



GOVERNMENT OF TAMILNADU

Naan Muthalvan – Project Based Experiential Learning

UNLOCKING INSIGHTS INTO THE GLOBAL AIR TRANSPORTATION NETWORK

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M.V.MUTHIAH GOVERNMENT ARTS COLLEGE FOR WOMEN

(Affiliated to Mother Teresa Women's University, Kodaikanal)

Reaccredited with "A" Grade by NAAC

DINDIGUL-624001.

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PG & RESEARCH DEPARTMENT OF MATHEMATICS
BONAFIDE CERTIFICATE

This is to certify that this is a bonafide record of the project entitled, "UNLOCKING INSIGHTS INTO THE GLOBAL AIR TRANSPORTATION NETWORK" done by Ms. S. PRINCY - (21321TR022), Ms. S. PRIYADHARSHINI - (21321TR023), Ms. P. RANJITHA – (21321TR024), and Ms. M. RENUKA – (21321TR025) This is submitted in partial fulfillment for the award of the degree of Bachelor of Science in Mathematics in M.V.MUTHIAH GOVERNMENT ARTS COLLEGE FOR WOMEN, DINDIGUL during the period of June 2023 to November 2023.

Project Mentor(s)

Head of the Department

S.NO	TOPIC	PAGE NO
1	INTRODUCTION	2
	1.1 OVERVIEW	2
	1.2 PURPOSE	3
2	PROBLEM DEFINITION & DESIGN THIN	4
	2.1 EMPATHY MAP	4
	2.2 IDEATION & BRAINSTORMING MAP	5
3	RESULT	6
	3.1 AIRPORTS FINAL	6
	3.2 NO. OF AIRPORTS	6
	3.3 AIRPORTS AT HIGHER ALTITUDE WITHIN A COUNTRY	7
	3.4 AIRPORTS AT HIGHER ALTITUDE IN WORLD	7
	3.5 AIRLINES WITHIN A COUNTRY	8
	3.6 NUMBER OF AIRLINES	8
	3.7 COUNTRY WITH MAXIMUM NUMBER OF AIRPORTS	9
	3.8 NUMBER OF FLIGHTS FROM AIRPORTS	9
	3.9 DASHBORDS	10
	3.10 STORY	14
4	ADVANTAGES & DIAADVANTAGES	16
	4.1 ADVANTAGES	16
	4.2 DISADVANTAGES	16
5	APPLICATIONS OF AIR TRANSPORTATION	16
6	FUTURE SCOPE	17
7	CONCLUTION	17

UNLOCKING INSIGHTS INTO THE GLOBAL AIR TRANSPORTATION NETWORK WITH TABLEAU

1. INTRODUCTION

Air Transport, which represents the next most substantial energy-consuming transport sector, includes passenger and freight airplanes, that is, aircraft configured for transporting passengers, freight, or mail. According to the International Air Transport Association (IATA), in 2017, airlines carried 4.1 billion passengers globally. This value increased by 7.3% over 2016, which represented an additional 280 million trips by air between 2016, and 2017. In addition, as with many of the energy and transport-related statistics in recent times, airlines in the Asia-Pacific region carried the largest number of passengers, According to IATA statistics, the market share of passengers increased from 2016 2017 by region is as follows:

1. Asia-Pacific, 36.3%; 1.5 billion passengers (10.6% increase from 2016).
2. Europe, 26.3%; 1.1 billion passengers (8.2% increase).
3. North America, 23%; 941.8 million passengers (3.2% increase).
4. Latin America, 7%; 286.1 million passengers (4.1% increase).
5. Middle East, 5.3%; 216.1 million passengers (4.6% increase).
6. Africa, 2.2%; 88.5 million passengers (6.6% increase).

In addition, it is noteworthy that the aggregated global number of 4.1 billion has doubled since 2005, and by 2036, IATA anticipates that airlines will carry nearly 8 billion passengers globally.

Since airfares are connected to carrier fuel costs (among others), there is an incentive for the industry to reduce fuel consumption as much as possible, both in their aircraft and in their airline infrastructure. According to a 2012 World Bank report, energy efficiency in the air transport sector has come from technology improvements in airframe and engine design, air traffic control, and airport operation.

PURPOSE OF THE AIR TRANSPORT

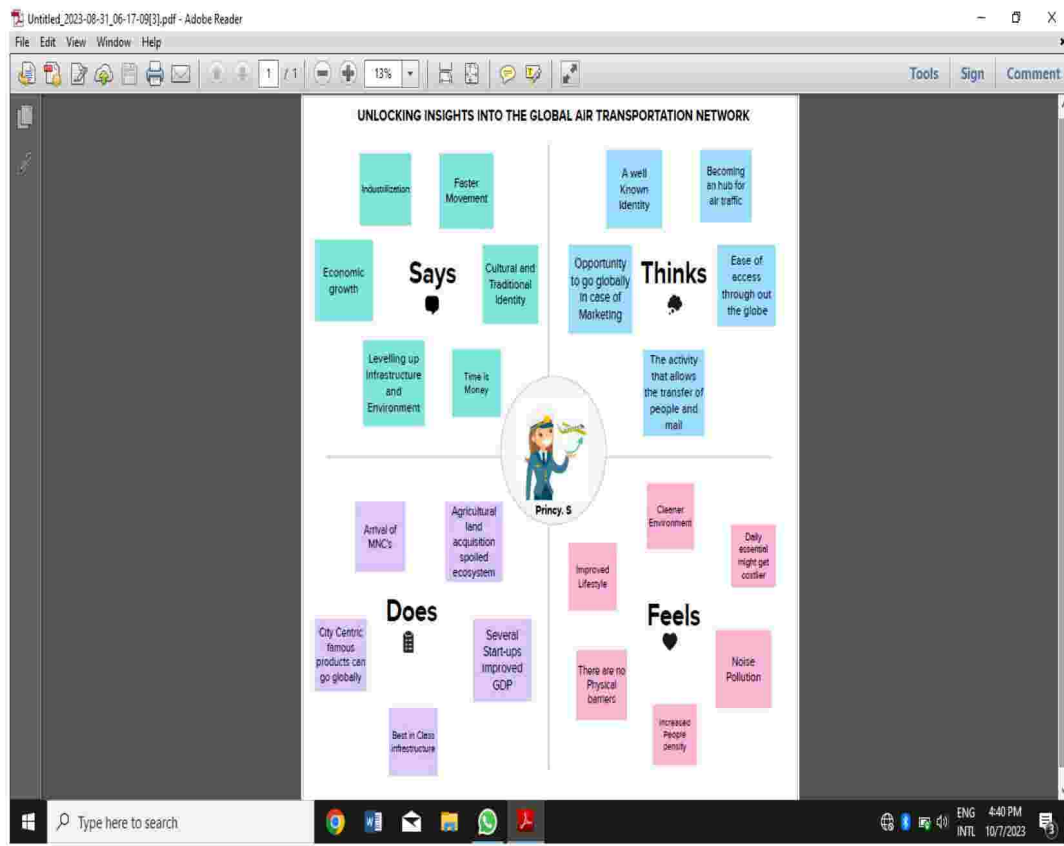
Air Transport allows people from different countries to cross international boundaries and travel other countries for personal, business, medical, and tourism purposes.

The importance of air transport lies in its ability as an economic engine to generate and support jobs, strengthen trade and connectivity between people and countries, promote tourism, and connect remote communities.



2. PROBLEM DEFINITION AND DESIGN THINKING

2.1 EMPATHY MAP



2.2 BRAINSTROMING MAP

Adobe Reader window showing a brainstorming map titled "GLOBAL AIR TRANSPORTATION NETWORK". The map is organized into sections: Brainstorm, Problem, Solution, and a central area with various notes and images.

Brainstorm & idea prioritization

Use the template if you need brainstorming ideas for your team. You should also use it to get ideas, understand the problem, and identify a solution.

Problem

What are the benefits of having a transportation network? How can we improve it? What are the benefits of having a transportation network? How can we improve it?

Solution

How can we improve the transportation network? What are the benefits of having a transportation network? How can we improve it?

GLOBAL AIR TRANSPORTATION NETWORK

PROBLEM 1

The world's air transportation network is facing a number of challenges. These include the need for more efficient routes, the need for more sustainable practices, and the need for more secure systems. The world's air transportation network is facing a number of challenges. These include the need for more efficient routes, the need for more sustainable practices, and the need for more secure systems.

PROBLEM 2

The world's air transportation network is facing a number of challenges. These include the need for more efficient routes, the need for more sustainable practices, and the need for more secure systems. The world's air transportation network is facing a number of challenges. These include the need for more efficient routes, the need for more sustainable practices, and the need for more secure systems.

PROBLEM 3

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PROBLEM 4

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PROBLEM 5

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Solution

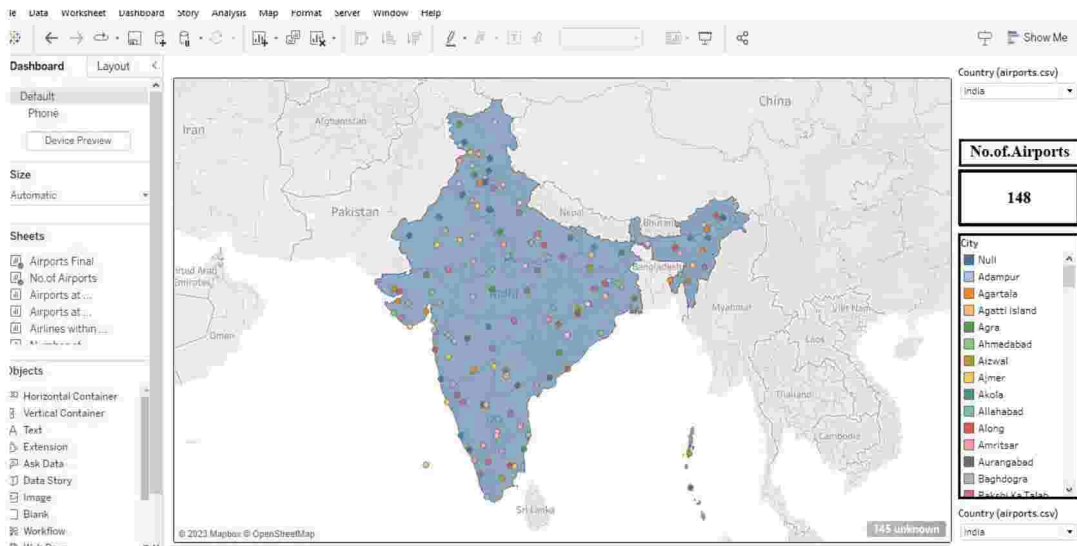
How can we improve the transportation network? What are the benefits of having a transportation network? How can we improve it?

Notes and Images

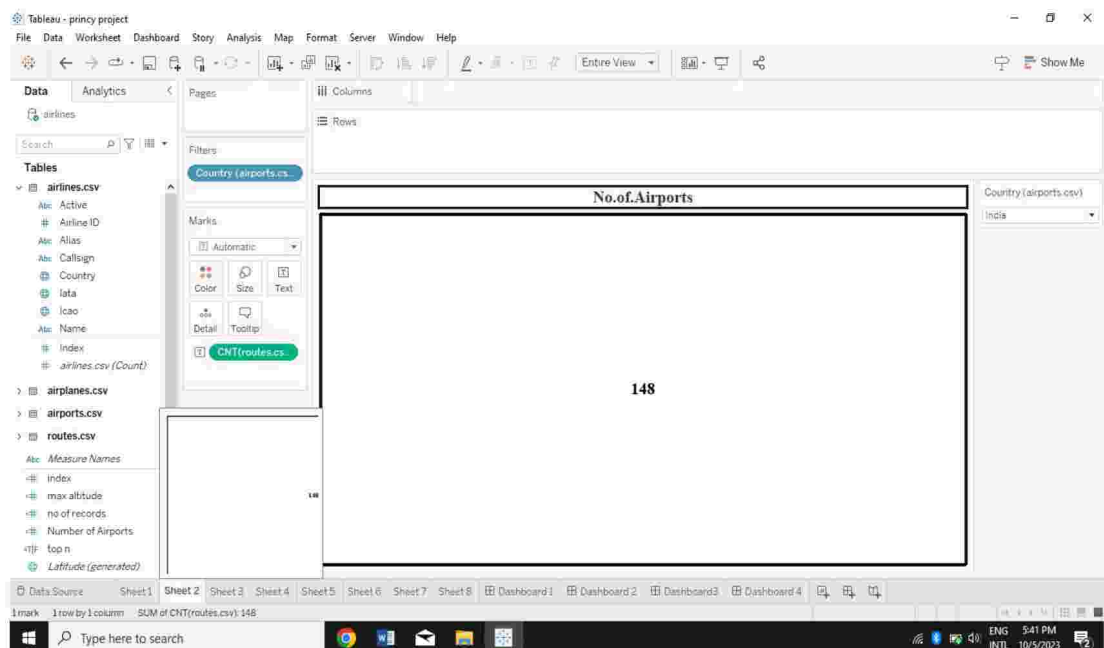
The central area of the map contains various notes and images. These include a photo of a group of people, a photo of an airplane, and a diagram of a network. The notes discuss the benefits of having a transportation network, the challenges of improving it, and the need for more efficient routes, more sustainable practices, and more secure systems.

3. RESULT

3.1 AIRPORTS FINAL



3.2 NUMBER OF AIRPORTS



3.3 AIRPORTS AT HIGHER ALTITUDE WITHIN A COUNTRY

Tableau - princy project

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Search

Tables

- airlines.csv
 - Active
 - Line ID
 - Alias
 - Call sign
 - Country
 - IATA
 - ICAO
 - Name
 - Index
 - airlines.csv (Count)
- airplanes.csv
- airports.csv
- routes.csv
 - Measure Names
 - index
 - max altitude
 - no of records
 - Number of Airports
 - top n
 - Latitude (generated)

Filters

Country (airports.csv)

top n: True

Columns

Rows

SUM(Index (Routes.csv)) Name (airports.csv) City ICAO (airports.csv)

Country (airports.csv)

India

Marks

SUM(Altitude)

Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Dashboard1 Dashboard2 Dashboard3 Dashboard4

3 marks 3 rows by 1 column SUM(Altitude): 3,099

Type here to search

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Index (Routes.csv)	Name (airports.csv)	City	ICAO (airports.csv)
2,836	Sardar Vallabhbhai Patel International Airport	Ahmedabad	VAAH
2,837	Akola Airport	Akola	VAAK
2,838	Aurangabad Airport	Aurangabad	VAAU

3.4 AIRPORTS AT HIGHER ALTITUDE IN WORLD

Tableau - princy project

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Search

Tables

- airlines.csv
 - Active
 - Line ID
 - Alias
 - Call sign
 - Country
 - IATA
 - ICAO
 - Name
 - Index
 - airlines.csv (Count)
- airplanes.csv
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- routes.csv
 - Measure Names
 - index
 - max altitude
 - no of records
 - Number of Airports
 - top n
 - Latitude (generated)

Filters

ICAO (airports.csv)

Columns

Rows

Name (airports.csv) City ICAO (airports.csv)

ICAO (airports.csv)

Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Dashboard1 Dashboard2 Dashboard3 Dashboard4

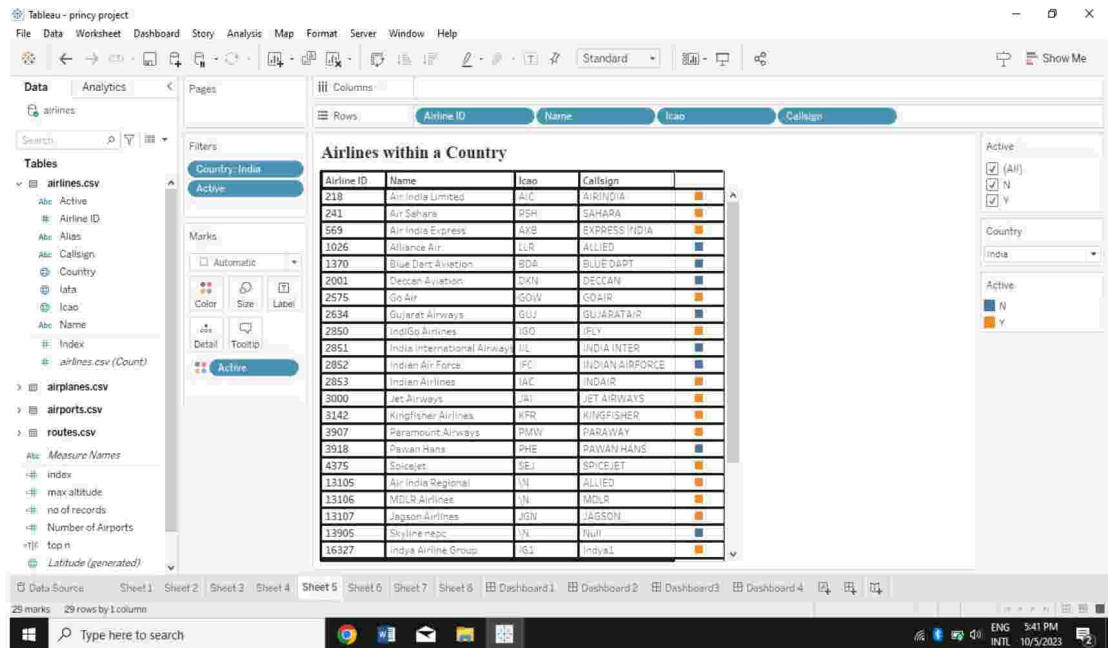
10 marks 10 rows by 1 column SUM(Altitude): 133,408

Type here to search

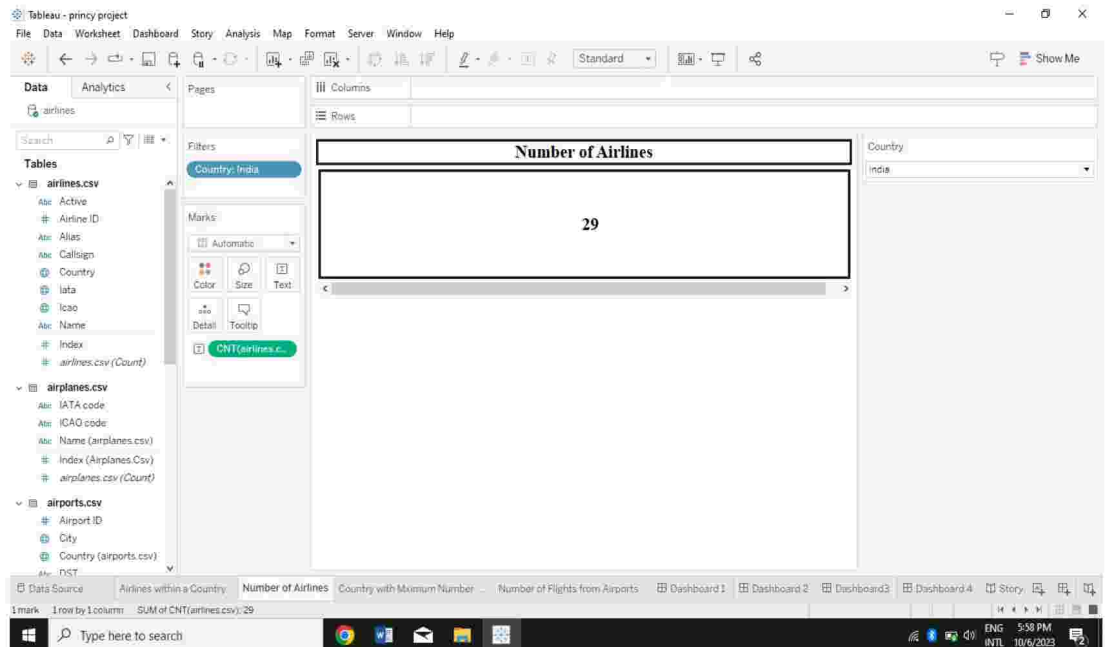
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Name (airports.csv)	City	ICAO (airports.csv)
Capitan Nicolas Rojas Airport	Potosi	SLPO
Copacabana Airport	Copacabana	SLCC
Daocheng Yading Airport	Daocheng	ZUDC
El Alto International Airport	La Paz	SLP
Golog Maqin Airport	Golog	ZLGL
Ilaca Manco Capac International Airport	Yllaca	SPJL
Kangding Airport	Kangding	ZUKD
Nigan Gunsa Airport	Shigatse	ZUAL
Qamda Bangda Airport	Bangda	ZUSD
Yushu Batang Airport	Yushu	ZYLS

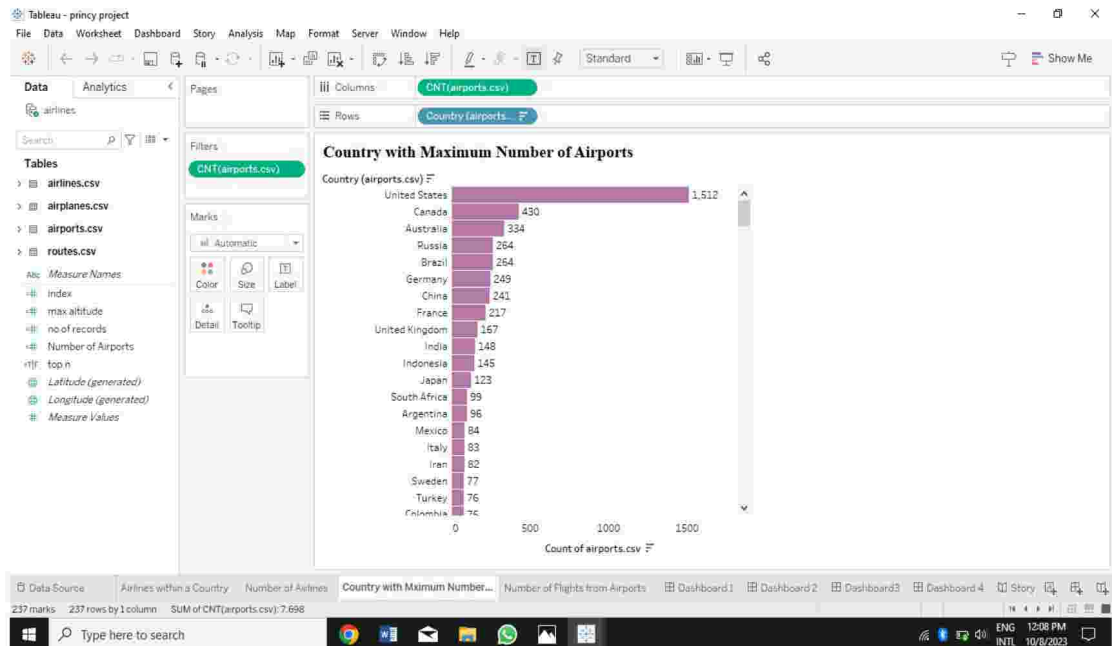
3.5 AIRLINES WITHIN A COUNTRY



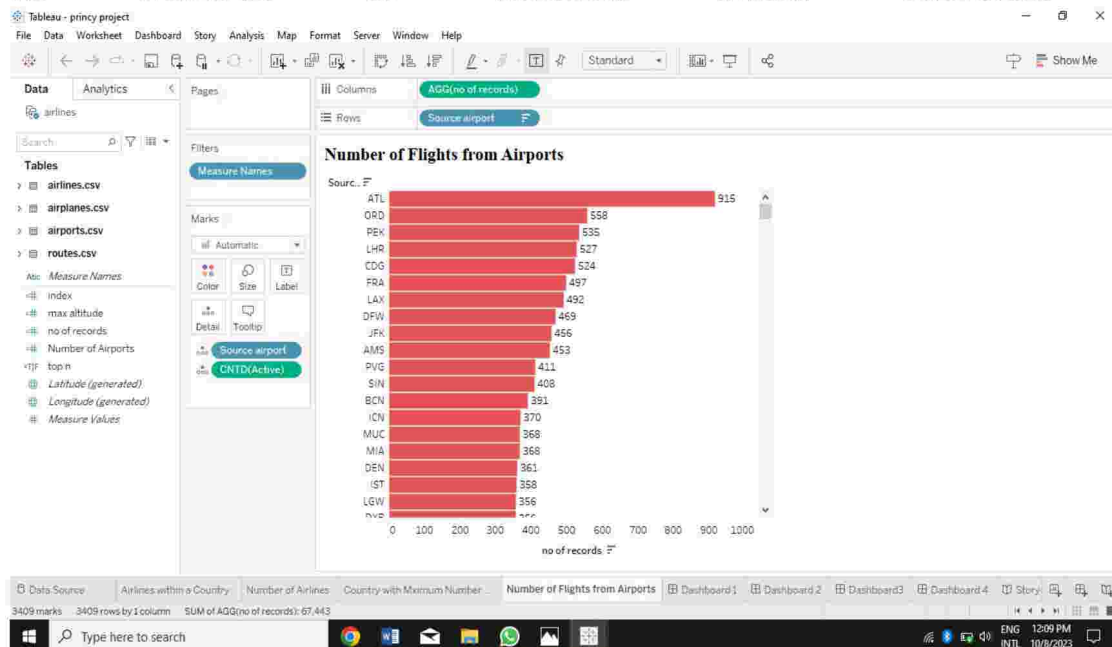
3.6 NUMBER OF AIRLINES



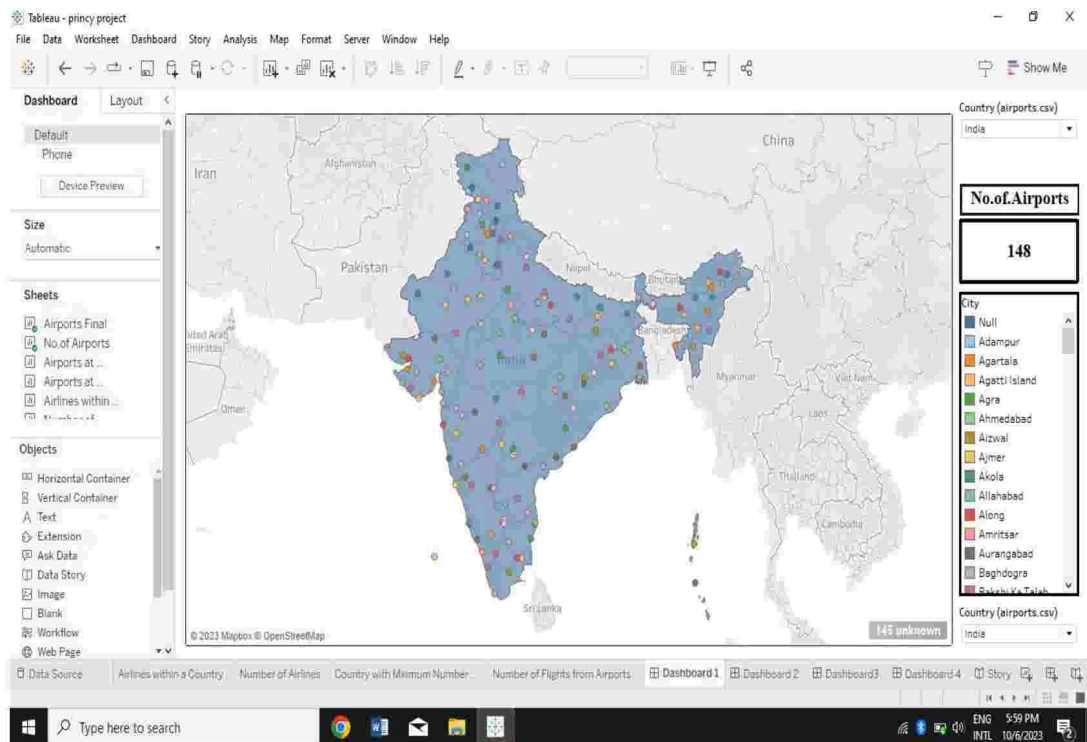
3.7 COUNTRY WITH MAXIMUM NUMBER OF AIRPORTS



3.8 NUMBER OF FLIGHTS FROM AIRPORTS



DASHBOARD 1



In dashboard 1 we get the information about in the world map showing country wise Airports. We mark the location of the Airports and we calculated the number of airports in India. 148 Airports in India. We also mark the city.

DASHBOARD 2

Airlines within a Country

Airline ID	Name	Icao	Callsign	Active
218	Air India Limited	AIC	AIRINDIA	Active
241	Air Sahara	RSH	SAHARA	Inactive
569	Air India Express	AXB	EXPRESS INDIA	Active
1026	Alliance Air	LLR	ALLIED	Inactive
1370	Blue Dart Aviation	BDA	BLUE DART	Inactive
2001	Deccan Aviation	DKN	DECCAN	Inactive
2575	Go Air	GOW	GOAIR	Active
2634	Gujarat Airways	GUJ	GUJARATAIR	Inactive
2850	IndiGo Airlines	IGO	IFLY	Active
2851	India International Airways	IIL	INDIA INTER	Inactive
2852	Indian Air Force	IFC	INDIAN AIRFORCE	Inactive
2853	Indian Airlines	IAC	INDAIR	Inactive
3000	Jet Airways	JAI	JET AIRWAYS	Active
3142	Kingfisher Airlines	KFR	KINGFISHER	Inactive
3907	Paramount Airways	PMW	PARAWAY	Inactive
3918	Pawan Hans	PHE	PAWAN HANS	Inactive
4375	Spicejet	SEJ	SPICEJET	Active
13105	Air India Regional	IN	ALLIED	Active
13106	MDLR Airlines	IN	MDLR	Inactive
13107	Jagson Airlines	JGN	JAGSON	Inactive
13905	Skyline nepc	IN	Null	Inactive
16327	Indya Airline Group	IGI	Indya1	Active
16362	OCEAN AIR CARGO	IXO	Null	Inactive
16738	NEPC Airlines	IN	Null	Inactive
16901	12 North	N12	12N	Active
19451	Air Costa	IN	Null	Inactive

Number of Airlines

In this dashboard 2 the table showing list of all airlines in country wise. We get information about Airlines within a country in India. The blue colour denotes the airline was active. The orange colour denotes the airline was in active. And we also calculated how many airlines in India ? There are 29 airlines.

DASHBOARD 3

Airports at Higher Altitude within a Country

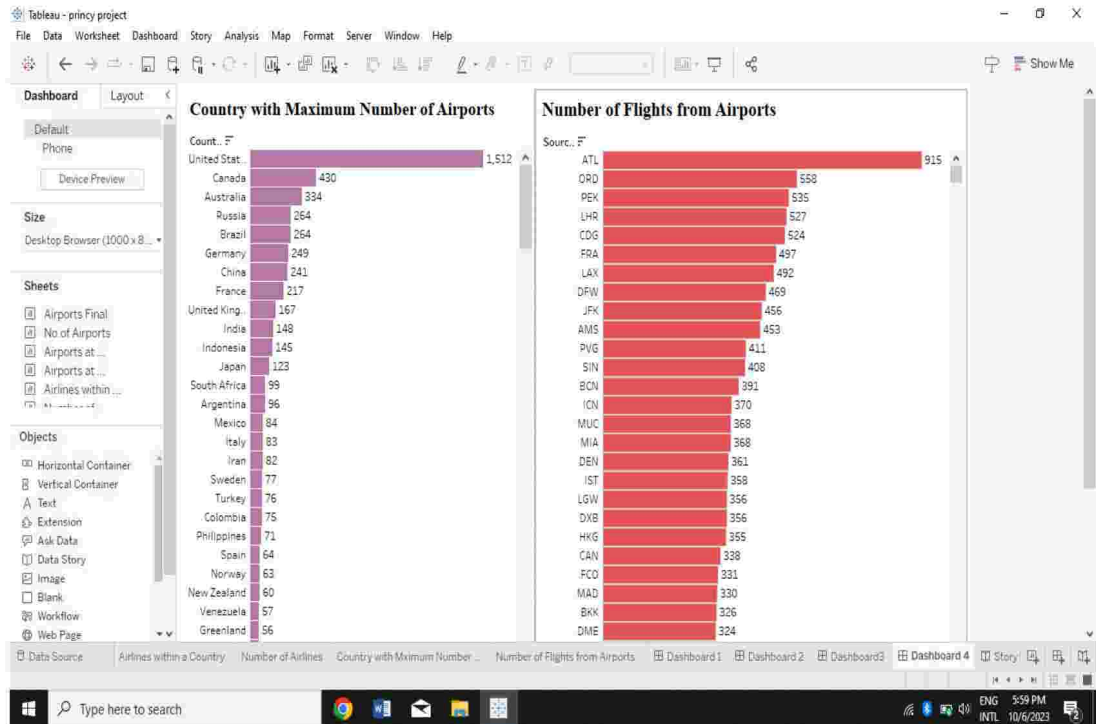
Index (Routes.Csv)	Name (airports.csv)	City	ICAO (airports.csv)
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2,838	Aurangabad Airport	Aurangabad	VAAU

Airports at Highest Altitude in World

Name (airports.csv)	City	ICAO (airports.csv)
Capitan Nicolas Rojas Airport	Potosi	SLPO
Copacabana Airport	Copacabana	SLCC
Daocheng Yading Airport	Daocheng	ZUDC
El Alto International Airport	La Paz	SLLP
Golog Maqin Airport	Golog	ZLGL
Inca Manco Capac International	Jalaca	SPJL

In this dashboard 3 we get the information about Top three Airports at Higher Altitude within a country in India. And also we calculated the Airports at Higher Altitude in World.

DASHBOARD 4



In this dashboard 4 we get the information about the bar graph showing country with maximum number of Airports and Number of flights from Airports.

STORY

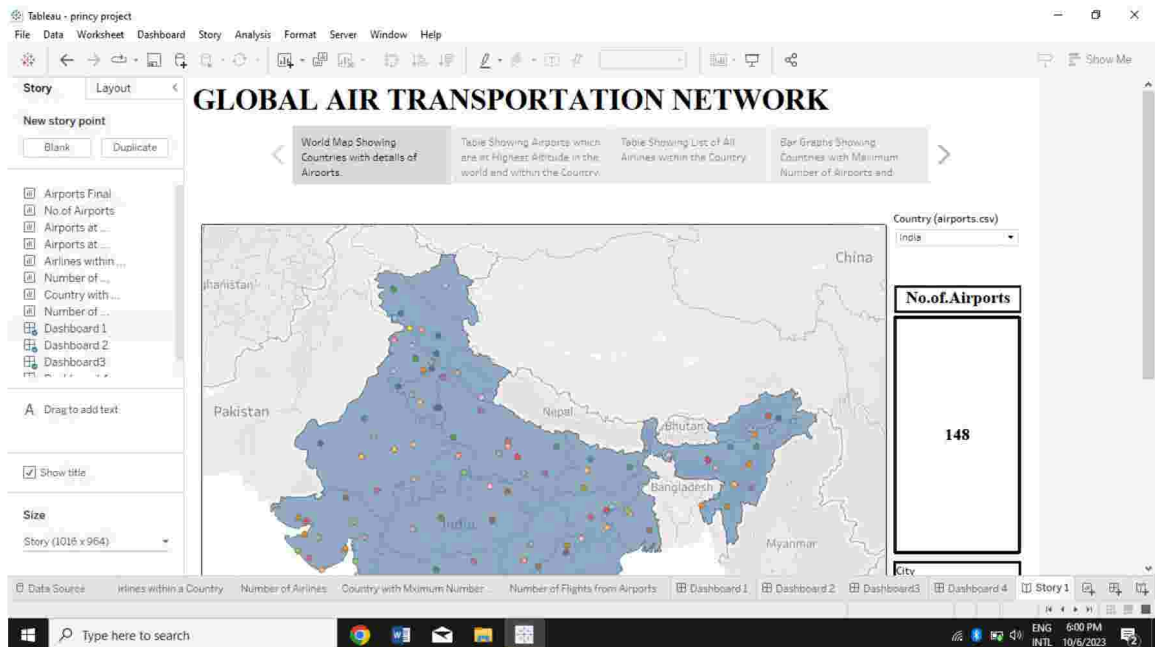


Tableau - princy project

File Data Worksheet Dashboard Story Analysis Format Server Window Help

Story Layout

New story point

Blank Duplicate

Airports Final
No. of Airports
Airports at ...
Airports at ...
Airlines within ...
Number of ...
Country with ...
Number of ...
Dashboard 1
Dashboard 2
Dashboard 3

Drag to add text

Show title

Size
Story (1016 x 964)

GLOBAL AIR TRANSPORTATION NETWORK

World Map Showing Countries with details of Airports.

Table Showing Airports which are at Highest Altitude in the world and within the Country.

Table Showing List of All Airlines within the Country.

Bar Graphs Showing Countries with Maximum Number of Airports and

Country (airports.csv)
India

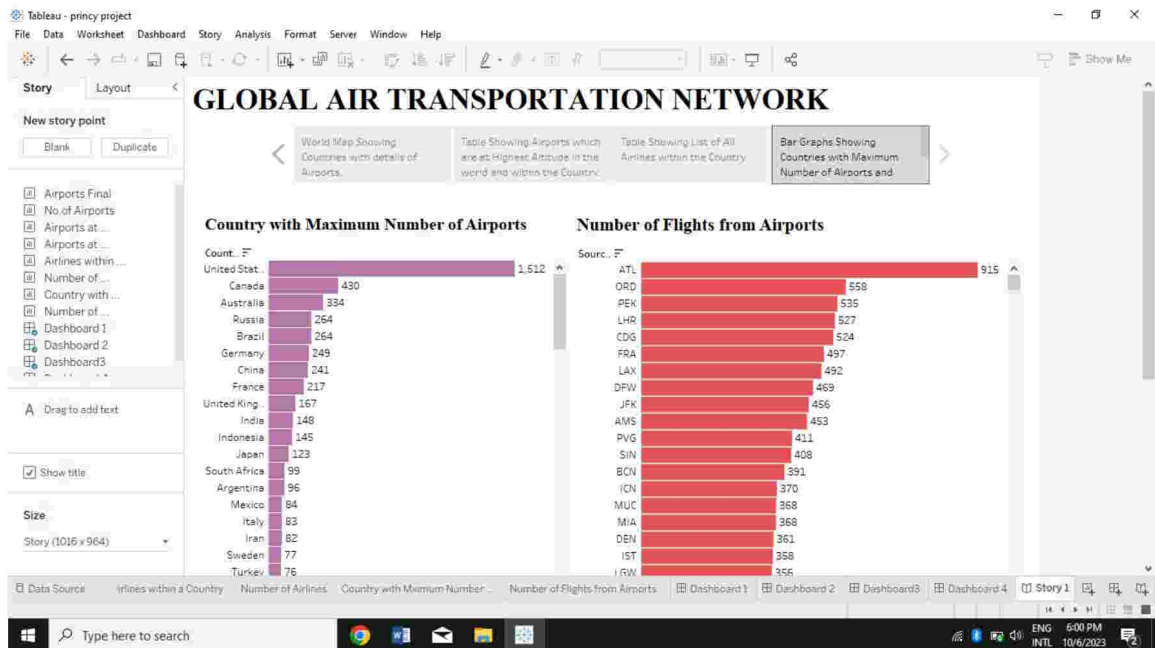
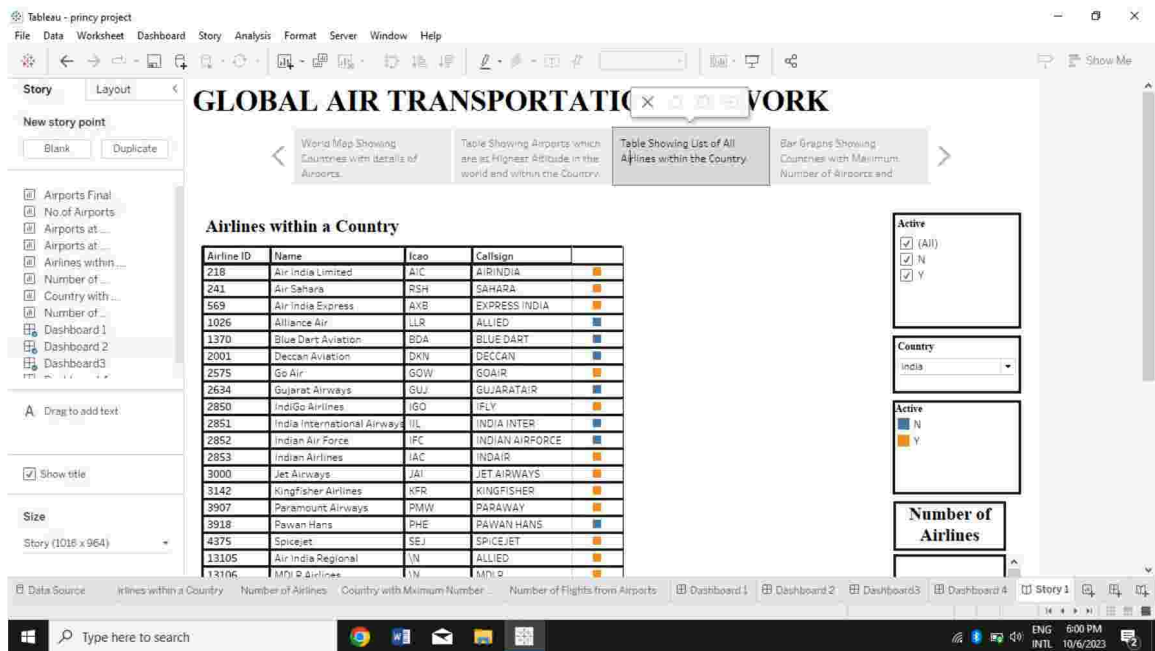
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Copacabana Airport	Copacabana	SLCC

Data Source Airlines within a Country Number of Airlines Country with Maximum Number Number of Flights from Airports Dashboard 1 Dashboard 2 Dashboard 3 Dashboard 4 Story 1

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4. ADVANTAGES & DISADVANTAGES

4.1 ADVATAGES

- Air Transport is the fastest means of transport. It is one of the most advanced and developed means of Transportation.
- This means helps to reach places where roads and rails cannot reach i.e jungles, deserts and mountains areas.
- Travel by air is comfortable but costly. Helicopters can land in small areas and are useful in mountain and terrain.
- Airways are useful during for providing rescue operations.
- Very Fast
- Deliver items quickly over long distances
- Give you high levels of security for sensitive items
- Be used for a range of goods

4.2 DISADVANTAGES

- Air transport can involve higher costs than other options, and is not suitable for all goods
- Flights are subjects to delay or cancelation
- You will need to pay taxes at each airport you use
- Fuel and currency surcharges will usually be added to freight costs
- Further transportation may be needed from the destination airport to the final destination

5. APPLICATIONS OF AIR TRANSPORTATION

Air transport is currently used in almost all industrial sectors and distribution chains.

Most companies use air transport to market goods and products internationally or to deliver samples and documents related to foreign trade operations.

6. FUTURE SCOPE

The future of the aviation industry in India is likely to see continued growth and expression, driven by factors such as a growing middle class, increased tourism, and government policies supporting the industry.

The roadmap outlined significant benchmarks to achieve the goal of making India the best-performing centre for aviation by 2040, in addition to expanding the country's aviation industry.

The aviation market is anticipated to expand quickly between 2022 and 2029 throughout the anticipated time period.

7. CONCLUSION

The Air transport industry is not only a vital engine of global socio-economic growth but is also of vital importance as a catalyst for economic development in most countries and for many regions within each country. Its importance arises not only from its ability to facilities the movement of people but also its ability to expedite the movement of goods.