Airlines Route Tracker

Final Report

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1. EXECUTIVE SUMMARY

According to the Federal Aviation Administration, roughly 100,000 flights take off and land every day all over the globe. Thus, air transport plays a vital role in business, trading and personal relationships within and between all regions of the world, with ordinally scenery that shows vast quantities of people and goods are moving by air around the world around the clock.
The rapid shifts in the aviation industry make it increasingly difficult for leaders to get the in-depth statistics they need to make clear, data-backed choices for their organizations.

The purpose of this report is to analyze worldwide airline traffic on the tentative to help airport operators and the airline industry to face the critical challenges of the market, responding some relevant business questions. In addition, one case study will be provided at the end of this work.

1.1 BUSINESS QUESTIONS

Transport infrastructure:

- "What is the worldwide distribution of airport, port and railway infrastructure? And what information can it give about the world's transport sector?"
- "Which are the most important airports in the world and in how many countries do they allow travel?"

Airlines:

- "How is the airline market composed and which airlines own the largest share of the market?"
- "Which carrier operates the most flights in the world and is present in more airports worldwide?"
- "How does the division of air traffic into domestic and international affects airports and airlines?"

Japan case study:

- "What is the distribution of transport infrastructure in Japan?"
- "What is the relationship between domestic airports and Japanese airlines?"
- "How is Japan's air traffic composed and which airlines are most present and allow the most connections?"

- "Which are the main international airports and the ones specialised in domestic traffic?"

1.2 DATASETS

In order to answer these business questions, we used three different datasets, which can be freely downloaded from Kaggle.com. All three datasets are obtained from the large OpenFlights.org database and attempt to give an overview of what air traffic worldwide was like in 2012, the year the datasets were created.

The first dataset is "Airline Database - A database of over 5000 airlines", a collection of approximately 6000 thousand airlines. The dataset is composed as follows:

- **Airline ID:** Unique OpenFlights identifier for this airline.
- **Name:** Name of the airline.
- **Alias:** Alias of the airline. For example, All Nippon Airways is commonly known as "ANA".
- **IATA:** 2-letter IATA code, if available.
- **ICAO:** 3-letter ICAO code, if available.
- **Callsign:** Airline callsign.
- **Country:** Country or territory where airline is incorporated.
- **Active:** "Y" if the airline is or has until recently been operational, "N" if it is defunct

The second dataset is: "'Airports, Train Stations, and Ferry Terminals - Openflight.org's database of the worlds transportation hubs" and as the name suggests it is a database of airports, train stations, and ferry terminals around the world.
The dataset is composed as follows:

- **Airport:** ID Unique OpenFlights identifier for this airport.
- **Name:** Name of airport.
- **City:** Main city served by airport.
- **Country:** Country or territory where airport is located.
- **IATA:** 3-letter IATA code.
- **ICAO:** 4-letter ICAO code.
- **Latitude:** Decimal degrees, usually to six significant digits. Negative is South, positive is North.
- **Longitude:** Decimal degrees, usually to six significant digits. Negative is West, positive is East.
- **Altitude:** In feet.

- **Timezone:** Hours offset from UTC.

- **DST:** Daylight savings time. One of E (Europe), A (US/Canada), S (South America), O (Australia), Z (New Zealand), N (None) or U (Unknown).
- **Tz:** database time zone.
- **Type:** Type of the airport. Value "airport" for air terminals, "station" for train stations, "port" for ferry terminals and "unknown" if not known.
- **Source:** Source of this data.

The third and last dataset used for this analysis is: 'Flight Route Database - A database of 59,036 flight routes.

The dataset contains 59036 routes between 3209 airports on 531 airlines spanning the globe. The data is updated to the year 2012 and is composed as follows:

- **Airline:** 2-letter (IATA) or 3-letter (ICAO) code of the airline.
- **Airline ID:** Unique OpenFlights identifier for airline.
- **Source airport:** 3-letter (IATA) or 4-letter (ICAO) code of the source airport.
- **Source airport ID:** Unique OpenFlights identifier for source airport
- **Destination airport:** 3-letter (IATA) or 4-letter (ICAO) code of the destination airport.
- **Destination airport ID:** Unique OpenFlights identifier for destination airport
- **Codeshare:** "Y" if this flight is a codeshare (that is, not operated by Airline, but another carrier), empty otherwise.
- **Stops:** Number of stops on this flight ("0" for direct)
- **Equipment:** 3-letter codes for plane type(s) generally used on this flight, separated by spaces

2. ETL – Extraction, Transformation and Loading

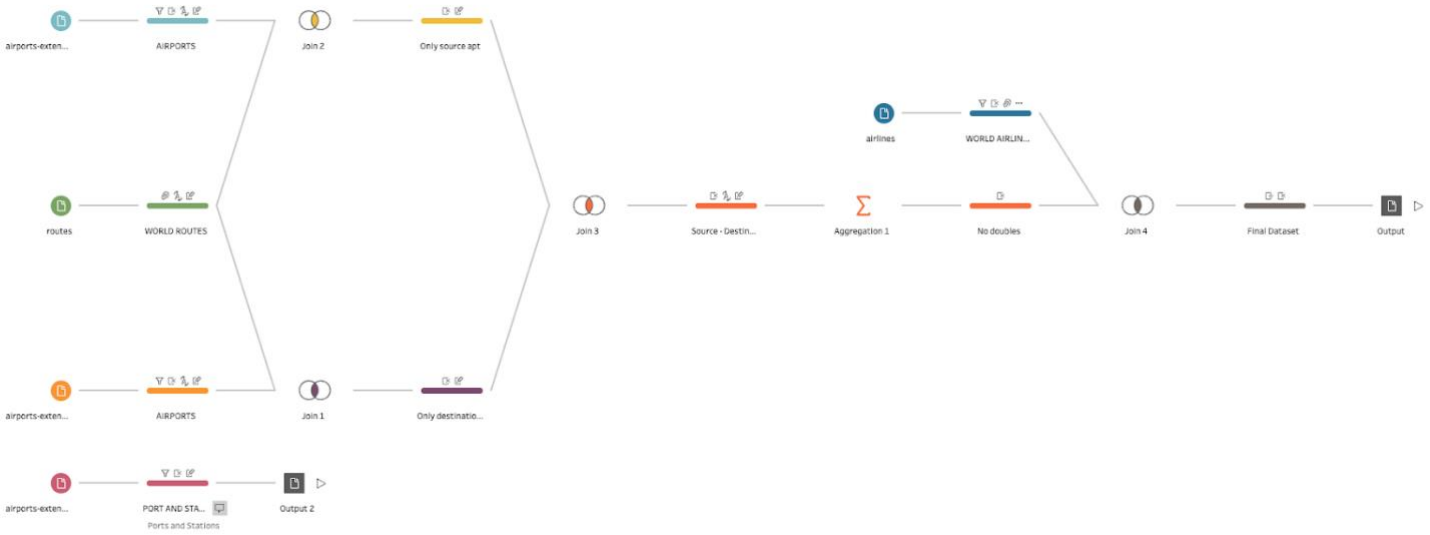
The **ETL procedure** is made up of 3 steps:

- Extraction
- Transformation
- Loading

In the **Extraction** step datasets are extracted through access to more or less structured databases or management information technology platforms. In our case data has been extracted from the Openaflights.org database via Kaggle.com

In the **Transformation** step the data extracted are processed to be transformed into consolidated data, useful for Data Warehouse (DWH) analyses: selections, normalizations, pairings, etc. It is key to maintain the granularity of the data.

We performed the **Transformation step** by using **Tableau Prep**. When the transformation operation is done, data is **loaded** into synthesis systems such a **DWH** or **Data Marts**.



2.1 Input and cleaning phase

The datasets have been uploaded on **Tableau Prep Builder.** It has been done some pre-cleaning and some fields have been excluded beforehand. The uploaded tables are:

Airport Extended

Tipo	Nome campo	Nome campo originale	Modifiche	Anteprima
#	F1	F1		1, 2, 3
Abc	F2	F2		Goroka Airport, Madang Airport, Mount Hagen Kagamuga Airport
Abc	F3	F3		Goroka, Madang, Mount Hagen
Abc	F4	F4		Papua New Guinea
Abc	F5	F5		GKA, MAG, HGU
Abc	F6	F6		AYGA, AYMD, AYMH
#	F7	F7		-6,08168983459, -5,20707988739, -5,82678985595703
#	F8	F8		145,391998291, 145,789001465, 144,296005249023 44
#	F9	F9		5.282, 20, 5.388
#	F10	F10		10
Abc	F11	F11		U
Abc	F12	F12		Pacific/Port_Moresby
Abc	F13	F13		airport
Abc	F14	F14		OurAirports

All *Airports-Extended*'s fields needed to be renamed. In particular, the fields **F10**, **F11**, **F12** and **F13** were converted into "**altitude**", "**timezone**", "**day_light_saving_time**" and "**source of the data**".

However, since these fields were not useful for our study, we decided to drop them. Furthermore, some fields such as "**airport ID**" or "**IATA**", have been converted to a string data type and others like "**airport country**", "**airport city**", "**lat**", "**long**" were recognized by Tableau as special geographical data. This Tableau's function comes in handy when it is requested to work with geo-spatial data. The software is able to automatically identify the specific coordinates of every single country, city or even airport loading their position on a world map.

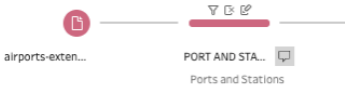
Regarding this dataset, there are other considerations as well. Indeed, the latter presents within it both **airports** and **ports** and **stations**. In order to conduct an analysis that is as linear and meaningful as possible, we decided to split the dataset into two parts: **the part of the dataset with "type: airport" and the entries with "type: port/station."**

This action aims to make the analysis of the dataset in the next steps much faster and to simplify the join operation.

In addition, another goal of our analysis, was to be able to put together in the final data source the latitude and longitude coordinates of both **departure** and **destination** airports. To do this, we needed as well to duplicate the "**airports. extended**" dataset so that we could later join and put together the geographic coordinates for both departure and arrival airports.

Tipo	Nome campo
Abc	airport ID
Abc	ICAO
Abc	airport name
Abc	airport country
Abc	airport city
#	lat
#	long
Abc	IATA
Abc	type

Type: airport



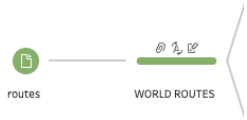
Tipo	Nome campo
#	Traffic ID
Abc	Traffic Name
Abc	Traffic City
Abc	Traffic Country
#	Traffic lat
#	Traffic long
Abc	type

Type: port/station

Routes

Tipo	Nome campo	Nome campo originale	Modifiche	Anteprima
Abc	airline	airline		2B
Abc	airline ID	airline ID		410
Abc	source airport	source airport		AER, ASF
#	source airport id	source airport id		2.965, 2.966
Abc	destination apir...	destination apirport		KZN, MRV
#	destination airp...	destination airport id		2.990, 2.962
Abc	codeshare	codeshare		NULL
#	stops	stops		0
Abc	equipment	equipment		CR2

The '**routes**' dataset was quite clean and no further cleaning was necessary.
Only small details had to be changed: **source_airport_id** and **destination_airport_id** were converted into a string data type and a typo was corrected (destination apirport → destination airport).



Tipo	Nome campo
Abc	airline IATA
Abc	airline ID
Abc	codeshare
Abc	layover
Abc	type of aircraft
Abc	destination airport id
Abc	source airport
Abc	destination airport
Abc	source airport id

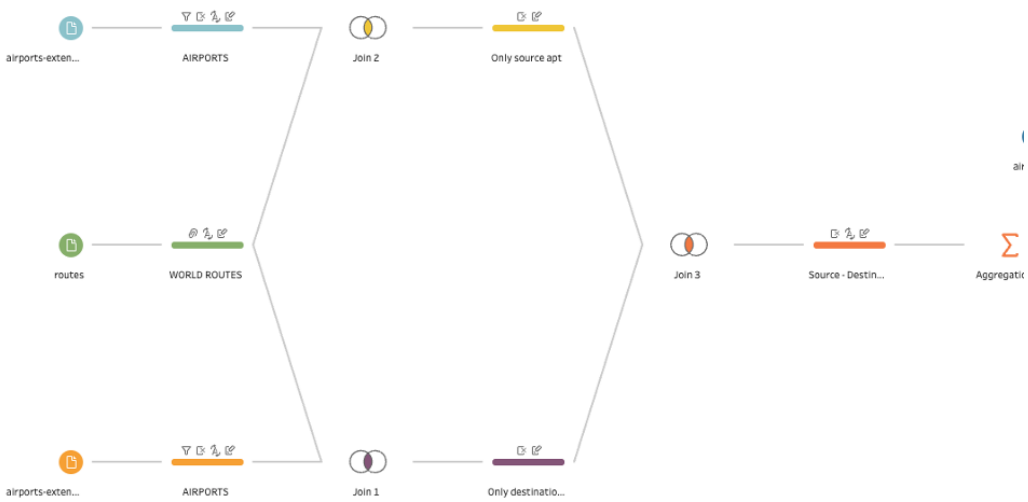
Airlines

Tipo	Nome campo	Nome campo originale	Modifiche	Anteprima
#	Airline ID	Airline ID		-1, 1, 2
Abc	Name	Name		Unknown, Private flight, 135 Airways
Abc	Alias	Alias		\N
Abc	IATA	IATA		-, NULL
Abc	ICAO	ICAO		N/A, GNL
Abc	Callsign	Callsign		\N, NULL, GENERAL
Abc	Country	Country		\N, NULL, United States
Abc	Active	Active		Y, N

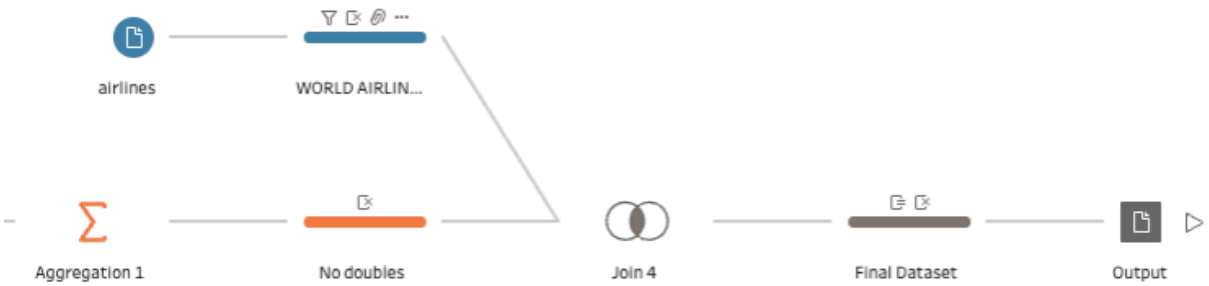
In the airline dataset, the '**Alias**' and '**callsign**' fields were removed. Then the null values were removed as they could affect our analysis and all tables were renamed to '**Airline ID**', '**Airline Name**' and so on.
The field '**Active Airline**' was classified as categorical: 1 if the airline is still active, 0 otherwise.

Tipo	Nome campo
Abc	Airline ID
Abc	Airline Name
Abc	Airline IATA
Abc	Airline ICAO
Abc	Airline Country
Abc	Airline Active

2.2 Joining phase



At this point in the preparation of the data, it can be seen that several joins were performed in order to merge the airport and route tables into a single dataset, also ensuring that the geographical coordinates of the arrival and departure airports could be obtained. After the join, a small clean-up of the resulting table was performed to remove and rename some redundant fields. At this point, an aggregation and grouping operation was performed to ensure that all duplicate rows from the internal join were removed.



The last stage of data preparation involves merging the airline dataset with the airport dataset, previously merged with the airline route dataset, to obtain the final dataset on which subsequent analyses and visualisations are to be performed.

2.3 Output phase

Eventually, we have got two tables:

- Airports
- Ports and Stations

The two tables will be used independently on Tableau as two different data sources.

3. DATA MODELLING

To model the data we used **DFM (Dimensional Fact Model)**, a graphical conceptual model for data mart, designed to:

1. effectively support the conceptual project.

2. create an environment in which to formulate user queries in an intuitive way.

3. allow the dialogue between the designer and the end user to refine the specifications of the requirements.

4. create a stable platform from which to start the logical project (starting from the target logical model)
   to return expressive and unambiguous documentation a posteriori.

The conceptual representation generated by the **DFM** consists of a set of factual schemes. The basic elements modeled by the schemes are: **facts**, **measures**, **dimensions** and **hierarchies**.

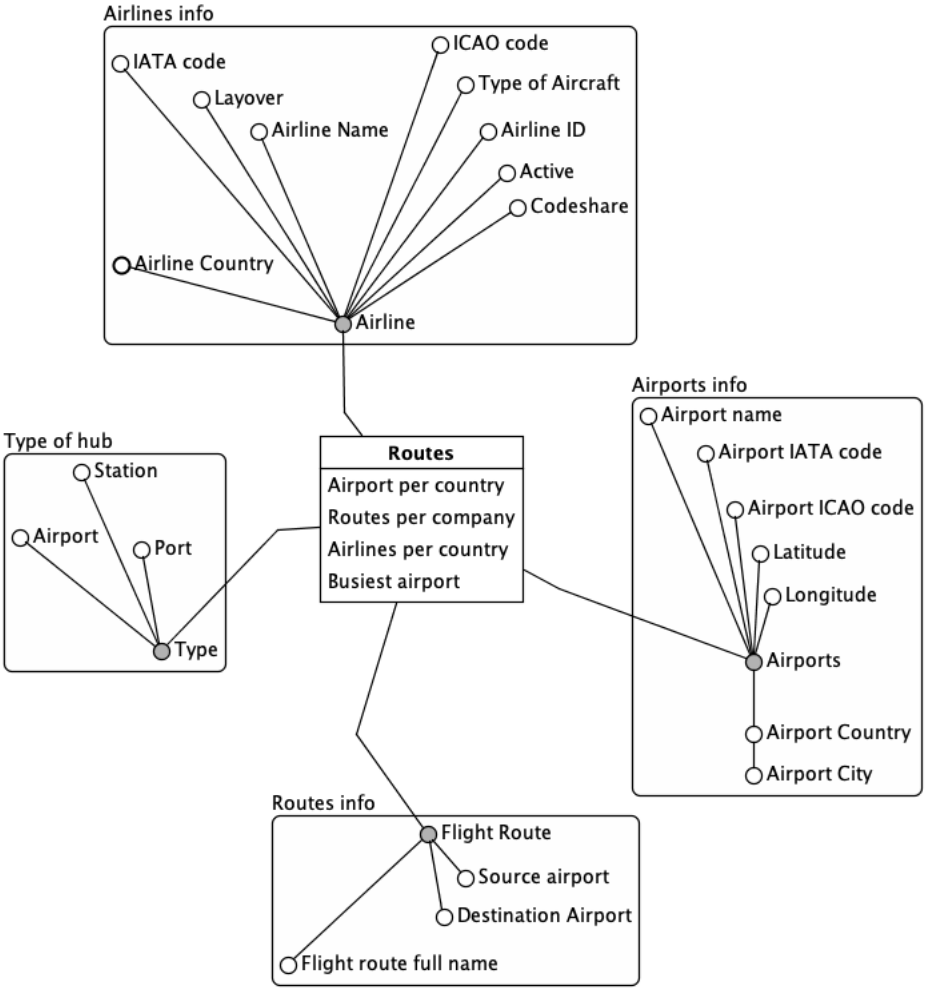
The scheme of facts is structured like a tree, each fact represents a concept of interest for the decision-making process, and so it represents the main objective of the analysis, typically models a set of events that occur, in this case, into a specific large tourist company.
It is essential that a fact has dynamic aspects, that is, it evolves over time.

A measure is a numerical property of a fact and describes a quantitative aspect of interest for analysis.

A dimension is a property with finite domain of a fact and describes an analysis coordinate.

The hierarchy is tree-shaped, whose nodes are dimensional attributes and whose edges model the many-to-one associations between pairs of dimensional attributes. It contains a dimension, located at the root of the tree, and all the dimensional attributes that describe it

3.1 FACT SCHEMA - World Air Traffic



In summary, as is possible to see in the following figure, through conceptual modeling, we have created **the scheme of facts**, structured like a tree where the root is the fact, and represents the main objective of the analysis.

For the conduction of the analysis, has been selected "**Routes**" as a *fact*, with five *metrics*: **airport per country, routes per company, airlines per country, busiest airport**

Four dimensions describe the facts:

1. *Airlines dimension* describes the information through **IATA code, Country, Layover, Name, ICAO code, Type of aircraft, Airline ID, Active, Codeshare**.

2. *Airport dimension* describes the different airport for **Airport Country, Airport City, Airport name, Airport IATA code, Airport ICAO code**, measuring for the attributes **Latitude** and **Longitude**

3. *Flight Routes dimension* describes the different routes info by the **Source airport, destination airport** and **flight route full name** attribute

4. *The Type dimension* measures the type of hub through the **Station, Airport**, and **Port** attribute.

 # The Fact Metrics are described in table below:

- Routes Features

FEATURES	TYPE
Airport per country	Integer
Routes per company	Integer
Airlines per country	Integer
Busiest airport	String

 # The dimensions attributes are described below:

- Type of Hub dimension features

FEATURES	TYPE
Station	String

Airport	String
Port	String

- Airports dimension features

FEATURES	TYPE
Airport name	String
Airport ICAO code	String
Latitude	Decimal
Longitude	Decimal
Airport Country	String
Airport City	String

- Flight Route dimension features

FEATURES	TYPE
Source Airport	String
Destination Airport	String
Flight route full name	String

- Airline dimension features

FEATURES	TYPE

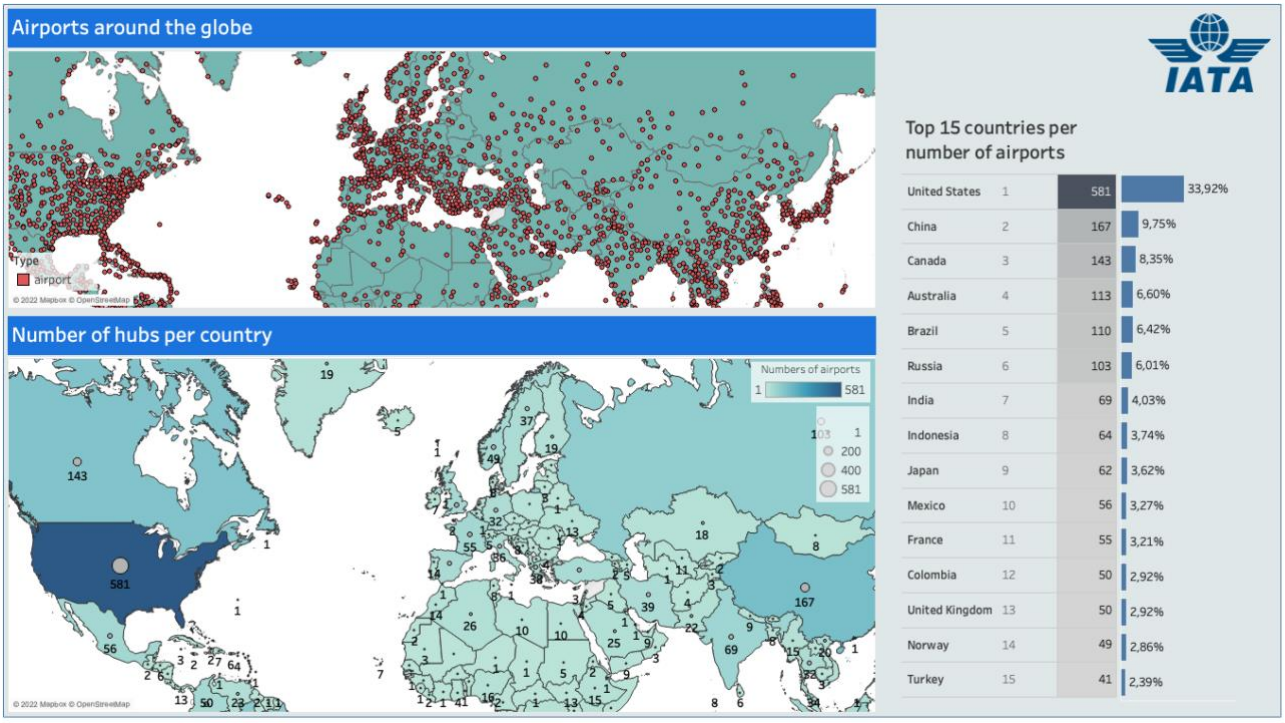
IATA code	String
Airline Country	String
Layover	String
Airline Name	String
ICAO code	Integer
Type of aircraft	String
Airline ID	String
Active	Binary
Codeshare	Binary

4. REPORTING

In this section of the report, dashboards were constructed to answer the proposed business questions. Each dashboard covers a different macro-area.

4.1 Dashboard N.1

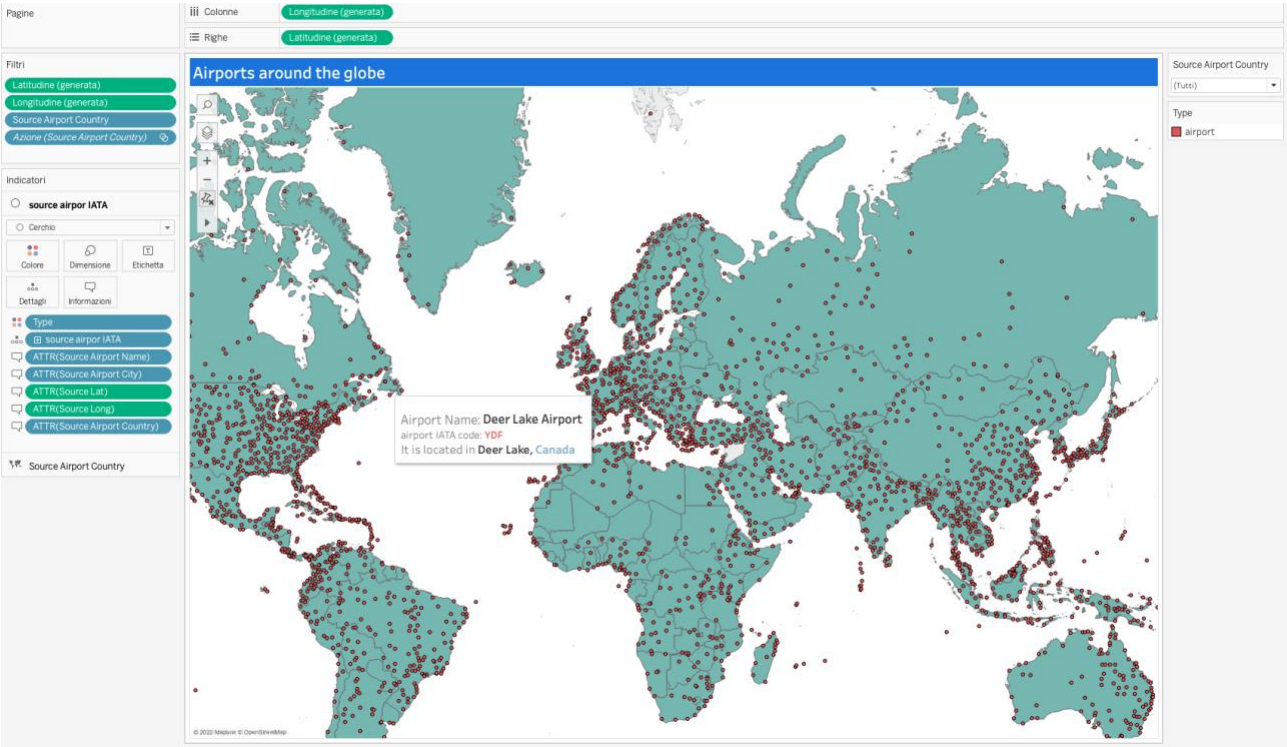
The first dashboard considers the civil aviation infrastructure deployed around the world. It includes the following sheets: "**Airports around the globe**", "**Number of hubs by country**", "**Top 15 countries by number of airports - ranking**", and "**Top 15 countries by number of airports - bar chart**".
The "**Number of hubs by Country**" worksheet functions as a filter. Clicking on one or more countries highlights their respective airports and their exact location



Airports around the globe

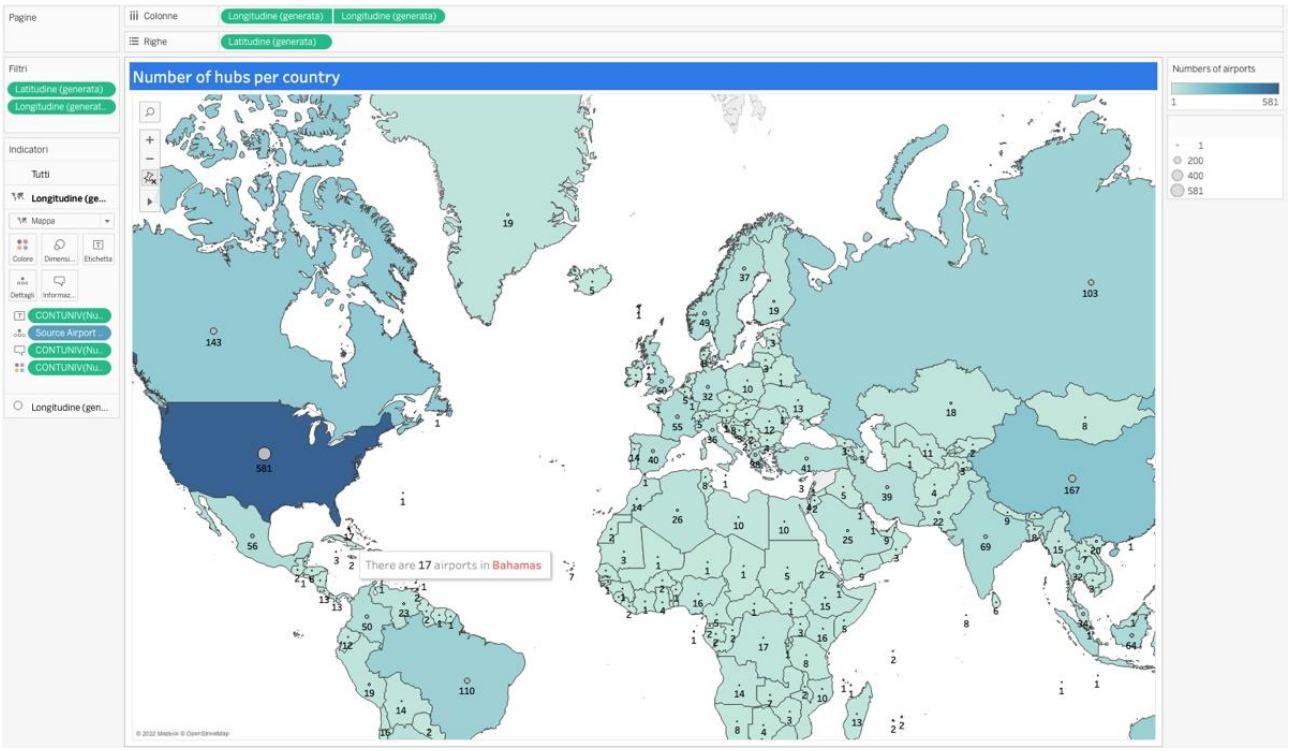
Given the nature of the data at our disposal, the first worksheet analyzed could only be a map. In fact, this kind of data lends itself very well to a type of visualization that is mainly *spatial*.

Specifically, the map shows the geographic location of every airport. In fact, each of them is represented by an IATA code, unique to each airport. By selecting the data type as "**airport**" in Tableau, the location of the dots will be automatically generated within the map.
One of the most important features of the worksheet is the **tooltip**: by hovering the mouse over the desired airport, the name of the airport, its IATA code, and the
precise city and country in which it is located appear on the screen.

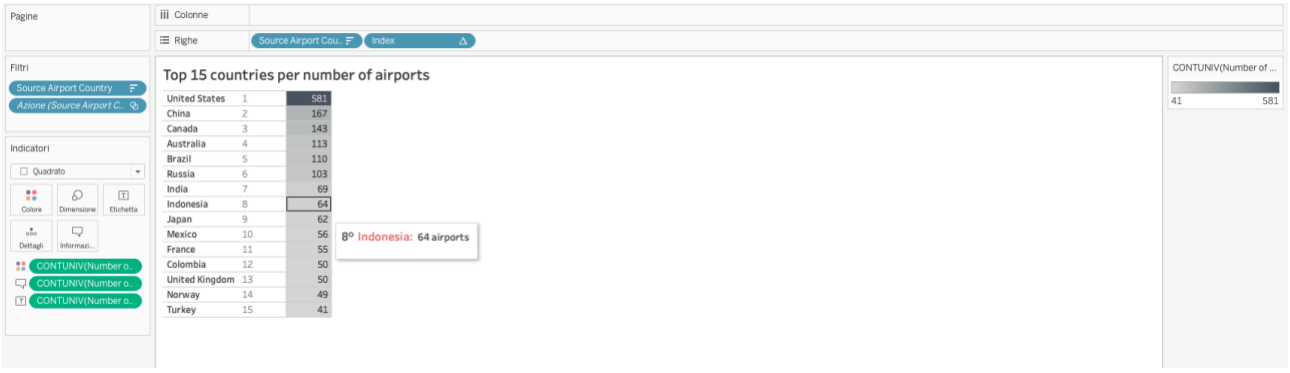


Number of hubs per country

This worksheet very effectively visually summarizes the total number of airports for each country. Both the gradient color and the point size serve as a reference for each nation's magnitude regarding the presence of airports within their borders. The map was generated by overlaying two maps along the horizontal axis using the "double axis" command.

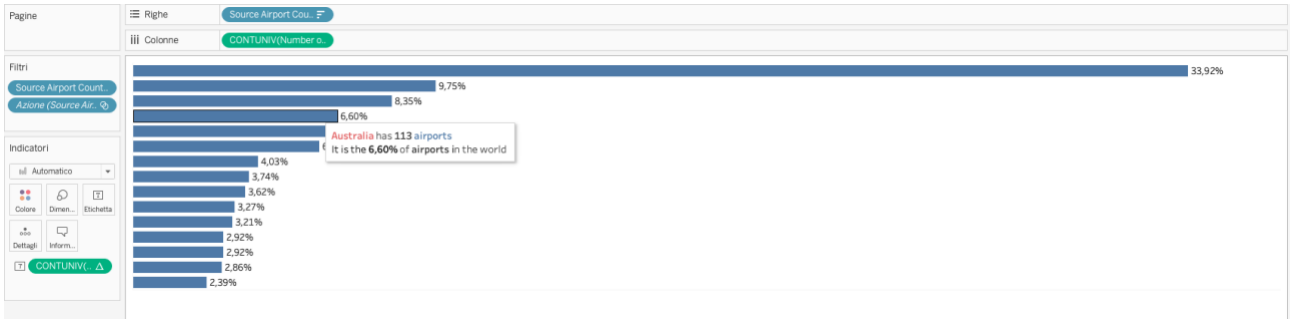


Top 15 countries per number of airports – Ranking



This chart allows us to graphically summarise the ranking of nations with the most airports within their borders. The gradient colour serves to empathise with the magnitude of each aggregated number. The filters include the function of showing only the top 15 countries

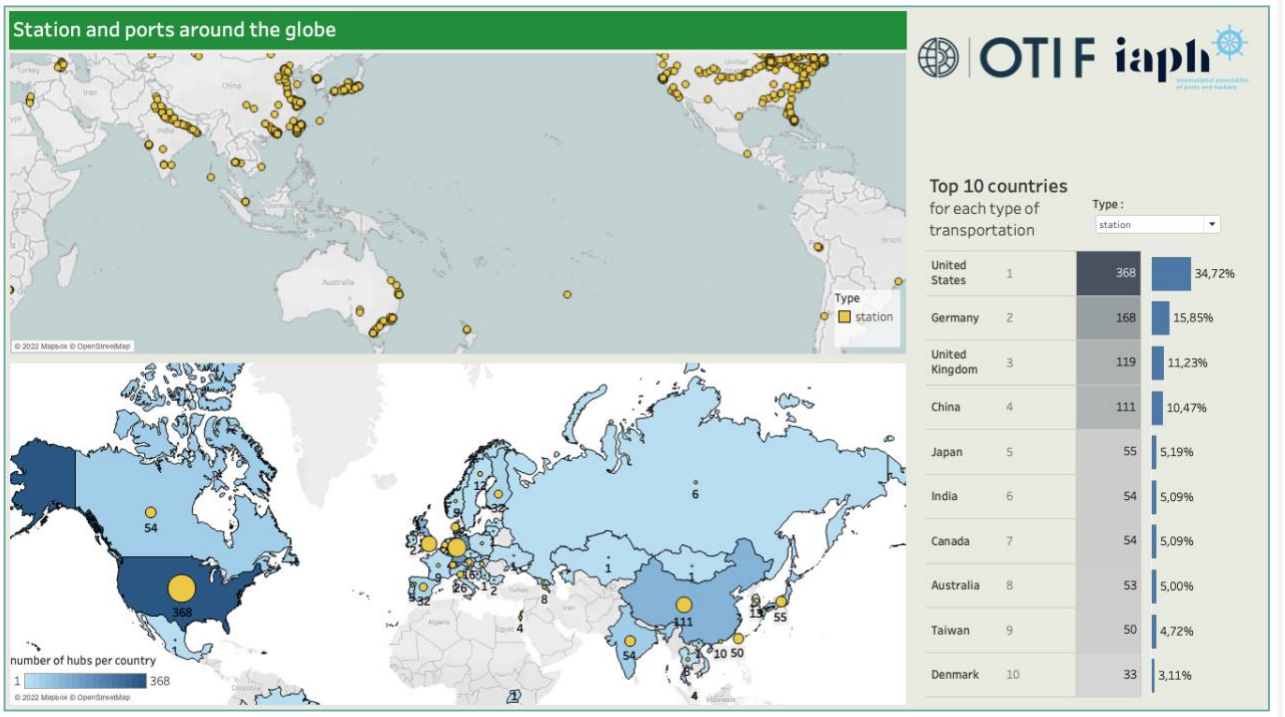
Top 15 countries per number of airports – Bar plot



The bar graph not only gives us a visual input, compared to the figure in the table opposite; it also shows, thanks to the tooltip, the percentage data compared to the total, i.e., how many airports each country has as a percentage of the total number of hubs in the world.

4.2 Dashboard N.2

The second dashboard analyzes the location of ports and train stations around the globe. It consists of four worksheets: "**Ports and Stations per country**," "**Ports and stations around the globe**," "**Ports and Stations per country - ranking**," "**Ports and Stations per country - bar plot.**"

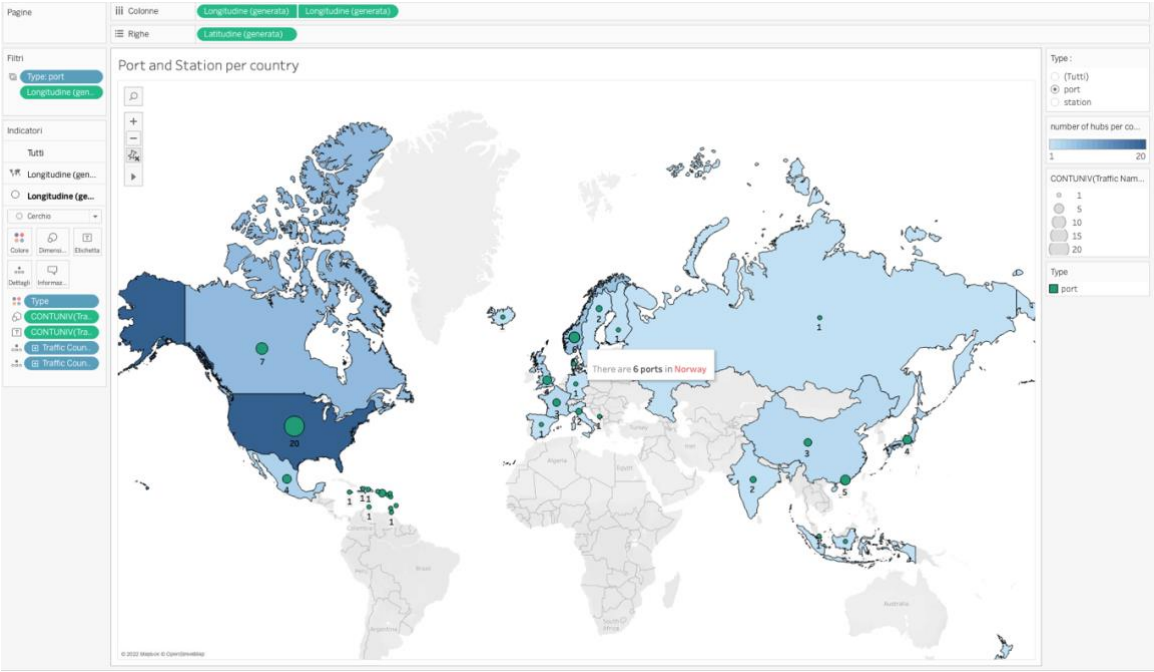


The "**Stations and Ports Around the World**" worksheet serves as a filter for the entire dashboard: by selecting individual ports or stations within the map, information can be gleaned regarding the country in which they are located and the amount of infrastructure of the same type within national borders. There is also the possibility, by taking advantage of the "**Type**" filter, to completely switch the object of analysis in the dashboard: in fact, one can easily switch from stations to ports or even analyze both together.

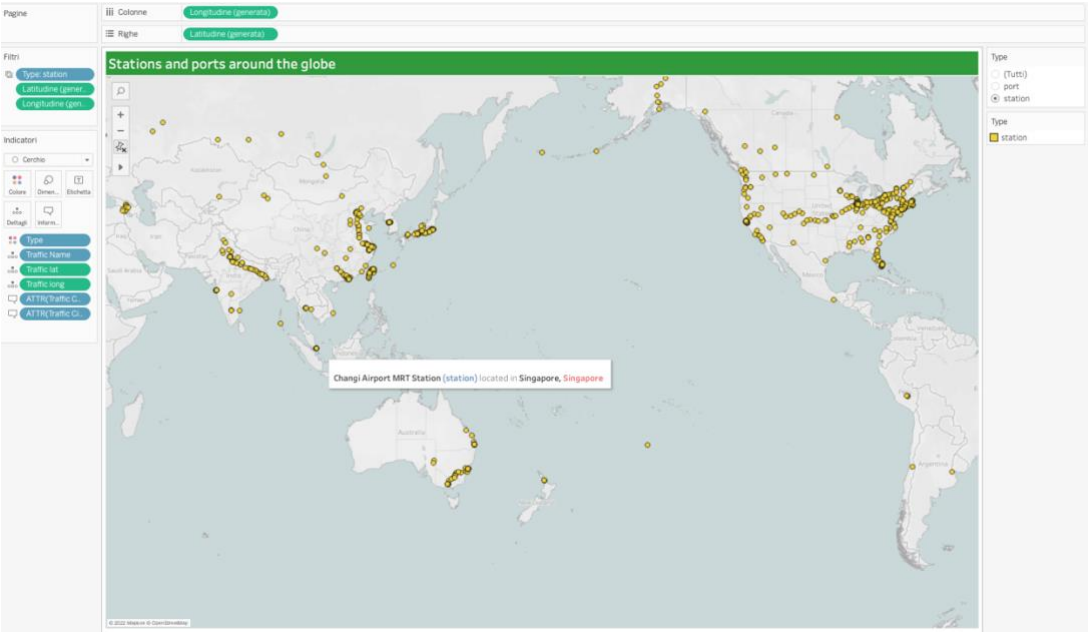
Ports and stations per country

As with airports, this worksheet shows the aggregate figure at national level for the total number of ports and stations. Here too, I applied the double horizontal axis technique to

create a two-tier visualisation that included both a differentiation between countries by colour gradient and by size of dots.

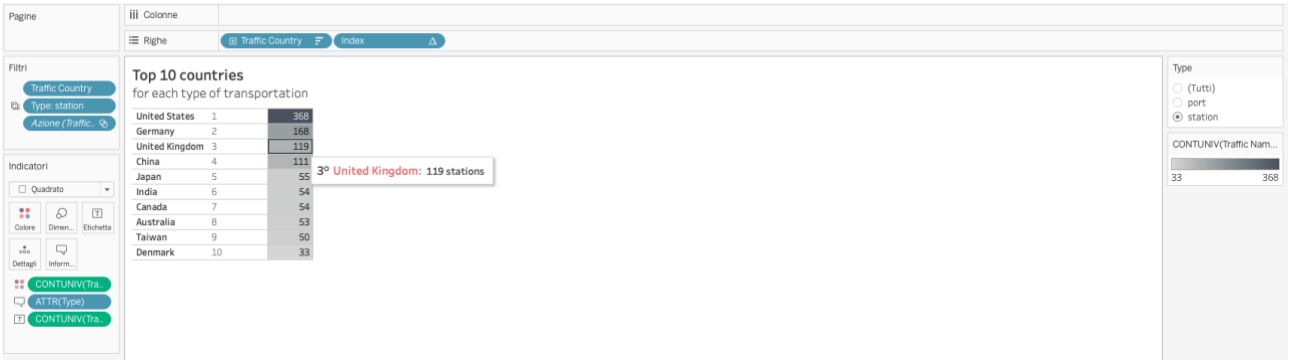


Stations and ports around the globe



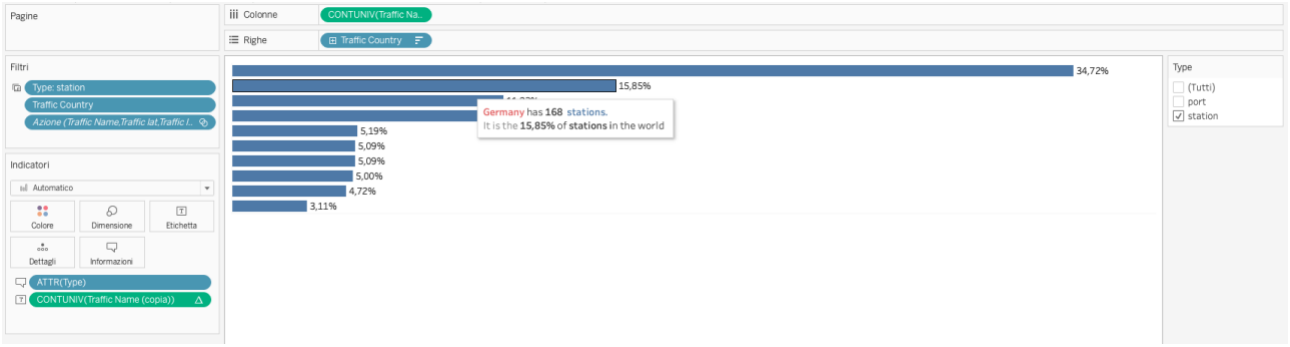
The following map is generated thanks to the latitude and longitude coordinates within the dataset, which allow a precise location of the different infrastructures. The main feature of the visualization is the possibility of changing the object of analysis from stations (yellow) to ports (green) via the '**type**' filter. The **tooltip** also gives an effective summary of the salient features of the infrastructure.

Ports and Stations per country – ranking



As with the previous dashboard, this one also proceeded by ranking countries by total number of ports and/or stations.
There are two filters: one allows one to switch between stations and ports, while the second has the task of displaying only the top 10 countries for each transport category

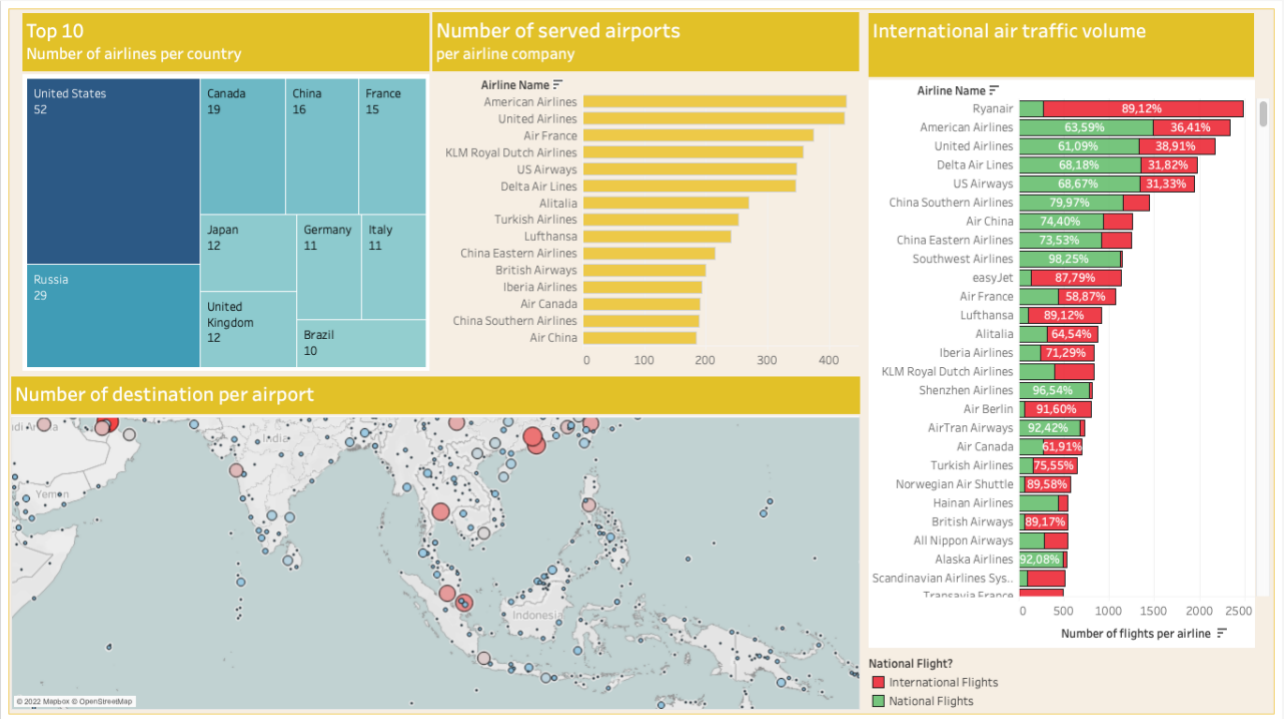
Ports and Stations per country - bar plot



It acts as a graphical input to the data shown in the table and also allows you to see the percentage data with respect to the world total.

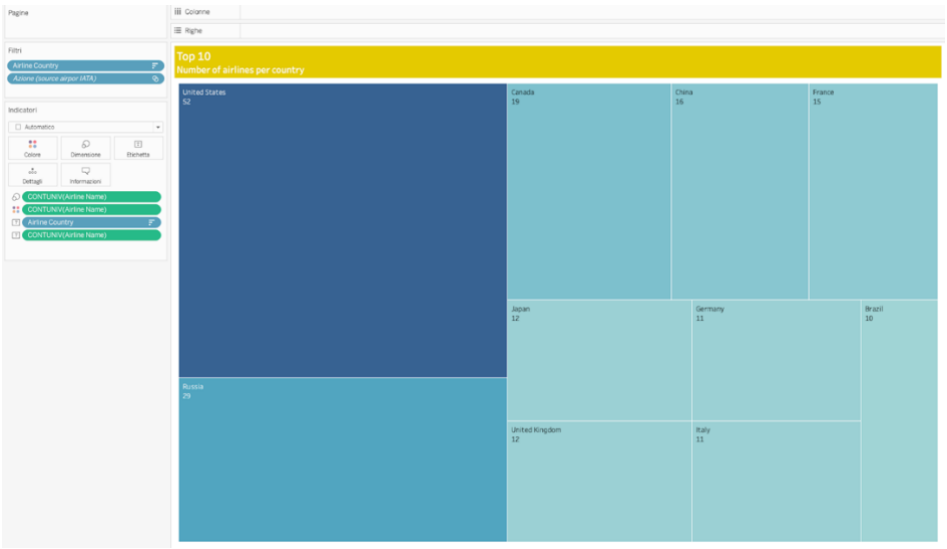
4.3 Dashboard N.3

The third dashboard deals with investigating another of our research objectives: air routes.



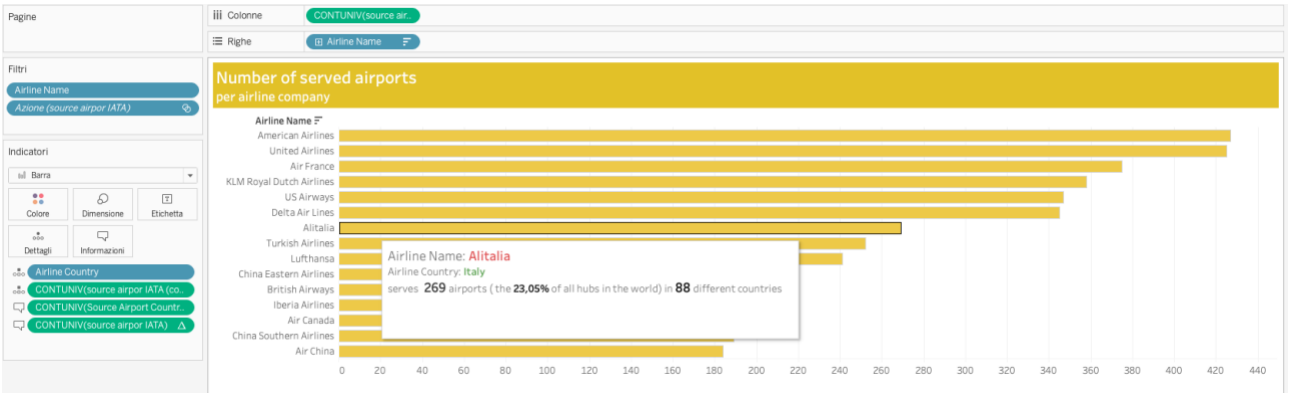
The latter is totally focused on air traffic and its breakdown into domestic and international traffic, the performance of individual airlines, and their monopoly capacity in the air traffic market. The dashboard consists of 4 worksheets: "**Number of airlines per country - top 10**," "**Number of served airports**," "**Number of destinations per airport**", "**International air traffic volume**". The world map, specifically the "**Number of destinations per airports**" worksheet, works as a filter for the entire dashboard. By selecting the various countries within the map, it is possible to study their air traffic composition, market share among the various operators, and their hub size and importance.

Top 10 of airlines per country



This type of visualization allows a clear and direct view of the top 10 countries in the world by number of registered airlines. As we have already seen, the US leads the ranking, followed by Russia and Canada.

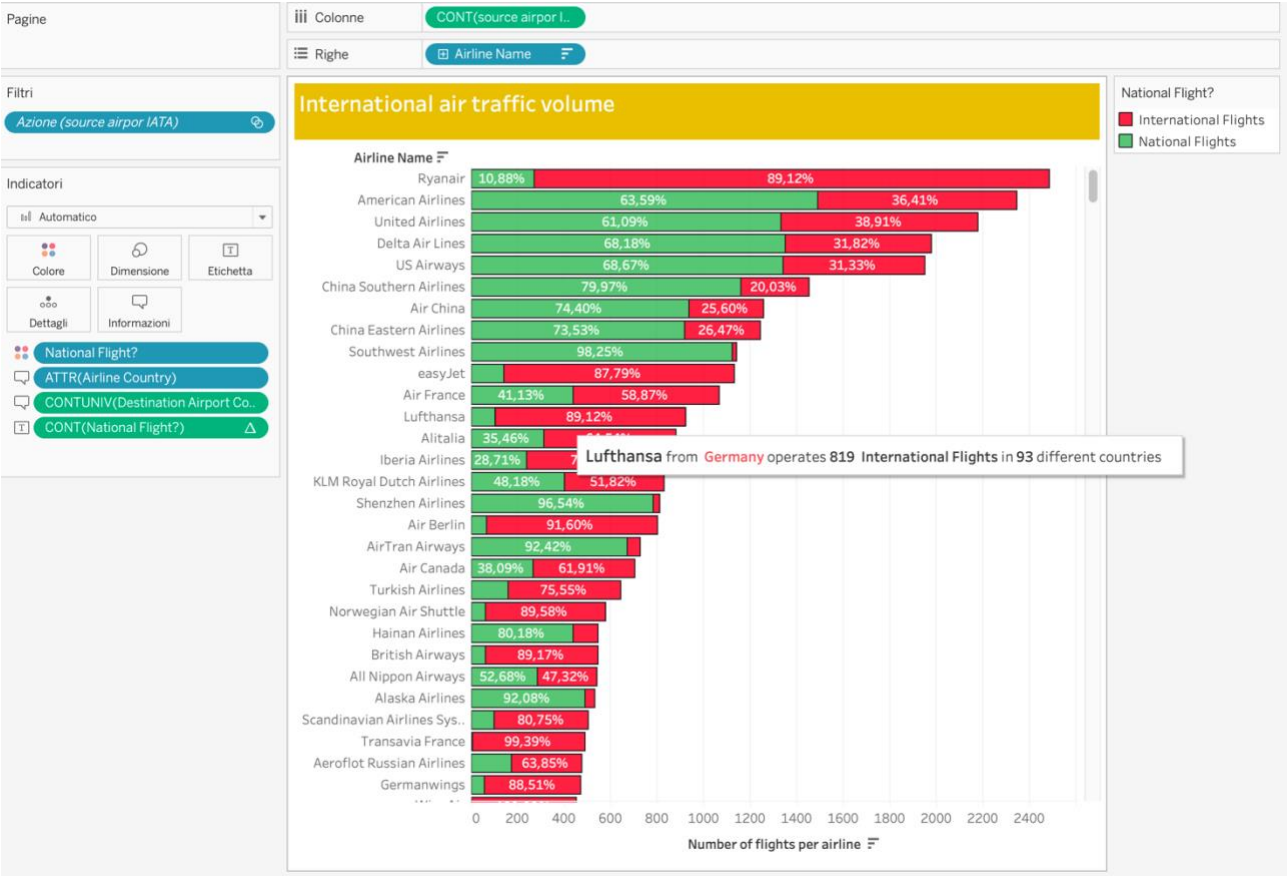
Number of served airports



This bar graph tries to investigate what is the distribution of the word market among the various airlines. It can be assumed that the more a company has a presence in airports, the stronger its market share is.
The graph shows the number of airports with at least one air route operated by one of the following airlines. Thanks to the tooltip we can easily see in how many countries and airports each airline operates - and the percentage compared to the total number of airports in the world –.

International air traffic volume

This visualization aims to investigate the traffic volume for each airline, i.e., the airlines with the highest number of flights. It can be deduced that the more flights an airline manages to operate, the stronger its market presence
Furthermore, in addition to the total number of flights operated by each airline, there is a breakdown of flights between domestic and international. This also allows us to understand how the various airlines specialize, between domestic, national and international.



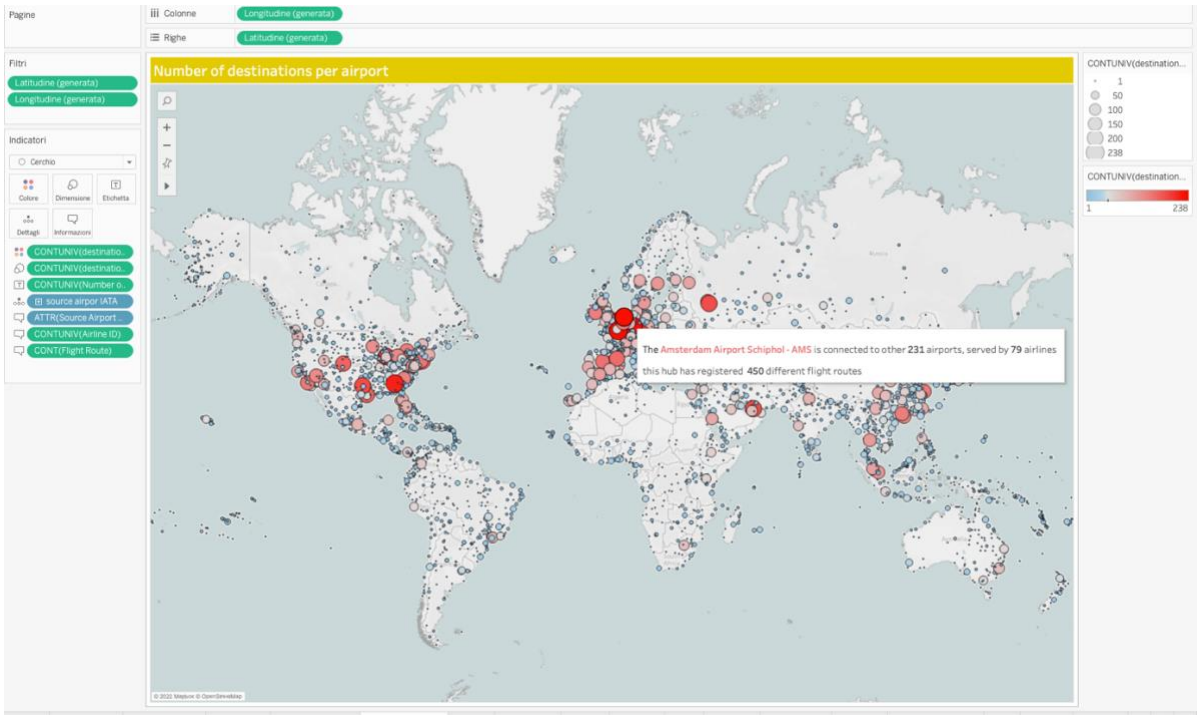
Number of destinations per airport

This worksheet allows us to get an idea of the importance of each individual airport in a visual and 'spatial' way. The importance of each individual airport can be extrapolated from three simple indicators:

1. The number of hubs to which the airport is connected

2. The number of airlines operating from that same
3. The number of different airline routes that were registered from each individual airport.

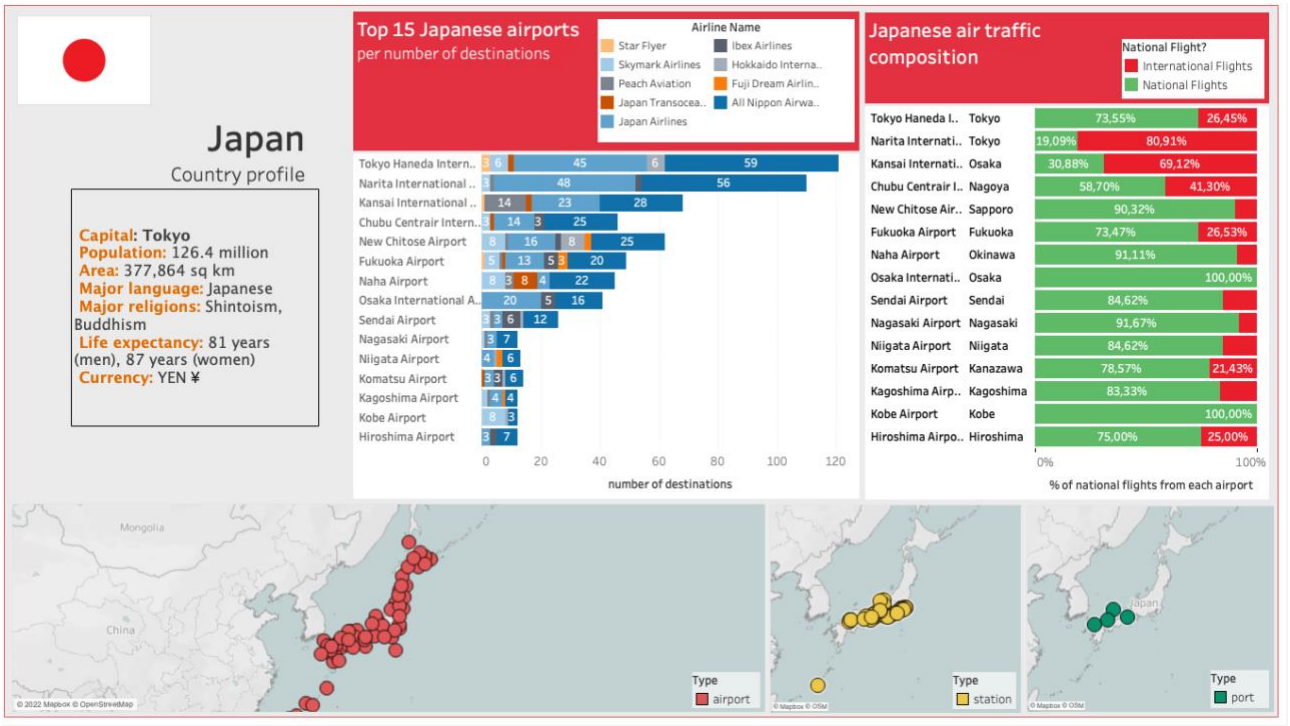
The size of the dots on the map and their colour indicate the 'connection' capacity of each hub, among which several European and American airports stand out.The gradient colour was chosen so that the change in hue occurs approximately when the number of connections is above 50. This makes it easier to distinguish large hubs from smaller ones. The tooltip summaries all this information clearly and directly.



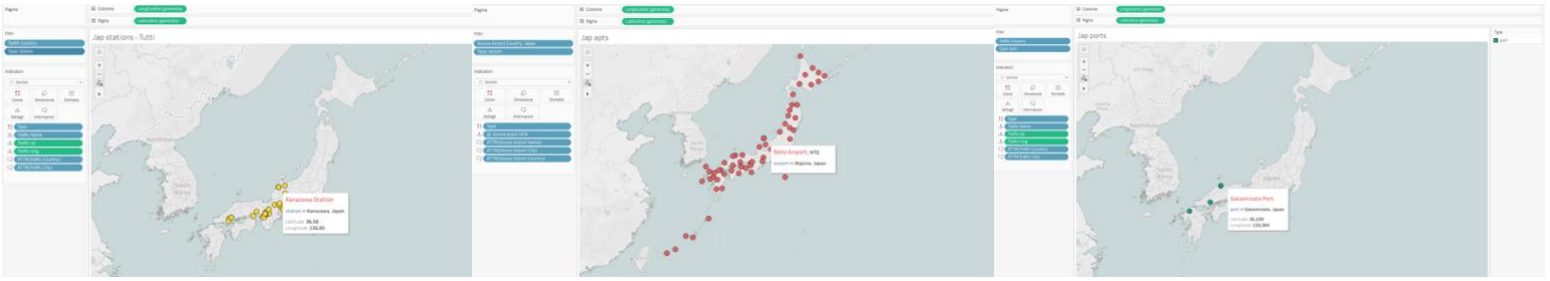
4.4 Dashboard N.4

The fourth and final dashboard is completely devoted to an analysis focused on a single country. The country chosen for this analysis is Japan. It was interesting to be able to study its infrastructural composition between airports, stations and ports. In addition, we analyzed the

breakdown of air traffic among the various Japanese airports and the relationship with domestic airlines. Ultimately, we wanted to investigate the breakdown of air traffic into domestic and international.



Japan Airports, Stations and Ports



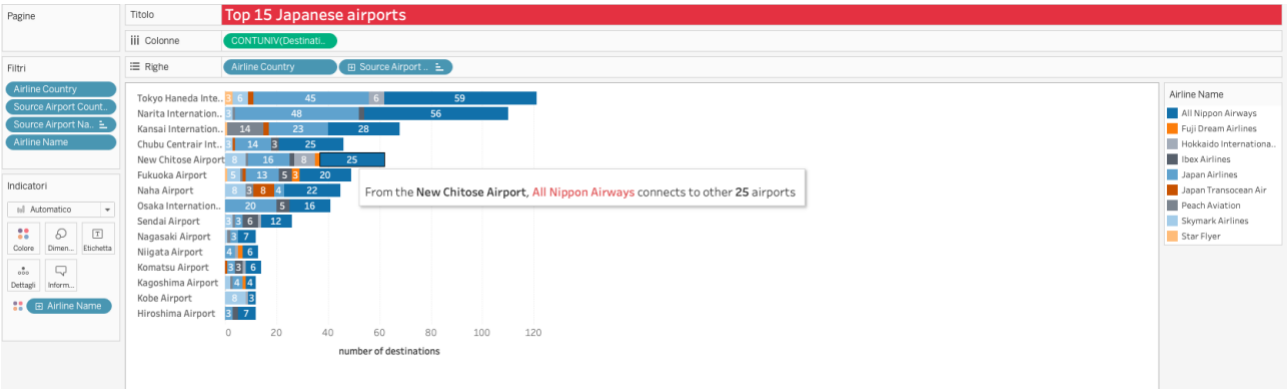
This series of three visualizations shows the exact location of airports, stations and ports throughout Japan.

Japanese airports and airlines

The worksheet shows the top 15 Japanese airports by traffic - i.e. where by traffic we mean the number of destinations available at each individual airport - and how this traffic is distributed among Japanese airlines.

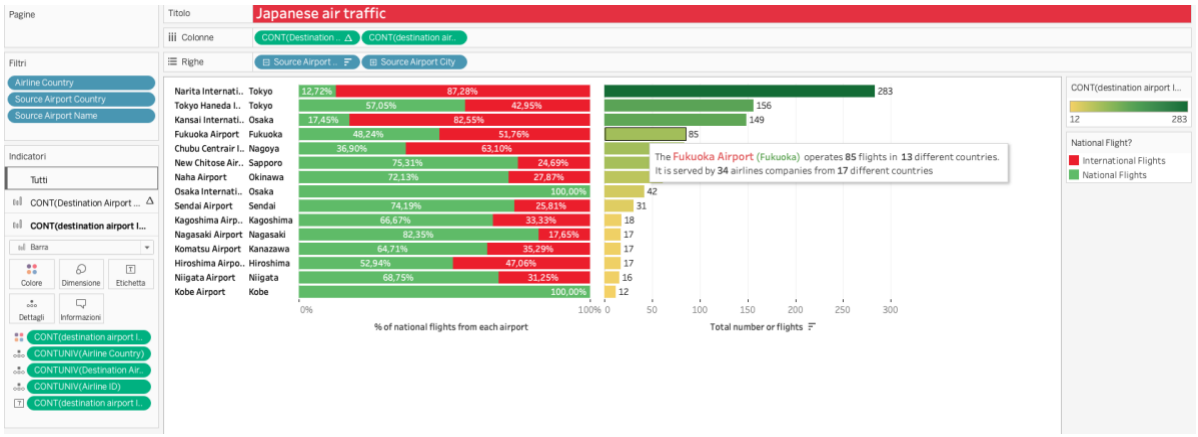
The aim of this visualisation was therefore to investigate the market relationship between the airports and the Japanese airlines.

Specifically, the graph shows us how there is a close relationship between the two main Japanese airports "Tokyo Haneda Int." and "Narita Int." and the two main domestic airlines "All Nippon Airways" and "Japan Airlines". There are, of course, also a number of other companies that base their business on smaller and less important airports.



Japanese Air Traffic

This last visualisation aims to provide an overview of Japanese air traffic and consists of two complementary levels of analysis. Generally speaking, the worksheet is intended to measure the total number of flights performed by each individual Japanese airport in order to first of all make explicit its importance from the point of view of traffic flow. This flow is dissected in the first graph in order to understand how this traffic is domestic traffic or is directed to airports outside the national borders. Already from this level of analysis we can, for example, understand how, limited to Tokyo, there are two airports, one "Narita Int." specialised mostly in international flights; and the "Tokyo Haneda Int." dedicated more to domestic traffic.

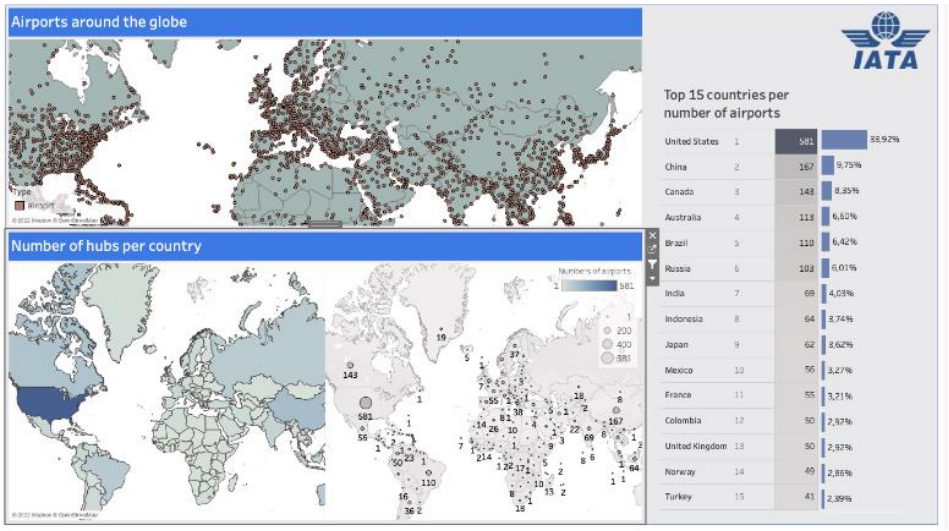


In addition, the tooltip effectively summarises all the most salient features of each airport, showing the number of flights operated and to how many countries, and how many airlines serve the hub.

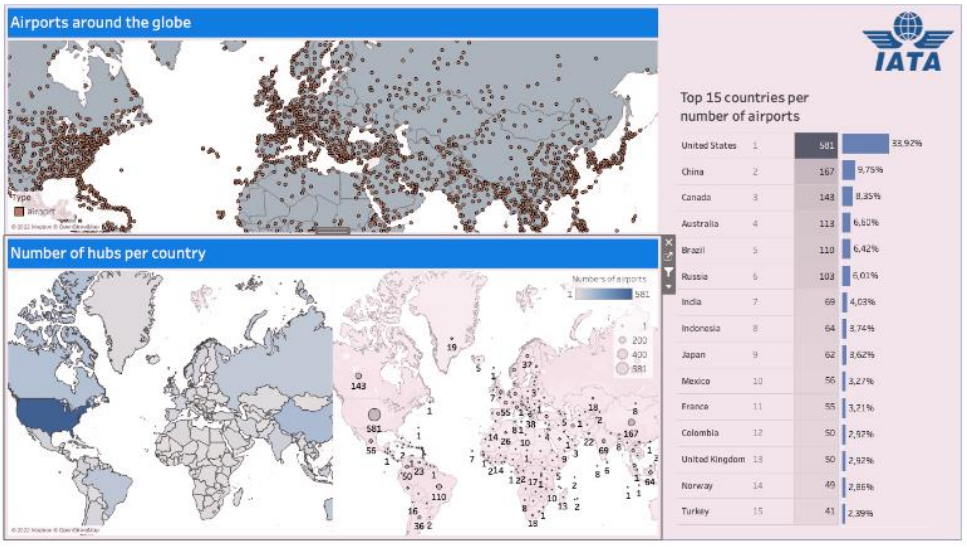
5. COLOR BLIND TEST

Why did we use these colors? The Color-Blind Test is a useful tool for testing whether the colors chosen for the dashboards can be seen by all kinds of people, even color-blind people. In the following section you can see that the colours chosen for the dashboards respond well to the colour blindness test.

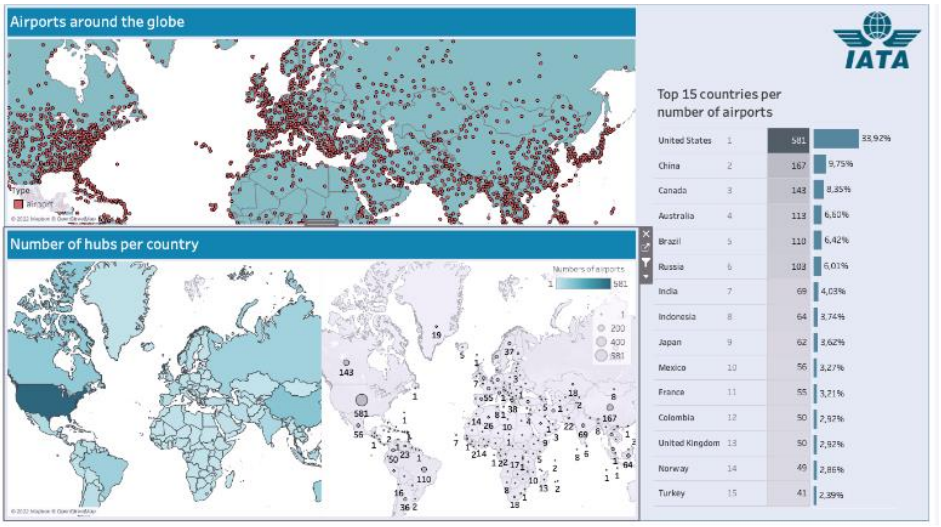
Protanomaly



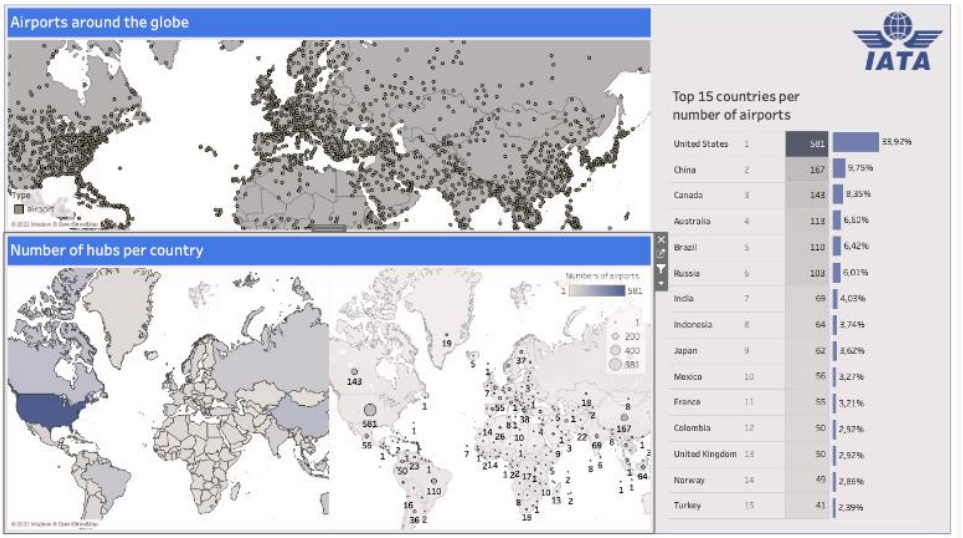
Deuteranomaly



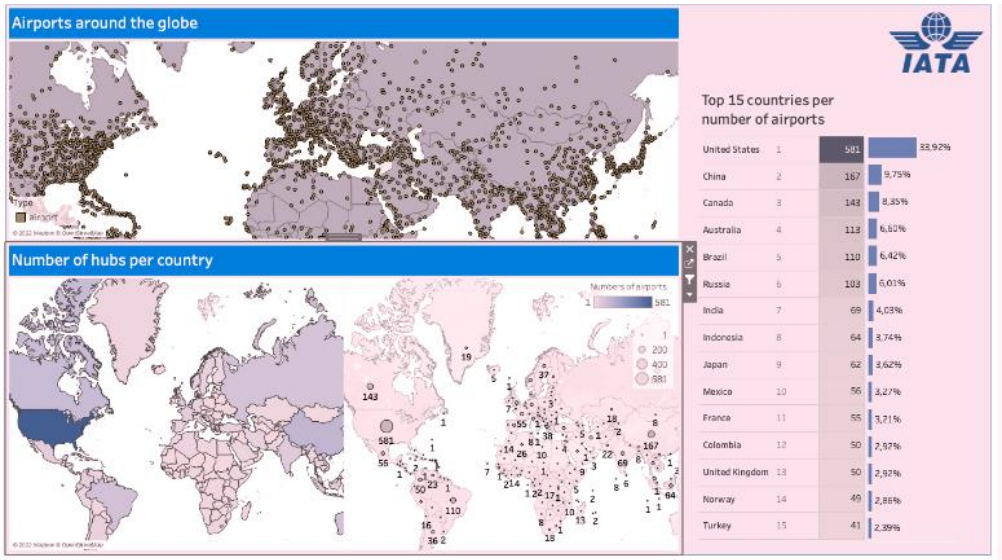
Tritanomaly



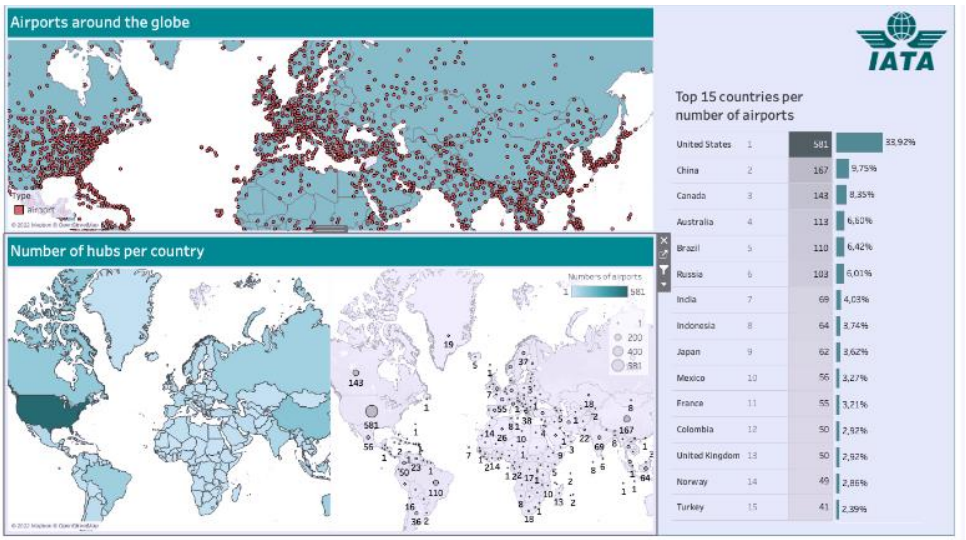
Protanopia



Deuteranopia



Tritanopia



Achromatopsia

Monochromacy

6. CONCLUSIONS

Through the analysis performed, we are able to answer the business questions we set ourselves and which form the focus of the report.
The analysis revealed that in recent decades there has been an increase in air traffic worldwide and growing competition between carriers, which has led to the need to adapt airport capacity to meet increased demand by expanding existing facilities or using new ones.

Identifying the movements of the means of transport investigated in the context of our survey: ports, airports and stations, we answered several business questions, examined by sector.

Transport Infrastructure:

By analysing the worldwide distribution of airport, port and rail infrastructure, we identified which are the top 15 countries in the world in terms of number of airports, ports and final stations.

Airports:
In this top 15, the United States ranks first, with 581 airports, representing 33.92% of the world's airports.
The United States is also the country with the most airlines per country, with 52 airlines.
Analysing specifically which airlines serve the most airports, we identified American Airlines, serving 427 airports in 95 different countries, which together with United Airlines partly determines the monopoly of the American market. It is followed immediately by Air France, which is present in a smaller number of airports, 375, but serves many more countries, 122.

Our analysis also showed how the number of destinations reachable from an airport can be a good indicator of its importance.
It emerged from our investigations that the main international hubs are mainly located in the United States, Europe and close to major world metropolises such as Istanbul, Tokyo or Shanghai.
The airport with the most possible destinations is Frankfurt am Main International Airport followed by Paris Charles de Gaulle airport, Amsterdam Schipol and Munich airport.

On the one hand, it can be asserted that air transport development is linked on one hand to the geographical contingencies of a territory; the United States, being a particularly large country but

with a low population density, has chosen to invest in air traffic as a privileged means of transport; on the other hand, European air traffic shows us how air transport tends to increase in proportion to the level of wealth and per capita income, as it is driven by the tourist and economic sector. We can also see how the capitals of emerging countries are equipping themselves for these new challenges by investing more and more in new technologies and infrastructure (see China)

Ports and stations:
Analysing the situation of ports and stations by country, it emerged that again the country with the highest distribution of ports and stations in the world is the United States with the presence of 20 ports and 368 stations, followed by Germany with 168 stations, the United Kingdom with 119 stations and finally China with 111 stations.

Airline Companies:

Analyzing the worldwide volume of air traffic showed that the airline with the most flights is **Rynair.**
It is a company that specializes mainly in international traffic, is not a national company and has no obligation to serve the country.
When analyzing the volume of air traffic, it emerged that the airline that makes the most flights is Rynair, the analysis retraces the condition that emerged during 2012. Moreover, it's a company specialized mainly in international traffic: the analysis shows that **Rynair operates 2,212 international flights in 29 different countries, compared to 270 domestic flights in 7 different countries, covering 89.12% of international flights.**

Rynair is followed by two American companies: **American Airlines** and **United Airlines**, where there is a greater concentration of domestic flights. An example of an airline that entirely covers domestic flights is given to us by Southwest Airlines.

The case study of Japan:

As far as Japan is concerned, the location of ports, airports and stations can be observed. Due to the country's insularity, airports are located all over the island, while ports and stations are in the south-west.

A top 15 list of Japan's major airports by number of destinations served by Japanese airlines was compiled, with **All Nippon Airways connecting 59 airports and Japan Airlines 45, followed by other smaller airports with secondary airlines.**

Finally, the composition of air traffic on a global scale was carried out, in which the distribution of domestic and international air traffic was made, immediately noting that **Narita International Airport is a predominantly international airport**, unlike **Tokyo Haneda, which is balanced between domestic and international flights, or Kobe, that is completely used for domestic traffic.**