



**Tecnológico  
de Monterrey**

*Advanced Topics on Machine Learning*

**Attribute representation from QS World University  
Rankings 2019**

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Assignment report  
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This document details our QS World Top 200 Universities Scientometrics dataset. The dataset was generated using data from QS, Scopus and SciVal and its main goal is to gather highly descriptive data of research within the top 200 Universities according to the QS World Ranking to use with different Machine Learning algorithms throughout the course “Computational Techniques for Machine Learning”.

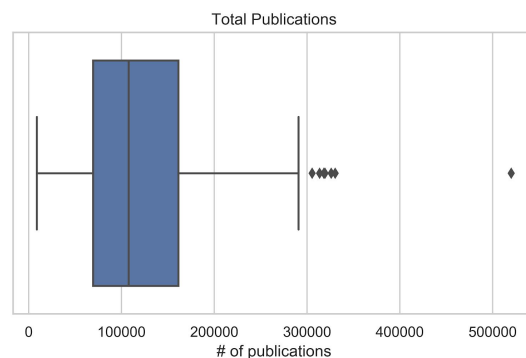
Although QS uses several variables to determine the position of the universities, this dataset is specifically focused on research. To gather the data we used Selenium for Python and we managed our data and created representations using the pandas and seaborn libraries. Aside from collecting attributes through the previously mentioned sources, we also created several variables using the obtained information. The generated variables are described in the final section of this document.

## Number of Articles

In this section we include the description of all attributes concerning the total number of articles that have been published by each institution.

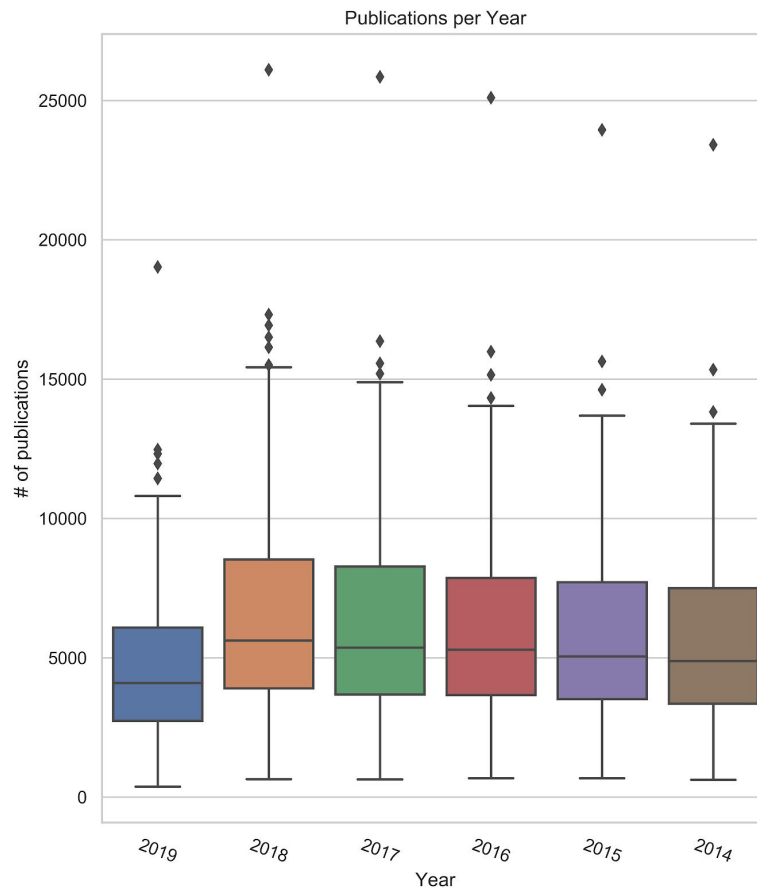
Attribute	Description
Number of papers	Total number of publications
Number of papers 2019	Total number of publications in 2019
Number of papers 2018	Total number of publications in 2018
Number of papers 2017	Total number of publications in 2017
Number of papers 2016	Total number of publications in 2016
Number of papers 2015	Total number of publications in 2015
Number of papers 2014	Total number of publications in 2014

We generated various boxplots for each of these attributes to analyze and get further insight on how the dataset is composed.



In the first plot, we can observe how most of the institutions are located below the 200,000 publications. The outlier that can be observed in the plot corresponds to Harvard University.

Next, we have included the attributes corresponding to each year for the last 5 years in order to compare the results.



There are many pending publications for 2019 since the year hasn't ended, which explains the considerable decrease. We can observe that although the changes are not necessarily drastic, there is definitely an increment. The IQR becomes wider starting in 2017.

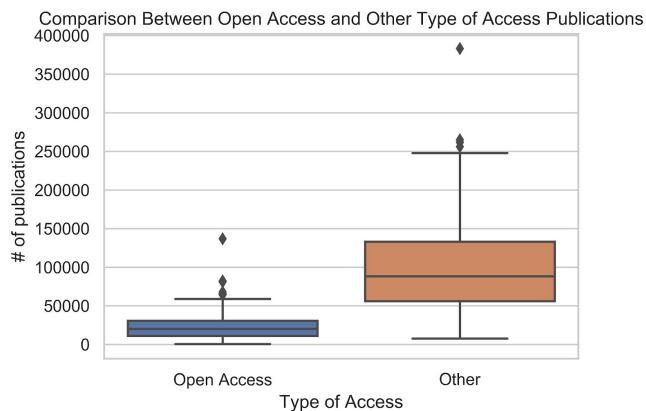
### Access Type

Here we enlist all attributes in our dataset that are related to the type of access for each of the 200 institutions. Some are overall attributes while others are specific to a certain year.

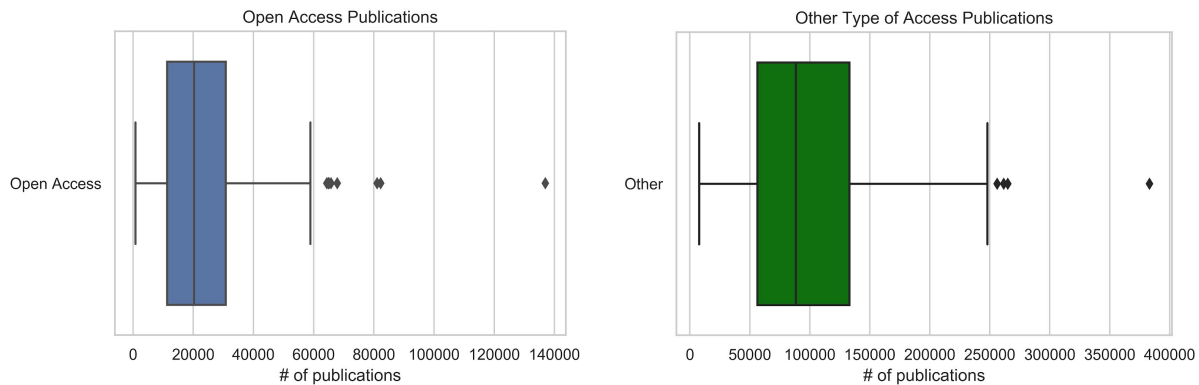
Attribute	Description
Open Access	Total number of publications that are catalogued as open access

Other	Total number of publications that are catalogued as other type of access
Open Access 2019	Total number of publications that are catalogued as open access in 2019
Other 2019	Total number of publications that are catalogued as other type of access in 2019
Open Access 2018	Total number of publications that are catalogued as open access in 2018
Other 2018	Total number of publications that are catalogued as other type of access in 2018
Open Access 2017	Total number of publications that are catalogued as open access in 2017
Other 2017	Total number of publications that are catalogued as other type of access in 2017
Open Access 2016	Total number of publications that are catalogued as open access in 2016
Other 2016	Total number of publications that are catalogued as other type of access in 2016
Open Access 2015	Total number of publications that are catalogued as open access in 2015
Other 2015	Total number of publications that are catalogued as other type of access in 2015
Open Access 2014	Total number of publications that are catalogued as open access in 2014
Other 2014	Total number of publications that are catalogued as other type of access in 2014

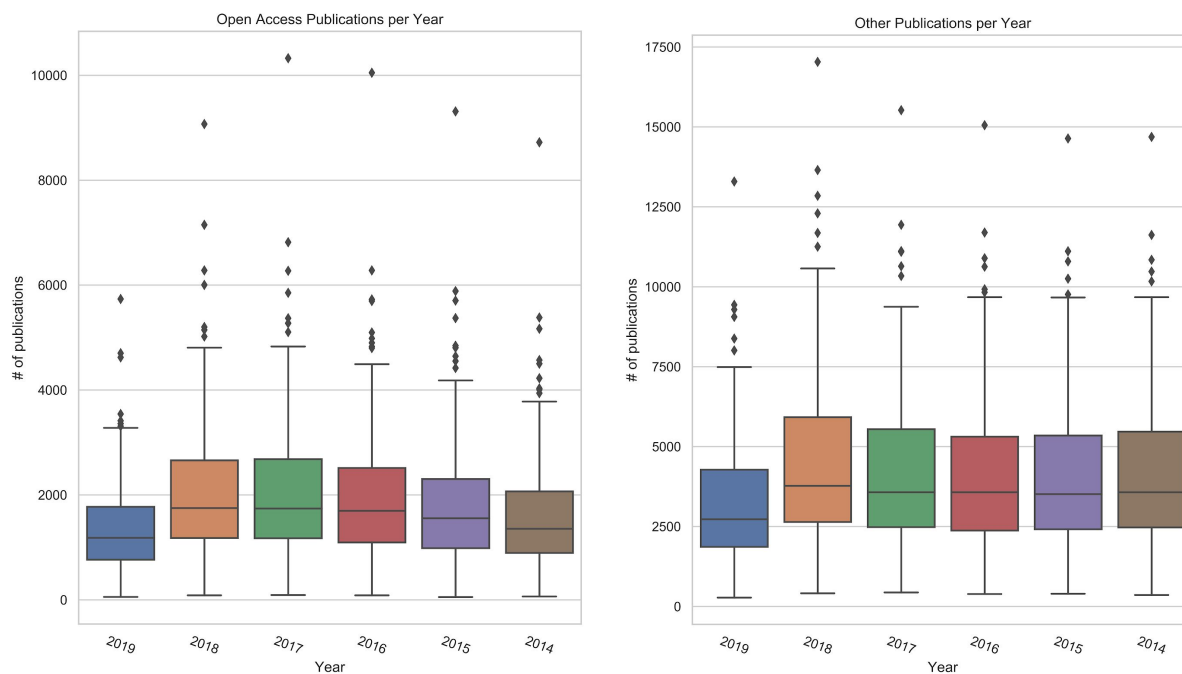
We continue to display the corresponding boxplots.



As we can see, the open access publications are more scarce than the other type of access. Since the difference doesn't allow us to appreciate fully the boxplots we decided to plot them separately.



Here we can appreciate that most publications are published under other types of access other than open access. Nevertheless, in both types, Harvard University leads with the most publications.



Here we can appreciate the behavior of both kinds of access throughout time. Open Access publications continue to grow although it seems to have stopped between 2017 and 2018. On Other Type of Access Publications we can observe that 2018 was the most prolific year.

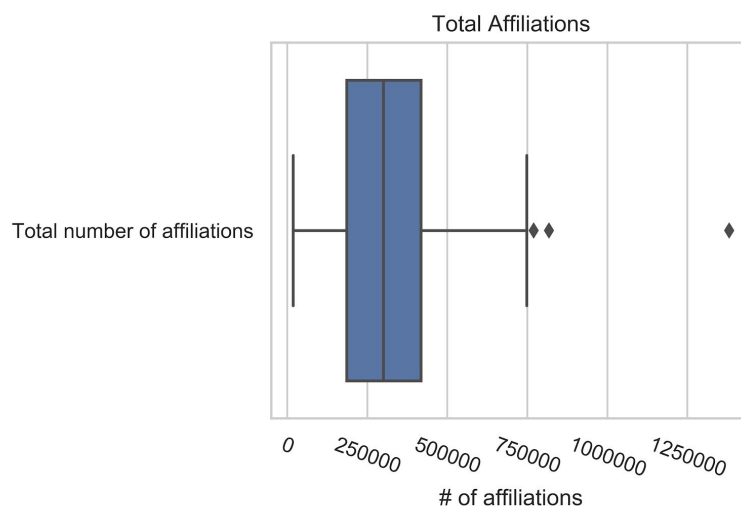
### **Affiliation of collaborating institutions**

Here we display the chosen attributes to represent the affiliation for each of the given universities.

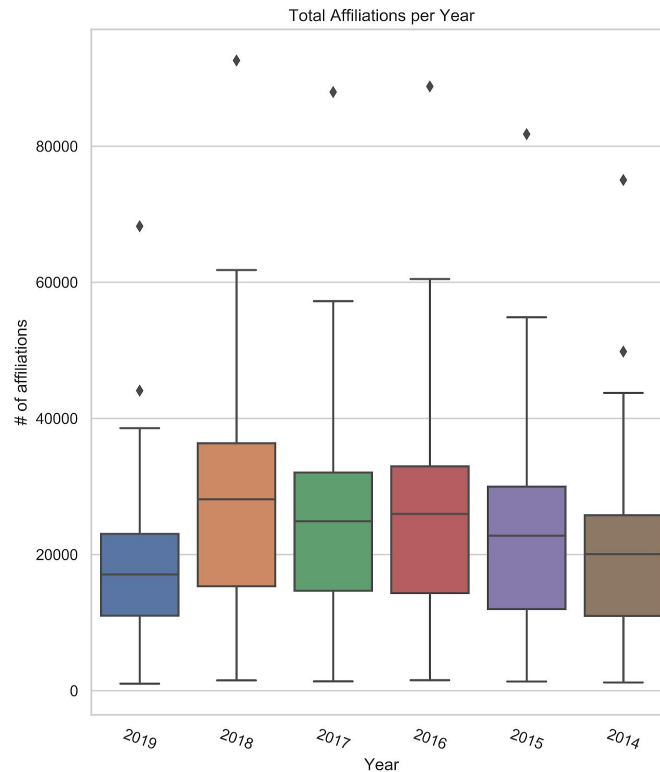
<b>Attribute</b>	<b>Description</b>
Total Affiliations	Total number of affiliations for each of the registered institutions
Most Important Affiliation 1	Name of the most prolific affiliation
Most Important Affiliation 2	Name of the second most prolific affiliation
Most Important Affiliation 3	Name of the third most prolific affiliation
Total Affiliations 2019	Total number of affiliations for each of the registered institutions in 2019
Most Important Affiliation 1 2019	Name of the most prolific affiliation in 2019
Most Important Affiliation 2 2019	Name of the second most prolific affiliation in 2019
Most Important Affiliation 3 2019	Name of the third most prolific affiliation in 2019
Total Affiliations 2018	Total number of affiliations for each of the registered institutions in 2018
Most Important Affiliation 1 2018	Name of the most prolific affiliation in 2018
Most Important Affiliation 2 2018	Name of the second most prolific affiliation in 2018
Most Important Affiliation 3 2018	Name of the third most prolific affiliation in 2018
Total Affiliations 2017	Total number of affiliations for each of the registered institutions in 2017
Most Important Affiliation 1 2017	Name of the most prolific affiliation in 2017
Most Important Affiliation 2 2017	Name of the second most prolific affiliation in 2017
Most Important Affiliation 3 2017	Name of the third most prolific affiliation in 2017
Total Affiliations 2016	Total number of affiliations for each of the registered institutions in 2016

Most Important Affiliation 1 2016	Name of the most prolific affiliation in 2016
Most Important Affiliation 2 2016	Name of the second most prolific affiliation in 2016
Most Important Affiliation 3 2016	Name of the third most prolific affiliation in 2016
Total Affiliations 2015	Total number of affiliations for each of the registered institutions in 2015
Most Important Affiliation 1 2015	Name of the most prolific affiliation in 2015
Most Important Affiliation 2 2015	Name of the second most prolific affiliation in 2015
Most Important Affiliation 3 2015	Name of the third most prolific affiliation in 2015
Total Affiliations 2014	Total number of affiliations for each of the registered institutions in 2014
Most Important Affiliation 1 2014	Name of the most prolific affiliation in 2014
Most Important Affiliation 2 2014	Name of the second most prolific affiliation in 2014
Most Important Affiliation 3 2014	Name of the third most prolific affiliation in 2014

We have generated the boxplots for the total affiliation counts, as done for previous attributes, first for the general total and then for each year.



We can observe a similar outlier as the one present in previous attributes. This one corresponds to Harvard Medical School.



Here we can observe the comparison between years. We can see how the tendency to increment stopped in 2017 but appears to resume in 2018. We can also observe that universities are definitely working towards the increment of their existing affiliations.

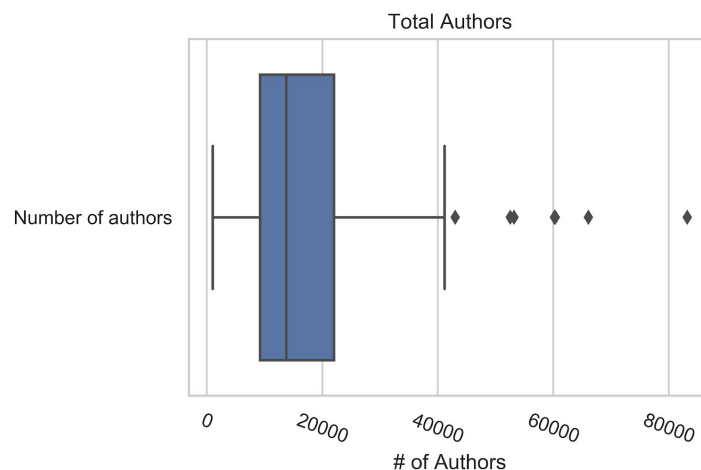
### Articles by author

The attributes related to authors are displayed in this section. We proceed to describe and later on show the box plots

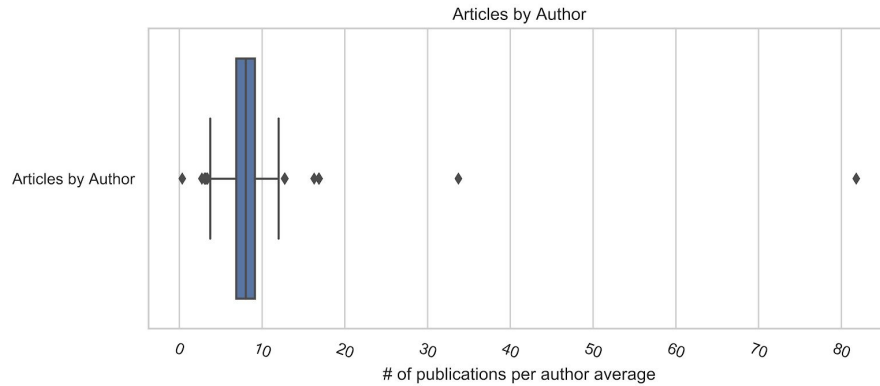
Attribute	Description
Number of Authors	The total sum of all authors working in the institution or that have published under the corresponding university
Articles by Author	Average papers published by authors at the institution
Number of Authors 2019	The total sum of all authors working in the institution or that have published under the corresponding university in 2019
Articles by Author 2019	Average papers published by authors at the institution in 2019
Number of Authors 2018	The total sum of all authors working in the institution or that have published under the corresponding university in 2018



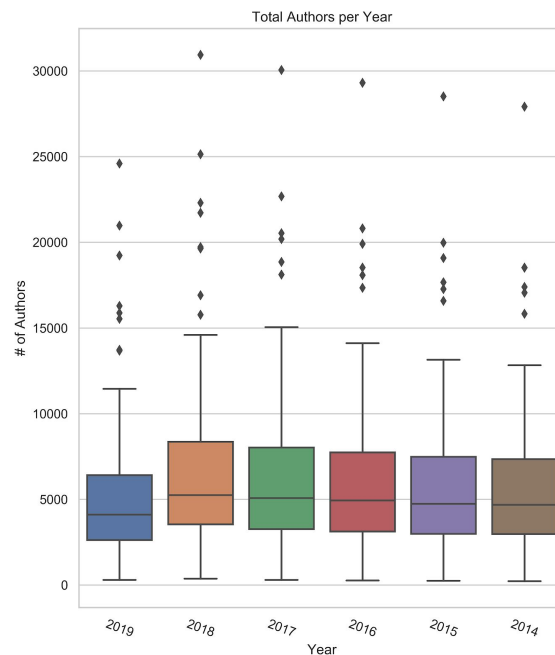
Articles by Author 2018	Average papers published by authors at the institution in 2018
Number of Authors 2017	The total sum of all authors working in the institution or that have published under the corresponding university in 2017
Articles by Author 2017	Average papers published by authors at the institution in 2017
Number of Authors 2016	The total sum of all authors working in the institution or that have published under the corresponding university in 2016
Articles by Author 2016	Average papers published by authors at the institution in 2016
Number of Authors 2015	The total sum of all authors working in the institution or that have published under the corresponding university in 2015
Articles by Author 2015	Average papers published by authors at the institution in 2015
Number of Authors 2014	The total sum of all authors working in the institution or that have published under the corresponding university in 2014
Articles by Author 2014	Average papers published by authors at the institution in 2014



The total number of authors seems to reflect the same effect that can be appreciated across all attributes. The gap between universities can be quite large in some cases. Here the maximum value is Harvard University which appears as the right-most outlier.

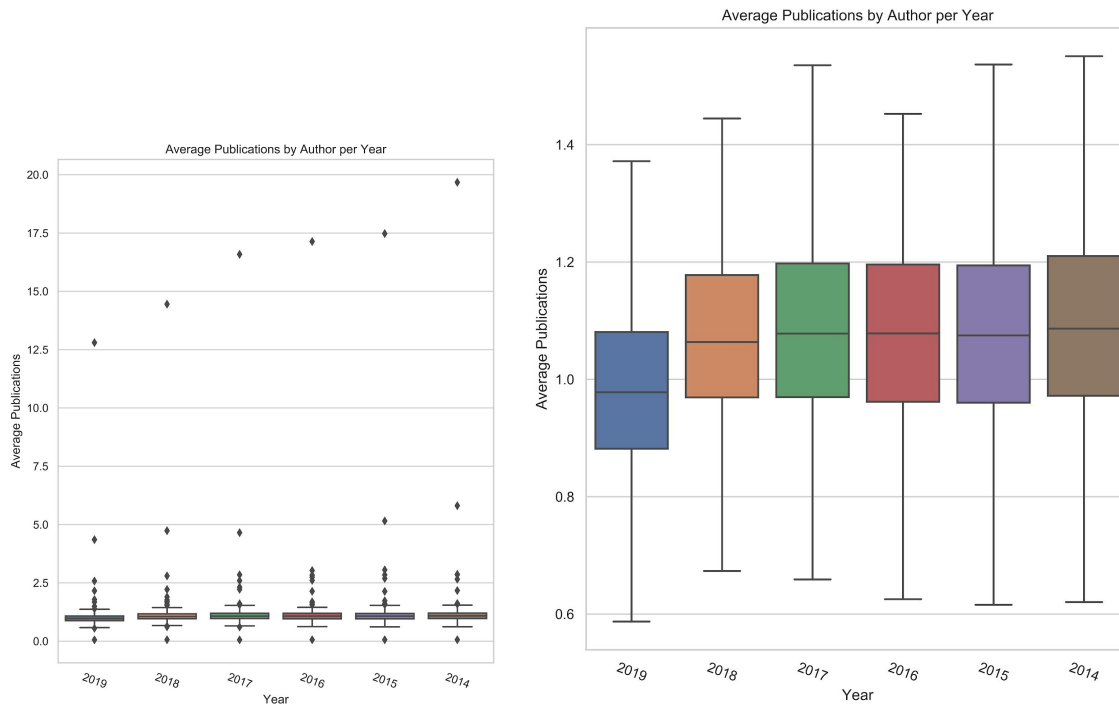


Here we can observe a really important outlier. This one corresponds to the Chinese University of Hong Kong. Excluding these outliers, we can observe that authors regularly publish under 15 publications.



Here we can observe that there is a tendency to increase the number of authors. Surprisingly, the top outlier grows constantly in comparison.

Next we generated the publications by author per year. However on our first attempt, some really strong outliers make it impossible to appreciate the plot properly. We display both the original and an “outlier free” plot in order to fully analyze the behavior of these attributes. As we will see, the median appears to be constant with some minimal variations. However the minimum value has a tendency to increase. The IQR remains constant throughout the years observed.



## Collaborating country

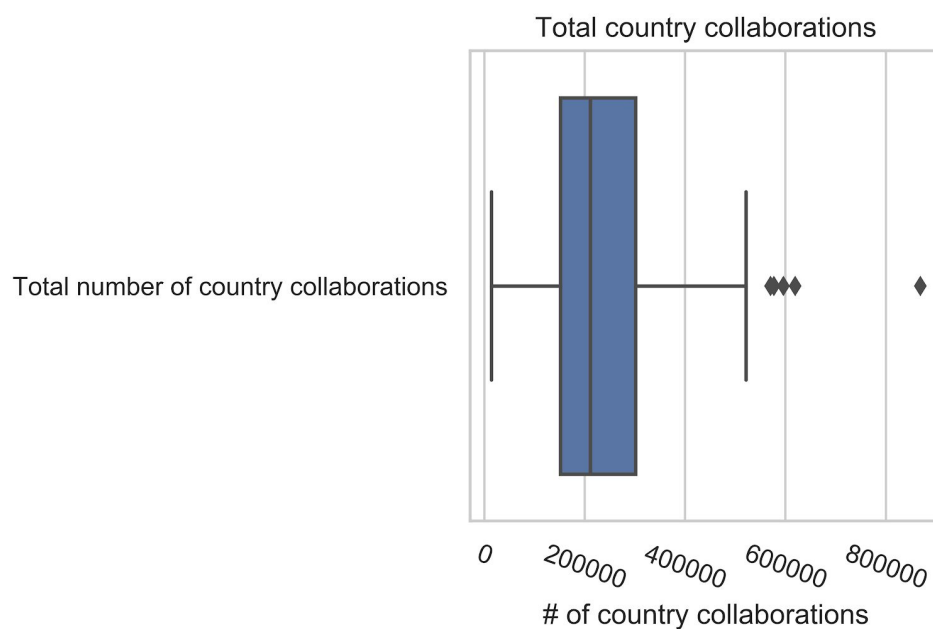
We continue to describe some of the collaboration per country attributes that have been selected and extracted.

Attribute	Description
Total number of country collaborations	Total number of country collaborations for each of the registered institutions
Most important country collaboration 1	Name of the most prolific country collaboration
Most important country collaboration 2	Name of the second most prolific country collaboration
Most important country collaboration 3	Name of the third most prolific country collaboration
Total number of country collaborations 2019	Total number of country collaborations for each of the registered institutions in 2019
Most important country collaboration 1 2019	Name of the most prolific country collaboration in 2019
Most important country collaboration 2 2019	Name of the second most prolific country

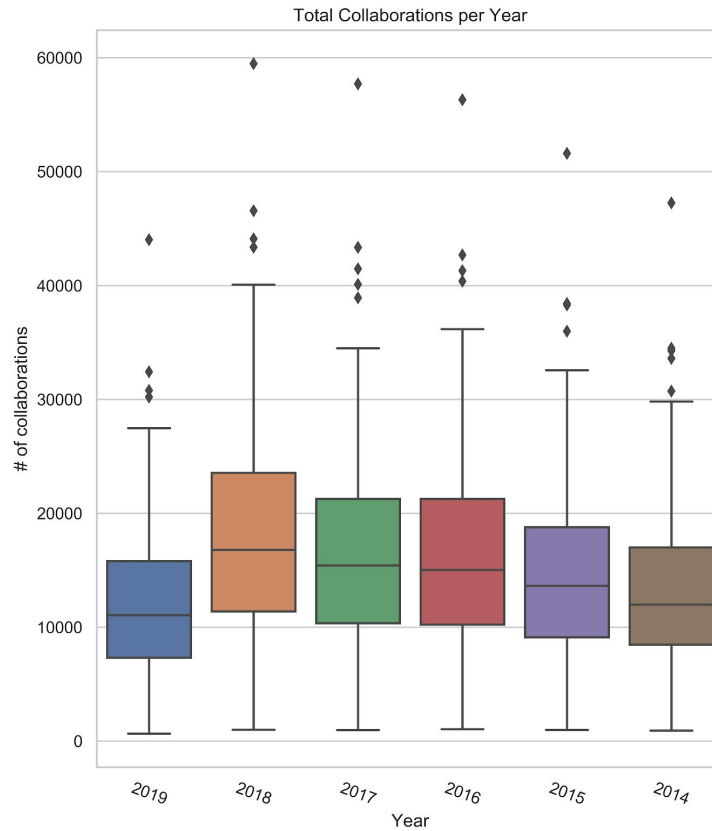
	collaboration in 2019
Most important country collaboration 3 2019	Name of the third most prolific country collaboration in 2019
Total number of country collaborations 2018	Total number of country collaborations for each of the registered institutions in 2018
Most important country collaboration 1 2018	Name of the most prolific country collaboration in 2018
Most important country collaboration 2 2018	Name of the second most prolific country collaboration in 2018
Most important country collaboration 3 2018	Name of the third most prolific country collaboration in 2018
Total number of country collaborations 2017	Total number of country collaborations for each of the registered institutions in 2017
Most important country collaboration 1 2017	Name of the most prolific country collaboration in 2017
Most important country collaboration 2 2017	Name of the second most prolific country collaboration in 2017
Most important country collaboration 3 2017	Name of the third most prolific country collaboration in 2017
Total number of country collaborations 2016	Total number of country collaborations for each of the registered institutions in 2016
Most important country collaboration 1 2016	Name of the most prolific country collaboration in 2016
Most important country collaboration 2 2016	Name of the second most prolific country collaboration in 2016
Most important country collaboration 3 2016	Name of the third most prolific country collaboration in 2016
Total number of country collaborations 2015	Total number of country collaborations for each of the registered institutions in 2015
Most important country collaboration 1 2015	Name of the most prolific country collaboration in 2015
Most important country collaboration 2 2015	Name of the second most prolific country collaboration in 2015

Most important country collaboration 3 2015	Name of the third most prolific country collaboration in 2015
Total number of country collaborations 2014	Total number of country collaborations for each of the registered institutions in 2014
Most important country collaboration 1 2014	Name of the most prolific country collaboration in 2014
Most important country collaboration 2 2014	Name of the second most prolific country collaboration in 2014
Most important country collaboration 3 2014	Name of the third most prolific country collaboration in 2014

In the boxplots we can observe the total number of collaborations and the collaborations per year.



In both boxplots we can observe certain outliers that truly exceed the maximum value shown by the boxplot. We can observe how collaborations have increased throughout the time. However, again we can appreciate an interesting decline in the number of collaborations during 2017. This might be a particular phenomena that we will stop to study later on.



## Document Type

Here we find attributes related to the different kinds of documents. All attributes in this section are numerical. We have extracted an overall count of each of the document types per year. For purposes of practicality we won't enlist the same attributes but contained in the dataset you will find a general count of publications per document type and per year. In total there are 17 categories,

Attribute	Description
Article	Publications categorized as an article
Conference Paper	Publications categorized as a conference paper
Review	Publications categorized as a review
Book Chapter	Publications categorized as a book chapter
Letter	Publications categorized as a letter
Note	Publications categorized as a note
Editorial	Publications categorized as an editorial

Short Survey	Publications categorized as a short survey
Erratum	Publications categorized as an erratum
Book	Publications categorized as a book
Conference Review	Publications categorized as a conference review
Report	Publications categorized as a report
Abstract Report	Publications categorized as an abstract report
Data Paper	Publications categorized as a data paper
Business Article	Publications categorized as a business article
Retracted	Publications categorized as a retracted
Type Undefined	Publications categorized as undefined

Boxplots for this section have been omitted since articles are predominant across all years and all other types, then most of the others categories cannot be truly examined.

### **Funding sponsor**

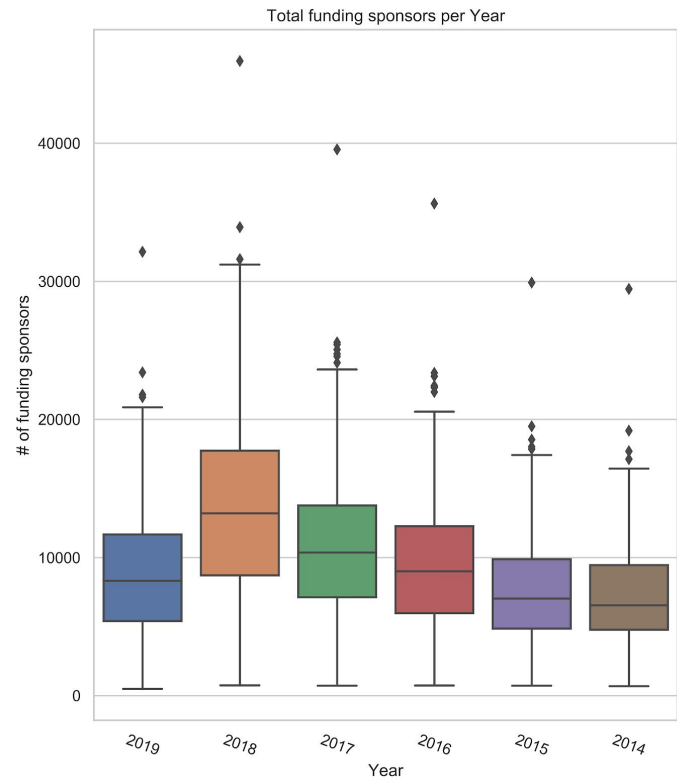
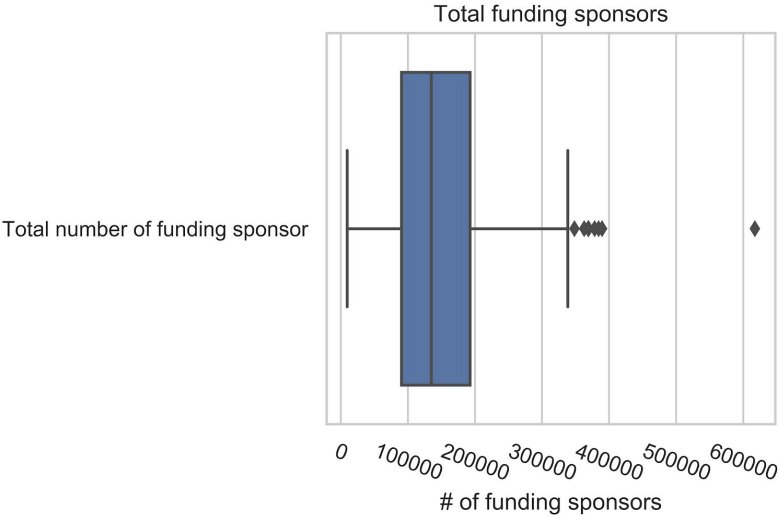
In this section the attributes related with funding sponsors are described.

<b>Attribute</b>	<b>Description</b>
Total number of funding sponsors	Total number of funding sponsors for each of the registered institutions
Most important funding sponsor 1	Name of the most recurrent funding sponsor
Most important funding sponsor 2	Name of the second most recurrent funding sponsor
Most important funding sponsor 3	Name of the third most recurrent funding sponsor
Total number of funding sponsors 2019	Total number of funding sponsors for each of the registered institutions in 2019
Most important funding sponsor 1 2019	Name of the most recurrent funding sponsor in 2019
Most important funding sponsor 2 2019	Name of the second most recurrent funding sponsor in 2019

Most important funding sponsor 3 2019	Name of the third most recurrent funding sponsor in 2019
Total number of funding sponsors 2018	Total number of funding sponsors for each of the registered institutions in 2018
Most important funding sponsor 1 2018	Name of the most recurrent funding sponsor in 2018
Most important funding sponsor 2 2018	Name of the second most recurrent funding sponsor in 2018
Most important funding sponsor 3 2018	Name of the third most recurrent funding sponsor in 2018
Total number of funding sponsors 2017	Total number of funding sponsors for each of the registered institutions in 2017
Most important funding sponsor 1 2017	Name of the most recurrent funding sponsor in 2017
Most important funding sponsor 2 2017	Name of the second most recurrent funding sponsor in 2017
Most important funding sponsor 3 2017	Name of the third most recurrent funding sponsor in 2017
Total number of funding sponsors 2016	Total number of funding sponsors for each of the registered institutions in 2016
Most important funding sponsor 1 2016	Name of the most recurrent funding sponsor in 2016
Most important funding sponsor 2 2016	Name of the second most recurrent funding sponsor in 2016
Most important funding sponsor 3 2016	Name of the third most recurrent funding sponsor in 2016
Total number of funding sponsors 2015	Total number of funding sponsors for each of the registered institutions in 2015
Most important funding sponsor 1 2015	Name of the most recurrent funding sponsor in 2015
Most important funding sponsor 2 2015	Name of the second most recurrent funding sponsor in 2015
Most important funding sponsor 3 2015	Name of the third most recurrent funding sponsor in 2015
Total number of funding sponsors 2014	Total number of funding sponsors for each of the registered institutions in 2014



Most important funding sponsor 1 2014	Name of the most recurrent funding sponsor in 2014
Most important funding sponsor 2 2014	Name of the second most recurrent funding sponsor in 2014
Most important funding sponsor 3 2014	Name of the third most recurrent funding sponsor in 2014



We can observe a very important increment in 2018 according to the plots. We can see how the tendency of growth remains constant throughout the years.

### **Subject area**

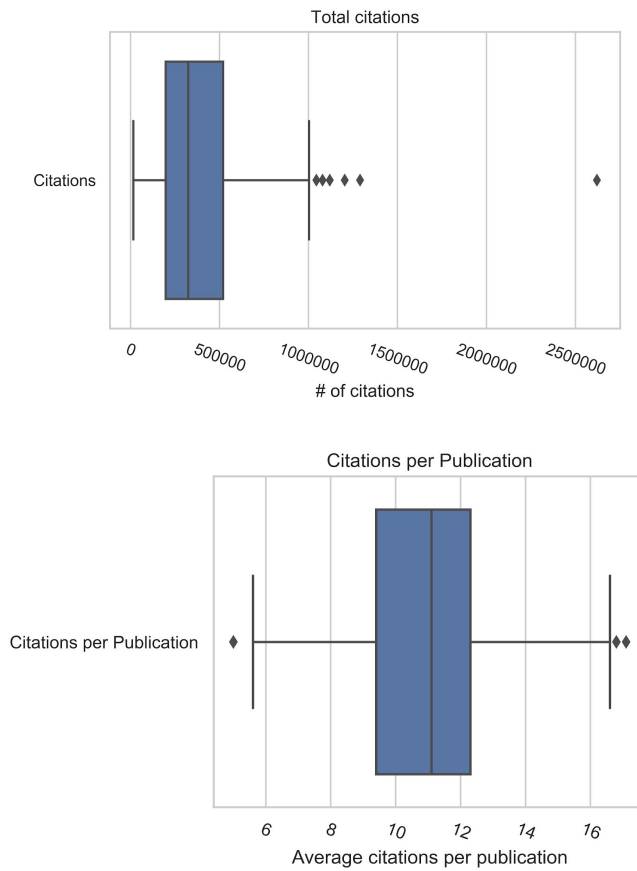
For the subject area attributes we have extracted data for each of the existing categories. A total of 28 subject areas have been taken into consideration according to the available data in scopus. For each of the 28 subject areas there is a total count per institution and a count per year for the period of time observed. However, in the section of generated variables, we detail the procedure we followed to group them into more general categories in order to simplify the work to be done later on. Boxplots have been omitted for this section.

### **Citations**

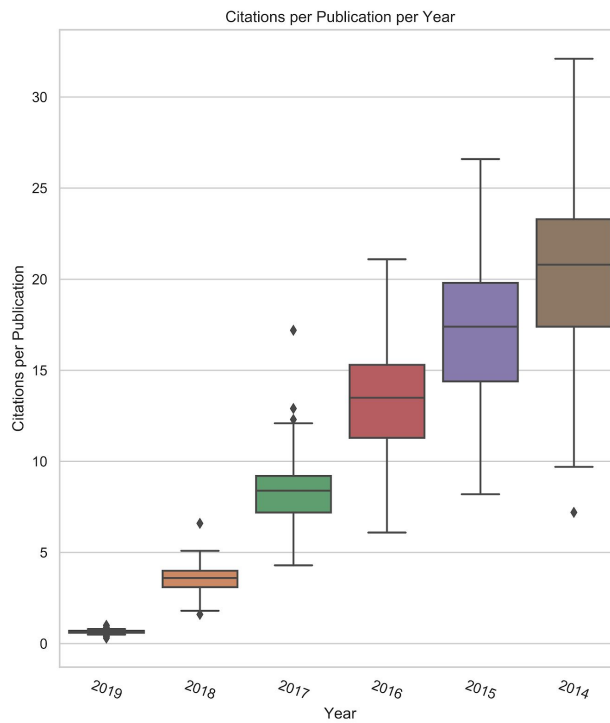
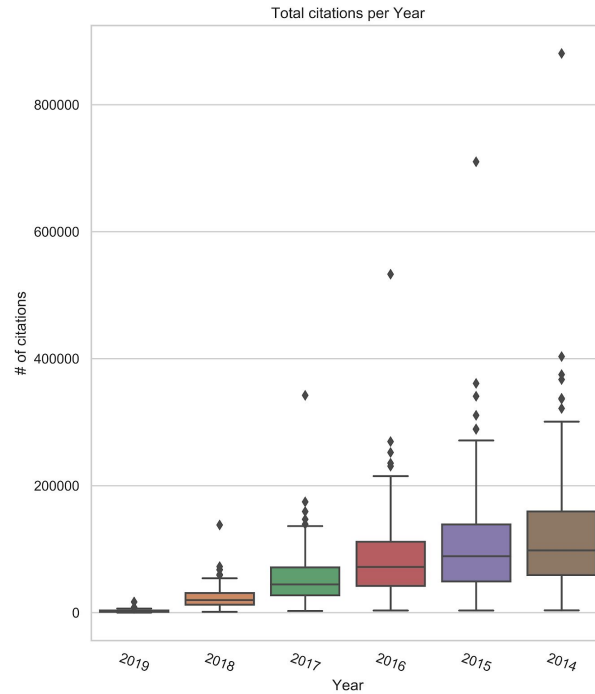
We now describe attributes related to citations per institution.

<b>Attribute</b>	<b>Description</b>
Citations	Total number of citations of all the existing publications per institution
Citations per Publication	Average citations per publication
Citations 2019	Total number of citations of the publications per institution in 2019
Citations per Publication 2019	Average citations per publication in 2019
Citations 2018	Total number of citations of the publications per institution in 2018
Citations per Publication 2018	Average citations per publication in 2018
Citations 2017	Total number of citations of the publications per institution in 2017
Citations per Publication 2017	Average citations per publication in 2017
Citations 2016	Total number of citations of the publications per institution in 2016
Citations per Publication 2016	Average citations per publication in 2016
Citations 2015	Total number of citations of the publications per institution in 2015
Citations per Publication 2015	Average citations per publication in 2015
Citations 2014	Total number of citations of the publications per institution in 2014

Citations per Publication 2014	Average citations per publication in 2014
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As we can see, citations per publication has the most normal behavior across all attributes. Total number of citations has some strong outliers which of course correspond to some of the older universities. As expected in citations per year we can observe that citations are proportional to the time since the article was published. The same behavior can be observed from average citations per publication.



## Generated Variables

In order to expand the dataset, several variables were created to track changes through time and to simplify analysis on some fronts. Each of the added variables are related to the categories described before, let us discuss them now.

To facilitate analysis by subject area we divided the 28 subjects from Scopus into 6 general categories; Humanities, Social Science, Natural Science, Formal Science, Applied Science, Other Discipline. Each of these is composed as follows.

Humanities:

- Arts and Humanities

Natural Sciences:

- Biochemistry Genetics and Molecular Biology
- Chemistry
- Earth and Planetary Sciences
- Energy
- Environmental Science
- Immunology and Microbiology
- Neuroscience
- Pharmacology Toxicology and Pharmaceutics
- Physics and Astronomy

Formal Sciences:

- Computer Science
- Mathematics

Applied Science:

- Agricultural and Biological Sciences
- Business Management and Accounting
- Chemical Engineering
- Dentistry
- Engineering
- Health Professions
- Materials Science
- Medicine
- Nursing
- Veterinary

Other Disciplines:

- Decision Sciences
- Multidisciplinary
- Discipline Undefined

Apart from the previously stated variables, several variables were added to keep track of change over time. There were 4 attributes added in general,

- Difference Over 2018 and 2017: Depending over the attribute the first variable added is the difference between the value for the attribute in 2018 and 2017. Representing the change in one year.

- Difference Over 2018 and 2014 Depending over the attribute the second variable added is the difference between the value for the attribute in 2018 and 2014. Representing the change in four years.
- Mean: We have also included the mean change for four one year intervals, 2018-2017, 2017-2016, 2016-2015 and 2015-2014.
- Standard Deviation: Finally the standard deviation for the same set as the mean was added.

Each of these four was generally included, some variables include not only total change from year to the next but also percent and slope changes.

The following table describes them.

Attribute	Description
Papers Change 1y	Total change in number of papers between 2018 and 2017
Papers Change 4y	Total change in number of papers between 2018 and 2014
Papers Change MEAN	Average change per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Papers Change STD	Standard Deviation of change per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Papers Slope 1y	Slope between the number of papers of 2018 and 2017
Papers Slope 4y	Slope between the number of papers of 2018 and 2014
Papers Slope MEAN	Average slope for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Papers Slope STD	Standard Deviation slope for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Papers Percent Change 1y	Percent change in number of papers between 2018 and 2017
Papers Percent Change 4y	Percent change in number of papers between 2018 and 2014
Papers Percent Change MEAN	Average percent change per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Papers Percent Change STD	Standard Deviation of percent change per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Open Access Change 1y	Total change of open access papers between 2018 and 2017
Open Access Change 4y	Total change of open access papers between 2018 and 2014

Open Access Change MEAN	Average change in open access papers per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Open Access Change STD	Standard Deviation of change in open access papers per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Open Access Percent Change 1y	Percent change of open access papers between 2018 and 2017
Open Access Percent Change 4y	Percent change of open access papers between 2018 and 2014
Open Access Percent Change MEAN	Average percent change in open access papers per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Open Access Percent Change STD	Standard Deviation of percent change in open access papers per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Affiliations Percent Change 1y	Percent change in affiliations between 2018 and 2017
Affiliations Percent Change 4y	Percent change in affiliations between 2018 and 2014
Affiliations Percent Change MEAN	Average percent change in affiliations per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Affiliations Percent Change STD	Standard Deviation of affiliations per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Papers by Author PC 1y	Percent change of Papers by author between 2018 and 2017
Papers by Author PC 4y	Percent change of Papers by author between 2018 and 2014
Papers by Author PC MEAN	Average percent change in papers by author per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Papers by Author PC STD	Standard Deviation of percent change in papers by author per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Country Collaborations Percent Change 1y	Percent change of Country Collaborations between 2018 and 2017
Country Collaborations Percent Change 4y	Percent change of Country Collaborations between 2018 and 2014
Country Collaborations Percent Change MEAN	Average percent change in Country Collaborations per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014

Country Collaborations Percent Change STD	Standard Deviation of percent change in Country Collaborations per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Articles Change 1y	Total change of Articles between 2018 and 2017
Articles Change 4y	Total change of Country Collaborations between 2018 and 2014
Articles Change MEAN	Average total change in articles per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Articles Change STD	Standard Deviation of articles in papers by author per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Conference Paper Change 1y	Total change of Conference Papers between 2018 and 2017
Conference Paper Change 4y	Total change of Conference Papers between 2018 and 2014
Conference Paper Change MEAN	Average Total change in Conference Papers per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Conference Paper Change STD	Standard Deviation of total change in Conference Papers per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Funding Sponsor Percent Change 1y	Percent change of Funding Sponsors between 2018 and 2017
Funding Sponsor Percent Change 4y	Percent change of Funding Sponsors between 2018 and 2014
Funding Sponsor Percent Change MEAN	Average percent change in Funding Sponsors per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Funding Sponsor Percent Change STD	Standard Deviation of percent change in Funding Sponsors per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Humanities Change 1y	Total Change in Humanities publications between the years 2018 and 2017
Humanities Change 4y	Total Change in Humanities publications between the years 2018 and 2014
Humanities Change MEAN	Average Total Change in Humanities publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Humanities Change STD	Standard Deviation for Total Change in Humanities publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014



Social Science 1y	Total Change in Social Science publications between the years 2018 and 2017
Social Science 4y	Total Change in Social Science publications between the years 2018 and 2014
Social Science MEAN	Average Total Change in Social Science publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Social Science STD	Standard Deviation for Total Change in Social Science publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Natural Science 1y	Total Change in Natural Science publications between the years 2018 and 2017
Natural Science 4y	Total Change in Natural Science publications between the years 2018 and 2014
Natural Science MEAN	Average Total Change in Natural Science publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Natural Science STD	Standard Deviation for Total Change in Natural Science publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Formal Science 1y	Total Change in Formal Science publications between the years 2018 and 2017
Formal Science 4y	Total Change in Formal Science publications between the years 2018 and 2014
Formal Science MEAN	Average Total Change in Formal Science publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Formal Science STD	Standard Deviation for Total Change in Formal Science publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Applied Science 1y	Total Change in Applied Science publications between the years 2018 and 2017
Applied Science 4y	Total Change in Applied Science publications between the years 2018 and 2014
Applied Science MEAN	Average Total Change in Applied Science publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Applied Science STD	Standard Deviation for Total Change in Applied Science publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and

	2015-2014
Other Discipline 1y	Total Change in Other Discipline publications between the years 2018 and 2017
Other Discipline 4y	Total Change in Other Discipline publications between the years 2018 and 2014
Other Discipline MEAN	Average Total Change in Other Discipline publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Other Discipline STD	Standard Deviation for Total Change in Other Discipline publications per year for the intervals 2018-2017, 2017-2016, 2016-2015 and 2015-2014
Citations Change 1y	Total change of Citations between 2018 and 2017
Citations Change 4y	Total change of Citations Sponsors between 2018 and 2014