QS University Ranking 2022 with rmarkdown, EDA

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QS World University Rankings

Each year QS university ranking provides a list of more than 1,000 universities worldwide, covering a total of 80 locations. Each institution has been assessed according to six key metrics: Academic reputation, employer reputation, faculty student, citations per faculty, international faculty, and international students. Finally, a summarize overall score that determine the ranking position based on the six key metrics.
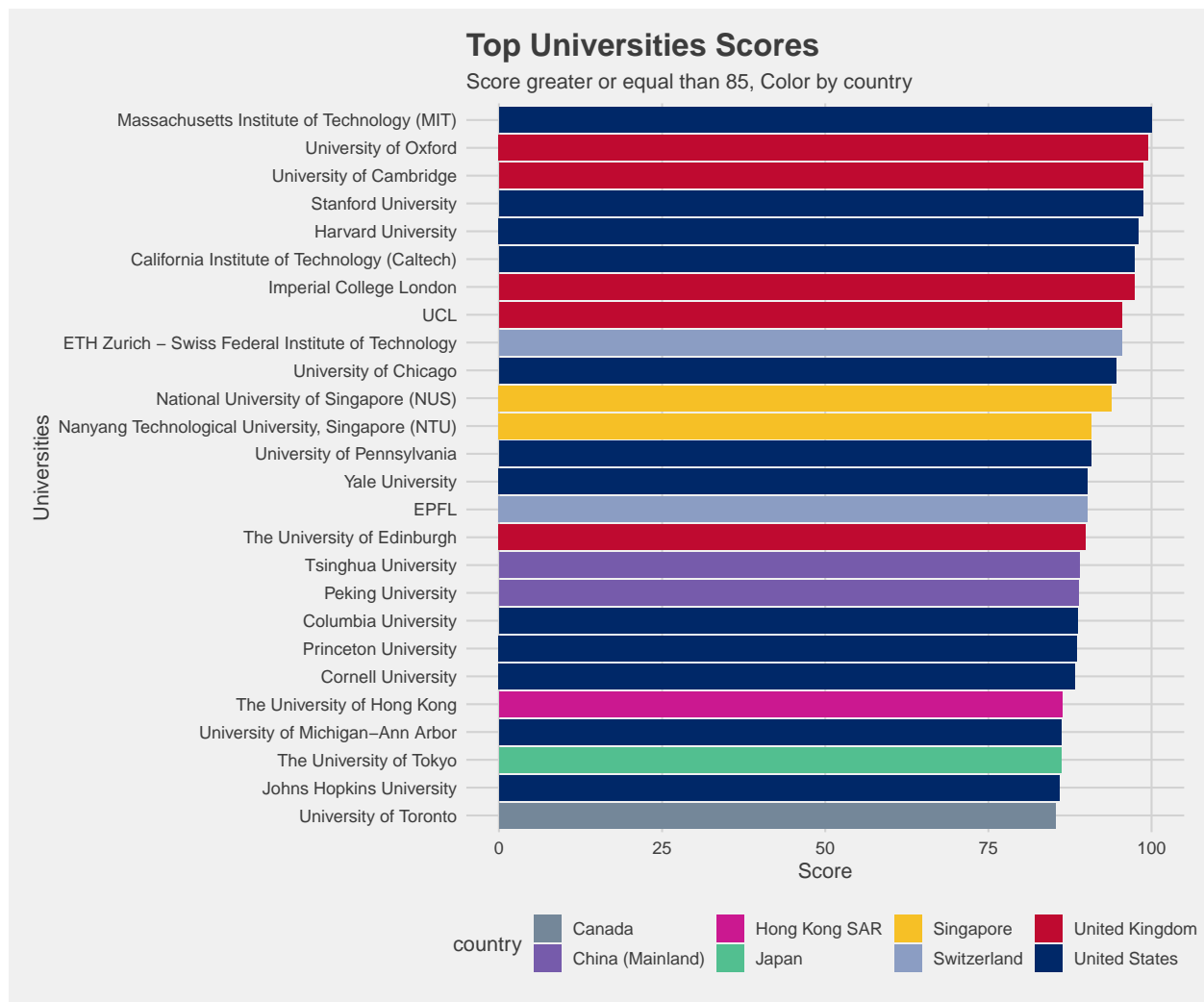
Top 10 Universities in the 2022 ranking:

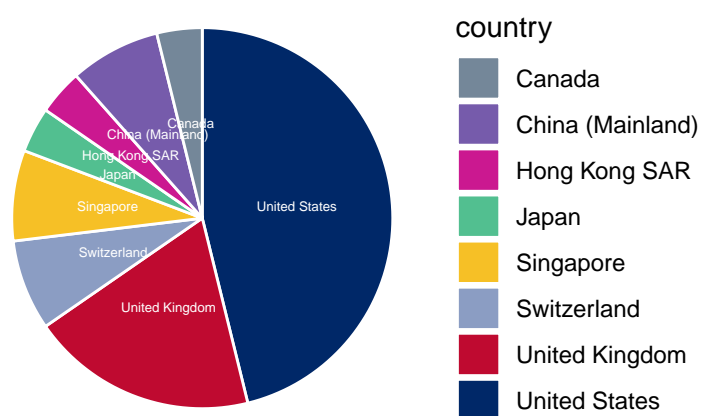| rank_display	university	score	country
1	Massachusetts Institute of Technology (MIT)	100.0	United States
2	University of Oxford	99.5	United Kingdom
3	Stanford University	98.7	United States
3	University of Cambridge	98.7	United Kingdom
5	Harvard University	98.0	United States
6	California Institute of Technology (Caltech)	97.4	United States
7	Imperial College London	97.3	United Kingdom
8	ETH Zurich - Swiss Federal Institute of Technology	95.4	Switzerland
8	UCL	95.4	United Kingdom
10	University of Chicago	94.5	United States

The United States and the United Kingdom have dominant positions in the top 10 universities worldwide, with the following standing out in the first places: *Massachusetts Institute of Technology (MIT)* (US) -still first place in the ranking-, *University of Oxford* (UK), *Stanford University* (US), *University of Cambridge* (UK) and *Harvard University* (US) respectively.

Top Universities (score greater or equal than 85)

Top Universities Scores
Score greater or equal than 85, Color by country

Proportions of the 8 countries

It is clear that in the top scores over or equal 85, both the US and the UK continue to stand out in academic fields with *65.4%* presence in the graph, above countries such as **Switzerland**, **Singapore** and **China** with

7.69% each respectively and finally, **Japan**, **Hong Kong** and **Canada** with *3,84%* each respectively.
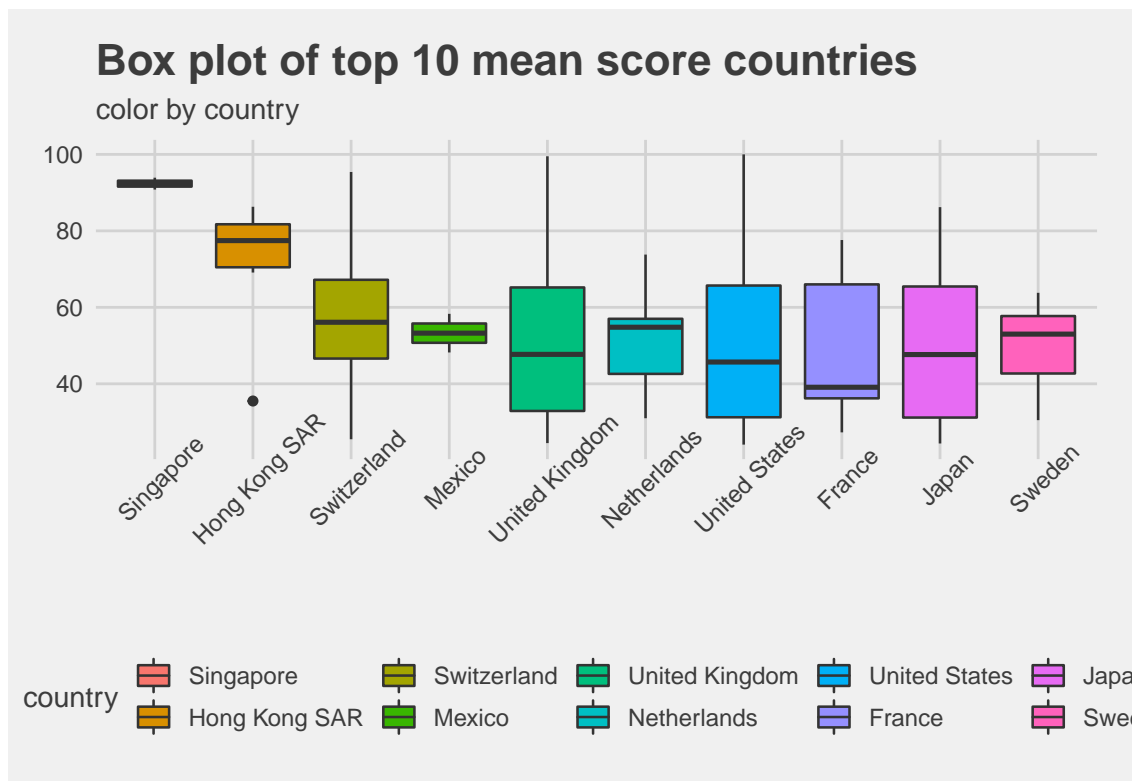
Analysis by *country*

Summary statistics (average in descending order).

country	mean.score	std.score	median.score	max.score	min.score	N.universities
Singapore	92.35000	2.192031	92.35	93.9	90.8	3
Hong Kong SAR	71.33333	18.558951	77.45	86.3	35.5	7
Switzerland	59.08889	22.546421	56.10	95.4	25.5	10
Mexico	53.25000	7.141779	53.25	58.3	48.2	24
United Kingdom	51.91429	21.961187	47.70	99.5	24.5	90
Netherlands	51.81538	12.517245	54.80	73.8	31.0	13
United States	51.05632	22.960982	45.70	100.0	24.1	177
France	49.98182	18.481873	39.10	77.6	27.3	32
Japan	49.76875	20.387405	47.65	86.2	24.4	48
Sweden	49.75000	12.706691	53.00	63.8	30.5	8

This table contains only the top 10 countries by mean score, and had to be interpreted with carefull. We have to consider that the number of universities by country vary from a range of *3* (**Singapore**) to *177* (**United States**). Therefore, it is expected that countries with a large number of universities would probably present a higher standard deviation of the scores and the or median score has to be compared knowing this differences of distribution. An histogram plot is relevant to know the **university score distribution** from the top 10 countries.

And also, a box plot can help to show more easily the quantiles and the size of the distribution of each country, where the median in eight of the countries does not exceed 60 score points and the three universities in Singapore are very close, over the 90 score points.
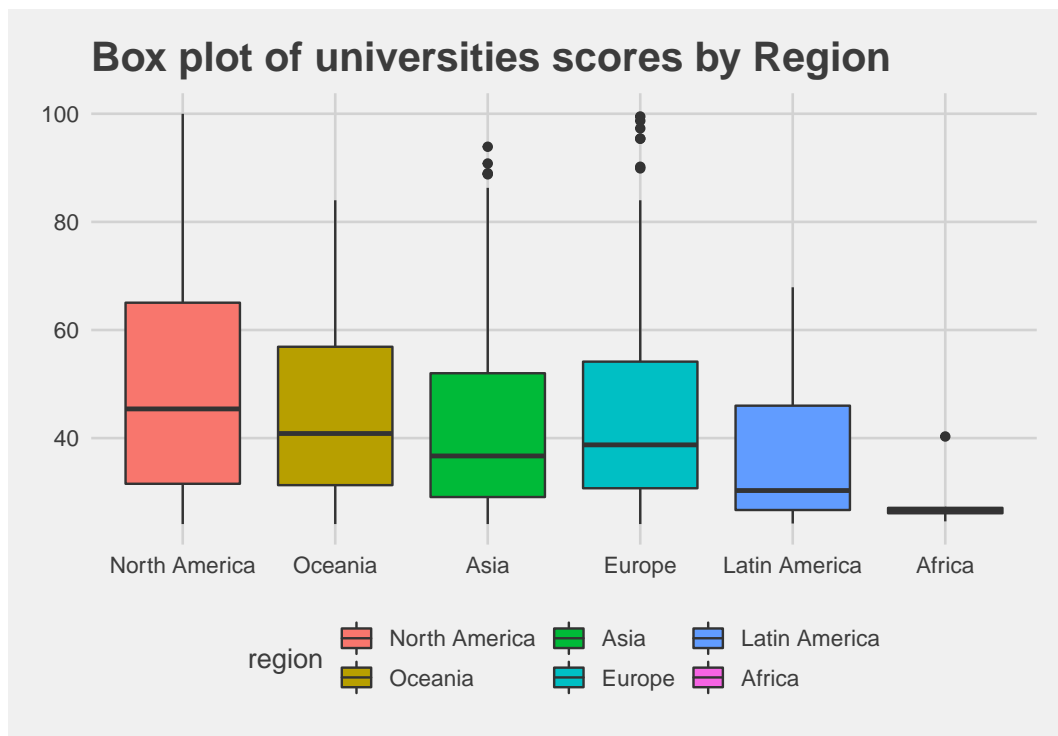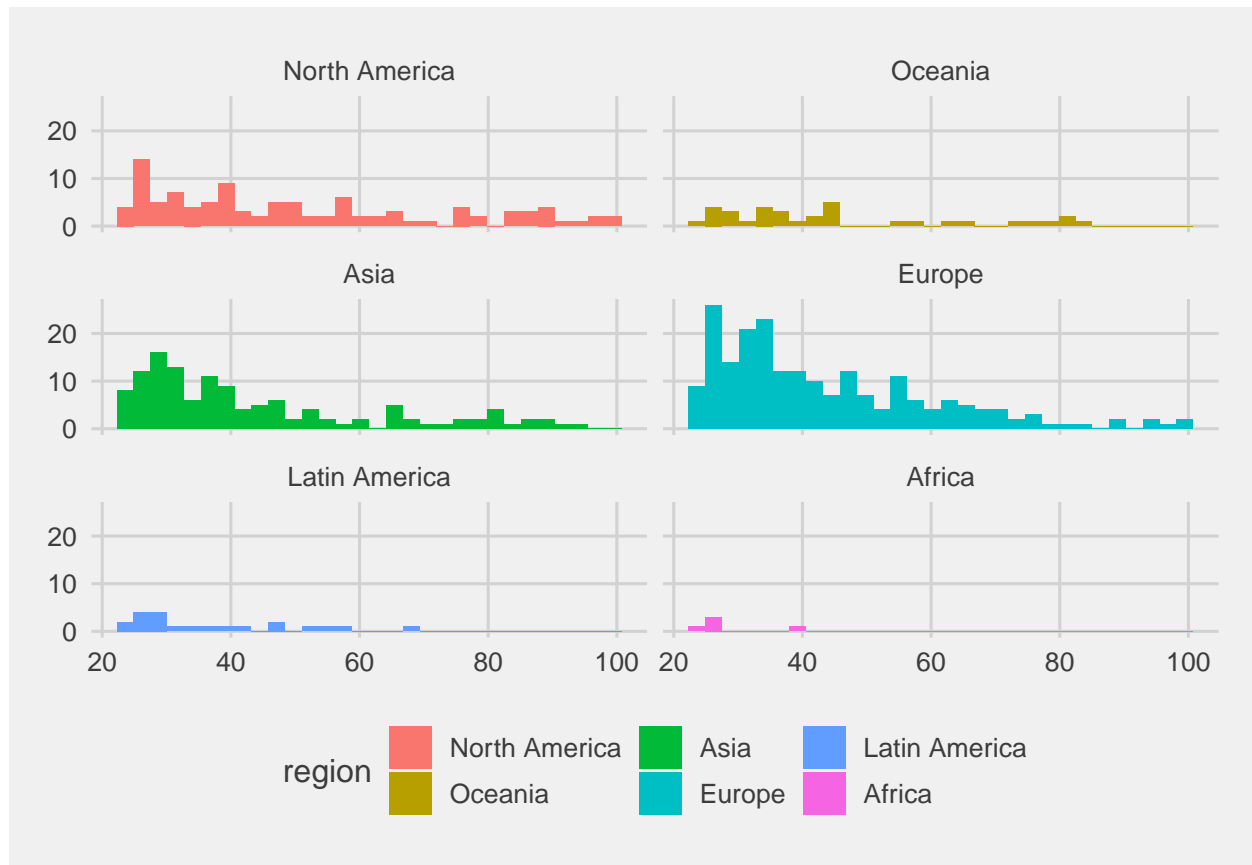

Box plot of top 10 mean score countries
color by country

Analysis by *region*

Summary statistics (average in descending order).

region	mean.score	std.score	median.score	max.score	min.score	N.universities
North America	50.49615	22.351694	45.40	100.0	24.1	205
Oceania	45.63235	18.594635	40.85	84.0	24.1	46
Asia	43.67040	18.926927	36.70	93.9	24.1	399
Europe	43.61698	17.195657	38.75	99.5	24.1	468
Latin America	36.89524	13.229530	30.30	67.9	24.2	151
Africa	28.96000	6.409992	26.70	40.3	24.6	31

As in the previous statistics table, it is essential to take into account the differences in the number of universities for each region, with **Europe** having the largest number of observations (*468*) and **Africa** having the least (*31*). In resume, **North America** leads the regions with an average score of *50.5* and the third largest number of universities (*205*). On the other hand, **Oceania**, **Asia** and **Europe** share a similar range of average scores (between *45.6* and *43.6*) and, finally, **Latin America** and **Africa** lag well behind with an average score of *36.9* and *29* respectively.

Another histogram for each region is necessary to understand the distributions of the scores and a box plot to see a comparative of the interquartile range and the outliers of **Asia**, **Europe** and **Africa**.

Box plot of universities scores by Region

Analysis of the Ivy league.

A historical analysis of the scores belonging to the Ivy league, filtering the last 6 years, where we can observe the latest trends of this select group of prestigious universities in the United States.
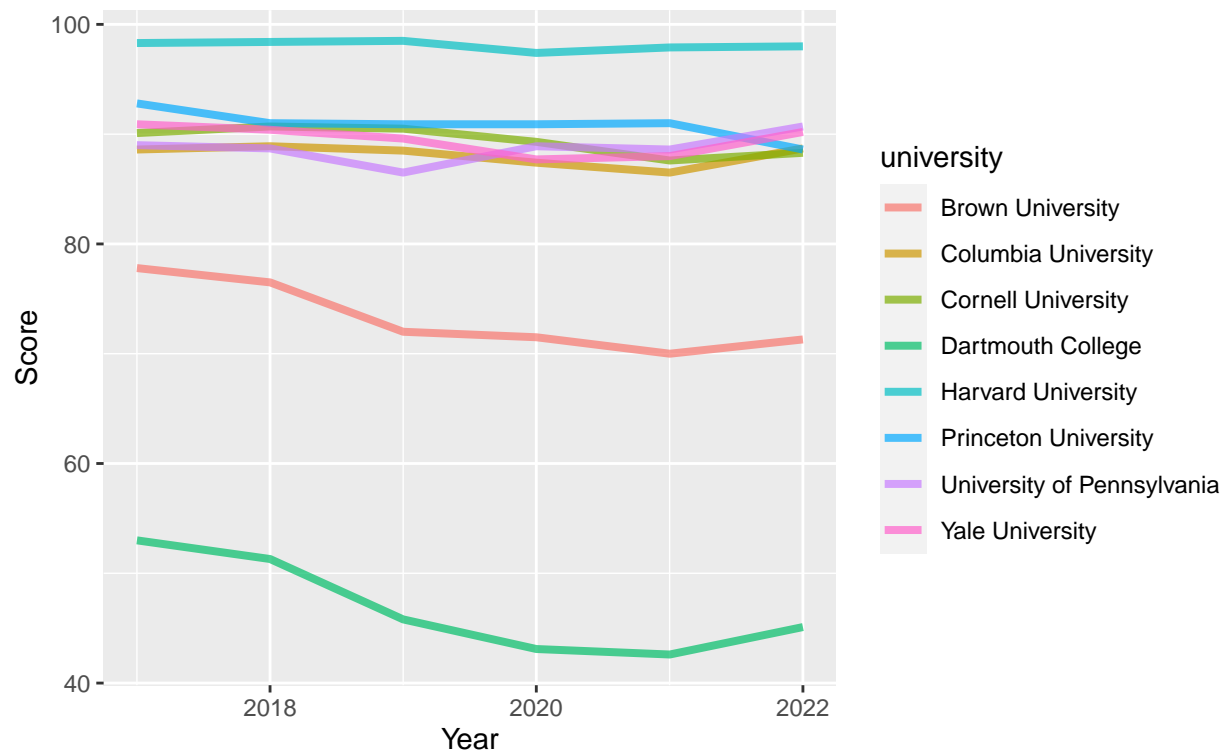
Summary statistics (average in descending order).

university	mean.score	std.score	median.score	max.score	min.score	N.years
Harvard University	98.08333	0.4070217	98.15	98.5	97.4	6
Princeton University	90.86667	1.3351654	90.95	92.8	88.6	6
Yale University	89.46667	1.3231276	89.90	90.9	87.7	6
Cornell University	89.41667	1.2528634	89.70	90.7	87.6	6
University of Pennsylvania	88.73333	1.3396517	88.80	90.7	86.5	6
Columbia University	88.10000	0.9444575	88.55	88.9	86.5	6
Brown University	73.18333	3.1694900	71.75	77.8	70.0	6
Dartmouth College	46.81667	4.3337820	45.45	53.0	42.6	6

In this case, it´s not necessary to take into account the number of observation like in the other tables, because each University has the same number of score observations from the last six years.

In summary, **Harvard University** comfortably leads with an average score of *98.1* points, followed by **Princeton University**, **Yale University**, **Cornell University**, **University of Pennsylvania** and **Columbia University** in a similar range with averages between *90.9* and *88.1*. Finally, **Brown University** and **Dartmouth College** finished the list with *73.2* and *46.8* average points, respectively.

More interesting is to see what happens with the trends of each University in the last six years and compare their performance with a line plot, where we can clearly see the declive of **Brown University** (*-8.35%*)

and **Dartmouth College** (*-14.9%*) since 2017 with a small recovery in the last year,a good rise from the **University of Pennsylvania** (*1.91%*) in recent years, a fall from **Princeton University** in the last year (*-4.53%*) and a remarkable performance from **Harvard University** (*-0.305%*), remaining firm in the highest positions in this ranking. The last table contains the percentage change from 2017 to 2022.

university	pct_change_in_percentage
University of Pennsylvania	1.9101124
Columbia University	0.1128668
Harvard University	-0.3051882
Yale University	-0.7700770
Cornell University	-1.9977802
Princeton University	-4.5258621
Brown University	-8.3547558
Dartmouth College	-14.9056604

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