





#### KAAMADHENU ARTS AND SCIENCE COLLEGE

#### **SATHYAMANGALAM**

#### **DEPARTMENT OF MATHEMATICS**

**Course Name: Data Analytics with Tableau** 

Academic Year: 2023-2024

A project report entitled

# "INSIGHTS INTO THE GLOBAL AIR TRANSPORTATION NETWORK WITH TABLEAU"

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# INDEX

S NO	TITLE	PAGE
5110		NO NO
1	UNLOCKING INSIGHTS INTO THE GLOBAL AIR TRANSPORTATION NETWORK	4
2	PROBLEM DEFINITION AND DESIGN THINKING	6
3	RESULT	8
4	STORY	11
5	VISUALIZATION	15
6	ADVANTAGES OF AIR TRANSPORT	18
7	DISADVANTAGES OF AIR TRANSPORT	19
8	CONCLUSION	20
9	APPENDIX	21

# 1 .UNLOCKING INSIGHTS INTO THE GLOBAL AIR TRANSPORTATION NETWORK

#### INTRODUCTION

#### 1.1 OVERVIEW

The global air transportation network is a complex and intricate web that connects people, goods, and ideas across the world. Understanding and optimizing this network is crucial for economic development, trade, and global connectivity. To unlock insights into this intricate system, one must delve into various facets, including routes, carriers, passenger behavior, and environmental impacts. The global air transportation network comprises a vast array of routes and destinations. Air travel is a critical driver of globalization, enabling people and products to move quickly and efficiently. Researchers and analysts employ data analysis and modeling techniques to comprehend how routes are established, maintained, and adjusted over time. Geographic information systems (GIS) play a crucial role in

mapping these networks, allowing researchers to visualize the interconnections among different cities and regions. Such insights are instrumental in route planning for airlines and can help identify underserved regions, thus fostering economic growth.

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#### 1.2 PURPOSE

1. Air travel and the associated infrastructure contribute to economic growth by creating jobs, stimulating tourism, and facilitating trade. Airports and airlines are often major employers in their respective regions.

Air transportation networks transport goods and cargo across the world. They are essential for the timely delivery of perishable goods, high-value items, and products that require rapid transportation.

Air networks connect remote and distant locations, enabling global connectivity. This connectivity is crucial for international business, diplomacy, and emergency response efforts

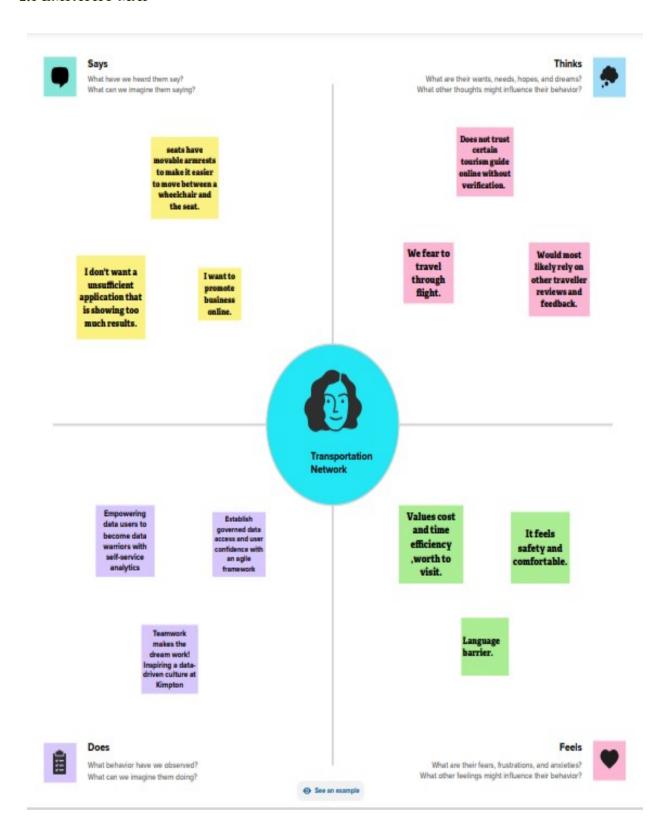
Air travel and the associated infrastructure contribute to economic growth by creating jobs, stimulating tourism, and facilitating trade. Airports and airlines are often major employers in their respective regionsrts.

Air travel is often the fastest mode of transportation, particularly for long distances. This saves time for both passengers and shippers.

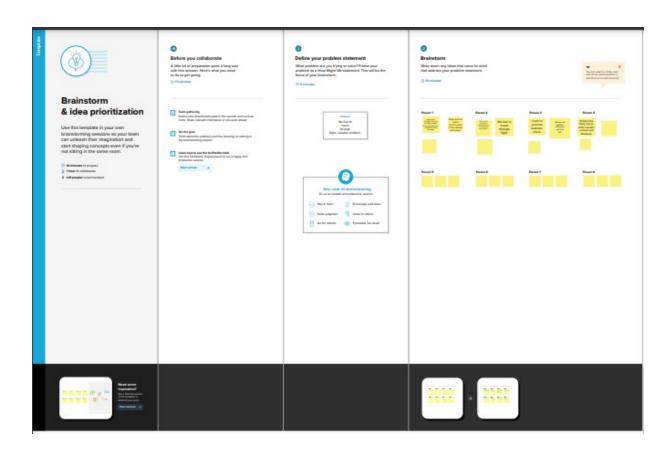
Air transportation networks play a vital role in emergency response, allowing for the rapid deployment of relief supplies, medical personnel, and equipment to disaster- stricken areas.

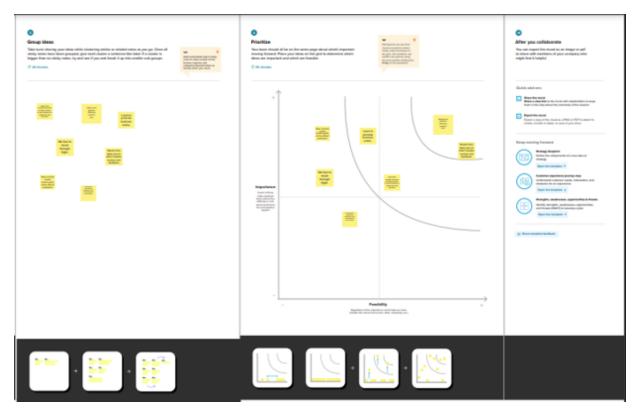
#### 2.PROBLEM DEFINITION AND DESIGN THINKING

#### 2.1 EMPATHY MAP



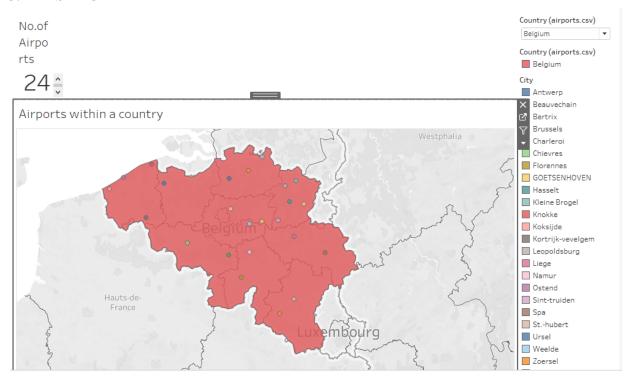
### 2.2 BRAINSTORM





# 3.RESULT

#### 3.1 DASHBOARD -1



#### **3.2 .DASHBOARD 2**

Airlines	s within a countr	'n		
Airline ID	Name	Icao	Callsign	
1270	Air Carnival	/N	Null	
20286	Air Pegasus	PPL	Null	
20264	Air Vistara	VTI	Null	
19451	Air Costa	/N	Null	
16901	12 North	N12	12N	
16738	NEPC Airlines	\N	Null	
16362	OCEAN AIR CARGO	IXO	Null	
16327	Indya Airline Group	IG1	Indya1	
13905	Skyline nepc	\N	Null	
13107	Jagson Airlines	JGN	JAGSON	
13106	MDLR Airlines	/N	MDLR	
13105	Air India Regional	\N	ALLIED	
4375	Spicejet	SEJ	SPICEJET	
3918	Pawan Hans	PHE	PAWAN HANS	
3907	Paramount Airways	PMW	PARAWAY	
3142	Kingfisher Airlines	KFR	KINGFISHER	
3000	Jet Airways	JAI	JET AIRWAYS	
2853	Indian Airlines	IAC	INDAIR	
2852	Indian Air Force	IFC	INDIAN AIRFORCE	
2851	India International Airw	ays IIL	INDIA INTER	
2850	IndiGo Airlines	IGO	IFLY	

#### 3.3 DASHBOARD 3

#### airport at highest altitude within a country ICAO (airpo.. Name (airports.csv) City Bamyan OABN Bamiyan Airport 8.367 Camp Bastion OAZI Camp Bastion Airport 2,943 Chakcharan Airport OACC 7,383 Chaghcharan Faizabad OAFZ Fayzabad Airport 3,872 OAFR Farah Farah Airport 3,083 Ghazni Airport OAGN 7,150 Ghazni Herat OAHR Herat Airport 3,206 OAJL 1,814 Jalalabad Jalalabad Airport OAIX Bagram Air Base 4.895 Kabul OAKB Hamid Karzai International Airport 5,877 Kandahar OAKN 3,337 Kandahar Airport Khost OAKS Khost Airport 3,756 OAUZ 1,457 Kunduz Konduz Airport Lashkar Gah OABT Bost Airport 2,464 Maimama OAMN Maimana Airport 2,743 Mazar-i-sharif OAMS Mazar | Sharif Airport 1,284 OASH Shank Air Base 6,890 OASA Sharana Airstrip 7,340 Sharona OASG Sheberghan Airport 1,053 Sheberghan Shindand OASD Shindand Airport 3,773 Tarin Kowt OATN Tarin Kowt Airport 4,429 Zaranj OAZJ Zaranj Airport 1,572

### Airports at Higher altitude in the World

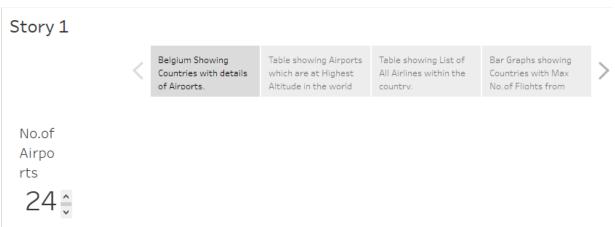
Name (airports.csv)	City	ICAO (airports.csv)		
Daocheng Yading Airport	Daocheng	ZUDC	14,472	^
Qamdo Bangda Airport	Bangda	ZUBD	14,219	
Kangding Airport	Kangding	ZUKD	14,042	:
Ngari Gunsa Airport	Shiquanhe	ZUAL	14,022	:
El Alto International Airport	La Paz	SLLP	13,355	
Capitan Nicolas Rojas Airport	: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

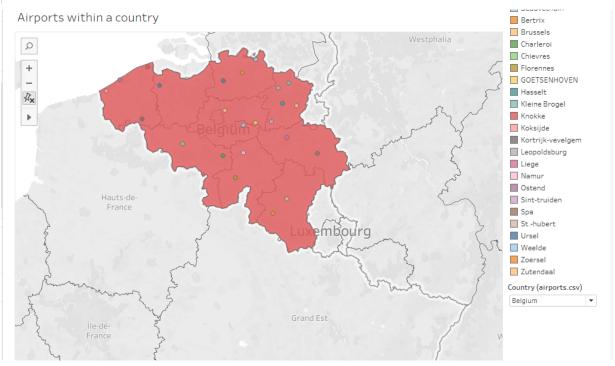
#### 3.4 DASHBOARD - 4



### 4. STORY

#### **4.1 STORY 1**





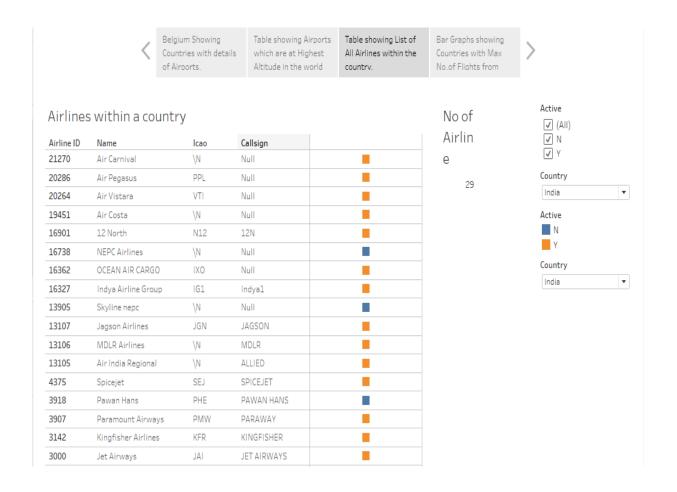
#### 4.2 STORY – 2



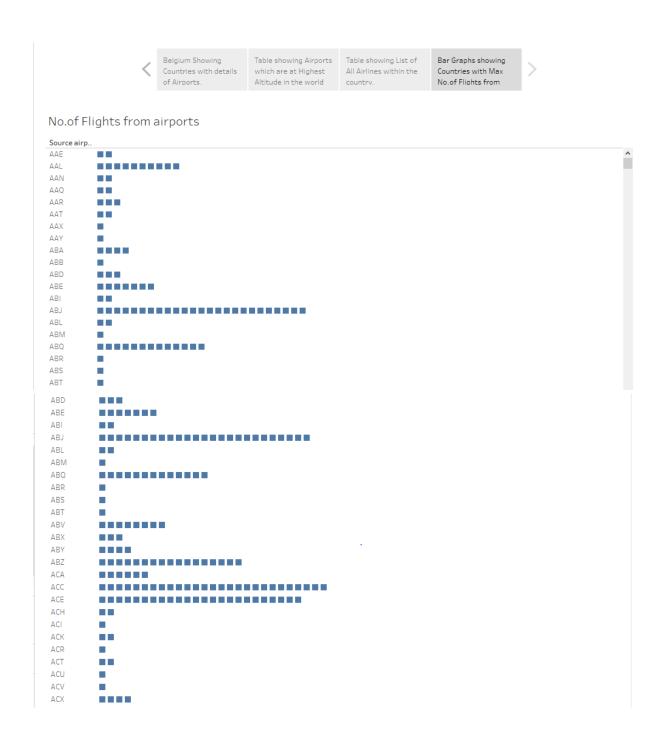
#### Airports at Higher altitude in the World

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

#### 4.3 STORY - 3

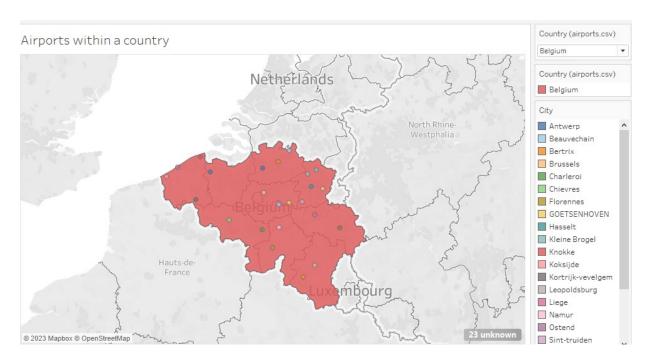


#### 4.4 STORY - 4

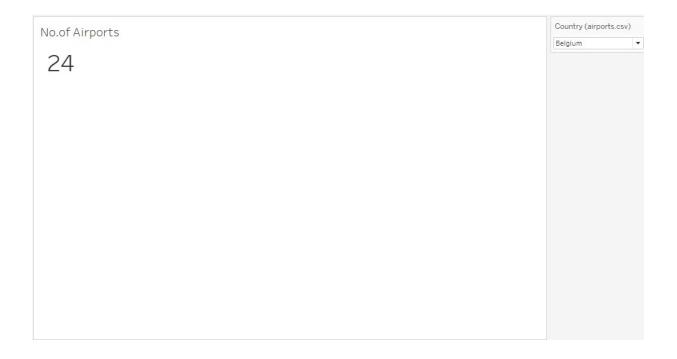


#### **5.VISUALIZATION**

## 5.1.WORLD MAP SHOWING DETAILS OF ALL AIRPORTS WITHIN A COUNTRY



#### 5.2. NUMBER OF AIRPORTS WITHIN THE COUNTRY



# **5.3 AIRPORTS AT HIGHER ALTITUDE WITHIN A COUNTRY**

airport a	t highes	t altitude within a country		Country (airports	.csv)
				Afghanistan	•
City Bamyan	OABN	Name (airports.csv)	8,367		
Camp Basti		Camp Bastion Airport	2,943		
Chaghcharan		Chakcharan Airport			
Faizabad	OAFZ	Fayzabad Airport	7,383		
Farah	OAFR	Farah Airport	3,872		
Ghazni	OAGN		3,083		
Herat	OAHR	Ghazni Airport	7,150		
		Herat Airport	3,206		
Jalalabad	OAJL	Jalalabad Airport	1,814		
Kabul	OAIX	Bagram Air Base	4,895		
	OAKB	Hamid Karzai International Airport	5,877		
Kandahar	OAKN	Kandahar Airport	3,337		
Khost	OAKS	Khost Airport	3,756		
Kunduz	OAUZ	Konduz Airport	1,457		
Lashkar Gah	OABT	Bost Airport	2,464		
Maimama	OAMN	Maimana Airport	2,743		
Mazar-i-sha	OAMS	Mazar   Sharif Airport	1,284		
Shank	OASH	Shank Air Base	6,890		
Sharona	OASA	Sharana Airstrip	7,340		
Sheberghan	OASG	Sheberghan Airport	1,053		
Shindand	OASD	Shindand Airport	3,773		
Tarin Kowt	OATN	Tarin Kowt Airport	4,429		
Zaranj	OAZJ	, Zaranj Airport	1,572		

# 5.4 AIRPORTS AT HIGHER ALTITUDE IN THE WORLD

Name (airports.csv)	City	ICAO (airports.csv)	
Daocheng Yading Airport	Daocheng	ZUDC	14,472
Qamdo Bangda Airport	Bangda	ZUBD	14,219
Kangding Airport	Kangding	ZUKD	14,042
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Yushu Batang Airport	Yushu	ZYLS	12,816
Copacabana Airport	Copacabana	SLCC	12,591
Inca Manco Capac International Airport	Juliaca	SPJL	12,552
Golog Maqin Airport	Golog	ZLGL	12,426

### 5.5: AIRLINES WITHIN A COUNTRY

Airline ID	Name	Icao	Callsign	I	✓ (AII) ✓ N
21270	Air Carnival	\N	Null	•	₩ Y
20286	Air Pegasus	PPL	Null		<u> </u>
20264	Air Vistara	VTI	Null		
19451	Air Costa	\N	Null		Country
16901	12 North	N12	12N		The we
16738	NEPC Airlines	\N	Null		India
16362	OCEAN AIR CARGO	IXO	Null		
16327	Indya Airline Group	IG1	Indya1		Active
13905	Skyline nepc	\N	Null		
13107	Jagson Airlines	JGN	JAGSON		N N
13106	MDLR Airlines	\N	MDLR		Y
13105	Air India Regional	\N	ALLIED	•	-
4375	Spicejet	SEJ	SPICEJET		
3918	Pawan Hans	PHE	PAWAN HANS		
3907	Paramount Airways	PMW	PARAWAY	•	
3142	Kingfisher Airlines	KFR	KINGFISHER		
3000	Jet Airways	JAI	JET AIRWAYS		
2853	Indian Airlines	IAC	INDAIR		
2852	Indian Air Force	IFC	INDIAN AIRFORCE		
2851	India International Airway	s IIL	INDIA INTER		
2850	IndiGo Airlines	IGO	IFLY	- I	
2634	Gujarat Airways	GUJ	GUJARATAIR		
2575	Go Air	GOW	GOAIR		
2001	Deccan Aviation	DKN	DECCAN		
1370	Blue Dart Aviation	BDA	BLUE DART		
1026	Alliance Air	LLR	ALLIED		
569	Air India Express	AXB	EXPRESS INDIA		
241	Air Sahara	RSH	SAHARA		
218	Air India Limited	AIC	AIRINDIA	_	

#### 5.6: NUMBER OF FLIGHTS FROM AIRPORTS

No.of Flights from airports



# 6. Advantages of Air Transport

# 1. High Speed

Air is the type of freight capable of traveling long distances in short periods of time. This makes this model an optimum choice if the client has an urgent need to ship a product or if their freight demands special standards of protection or acclimation. It is the quickest transport mode and is therefore ideal for long-distance transport of goods. It takes less time.

#### 2. Fast Service

Air transportation offers convenient, reliable and fast services of transport. It is considered the cheapest way to ship peregrinate goods. It offers a standard, convenient, reliable and fast service



# 3. Send almost everywhere your freight

In regions that are not readily accessible to other modes of transport, air transport is considered to be the only means of transport. Open to all regions, irrespective of land interference. A vast network of airlines covering nearly the whole globe is available for many airlines. This ensures that the package can be sent almost anywhere.

### 4. High Standard of Security

High standard of protection with a low risk of robbery and injury. Shipping by air has a high degree of security since airport safety restrictions on cargo are strictly enforced. Tightly controlled airport controls also minimize cargo theft and loss.

### 5. Natural Route

An aircraft can fly to any location without seeing any natural obstacles or barriers. Since customs formalities are easily compiled. It eliminates the need for more time to seek clearance. Air travel is used for relief operations during earthquakes, floods, accidents, and famines.

# 6. There is less need for heavy packaging

Air exports, in general, entail less hard packaging than ocean shipments. This ensures you save both time and money by not having to provide extra packaging services.



# 7. Disadvantages of Air Transport

Climate conditions that are adverse: Extreme weather will cause planes to be grounded and airports to close, halting shipments for several days and rendering the service ineffective.

#### 1. Risky

Air travel is the riskiest mode of transport, since there can be considerable losses to goods, customer and crews as a result of a minor crash. Compared to other means of travel, the risks of collisions are higher.

#### 2. Cost

Air travel is considered to be the most expensive means of transportation. The cost of maintaining aircraft is higher and the costs for the building of aerodromes and avions are much higher. That's why air travel is so expensive that it gets beyond ordinary people's grasp.

#### 3. Some Product Limitation

There is a whole variety of materials not suitable for such products, from explosives, gases, bat teries, fired solids and liquids, which cannot be shipped by air to name but a few.

# 4. Capacity for Small Carriage

The aircraft have no room and therefore are not ideal for carriage of voluminous and cheaper materials. As is seen for rails, the load volume cannot be raised.

#### 5. Enormous investment

Air travel calls for enormous spending in aerodrome building and servicing. It also calls for professional, qualified and qualified staff that need a significant investment.

#### 8. CONCLUSION

Air transportation networks have revolutionized the way the world connects, making distant lands accessible, and enabling the rapid movement of people and goods on a global scale. These networks consist of a complex interplay of airlines, airports, aircraft, air traffic control, and supporting infrastructure that collectively form the lifeblood of modern society. The advantages of air transportation are manifold, but they come with their own set of challenges.

One of the most significant advantages of air transportation is speed and efficiency. Whether it's for personal travel or the expedited delivery of cargo, air travel is unmatched in its ability to cover vast distances in remarkably short timeframes. This is particularly evident in long-distance and international travel, where air transport excels as the preferred mode of transit due to its rapidity. The frequency and convenience of scheduling further enhance its appeal, offering travelers a wide range of departure times and options to fit their specific needs.

Global connectivity is another major advantage, with air transportation networks functioning as the lifeblood of the world's economy. They bring nations closer together, providing essential links for international business, trade, and diplomacy. Major hub airports serve as gateways to the world, connecting passengers to an ever-expanding network of destinations, fostering economic growth, and fueling the global exchange of cultures and ideas.

The cargo transport facet of air networks ensures the timely delivery of high-value, perishable, and time-sensitive goods. From pharmaceuticals to electronic components, air freight services play an indispensable role in global trade and supply chain logistics. When disaster strikes or emergency relief is needed, air transportation networks become lifelines, transporting humanitarian aid and medical teams swiftly to affected areas.

#### 9.APPENDIX

#### **DASHBOARD** 1

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Dashboard1?:language=en-US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### **DASHBOARD 2**

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Dashboard2?:language=en\_-US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### DASHBOARD 3

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Dashboard3?:language=en -US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### **DASHBOARD 4**

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Dashboard4?:language=en -US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### STORY 1

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Story1?:language=en-US &publish=ves&:display\_count=n&:origin=viz\_share\_link

#### STORY 2

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Story1?:language=en-US &publish=yes&:display count=n&:origin=viz share link

#### STORY 3

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Story1?:language=en-US &publish=yes&:display count=n&:origin=yiz share link

#### **STORY 4**

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Story1?:language=en-US &publish=yes&:display\_count=n&:origin=viz\_share\_link

#### VISUALIZATION

#### World map showing details of Airports within a country:

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Airportswithinacountry?:language=en-US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### **Number of Airports within the country:**

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/No\_ofAirports?:language=en-US&publish=yes&:display count=n&:origin=viz share link

#### Airports at higher altitude within a country:

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/airportathighestaltitudewithinacountry?:language=en-US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### Airports at higher altitude in the world:

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/AirportsatHigheraltitudein theWorld?:language=en-US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### Airlines within a country:

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/Airlineswithinacountry?:language=en-US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### **Number of Flights from Airports:**

https://public.tableau.com/views/GlobalAirTransportation\_16975311161790/No\_ofFlightsfromairports? :language=en-US&publish=yes&:display\_count=n&:origin=viz\_share\_link

#### PROJECT EXPLANATION VIDEO LINK:

https://drive.google.com/file/d/1PHUN7uBXBl7YC9TRwGfyZULdQ4lgpozD/view?usp=sharing