University Success Analysis

Power Bi Specialization Project

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Overview:

The 'University Success Analysis' study is an analysis of university rankings in various systems. Comparing university rankings, studying the impact of ranking criteria on university placements, and examining the unpredictable shifts in university measurements over time are the main goals.

The approach used for this study includes the effective use of Excel and SQL for exploratory data analysis (**EDA**) and data aggregation. To provide a thorough visualization of university rankings and enable an in-depth knowledge of the complex relationships between different criteria and their effects on institutional standings, a **Power BI** dashboard will also be carefully created.

The Objective:

The goals of this project are to assess and compare university rankings, pinpoint the crucial factors shaping these rankings, and analyze regional trends. Through these objectives, we aim to provide a deeper understanding of the dynamics behind university positions in various ranking systems.

Data Modelling:

Measures:For this data set , I created the measures listed below

Measure #1: Total Students :

```
Total Students = SUM(University_Year[num_students])
```

Measure #2:Total International Students:

```
total_international_students = sum(university_year[pct_international_students])
```

Measure #3:Total Universities :

```
Total Universities = COUNT(university[id] )
```

Coloumns: To clear some calculations , I created following coloumnns:

Total female student:

Since we have percentage of female student out of total student so here we calculates the total number of female students by **applying the percentage of female students** to the total student population for each year.

Total_female_student=

[(university_year[pct_female_students]/100)*university_year[num_students]

Total International student:

Since we have percentage of International student out of total student so here we calculates the total number of International students by **applying the percentage of International students** to the total student population for each year.

Total_ International _student=

[(university_year[pct_ International _students]/100)*university_year[num_students]

Data Dictionary:

1. university_year

Stores annual demographic and size data for each university.

- university_id (INT, FOREIGN KEY): The unique identifier for the university. Links to the university table.
- year (INT): The academic year the data is for (e.g., 2023).
- num_students (INT): The total number of students enrolled at the university for that year.
- student_staff_ratio (FLOAT): The ratio of students to academic staff. A lower number generally indicates smaller class sizes.
- pct_international_students (FLOAT): The percentage of the total student body classified as international students.

- pct_female_students (FLOAT): The percentage of students who identify as female.

2. ranking_criteria

Defines the individual metrics used by different ranking systems (e.g., "Teaching Reputation," "Citations per Faculty").

- id (INT, PRIMARY KEY): A unique identifier for each criterion.
- ranking_system_id (INT, FOREIGN KEY): Identifies which ranking system (e.g., QS, THE) this criterion belongs to. Links to the ranking_system table.
- criteria_name (VARCHAR): The name of the specific measurement or criterion.

3. university_ranking_year

The core fact table. Contains the actual scores universities received for specific criteria in specific years.

- university_id (INT, FOREIGN KEY): The identifier for the university. Links to the university table.
- ranking_criteria_id (INT, FOREIGN KEY): The identifier for the criterion being scored. Links to the ranking_criteria table.
- year (INT): The year this score was published.
- score (FLOAT): The actual score the university received for that criterion and year.

4. university

A list of all universities included in the dataset.

- id (INT, PRIMARY KEY): The unique identifier for the university.
- country_id (INT, FOREIGN KEY): The identifier for the country where the university is located. Links to the country table.
- university_name (VARCHAR): The full name of the university.

5. country

A list of countries.

- id (INT, PRIMARY KEY): The unique identifier for the country.
- region_id (INT, FOREIGN KEY): The identifier for the region the country is in. Links to the region table.
- country_name (VARCHAR): The name of the country.

6. region

A list of world regions, including population data.

- id (INT, PRIMARY KEY): The unique identifier for the region.
- region_name (VARCHAR): The name of the geographic region.
- population_2020 (BIGINT): The estimated population of the region for the year 2020.
- population_2021 (BIGINT): The estimated population for 2021.
- population_2022 (BIGINT): The estimated population for 2022.

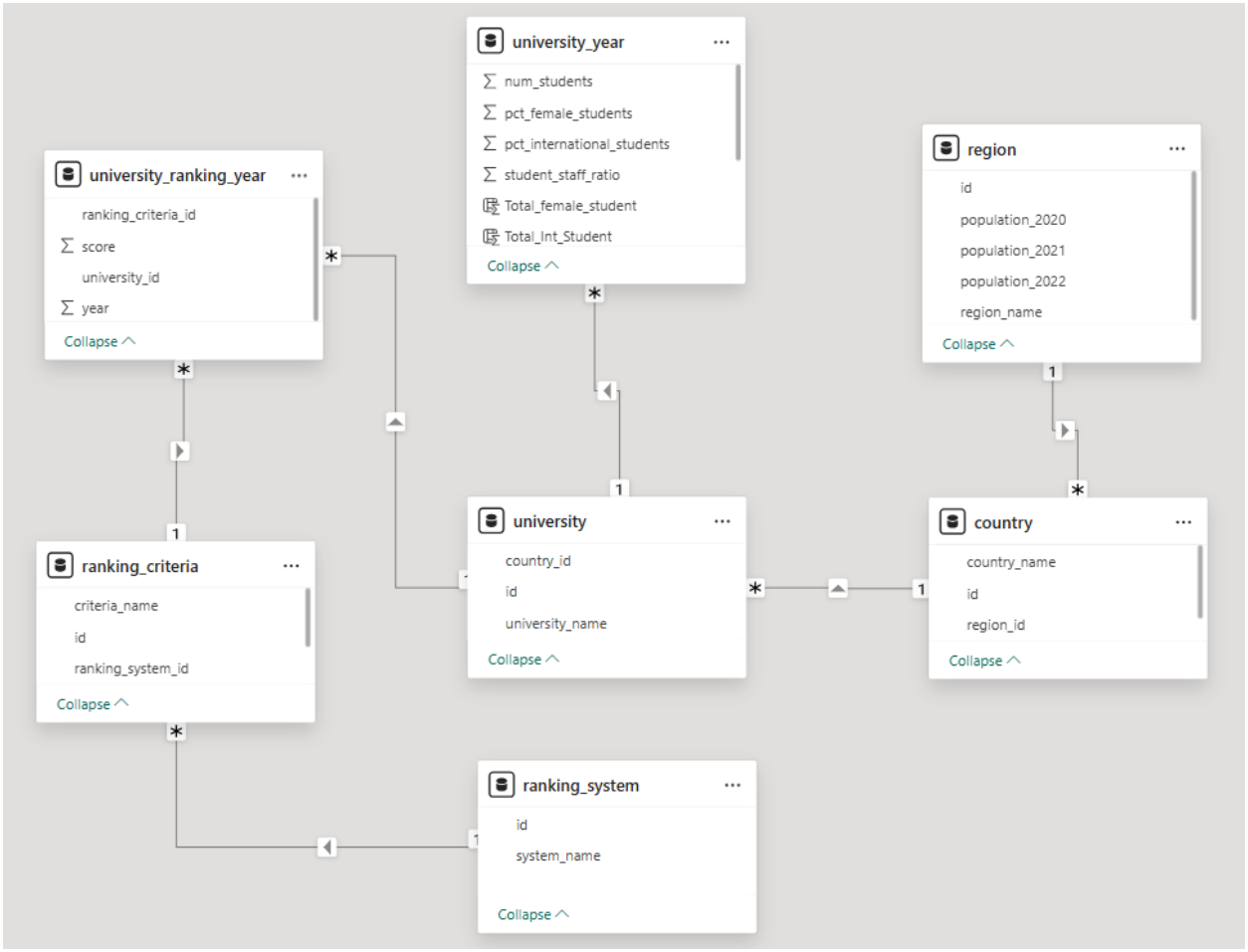
7. ranking_system

A list of organizations that publish university rankings (e.g., "QS World University Rankings," "Times Higher Education").

- id (INT, PRIMARY KEY): The unique identifier for the ranking system.
- system_name (VARCHAR): The name of the ranking organization and its publication.

This database allows us to connect a university's annual performance (university_year) and its specific scores (university_ranking_year) to the criteria and systems that define quality (ranking_criteria, ranking_system). Furthermore, you can analyze these results geographically by linking universities to their country and broader region. This setup is perfect for identifying trends, comparisons, and the factors that truly influence a university's standing.

ER DIAGRAM:


university_year
num_students
pct_female_students
pct_international_students
student_staff_ratio
Total_female_student
Total_Int_Student
Collapse
university_ranking_year
ranking_criteria_id
score
university_id
year
Collapse
region
id
population_2020
population_2021
population_2022
region_name
Collapse
university
country_id
id
university_name
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country
country_name
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region_id
Collapse
ranking_criteria
criteria_name
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system_name
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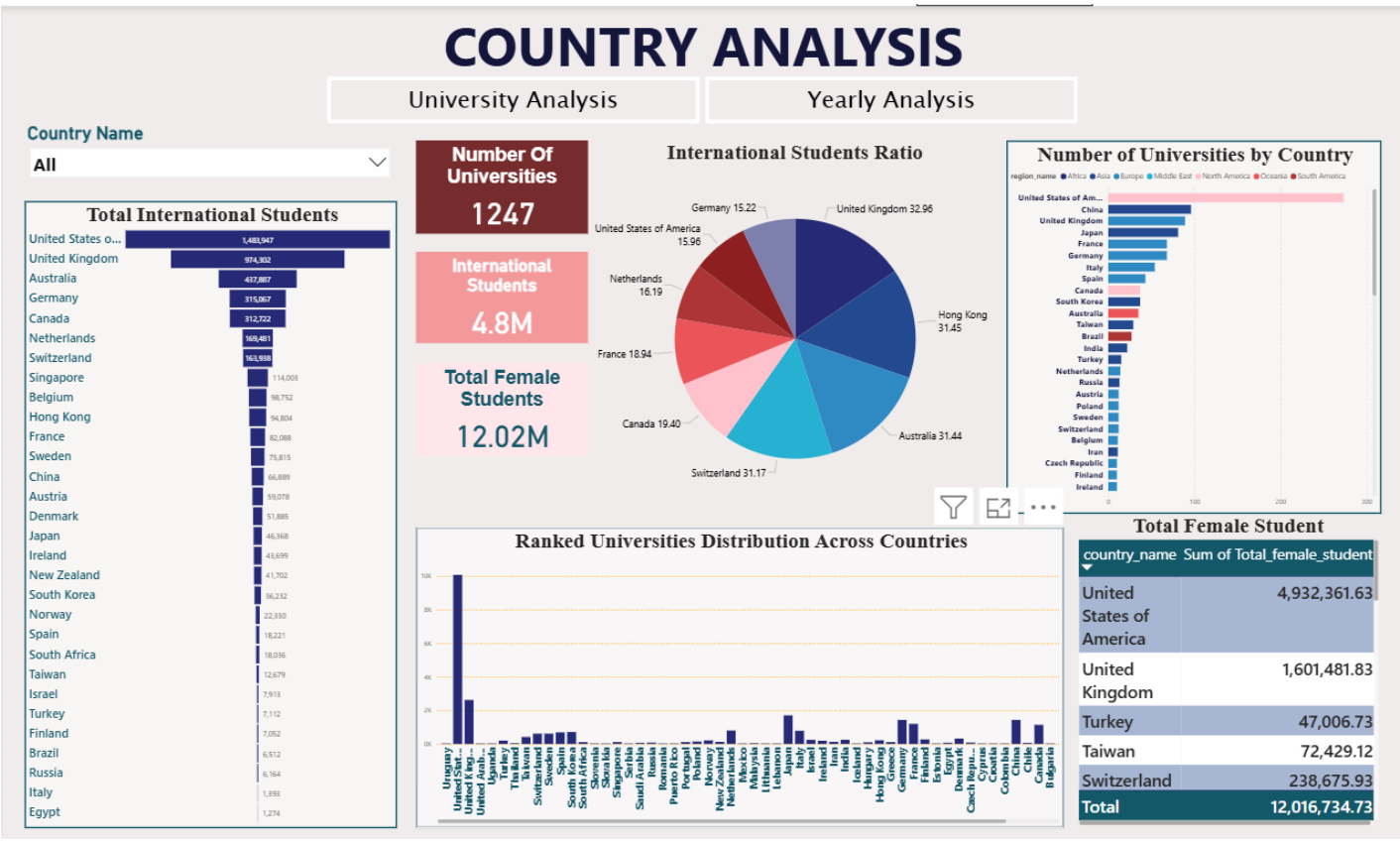
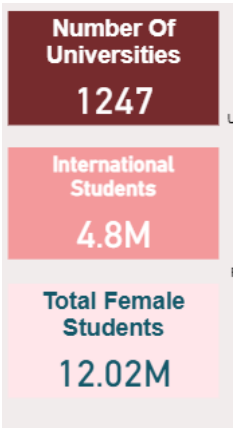
PowerBi Dashboards:

REPORT # 1 : COUNTRY ANALYSIS



OverView

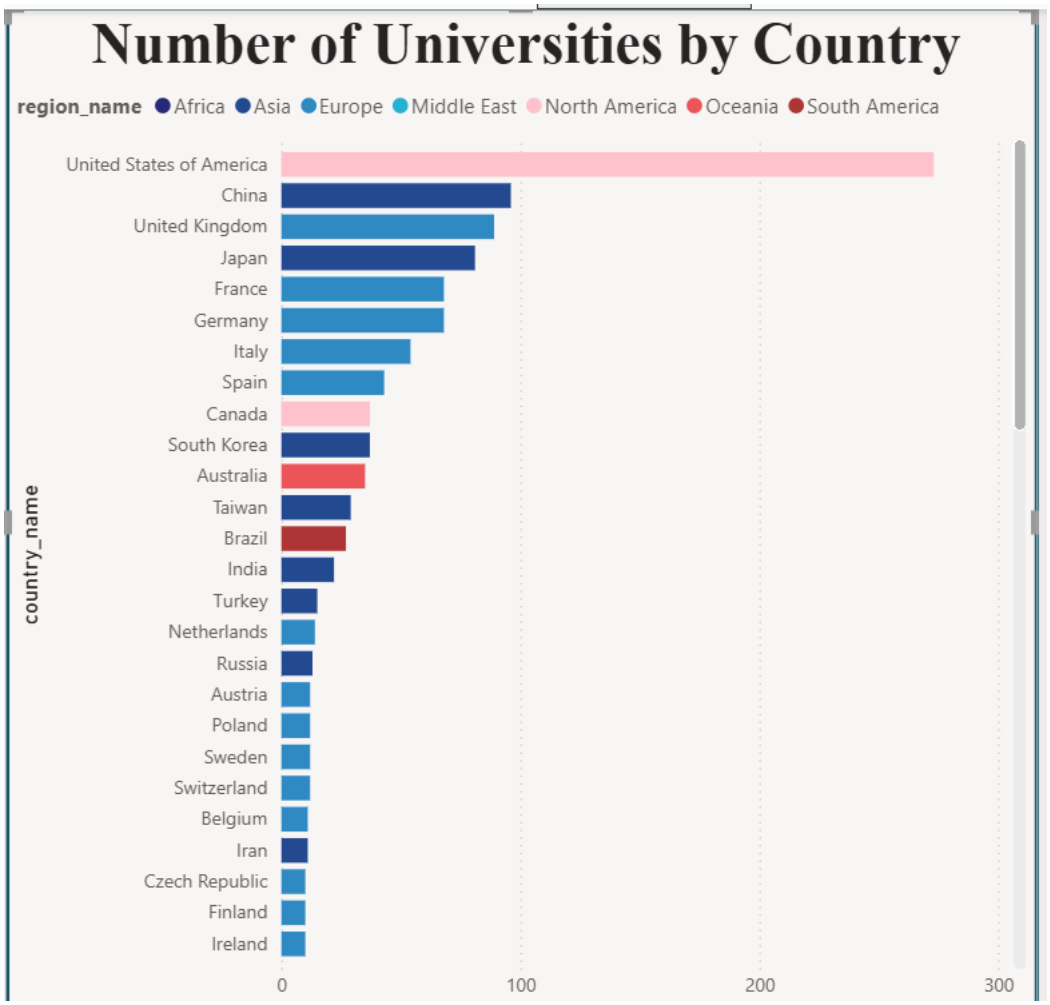


The data we are working on has 1247 record of universities , having 4.8 million international students and 12.02 million female students overall.

There is a filter option named **"Country Name"** which filtered data for you to see insights for each country

Problem Statement #1:

How many universities are there in each country?



INSIGHTS: According to the data, there is a noticeable concentration of American universities. This finding implies that there are a sizable number of universities in the nation, pointing to a strong and varied academic environment. The large number of universities included in the dataset highlights the USA's status as a major centre for education.

The size of the nation, its varied population, and its long-standing emphasis on higher education are some of the reasons for this concentration. Knowing this fact highlights the United States' crucial position in the higher education industry and offers useful context to analyse the distribution of universities around the world. It also emphasises how crucial it is to take national and regional factors into account when assessing the state of higher education around the world.

Problem Statement #2:

What is the distribution of international students across different countries?

INSIGHTS:

The United States is one of the most popular countries for international students to study in. This is because of its excellent schools, many types of classes, and diverse culture.

It is important to support these students and continue to make the US a welcoming place for global talent. This helps promote international education and collaboration.

Problem Statement #3:

Which country has the highest number of female students enrolled in universities?

Total Female Student

country_name	Sum of Total_female_student
United States of America	4,932,361.63
United Kingdom	1,601,481.83
Turkey	47,006.73
Taiwan	72,429.12
Switzerland	238,675.93
Total	12,016,734.73

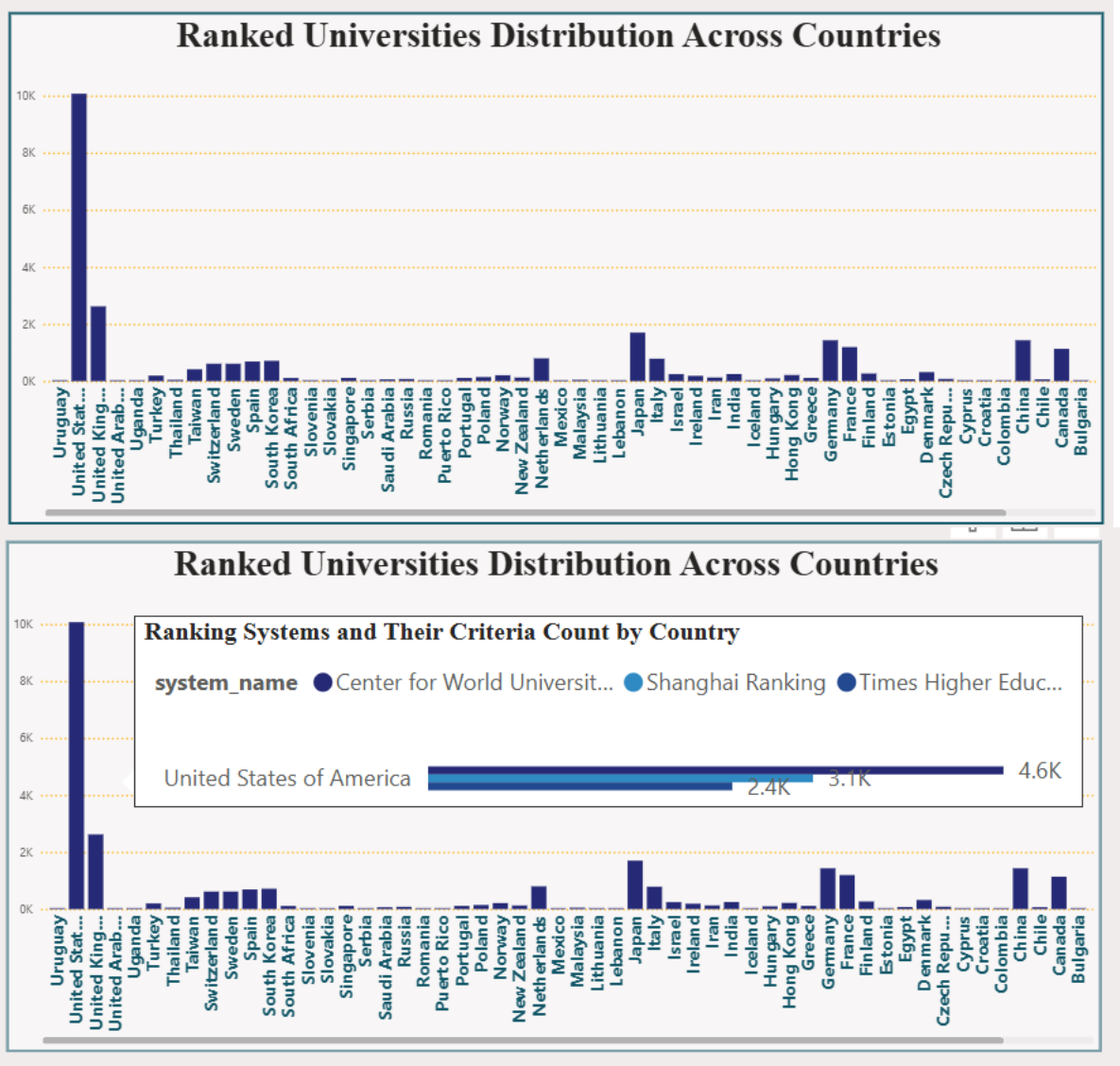
INSIGHTS:

The United States has the highest number of female university students in the dataset. This shows that US colleges provide a welcoming and supportive environment for women.

It also underscores the importance of continued efforts to promote gender equality in education worldwide, fostering an environment where women can pursue academic excellence and contribute meaningfully to various fields.

Problem Statement #4:

How are universities distributed across countries in global ranking systems, and which ranking systems include the most universities from each country?



INSIGHTS:

United States dominates with the highest number of ranked universities, followed by U.K., China, Germany, and Canada.

Smaller countries (e.g., Switzerland, Netherlands, Singapore) have fewer universities overall but are still represented.

Many developing or smaller nations (e.g., Uruguay, Saudi Arabia, Egypt) have very limited representation.

Overall message: Global university rankings are highly concentrated, with a handful of countries dominating representation.

Tooltip (Example shown for the United States)

Displays:

System Name (Center for World University Rankings, Shanghai Ranking, Times Higher Education).

Criteria Counts – how many U.S. universities are included in each ranking.

For the United States:

Center for World University Rankings (CWUR): 4.6K universities

Shanghai Ranking: 2.4K universities

Times Higher Education (THE): 3.1K universities

Tooltip Insight:

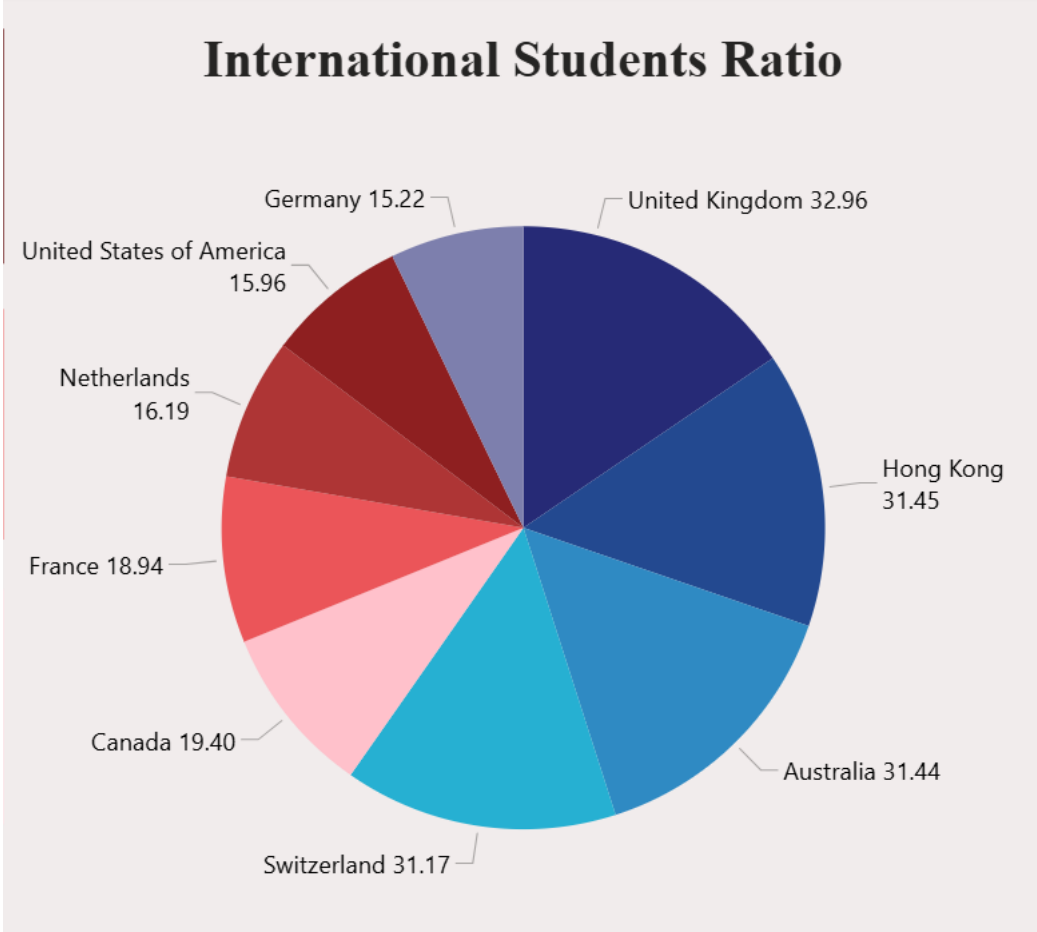
This breakdown shows not only how many U.S. universities are ranked overall but also which ranking system includes them. For example, CWUR covers the most U.S. universities compared to the others.

The **visualization** compares the number of ranked universities across countries.

The **tooltip** provides a breakdown of how each ranking system (CWUR, Shanghai, THE) contributes to that country's total.

Problem Statement #5:

Which countries have the highest proportion of international students relative to their total student population?



INSIGHTS :

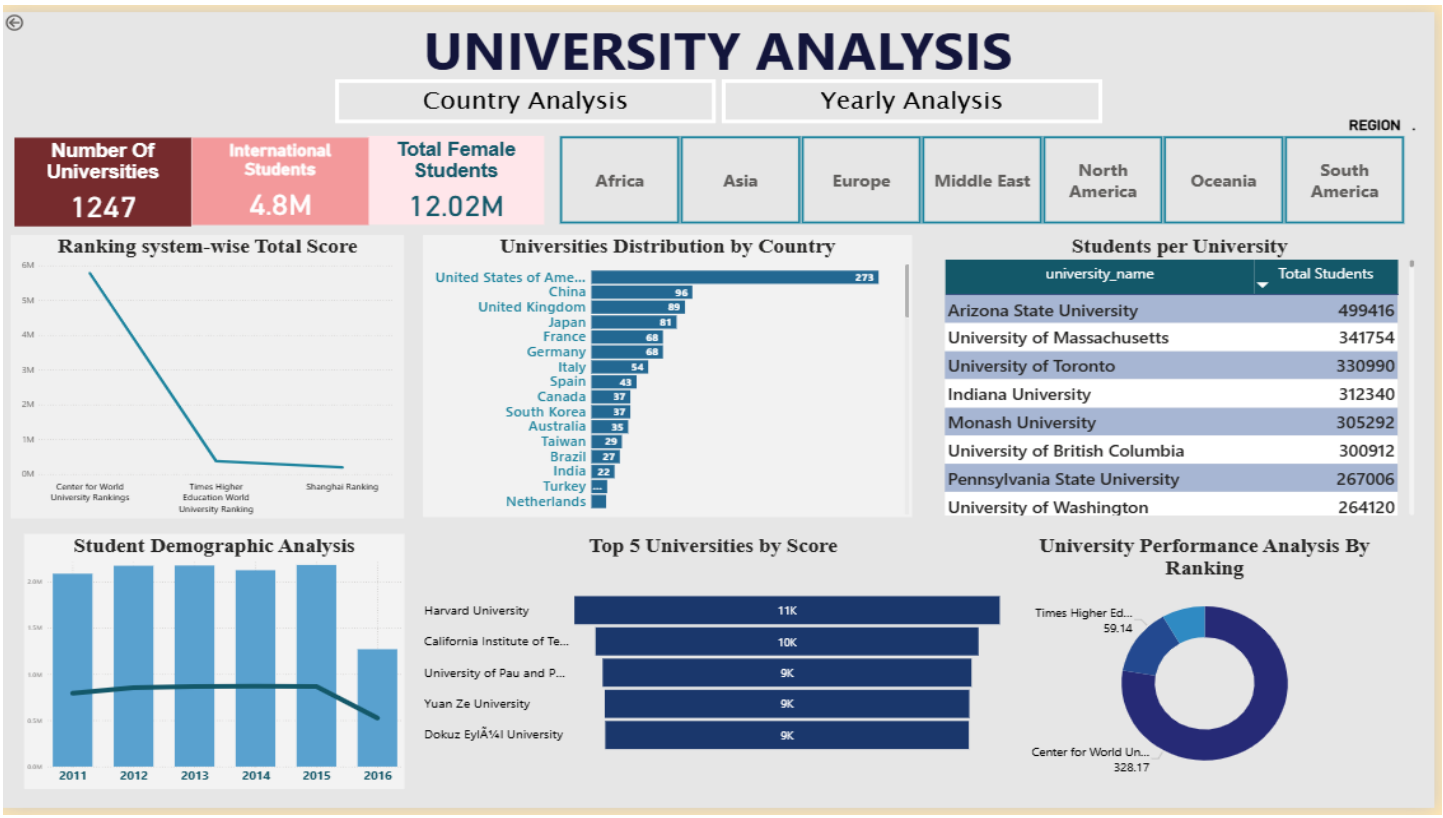
This visualization is for top 10 countries international students ratio. **United Kingdom (32.96%)** has the highest ratio.

Hong Kong (31.45%), Australia (31.44%), and Switzerland (31.17%) are also heavily reliant on international students.

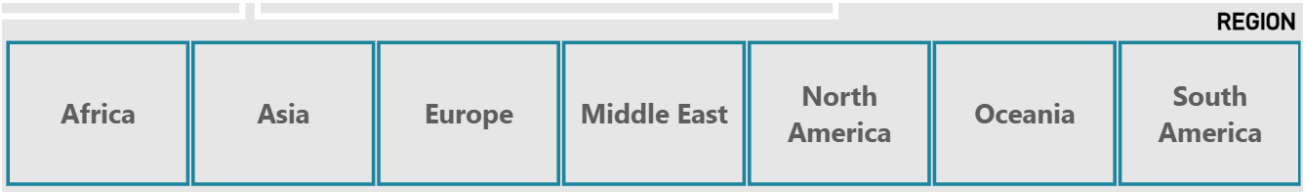
Canada (19.40%) and **France (18.94%)** fall in the mid-range.

Netherlands (16.19%), U.S. (15.96%), and Germany (15.22%) have large numbers of international students, but relative to their overall student populations, the ratio is much smaller.

REPORT #2: UNIVERSITY ANALYSIS



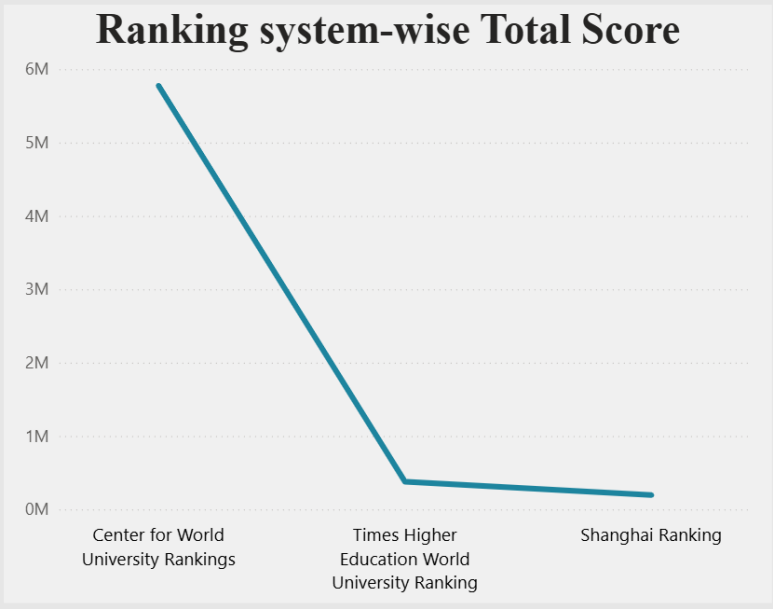
Slicer Overview:



The Region Slicer allows you to actively interact with the report, making it easier to filter and focus on specific regions.

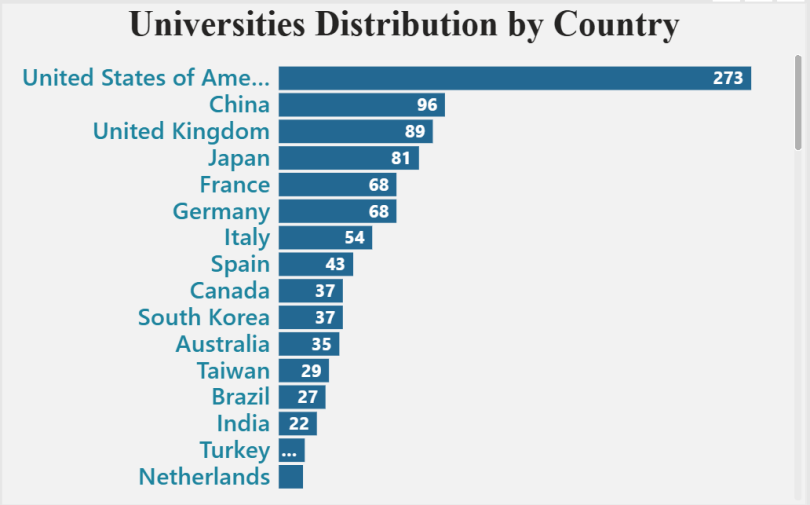
Problem Statement#1:

What is the Trend in Ranking Scores of Universities for Different Ranking Systems?

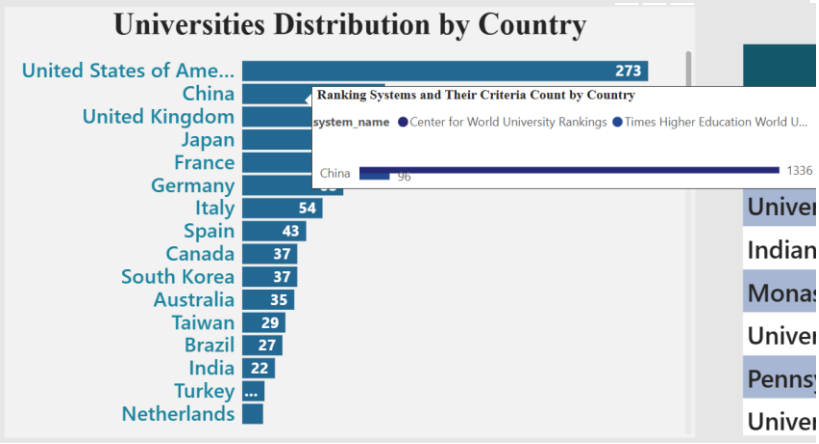


INSIGHTS:
The analysis shows that the Center of University World Ranking gets the highest score among the ranking systems. This means more universities are listed under it compared to others, showing its wide use and influence in academics. Its strong presence suggests that many trust its method, making it a popular choice for comparing universities worldwide. Understanding this ranking is important for universities that want to measure their academic strength and plan strategies to improve their global position.

Problem Statement #2:
How Many Universities are in each Country



INSIGHT:
This Visualization gives us understanding of how many universities are in the countries.
According to our data US has high number of universities, second comes the China with number of universities 96.



INSIGHT:
In this visual , if we want to know about the rankings the universities got , this tooltip helps in it . For example , In China : Center for World Universties has given 1336 scores and Times Higher Education has given 96 scores.

Problem Statement #3:

Which university has the highest number of students?

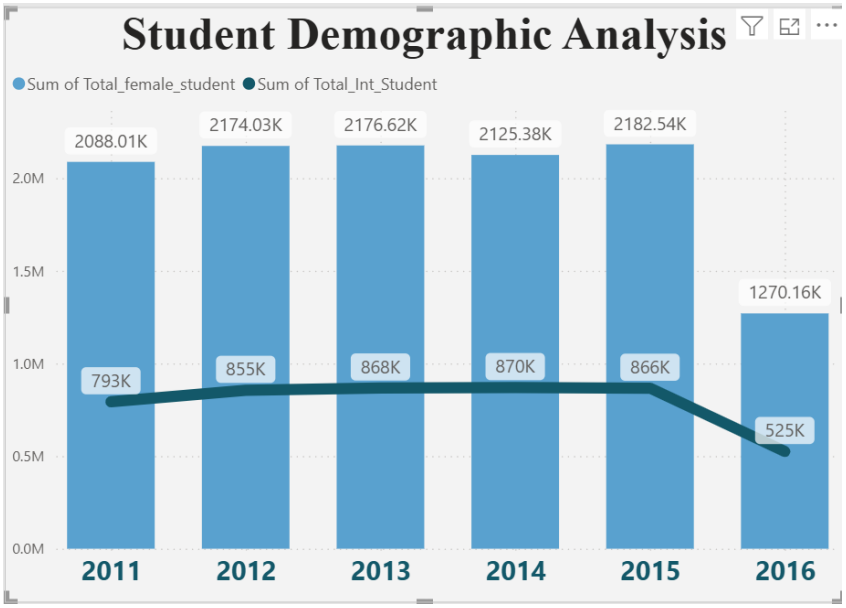
Students per University

University Name	Total Students
Arizona State University	499416
University of Massachusetts	341754
University of Toronto	330990
Indiana University	312340
Monash University	305292
University of British Columbia	300912
Pennsylvania State University	267006
University of Washington	264120

INSIGHTS: Among the universities in the dataset, Arizona State University stands out as having the largest student enrolment, as revealed by the research. This difference shows the large enrolment that Arizona State University offers, which is larger than that of other universities. This result indicates the possibility that the university's high enrolment rates are due to a variety of program options, strong support networks, and possibly successful recruitment tactics.

Problem Statement #4:

What is the overall trend in Female Students Enrollment & International Students Enrollment ?



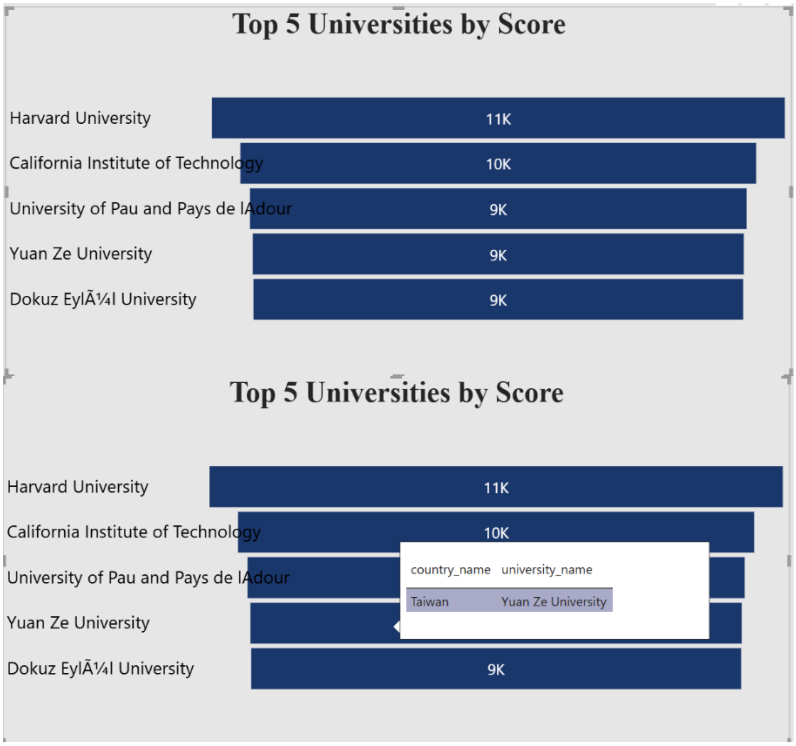
INSIGHTS:

The number of female students remained relatively stable and high, fluctuating between approximately 2.08 million and 2.18 million. This suggests consistent female participation in education during this period.

While international student numbers continued their strong growth in 2016, the female student population collapsed. This divergent trend highlights that the factor causing the drop in female students did not negatively affect the recruitment of international students.

Problem Statement #5:

What are the top 5 Universities according to the score?

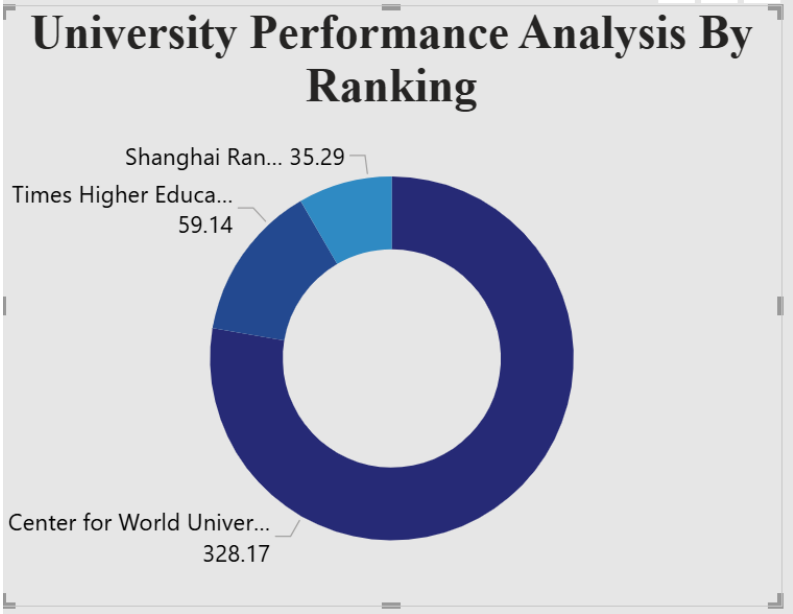


INSIGHTS: This visualizations gives us the knowledge of the top 5 universities according to the ranking system's scores, Harvard University has the hight score of about 11k then comes the California Institute.

INSIGHTS: Upon seeing the visualization one can question that I want to know which country this university belongs to , this tooltip helps them by giving the country name.

Problem Statement #6:

How Ranking systems effects the Universities performance?



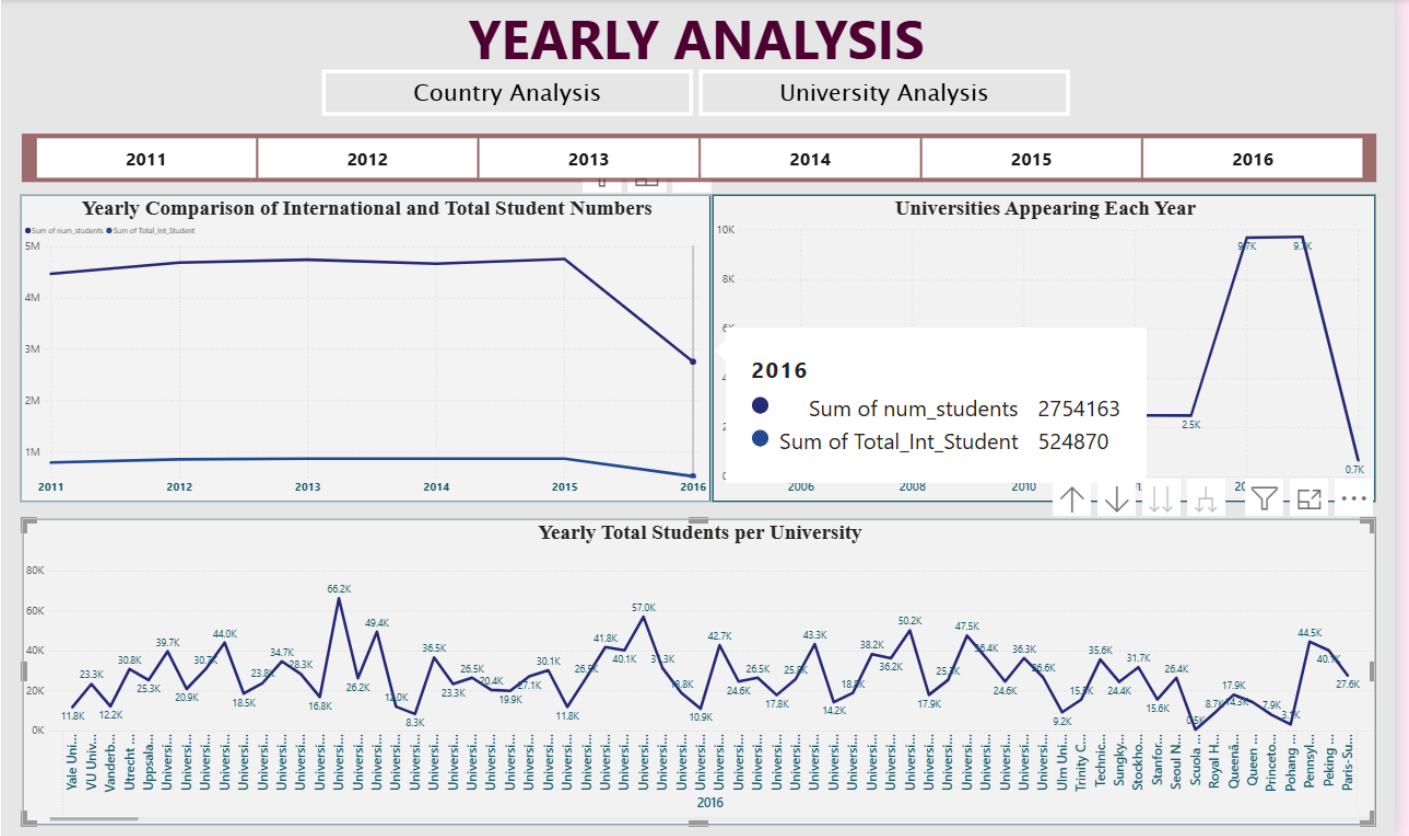
INSIGHTS:This donut chart highlights which ranking system gives universities higher or lower average scores.

A higher average score suggests that more universities perform better under that system's criteria.

Differences between systems show how ranking methods impact overall results.

Institutions can use this to understand where they are rated more favorably and align strategies with those criteria.

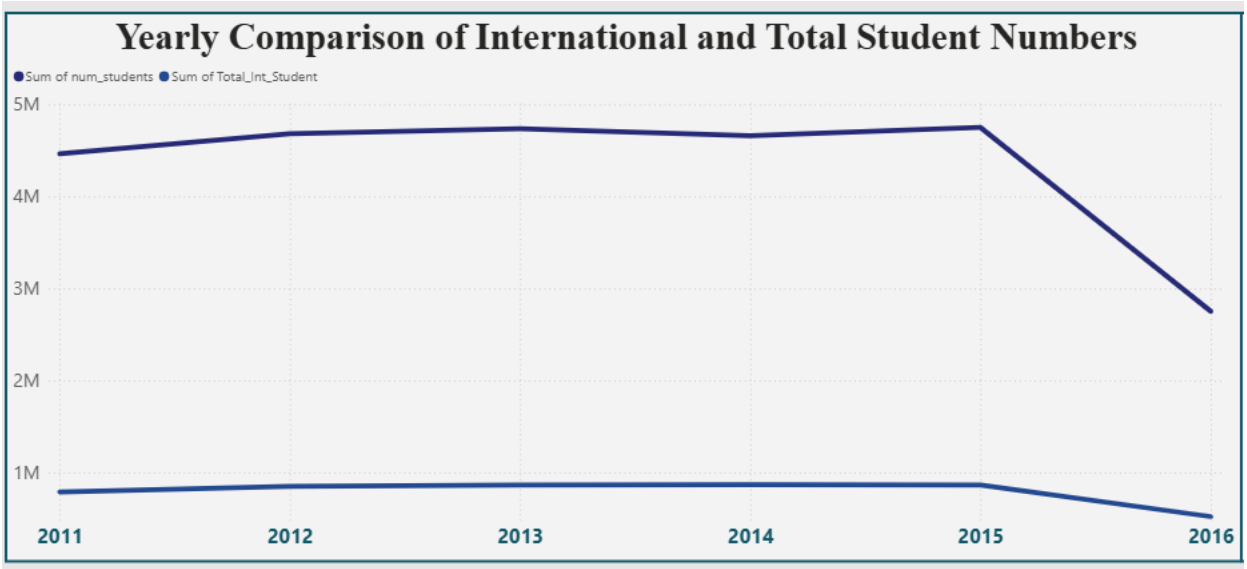
REPORT #3: YEARLY ANALYSIS



Overview:

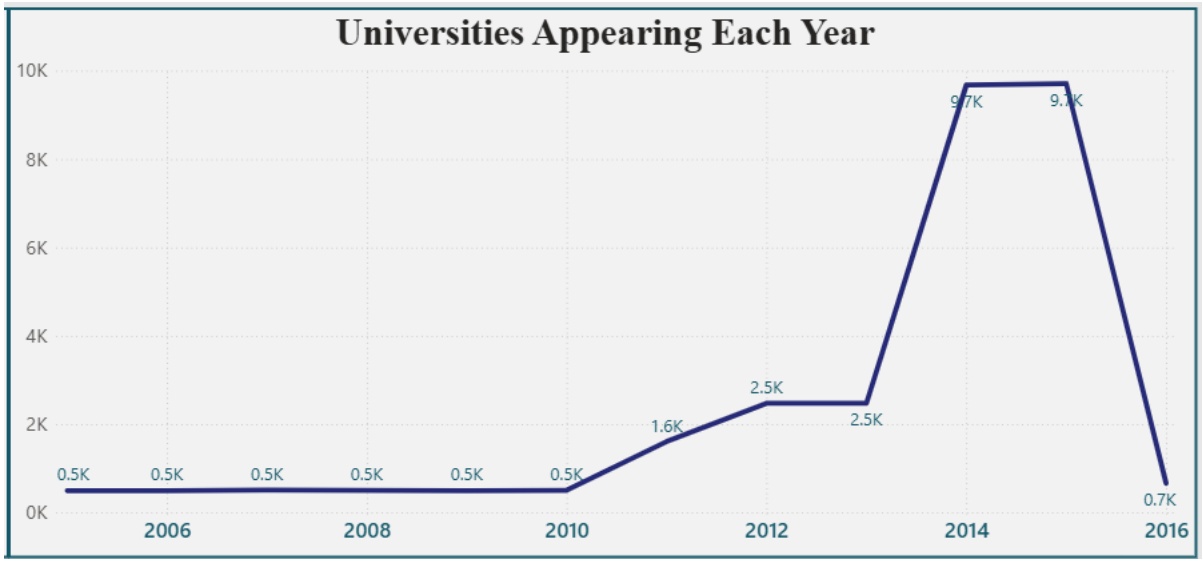
This slicer help us to interact with the dashboard where all the visuals are related to years.

Overall trend in Female Students Enrollment & International Students Enrollment



INSIGHTS:
From 2011 to 2016, both international and female student enrollments in universities showed steady growth, reflecting globalization and progress in gender inclusivity. However, in 2016, both groups experienced a sudden decline, suggesting possible disruptions from policy changes, economic conditions, or social factors. Understanding these shifts is vital for universities and policymakers to adapt strategies that support diversity, inclusivity, and stable international student mobility.

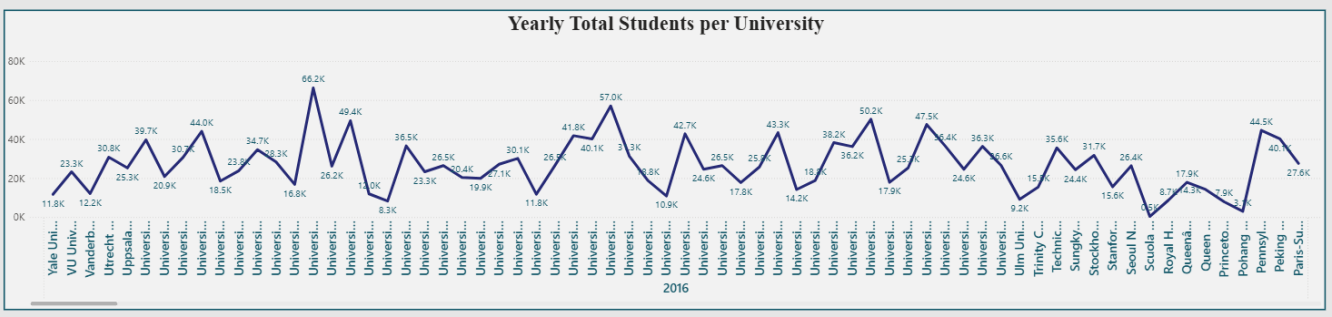
Trend in the Number of Universities Over the Years



INSIGHTS :

The analysis reveals a consistent upward trajectory in the number of universities over time, with a marked decline observed in 2016. This pattern underscores the fluidity inherent in the higher education domain and emphasizes the necessity for thorough exploration into the factors contributing to this downturn. Unraveling the cause of this decline can offer invaluable perspectives into the underlying dynamics steering the expansion and resilience of universities, potentially unveiling economic, social, or policy-related influences shaping higher education trends. Such insights are indispensable for guiding strategic deliberations and interventions aimed at fortifying and augmenting the robustness of universities amid fluctuating circumstances.

What is the Total number of students in universities?



INSIGHTS :
This visuallization shows the overall size of the student population enrolled in universities. It helps measure the growth or decline of higher education participation over time, reflecting trends in accessibility, demand, and the capacity of institutions to accommodate students.

Conclusion:

This study of the university dataset gave useful insights into global higher education. The data included countries, universities, ranking systems, and different performance measures, providing a strong base for analysis.

Key findings show that most universities are concentrated in the United States, highlighting its major role in higher education. The differences in ranking systems and their unique criteria also reveal how complex it is to evaluate universities worldwide.

The analysis found changing trends in rankings across countries and systems, showing that universities and policymakers need to stay flexible with shifting global and educational conditions. It also showed connections between university scores, student–staff ratios, and international student enrollment, pointing to important factors that affect performance and inclusivity.

Student demographics added more insight, with clear trends in female and international student enrollment. These findings stress the importance of building inclusive and supportive learning spaces for diverse students.

Overall, this project provided a clear view of the global higher education landscape, showing how many factors shape the way universities are judged and understood in today’s connected world.

THANKYOU