# International visibility of Brazilian public universities

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## INTRODUCTION

Although the development of scientific and technological infrastructure and training and expansion of the Brazilian academic community are very recent events in Brazil, in recent years the country was one of those who get prominence on the international scene.
**The main objective of this study is to detect which Brazilian universities have the greatest international visibility and in which specific areas they specialize.** This information will allow to determine the main focuses attraction scientific of the Brazilian University System.

## SOURCES AND METHODOLOGY

**Identification of the most cited Brazilian universities worldwide**

Essential Science Indicators (ESI) of *Clarivate Analytics* (edition 2017):

- Collection of data on scientific production and citations received in the last 10 years;
- Collection of the number of citations received from the 1000 most cited institutions in the world, and in the main Brazilian universities;
- Comparative of the relative impact of each university with the average of the relative impact of Brazil.

**Selection of highly cited Brazilian documents**

Journal Citation Reports:

- Selection of publications in the TOP 1% of most cited in 22 areas WoS

**Detection of Brazilian public universities in the world's main universities rankings**

- **Academic Ranking of World Universities** (ARWU);
- **Quacquarelli Symonds World University Rankings** (QS);
- **Times Higher Education** (THE).
- Collection of data about the position reached by Brazilian universities was obtained in the general ranking (*Subject*) and in the thematic specialties (*Field*).

**Aggregation in broad subject areas**

- **GIPP classification of Thomson Reuters:**
- Data was aggregated into 4 broad areas:
  1. Engineering;
  2. Life Science & Medicine;
  3. Experimental Science;
  4. Social Science & Humanities.

**Representation of more visible universities and thematic area of specialization**

- The areas of greater visibility and the most relevant universities in each area were detected.

## RESULTS

- A total of **398.386 Brazilian scientific publications** was indexed in the WoS databases during the period analyzed (2007-2017).
- The country ranks 13th by number of documents published in the world, 17th by citations received and 123rd by citations/documents, with an average of 8.22 citations per document in all areas.

**Figure 1: Position of Brazilian universities in the world ranking of highly cited documents according to the areas of the Essential Science Indicators (2007-2017).**
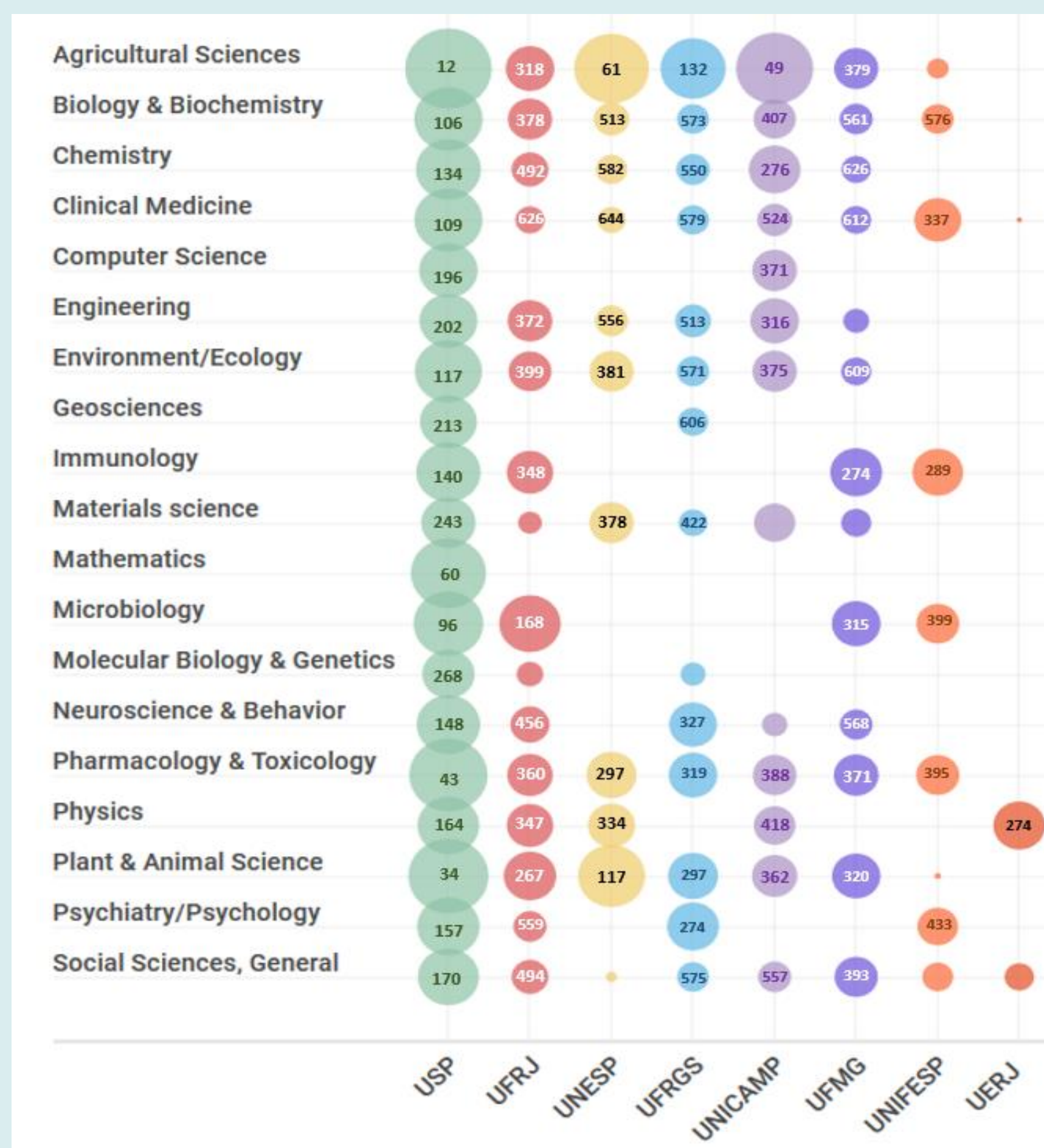
In Figure 1 the better position is represented by the larger size of the presented circles. Ranked 12th in the world, USP is first in Agricultural Sciences and second in Plant & Animal Science in 34th place in the world.



**Table 1: Number of citations received per document by areas in the Brazilian universities publications (1000 most cited institutions) (2007-2017).**

| Areas Essential Science Indicators | Brazil | UNIFESP | UERJ | UFRJ | USP | UFRGS | UNICAMP | UFMG | UNESP |
|---|---|---|---|---|---|---|---|---|---|
| **Agricultural Sciences** | 4,79 | 6,24 | - | 7,51 | 7,03 | 5,60 | 8,81 | 4,03 | 3,80 |
| **Biology & Biochemistry** | 10,14 | 10,27 | - | 12,12 | 10,94 | 11,98 | 10,92 | 13,06 | 8,09 |
| **Chemistry** | 9,55 | - | - | 9,15 | 10,91 | 11,68 | 10,87 | 10,82 | 9,34 |
| **Clinical Medicine** | 9,64 | 11,01 | 8,50 | 10,26 | 10,44 | 10,78 | 8,44 | 10,16 | 7,03 |
| **Computer Science** | 4,77 | - | - | - | 5,81 | - | 5,17 | - | - |
| **Economics & Business** | 3,92 | - | - | - | 6,43 | - | 7,44 | - | - |
| **Engineering** | 6,15 | - | - | 6,33 | 11,49 | 6,90 | 12,90 | 6,24 | 6,88 |
| **Environment/Ecology** | 10,09 | - | - | 10,36 | - | 9,19 | - | 8,92 | 9,32 |
| **Geosciences** | 9,67 | - | - | - | 12,13 | 8,23 | - | - | - |
| **Immunology** | 12,58 | 15,30 | - | 14,65 | 12,55 | - | - | 17,23 | - |
| **Materials Science** | 7,68 | - | - | 8,18 | 8,45 | 7,66 | 9,27 | 9,89 | 8,95 |
| **Mathematics** | 3,81 | - | - | - | 4,24 | - | - | - | - |
| **Microbiology** | 9,76 | 12,30 | - | 12,60 | 9,89 | - | - | 9,01 | - |
| **Molec Biology & Genetics** | 12,23 | - | - | 19,98 | 16,03 | 15,03 | - | - | - |
| **Multidisciplinary** | 9,16 | - | - | - | - | - | - | - | - |
| **Neuroscience & Behavior** | 12,13 | 10,84 | - | 14,08 | 12,88 | 14,48 | 10,61 | 11,75 | |
| **Pharmac & Toxicology** | 8,96 | 10,77 | - | 9,09 | 10,33 | 9,50 | 9,32 | 8,94 | 10,17 |
| **Physics** | 10,86 | - | 16,36 | 17,20 | 13,99 | - | 13,95 | - | 16,43 |
| **Plant & Animal Science** | 5,28 | 6,30 | - | 6,55 | 6,59 | 5,03 | 6,90 | 5,31 | 5,00 |
| **Psychiatry/Psychology** | 9,22 | 9,64 | - | 8,87 | 12,35 | 13,67 | - | - | - |
| **Social Sciences, general** | 4,54 | 6,14 | 4,91 | 4,40 | 5,90 | 4,82 | 4,78 | 5,09 | 2,98 |
| **Space science** | 15,13 | - | - | - | - | - | - | - | - |
| **All fields** | **8,22** | **10,51** | **10,39** | **10,28** | **10,05** | **9,35** | **9,34** | **9,23** | **7,38** |
| **World ranking position** | 17º | 648º | 961º | 459º | 108º | 541º | 461º | 608º | 509º |
| **Nº documents** | 398.386 | 17.394 | 10.438 | 26.116 | 89.051 | 23.454 | 28.603 | 20.861 | 32.526 |
| **Nº citations** | 3.273.335 | 182.872 | 108.436 | 268.366 | 895.169 | 219.257 | 267.092 | 192.474 | 240.004 |

**Figure 2: Brazilian universities with higher international visibility by thematic area in the world's main universities rankings (2016-2017).**

Nine Brazilian public universities were listed on all three major general rankings. USP shows greater visibility in all the thematic fields. UFRJ highlights as the best Brazilian federal university (in Engineering and Technology)
On the other hand, traditionally recognized as an institution specialized in the Health Sciences, UNIFESP stands in Life Science & Medicine.
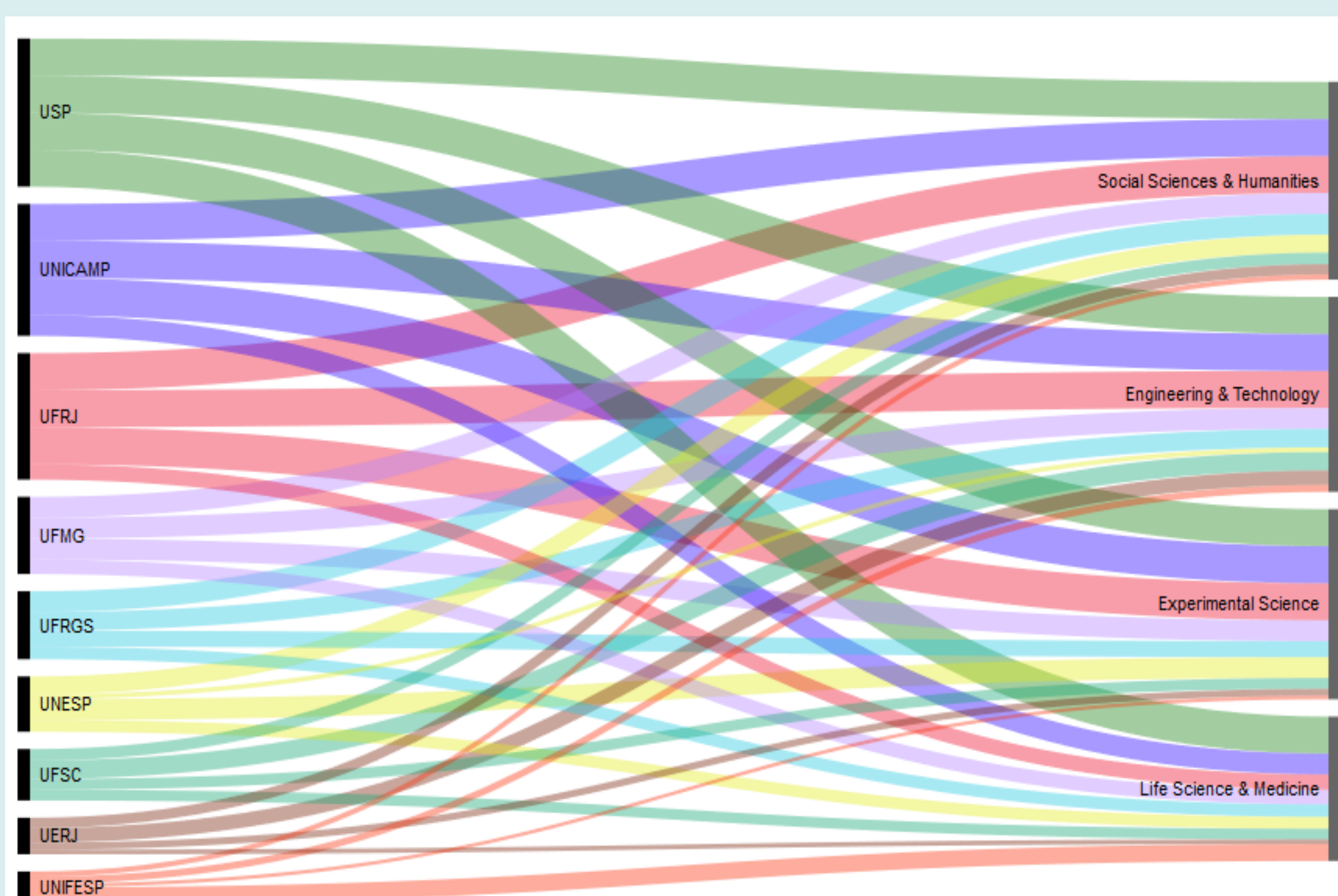


## CONCLUSIONS

- Brazilian public universities are the only ones that have indicators of international visibility. No institution analyzed is private.
- The institutional a typology (public/private) is totally related to the activity of universities in Brazil. The publics universities ones are much more intensive in R&D.
- Global comparisons can damage certain types of universities and influence their positioning.
- Thematic specialization of the institutions can have a high influence on their position in a general universities ranking.
- Universities oriented to areas with high visibility (such as experimental sciences or medical sciences) will have a better chance to get best positions.
- It is very important to identify universities with similar disciplinary approaches in order to compare them and interpret this kind of comparisons.