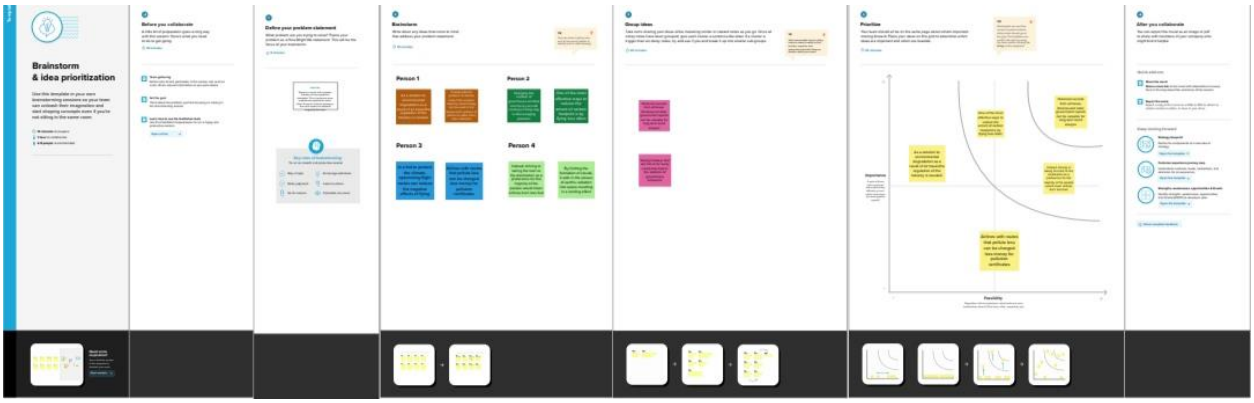
In summary, the purpose is to leverage Tableau's data visualization and analytics capabilities to gain valuable insights, optimize operations, and make data-driven decisions within the global air transportation network.

2.Problem Definition And Design Thinking

2.1 Empathy map



Brainstroming map



3.Result:

Tableau is a powerful data visualization tool that can help you unlock insights into the global air transportation network by creating interactive and informative visualizations. To showcase the results effectively, you can follow these steps:

1. **Data Preparation:** Gather and clean your data. Ensure that it includes relevant information about airports, flights, routes, passenger data, and any other relevant metrics.

2. **Connect Data:** Import your cleaned data into Tableau and connect it to create a data source.

3. **Create Dashboards:** Design interactive dashboards with visualizations. You can create maps to display airport locations, line charts to show flight trends, and bar charts for passenger statistics.

4. **Use Filters:** Implement filters to allow users to interact with the data. They can filter by airlines, regions, or time periods to focus on specific aspects of the air transportation network.

5. **Annotations and Tooltips:** Add annotations and tooltips to provide context and additional information when users hover over data points.

6. **Storytelling:** Build a story within Tableau to guide users through your insights. This can help convey the narrative you want to share.

7. **Sharing:** Publish your Tableau workbook or dashboard to Tableau Server or Tableau Public, depending on your audience's accessibility needs.

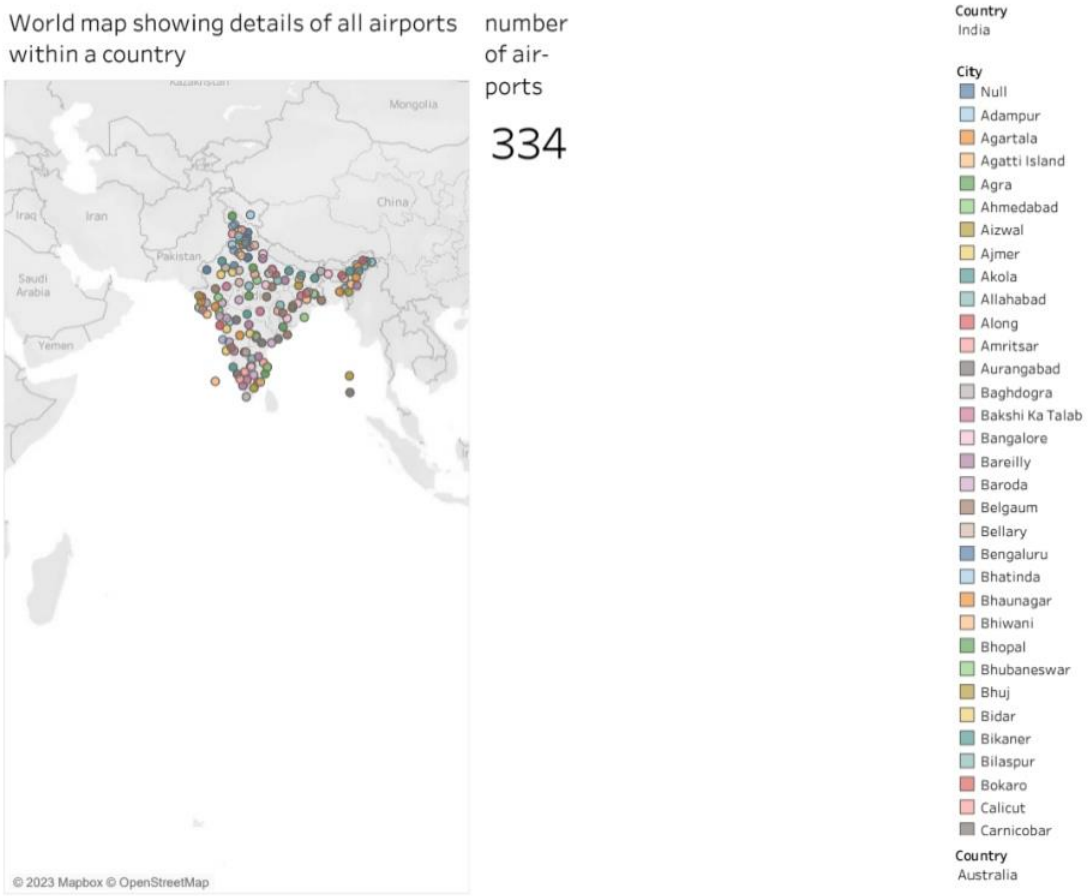
8. **Interactivity:** Ensure that your dashboard is interactive, allowing users to explore data on their own. Utilize actions and parameters to enhance this interactivity.

9. **Performance Optimization:** Optimize your dashboard's performance, especially if dealing with a large dataset, by using extracts and data source filters.

10. **Documentation:** Provide documentation for your dashboard, explaining the data sources, definitions, and any custom calculations or filters used.

By following these steps, you can effectively use Tableau to unlock insights into the global air transportation network and present your results in a visually appealing and informative manner.

Dashboard:



Airlines within a country

Airline ID (a..	Name (airlines (1).csv)	ICAO (airlin..	Callsign
2838	Il Ciocco International Tra..	CIO	CIOCCO
2839	Il-Avia	ILV	ILAVIA
2840	Ildefonso Redriguez	IDL	ILDEFONSO
2841	Iliamna Air Taxi	IAR	ILIAMNA AIR
2842	Ilpo Aruba Cargo	ILP	Null
2843	Ilyich-Avia	ILL	ILYICHAVIA
2844	Imaer	IMR	IMAER
2845	Imair Airlines	ITX	IMPROTEX
2846	Imperial Airways	PNX	PHOENIX
2847	Imtrec Aviation	IMT	IMTREC
2848	Independence Air	IDE	INDEPENDENCE AIR
2849	Independent Air Freighters	IDP	INDEPENDENT
2850	IndiGo Airlines	IGO	IFLY
2851	India International Airways	IIL	INDIA INTER
2852	Indian Air Force	IFC	INDIAN AIRFORCE
2853	Indian Airlines	IAC	INDAIR
2854	Indicator Company	IDR	INDICATOR
2855	Indigo	IBU	INDIGO BLUE
2856	Indonesia Air Transport	IDA	INTRA
2857	Indonesia AirAsia	AWQ	WAGON AIR
2858	Indonesian Airlines	IAA	INDO LINES
2859	Industri Pesawat Terbang..	IPN	NUSANTARA
2860	Industrias Titan	ITN	TITANLUX
2861	Infinit Air	FFI	INFINIT
2862	Inflite The Jet Centre	INS	Null
2863	Innotech Aviation	IVA	INNOTECH
2864	Insel Air International	INC	INSELAIR
2865	Instituto Cartografico de ..	ICC	CARTO
2866	Intair	INT	INTAIRCO

Active
- [x] N
- [x] Y

Country
India

Active
- N
- Y

airports at higher altitude within a country

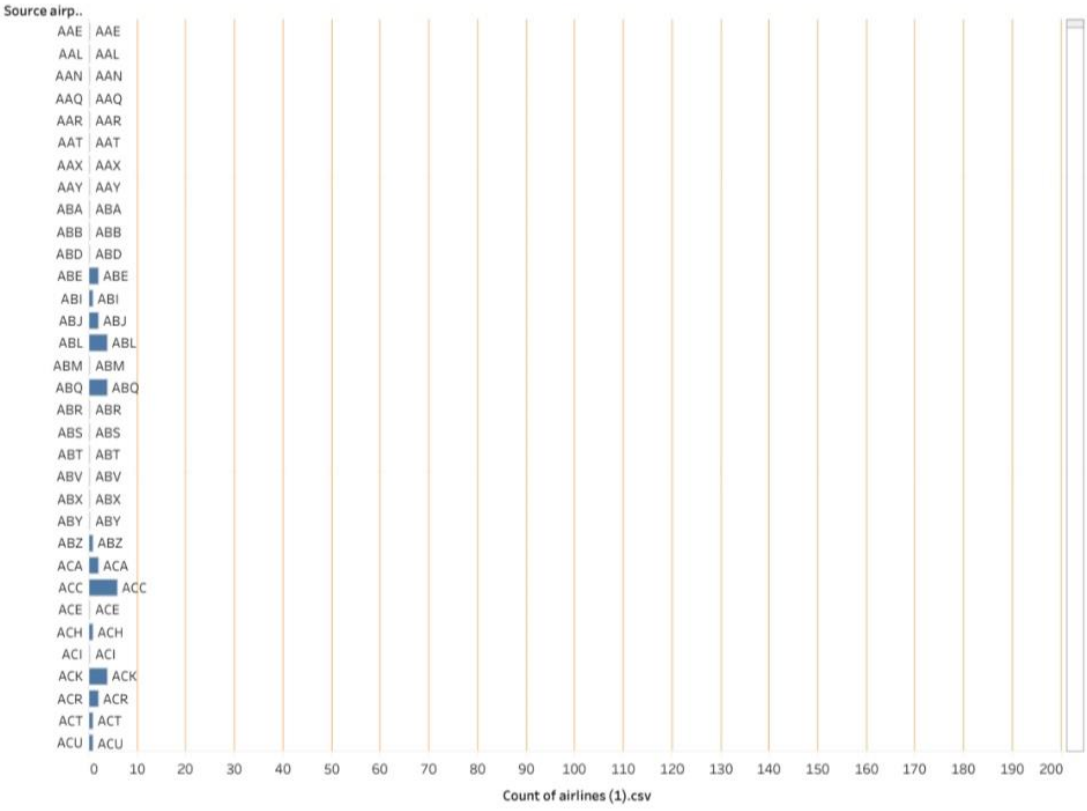
Index (Rout..	Name	City	Icao	
2,836	Sardar Vall..	Ahmedabad	VAAH	18
2,837	Akola Airpo..	Akola	VAAK	9
2,838	Aurangaba..	Aurangabad	VAAU	1,91
2,839	Chhatrapat..	Mumbai	VABB	3
2,840	Bilaspur Air..	Bilaspur	VABI	8
2,841	Bhuj Airport	Bhuj	VABJ	2
2,842	Belgaum Ai..	Belgaum	VABM	2,4
2,843	Vadodara A..	Baroda	VABO	1
2,844	Raja Bhoj In..	Bhopal	VABP	1,71
2,845	Bhavnagar ..	Bhaunagar	VABV	4
2,846	Daman Airp..	Daman	VADN	3
2,847	Deesa Airp..	Deesa	VADS	4
2,848	Guna Airport	Guna	VAGN	1,6
2,849	Dabolim Air..	Goa	VAGO	1
2,850	Devi Ahilya..	Indore	VAID	1,8
2,851	Jabalpur Ai..	Jabalpur	VAJB	1,6
2,852	Jamnagar A..	Jamnagar	VAJM	6
2,853	Kandla Airp..	Kandla	VAKE	9
2,854	Khajuraho ..	Khajuraho	VAKJ	7
2,855	Kolhapur Ai..	Kolhapur	VAKP	1,9
2,856	Keshod Airp..	Keshod	VAKS	1
2,857	Dr. Babasa..	Nagpur	VANP	1,0
2,858	Nashik Airp..	Nasik Road	VAOZ	1,9
2,859	Pune Airport	Pune	VAPO	1,9
2,860	Porbandar ..	Porbandar	VAPR	2
2,861	Rajkot Airp..	Rajkot	VARK	4
2,862	Raipur Airp..	Raipur	VARP	1,0
2,863	Solapur Air..	Sholapur	VASL	1,5
2,864	Surat Airpo..	Surat	VASU	1
2,865	Maharana P..	Udaipur	VAUD	1,6
2,877	Along Airpo..	Along	VEAN	9
2,878	Agartala Ai..	Agartala	VEAT	4
2,879	Lengpui Air..	Aizwal	VELP	1,3

Airports at Highest Altitude in World

Name	City	Icao	
Capitan Nicolas Rojas Air..	Potosi	SLPO	12,913
Copacabana Airport	Copacabana	SLCC	12,591
Daocheng Yading Airport	Daocheng	ZUDC	14,472
El Alto International Airp..	La Paz	SLLP	13,355
Golog Maqin Airport	Golog	ZLGL	12,426
Inca Manco Capac Interna..	Juliaca	SPJL	12,552
Kangding Airport	Kangding	ZUKD	14,042
Ngari Gunsa Airport	Shiquanhe	ZUAL	14,022
Qamdo Bangda Airport	Bangda	ZUBD	14,219
Yushu Batang Airport	Yushu	ZYLS	12,816

Country
India

Number of flights from airport

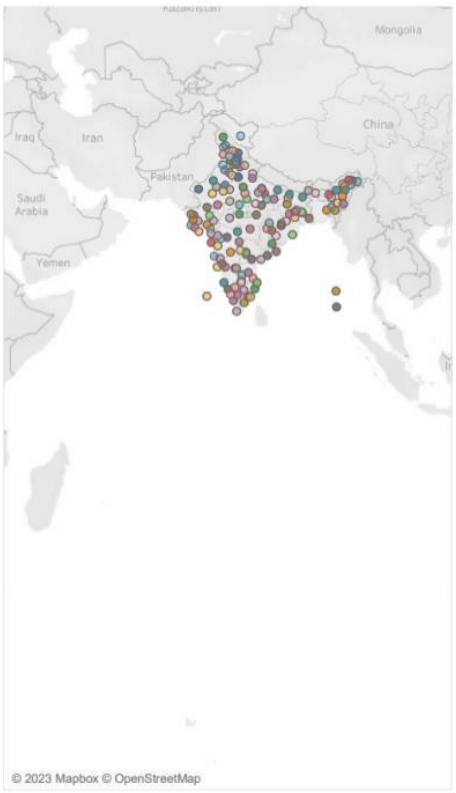


Story

Global Air Transportation Network

World Map Showing Countries With details of Airports	Table showing list of all airlines within the country	Table showing Airports which are at highest altitude in th..	Bar graphs showing countries with max no.of airports &No.of ..

World map showing details of all airports within a country



number of air-ports

334

Country
India

City
- Null
- Adampur
- Agartala
- Agatti Island
- Agra
- Ahmedabad
- Aizwal
- Ajmer
- Akola
- Allahabad
- Along
- Amritsar
- Aurangabad
- Baghdogra
- Bakshi Ka Talab
- Bangalore
- Bareilly
- Baroda
- Belgaum
- Bellary
- Bengaluru
- Bhatinda
- Bhaunagar
- Bhiwani
- Bhopal
- Bhubaneswar
- Bhuj
- Bidar
- Bikaner
- Bilaspur
- Bokaro
- Calicut
- Carnicobar

Country
Australia

Global Air Transportation Network

World Map Showing Countries With details of Airports | **Table showing list of all airlines within the country** | Table showing Airports which are at highest altitude in th.. | Bar graphs showing countries with max no.of airports &No.of ..

Airlines within a country

Airline ID (a..	Name (airlines (1).csv)	ICAO (airlin..	Callsign	
2838	Il Ciocco International Tra..	CIO	CIOCCO	
2839	Il-Avia	ILV	ILAVIA	
2840	Ildefonso Redriguez	IDL	ILDEFONSO	
2841	Iliamna Air Taxi	IAR	ILIAMNA AIR	
2842	Ilpo Aruba Cargo	ILP	Null	
2843	Ilyich-Avia	ILL	ILYICHAVIA	
2844	Imaer	IMR	IMAER	
2845	Imair Airlines	ITX	IMPROTEX	
2846	Imperial Airways	PNX	PHOENIX	
2847	Imtrec Aviation	IMT	IMTREC	
2848	Independence Air	IDE	INDEPENDENCE AIR	
2849	Independent Air Freighters	IDP	INDEPENDENT	
2850	IndiGo Airlines	IGO	IFLY	
2851	India International Airways	IIL	INDIA INTER	
2852	Indian Air Force	IFC	INDIAN AIRFORCE	
2853	Indian Airlines	IAC	INDAIR	
2854	Indicator Company	IDR	INDICATOR	
2855	Indigo	IBU	INDIGO BLUE	
2856	Indonesia Air Transport	IDA	INTRA	
2857	Indonesia AirAsia	AWQ	WAGON AIR	
2858	Indonesian Airlines	IAA	INDO LINES	
2859	Industri Pesawat Terbang..	IPN	NUSANTARA	
2860	Industrias Titan	ITN	TITANLUX	
2861	Infinit Air	FFI	INFINIT	
2862	Inflite The Jet Centre	INS	Null	
2863	Innotech Aviation	IVA	INNOTECH	
2864	Insel Air International	INC	INSELAIR	
2865	Instituto Cartografico de ..	ICC	CARTO	
2866	Intair	INT	INTAIRCO	
2867	Intal Avia	INL	INTAL AVIA	
2879	Inter-Mountain Airways	IMA	INTER-MOUNTAIN	
2880	Inter-State Aviation	ITS	INTER-STATE	
2881	Interair South Africa	ILN	INLINE	
2882	Interaire	NTE	INTERMEX	
2883	Interavia Airlines	SUW	ASTAIR	
2884	Interaviatrans	IVT	INTERAVIA	

Active
- [x] N
- [x] Y

Country
India

Active
- N
- Y

Global Air Transportation Network

World Map Showing Countries With details of Airports | Table showing list of all airlines within the country | Table showing Airports which are at highest altitude in th.. | Bar graphs showing countries with max no.of airports &No.of ..

airports at higher altitude within a country

Index (Rout..	Name	City	Icao	
2,836	Sardar Vall..	Ahmedabad	VAAH	18
2,837	Akola Airpo..	Akola	VAAK	99
2,838	Aurangaba..	Aurangabad	VAAU	1,91
2,839	Chhatrapat..	Mumbai	VABB	3
2,840	Bilaspur Air..	Bilaspur	VABI	89
2,841	Bhuj Airport	Bhuj	VABJ	26
2,842	Belgaum Ai..	Belgaum	VABM	2,48
2,843	Vadodara A..	Baroda	VABO	12
2,844	Raja Bhoj In..	Bhopal	VABP	1,71
2,845	Bhavnagar ..	Bhaunagar	VABV	4
2,846	Daman Airp..	Daman	VADN	3
2,847	Deesa Airp..	Deesa	VADS	48
2,848	Guna Airport	Guna	VAGN	1,60
2,849	Dabolim Air..	Goa	VAGO	15
2,850	Devi Ahilya..	Indore	VAID	1,85
2,851	Jabalpur Ai..	Jabalpur	VAJB	1,62
2,852	Jamnagar A..	Jamnagar	VAJM	6
2,853	Kandla Airp..	Kandla	VAKE	9
2,854	Khajuraho ..	Khajuraho	VAKJ	72
2,855	Kolhapur Ai..	Kolhapur	VAKP	1,99
2,856	Keshod Airp..	Keshod	VAKS	16
2,857	Dr. Babasa..	Nagpur	VANP	1,03
2,858	Nashik Airp..	Nasik Road	VAOZ	1,90
2,859	Pune Airport	Pune	VAPO	1,94
2,860	Porbandar ..	Porbandar	VAPR	2
2,861	Rajkot Airp..	Rajkot	VARK	44
2,862	Raipur Airp..	Raipur	VARP	1,04
2,863	Solapur Air..	Sholapur	VASL	1,58
2,864	Surat Airpo..	Surat	VASU	1
2,865	Maharana P..	Udaipur	VAUD	1,68
2,877	Along Airpo..	Along	VEAN	90
2,878	Agartala Ai..	Agartala	VEAT	4
2,879	Lengpui Air..	Aizwal	VELP	1,39

Airports at Highest Altitude in World

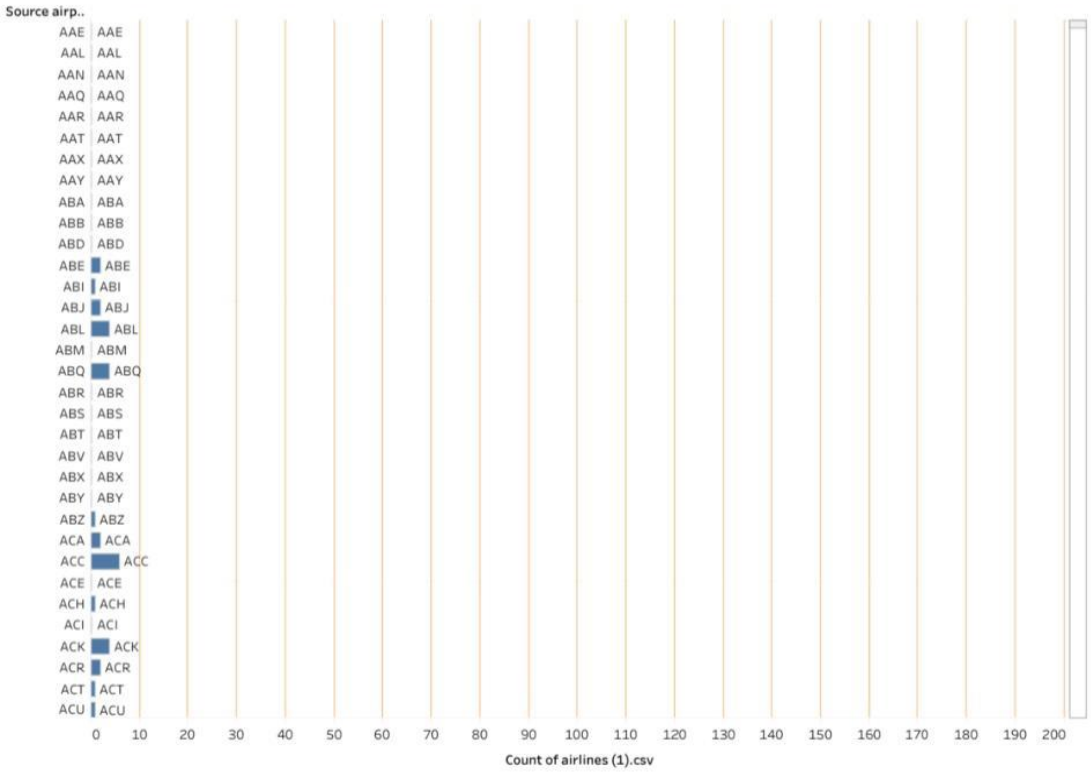
Name	City	Icao	
Capitan Nicolas Rojas Air..	Potosi	SLPO	12,913
Copacabana Airport	Copacabana	SLCC	12,591
Daocheng Yading Airport	Daocheng	ZUDC	14,472
El Alto International Airp..	La Paz	SLLP	13,355
Golog Maqin Airport	Golog	ZLGL	12,426
Inca Manco Capac Interna..	Juliaca	SPJL	12,552
Kangding Airport	Kangding	ZUKD	14,042
Ngari Gunsa Airport	Shiquanhe	ZUAL	14,022
Qamdo Bangda Airport	Bangda	ZUBD	14,219
Yushu Batang Airport	Yushu	ZYLS	12,816

Country
India

Global Air Transportation Network

World Map Showing Countries With details of Airports	Table showing list of all airlines within the country	Table showing Airports which are at highest altitude in th..	Bar graphs showing countries with max no.of airports &No.of ..

Number of flights from airport



4. Advantage and disadvantage

4.1 Advantage of Unlocking Insights into the Global Air Transportation Network with Tableau

Advantages:

1. Data Visualization: Tableau is renowned for its powerful data visualization capabilities. It can help you create interactive and visually appealing charts, graphs, and maps to represent complex air transportation data, making it easier to understand and analyze.

2. Interactive Dashboards: Tableau allows you to build interactive dashboards that enable users to explore data and drill down into specific details. This interactivity can facilitate deeper insights into the network.

3. Real-time Updates: You can connect Tableau to real-time data sources, providing up-to-the-minute information on flights, routes, and other relevant data, which is crucial in the dynamic aviation industry.

4. Customization: Tableau offers customization options, allowing you to tailor your visualizations to specific research questions or stakeholders' needs.

5. Integration: Tableau can integrate with various data sources and databases, enabling you to consolidate and analyze data from multiple sources, such as flight schedules, passenger data, and weather information.

4.2 Disadvantage of Unlocking Insights into the Global Air Transportation Network with Tableau

Disadvantages:

1. Complexity: Tableau can be complex to set up and use effectively, especially when dealing with large and diverse datasets. Users may require training to harness its full potential.

2. Cost: Tableau licenses and ongoing maintenance costs can be high, which may not be feasible for smaller organizations or research projects with limited budgets.

3. Data Preparation: Data preparation is a crucial step in Tableau, and if your data is messy or incomplete, it can be time-consuming to clean and transform it for analysis.

4. Performance Issues: Working with extensive datasets in Tableau can sometimes lead to performance issues, especially when creating complex visualizations or dashboards.

5. Steeper Learning Curve: For users unfamiliar with Tableau, there may be a learning curve involved in mastering its features and capabilities.

In summary, Tableau can be a valuable tool for unlocking insights into the global air transportation network, thanks to its powerful visualization and data analysis capabilities. However, it also comes with challenges related to complexity, cost, and data preparation that need to be considered when deciding to use it for such analysis.

5.Applications:

Tableau is a powerful data visualization tool that can be used to unlock insights into the global air transportation network. Here's how you can use Tableau applications to do so:

1. **Data Collection**: Gather relevant data from sources such as airlines, airports, flight schedules, and passenger statistics. Ensure the data is in a structured format, ideally a database or spreadsheet.

2. **Data Cleaning and Preparation**: Import the data into Tableau and perform necessary data cleaning and transformation. This may include handling missing values, data normalization, and creating calculated fields.

3. **Data Visualization**: Utilize Tableau's drag-and-drop interface to create interactive and informative visualizations. You can create maps to show flight routes, bar charts to display passenger statistics, and scatter plots to analyze airline performance.

4. **Dashboard Creation**: Combine multiple visualizations into a cohesive dashboard. Dashboards allow you to present a comprehensive view of the global air transportation network, making it easier to identify trends and insights.

5. **Filters and Interactivity**: Implement filters and interactivity in your Tableau dashboard to allow users to explore the data. For example, users can filter by airline, airport, or time period to drill down into specific aspects of the network.

6. **Geospatial Analysis**: Take advantage of Tableau's geospatial capabilities to visualize flight routes, airport locations, and congestion patterns. This can help uncover insights related to connectivity and regional disparities.

7. **Time-Series Analysis**: Use Tableau to create time-series visualizations that track changes in air traffic, passenger numbers, or airline market share over time. This can reveal seasonal trends and long-term patterns.

8. **Data Storytelling**: Narrate the insights you've discovered using annotations, captions, and tooltips. This helps users understand the significance of the data and the implications for the global air transportation network.

9. **Sharing and Collaboration**: Share your Tableau dashboard with stakeholders and collaborate on the findings. Tableau allows for easy sharing through web-based dashboards or exporting visualizations as images or PDFs.

10. **Continuous Monitoring**: Set up data connections that update automatically, ensuring that your insights remain current. You can also schedule regular data refreshes and updates in Tableau Server or Tableau Online.

By leveraging Tableau applications in this way, you can unlock valuable insights into the global air transportation network, enabling better decision-making, optimization, and strategic planning within the aviation industry.

6.Conclution:

Unlocking insights into the global air transportation network with Tableau can provide valuable conclusions for various stakeholders, including airlines, airports, and policymakers. Some key conclusions might include:

1. **Route Optimization**: By analyzing flight data, airlines can optimize their routes, minimize fuel consumption, and reduce operating costs.

2. **Demand Forecasting**: Understanding passenger trends and booking patterns can help airlines anticipate demand, adjust pricing strategies, and optimize seat allocation.

3. **Airport Efficiency**: Airports can use Tableau to improve passenger flow, reduce congestion, and enhance overall airport efficiency.

4. **Safety and Security**: Identifying potential vulnerabilities and security risks within the network can aid in strengthening aviation security measures.

5. **Environmental Impact**: Tableau can assist in monitoring the environmental impact of aviation, enabling airlines to implement more sustainable practices.

6. **Market Expansion**: Airlines can use insights to identify untapped markets and expand their route networks strategically.

7. **Customer Experience**: Improving the passenger experience through data-driven decisions, such as optimizing layover times and amenities.

8. **Regulatory Compliance**: Ensuring compliance with aviation regulations and safety standards through data analysis.

In summary, leveraging Tableau for analyzing the global air transportation network can lead to more efficient, safer, and environmentally conscious operations, benefiting both industry stakeholders and travelers.

7.Future scope:

Exploring the future scope of unlocking insights into the global air transportation network with Tableau involves leveraging advanced analytics, data integration, and visualization techniques. Here are some potential areas of development:

1. **Real-time Data Integration:** Enhance the ability to integrate real-time data sources, such as flight tracking data, weather information, and passenger demographics, to provide up-to-the-minute insights for airlines, airports, and travelers.

2. **Predictive Analytics:** Develop predictive models for flight delays, passenger demand, and route optimization. These models can help airlines and airports make proactive decisions to improve efficiency and customer experience.

3. **Personalized Travel Experiences:** Utilize Tableau to create personalized dashboards and recommendations for travelers. This could include customized itineraries, airport navigation assistance, and real-time updates on flights and services.

4. **Supply Chain Optimization:** Extend Tableau's capabilities to optimize the supply chain for airlines, ensuring efficient management of aircraft, crew, and maintenance resources.

5. **Environmental Impact Analysis:** Analyze and visualize the environmental impact of air travel, including carbon emissions and fuel consumption. This can aid in developing sustainable aviation practices.

6. **Security and Safety:** Improve security measures by integrating security data with Tableau to identify potential threats and enhance passenger safety.

7. **Cost Reduction:** Use Tableau to identify cost-saving opportunities in various aspects of the aviation industry, such as fuel efficiency, maintenance, and personnel management.

8. **Regulatory Compliance:** Develop tools to help airlines and airports stay compliant with evolving aviation regulations, ensuring safety and operational integrity.

9. **Customer Feedback Analysis:** Utilize sentiment analysis and customer feedback data to improve the quality of services provided by airlines and airports.

10. **Global Network Expansion:** As the global air transportation network continues to grow, Tableau can be used to analyze market trends and identify opportunities for expansion and collaboration.

To achieve these goals, collaboration between data scientists, aviation experts, and Tableau developers will be essential. Additionally, staying updated with the latest Tableau features and data visualization best practices will be crucial for maximizing the potential of this tool in the context of the global air transportation network.