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## "THE IMPACT OF CLASSIFICATION SYSTEMS IN THE EVALUATION OF THE RESEARCH PERFORMANCE OF THE LEIDEN RANKING UNIVERSITIES"

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#### Abstract

Barring source (citing-side) normalization procedures, any other normalization procedure will depend on the classification system used, namely, on the way publications (or journals) are assigned to scientific fields. In this paper, we study the consequences for the ranking of the 500 universities in the 2013 edition of the Leiden Ranking of using one of two classification systems: a Web of Science journal-level system, consisting of 236 subject categories, or a publication-level algorithmically constructed system, consisting of 5,119 clusters. Universities are ranked according to the *Top 1%* citation impact indicator. The reference sets for this indicator under the two classification systems are very different. Our main result is the following: the choice of classification system changes quite considerably the ranking of the 500 universities in the 2013 edition of the Leiden Ranking.

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## I. INTRODUCTION

Assume we want to compare the performance of a set of research units taking into account the citation distributions of the articles in the periodical literature they have published during a certain period of time in a number of scientific fields. The ranking of these units is a complex task that depends on a large number of factors. In this paper, we study the consequences of choosing between two *classification systems* of science, that is, between two ways of assigning individual publications (or journals) to scientific fields. This is an important problem, since differences in production and citation practices between scientific fields must be normalized before any meaningful assessment of these units' research output is possible. Barring source (citing-side) normalization procedures (see *inter alia* Waltman *et al.*, 2013, and the references cited there), any other normalization procedure will depend on the classification system used.

The two classification systems compared in this paper are the following: the Web of Science (WoS hereafter) journal-level classification system, consisting of 236 journal subject categories (or simply categories hereafter), and an alternative publication-level system arising from the algorithmic methodology introduced in Waltman & Van Eck (2012) that classifies individual publications into clusters solely based on direct citations between them.

In practice, the choice of the WoS classification system is often made because, together with the Scopus system, it is readily available. However, a number of studies question the appropriateness of this system for normalization purposes.<sup>1</sup> Among the publication-level alternatives, Klavans and Boyack (2015) conclude that classification systems based on direct citation using the Waltman & Van Eck (2012) methodology are more accurate than classification systems based on bibliographic coupling or co-citation. Ruiz-Castillo & Waltman (2015) apply the Waltman & Van Eck (2012) methodology to a WoS

<sup>&</sup>lt;sup>1</sup> See *inter alia* Neuhaus & Daniel (2009) for Chemistry and related fields, Van Leeuwen & Calero Medina (2012) for Economics & Business, Van Eck *et al.* (2013) for Clinical and Basic Medical Research, and Leydesdorff & Bornman (2015) for Library and Information Science, and Science & Technology Studies.

dataset consisting of 9.4 million publications from the 2003-2012 period. A sequence of twelve independent classification systems is obtained, in each of which the same set of publications is assigned to an increasing number of clusters. In this paper, we use the version corresponding to granularity level 8 (the G8 classification systems hereafter) consisting of 5,119 clusters. This is the version recommended in Ruiz-Castillo & Waltman (2015) and Perianes-Rodriguez & Ruiz-Castillo (2016).

Naturally, ranking outcomes may also depend on many other factors, including the choice of citation impact indicators. In this paper, we focus on a percentile rank indicator for two reasons. Firstly, although percentile rank indicators directly incorporate a suitable normalization procedure for citation counts of publications from different clusters or categories (see *inter alia* Bornmann & Marx, 2013), it is important to understand that they are conditional on the classification system used. For example, given any classification system with J clusters, the Top X% indicator is defined as the percentage of an institution's scientific output included in the set formed by the top X% of the most cited publications in each of the J clusters.

Secondly, percentile rank indicators occupy a prominent role both in the Leiden Ranking of universities and the SCImago Institutions Ranking.<sup>2</sup> Together with the Mean Normalized Citation Score, the 2015 version of the Leiden Ranking includes the *Top 50%*, the *Top 10%*, and the *Top 1%* indicators, whereas the SCImago Institutions Ranking includes the *Top 10%* indicator. Since Ruiz-Castillo & Waltman (2015) studied the consequences of using the *Top 10%* indicator under the WoS and the G8 systems, in this paper we study the consequences of using the *Top 1%* indicator. This is an interesting contrast, since it is well known that differences between classification systems tend to increase as the threshold of excellence goes up (Zitt *et al.*, 2005, and Perianes-Rodriguez & Ruiz-Castillo, 2016).

<sup>&</sup>lt;sup>2</sup> SCImago is a research group from the *Consejo Superior de Investigaciones Científicas*, University of Granada, Extremadura, Carlos III (Madrid) and Alcalá de Henares in Spain. The *SCImago Institutions Rankings* (SIR; www.scimagoir.com) is a bibliometric ranking of research institutions based on Elsevier's Scopus database that includes the Top 10% indicator.

Naturally, to facilitate the comparison of the consequences of using the *Top 10%* or the *Top 1%* indicators, we follow closely the following four methodological decisions adopted in Ruiz-Castillo & Waltman (2015). (i) We focus on the 3.6 million articles published in the 2005-2008 period, and the citations they receive during a five-year citation window for each year in that period. (ii) In the WoS system, approximately 45% of the articles in the dataset are assigned to two or more categories up to a maximum of six. To deal with this problem, we adopt a fractional strategy. (iii) The set of research units investigated consists of the 500 universities included in the 2013 edition of the CWTS Leiden Ranking (Waltman *et al.*, 2012a) –the LR universities hereafter. (iv) There are 2.4 million distinct articles in which at least one author belongs to one of the LR universities. Only 30% of this total has a single address line. We use the address-line fractional counting approach to solve the problem of the remaining publications assigned to several co-authors working in different institutions. As a result, the total number of articles in the LR universities becomes 1.9 million. (v) To solve the problems generated in the computation of the indicators by the discrete nature of citation distributions combined with the presence of many publications with the same number of citations, we follow the approach recommended in Waltman & Schreiber (2013).

The rest of the paper is organized into three Sections and two Appendices. Section II serves two purposes: it presents the data, as well as the results concerning the differences between the WoS and the G8 classification systems as the threshold of excellence increases. Section III contains the empirical results concerning the consequences of applying the *Top 1%* indicator to the 500 LR universities under the two classification systems. Finally, Section IV offers some conclusions. Appendix I discusses the method for establishing the differences between the WoS and the G8 systems when the WoS system is constructed according to a fractional scheme, whereas Appendix II includes the ranking of the LR universities according to the *Top 1%* indicator under the two classification systems.

## II. DATA, AND DIFFERENCES BETWEEN CLASSIFICATION SYSTEMS

#### III.1. The data

Our dataset results from the application of the publication-level algorithmic methodology in Waltman & Van Eck (2012) to 9,446,622 distinct articles published in 2003-2012. Publications in local journals, as well as popular magazines and trade journals, have been excluded (for the details, see Ruiz-Castillo & Waltman, 2015). We work with journals in the sciences, the social sciences, and the arts and humanities, although many arts and humanities journals are excluded because they are of a local nature.

In this paper, we focus on the set of 3,614,447 distinct articles published in the period 2005-2008. To save space, descriptive statistics of this dataset are available in Ruiz-Castillo & Waltman (2015). To deal with the problem of multiple assignment of articles to WoS categories, we adopt a fractional strategy according to which each article is fractioned into as many equal pieces as necessary, with each piece assigned to a corresponding category.

#### III.2. Differences between classification systems

Following Zitt *et al.* (2005), we consider the possibility of computing the set of the top X% most cited publications in every cluster in a pair of classification systems A and B. An article that belongs to the top X% in cluster *j* in system A (or B) may not belong to the top X% in cluster *l* in system B (or A). The more often this is the case, the more different the two systems will be according to the X% criterion. For comparison purposes, we begin by studying the differences between the G8 system and the member of the sequence of twelve independent classification systems in Ruiz-Castillo & Waltman (2015) corresponding to granularity level 6 –the G6 classification system hereafter– consisting of 1,363 clusters.

Let  $c_j$  be the ordered citation distribution of cluster j in system G8, where j = 1,..., 5119. The union  $C = \bigcup_j \{c_j\}$  is the overall citation distribution. Similarly, let  $d_g$  be the ordered citation distribution of cluster g in system G6, where g = 1,..., 1363, and let  $D = \bigcup_g \{d_g\}$  be the overall citation distribution in this case. The total number of articles in C, and D is 3.6 million. For the comparison between the G6

and G8 systems, let  $\mathbf{x}_j$  and  $\mathbf{x}_g$  be the sets of the top  $X^{\%}$  most cited articles in cluster citation distributions  $c_j$  and  $c_g$ , and denote the union of these sets by  $\mathbf{X}^{G8} = \bigcup_j \{\mathbf{x}_j\}$ , and  $\mathbf{X}^{G6} = \bigcup_g \{\mathbf{x}_g\}$ . Since both systems have the same number of articles, the number of articles in  $\mathbf{X}^{G8}$  and  $\mathbf{X}^{G6}$  is also the same, say  $N^X$ . Let  $\mathbf{X}^{68}$  be the set of distinct articles common to both systems, namely, let  $\mathbf{X}^{68} = \mathbf{X}^{G6} \cap \mathbf{X}^{G8}$ . Let  $N^{X68}$  be the number of articles in  $\mathbf{X}^{68}$ . The difference between the top  $X^{\%}$  most cited articles in both systems is measured through the percentage that the articles in  $\mathbf{X}^{G8} - \mathbf{X}^{68}$  represent in  $\mathbf{X}^{G6}$  (or the percentage that the articles in  $\mathbf{X}^{G6} - \mathbf{X}^{68}$  (or the percentage that the articles in  $\mathbf{X}^{G6} - \mathbf{X}^{68}$  is also in articles are in Table 1.

#### Table 1 around here

Let  $e_k$  be the ordered citation distribution of category k in the WoS system, where k = 1, ..., 236. The union  $E = \bigcup_k \{e_k\}$  is the overall citation distribution in this case. Although the number of articles in each citation distribution  $e_k$  will typically be a fractional number, the total number of articles in E is 3.6 million. However, to compare the systems G8 and G6 with the WoS system we must take into account that the later has been constructed according to a fractional scheme. To facilitate the reading of the text, the extension of the original method can be found in Appendix I. The results for the comparison between the WoS and the two granularity levels are also in Table 1.

Table 1 warrants the following two comments. Firstly, independently of the pair of classification systems being compared, we confirm that –as in Zitt *et al.* (2005) and Perianes-Rodriguez & Ruiz-Castillo (2016)– the difference between them increases as the threshold of excellence goes up. Secondly, in the key comparison between the WoS and the G8 systems we observe that, at least in the upper tail of the cluster and categories citation distributions the difference is very large. In particular, for the top 1% of

most cited articles this difference is 51.7%, or twenty percentage points above the difference for the top 10% of most cited articles.<sup>3</sup> Therefore, the choice between classification systems could have dramatic consequences for the ranking of research units when the citation impact indicators are defined over the very upper tail of citation distributions, such as the *Top 1%* indicator studied in Section III.

There are 2,420,054 distinct articles –or 67% of the 3.6 million articles published in 2005-2008– with at least one address line belonging to an LR university. Differences between the WoS and G8 systems for this dataset according to the top X% criterion when X = 50%, 10%, and 1%, are essentially the same as the differences presented in Table 1(results are available on request).

## III.3. Counting method

The distribution of the 2.4 million distinct articles with at least one address line belonging to an LR university by the number of address lines, as well as other descriptive statistics can be found in Perianes-Rodriguez & Ruiz-Castillo (2015b). It turns out that the percentage of articles with a single address line is 30.0% of the total. The assignment of the remaining 70% of the 2.4 million distinct articles that are co-authored by two or more institutions is made according to the address-level fractional counting method. The total number of articles in the LR universities according to the address-level fractional counting method is 1,886,106.1, or 77.9% of the 2.4 million articles with at least one address line belonging to a LR university, and 52.2% of the 3.6 million articles published in 2005-2008 (see Perianes-Rodriguez & Ruiz-Castillo, 2015a, for the distribution of the 1.9 million articles among the 500 LR universities).

#### **III. EMPIRICAL RESULTS**

Columns 1 and 2 in Table A in Appendix II present the results of applying the *Top 1%* indicator in the two classification systems, ordered by the *Top 1%* values in the G8 system. Table A reports the

<sup>&</sup>lt;sup>3</sup> Using the same dataset, Perianes-Rodriguez & Ruiz-Castillo (2016) make the same comparisons when the problem of the assignment of articles to multiple categories in the WoS system is solved according to a multiplicative strategy. Differences between the WoS and the G8 systems are of the same order of magnitude for every X = 50%, 10%, and 1%.

ratio of each university's *Top 1%* value and the world reference, namely, 1.00%. Thus, if a university has a *Top 1%* value of 1.12%, Table A reports a value of (1.12%/1.00%) = 1.12, so that the value one can serve as a benchmark for evaluating the research units in the usual way. The university ranks according to the *Top 1%* values in the WoS system, the ranking differences, and the differences between the indicator values are presented in column 3, 4, and 5, respectively.

Consider the possibility of measuring the discriminatory power of an indicator by the coefficient of variation and the range of their values. We know that differences in citation impact between the LR universities tend to increase when we reach the last few percentiles of citation distributions including the most highly cited articles (Figure 3 in Perianes-Rodriguez & Ruiz-Castillo, 2015b). Therefore, the greater the threshold of excellence is, that is, the further we go towards the very upper tail of citation distributions, the greater the discriminatory power of indicators of citation excellence is expected to be. In our case, the first observation is that, independently of the classification system we use, the *Top 1%* indicator has a greater discriminatory power than the *Top 10%* indicator. For example, when we use the G8 system, the coefficient of variation and the range of the *Top 1%* values are 0.56 and 3.78, whereas these quantities for the *Top 10%* values are 0.35 and 2.08.

Since cardinal differences in university values when we use the *Top 1%* indicator are greater than when we use the *Top 10%* indicator under both classification systems, this fact has no implications concerning how important the consequences of using the two systems are. Turning towards this issue, we begin by observing that the Pearson and the Spearman correlation coefficients between university values and ranks according to the *Top 1%* indicator –0.92 and 0.90– are significantly lower than according to the *Top 10%* indicator in Ruiz-Castillo & Waltman (2015) –0.97 and 0.96.

As far as differences for individual universities of going from the WoS to the G8 system when the *Top 1%* is used, we take two aspects into account: the re-rankings that take place in such a move (column 4 in Table A), and the differences between the university values themselves (columns 5). The results,

which are presented in Table 2, can be compared with the differences found in going from the WoS and the G8 systems when using the *Top 10%* indicator. To facilitate the comparison, these differences are presented in Table 3, taken from Table 6 in Ruiz-Castillo & Waltman (2015).

#### Tables 2 and 3 around here

Relatively large re-rankings of more than 25 positions according to the *Top 1%* indicator occur much more frequently than according to the *Top 10%* indicator: 296 *versus* 195 universities (Panel A in Tables 2 and 3). This is mostly due to the situation among the last 400 universities, where these numbers are 264 and 188, respectively. Nevertheless, as many as 32 large re-rankings take place among the first 100 universities. On the other hand, only 61 universities, or 12.2% of the total exhibit small re-rankings equal to or smaller than five positions.

Something similar occurs when we consider differences in indicator values (Panel B in Tables 2 and 3). Large changes greater than 0.10 in indicator values occur more or less equally frequently among the first 100 and the last 400 universities according to the *Top 1%* indicator: in both cases, approximately 60% of universities exhibit large changes in indicator values. Instead, these percentages are 13% and 20.5% according to the *Top 10%* indicator.

By way of example, Panel C in Table 2 includes the largest gainers and losers among the first 100 universities when going from the WoS to the G8 system. The three columns include the ranking according to the G8 system, the number of positions in the re-ranking, and the difference in *Top 1%* values. With the criterion of a re-ranking greater than 50 positions, we have only 11 gainers. In nine cases the gains take place between positions 49 and 99. We have also added the loser with the greatest difference in *Top 1%* values, namely, Rice University.

Finally, to illustrate the sensitivity of university *Top 1%* values to the choice of a classification system, we use the 32 Chinese universities (excluding Hong Kong) as an interesting example. Each of these universities is indicated using a red cross in Figure 1. The main lesson is that, as we go from the

WoS system to G8, the performance of almost all Chinese universities worsens. This deterioration is especially significant for the best performing Chinese universities. Not surprisingly, these results coincide with what we saw in Ruiz-Castillo & Waltman (2015) when we use the *Top 10%* indicator. An explanation of the Chinese case is beyond the scope of this paper, but it may relate to the specific characteristics of the research areas in which Chinese universities focus their activity or to the citation behavior of Chinese researchers (since researchers' citation behavior determines how publications are clustered in the algorithmic methodology).

#### Figure 1 around here

#### **IV. DISCUSSION AND CONCLUSIONS**

There are a number of recent results favoring publication-level over journal-level classification systems. Using a set of new gold standards –consisting of articles with at least 100 references–, Klavans & Boyack (2015) compare publication-level algorithmically constructed classification systems based in direct citations à la Waltman & Van Eck (2012) with six journal-level systems that do not include the WoS. They conclude that the former are more accurate than the latter in the sense that they are better at concentrating references. Among the alternatives to the WoS system, Ruiz-Castillo & Waltman (2015) study a sequence of twelve independent classification systems based on the Waltman & Van Eck (2012) algorithmic methodology at different granularity levels. Although it is difficult to isolate an optimal granularity level, Ruiz-Castillo & Waltman (2015) conclude that classification systems with a few thousands clusters with a minimum size provide a credible alternative to the WoS system, and focus their empirical analysis on the G8 system. Finally, in Perianes-Rodriguez & Ruiz-Castillo (2016) we study the standard target (cited-side) normalization procedures in which raw citation counts are normalized using the clusters' mean citations as normalization factors for different classification systems. We reach the following two conclusions. Firstly, the granularity level 8 clearly dominates the granularity level 6 within the Ruiz-Castillo & Waltman (2015) sequence.

standard normalization procedures turned out to be non-comparable, the G8-normalization procedure performs better using the WoS system for evaluation purposes than the WoS-normalization procedure using the G8 system for evaluation purposes.

In practice, the Centre for Science and Technology Studies (CWTS) adopts a publication-level algorithmically constructed classification system à la Waltman & Van Eck (2012) consisting of 3,822 clusters in the 2015 edition of the Leiden Ranking. Taking into account the above results, we sympathize with this choice. However, we believe that it is important to keep studying the consequences of moving from joint-level classification systems to publication-level alternatives. This paper has contributed to this topic by comparing the consequences for the ranking of the 500 LR universities of using a WoS journal-level classification system with 236 categories, or the G8 publication-level system with 5119 clusters. Naturally, the ranking of research units depend also on which citation impact indicator we use. Since Ruiz-Castillo & Waltman (2015) studied the *Top 10%* indicator, in this paper we have focused on the *Top 1%* indicator.

The consequences of moving from the WoS to the G8 system using one  $T_{op} X$ % indicator depend on two factors. Firstly, the difference between the set of the top X% of most cited articles in every category in the WoS system, and the set of the top X% of most cited articles in every cluster in the G8 system. The greater the difference between these sets is, the greater should be the consequences for the ranking of research units of using one or the other system independently of the value of X. Secondly, the differences between the universities' research performance at the top X% of their citation distributions. The greater is the superiority of one university over another, the lower the consequences of using one or the other classification system, i. e. the more robust will be the ranking of these universities to the system we use.

Our main result is best explained in two parts.

1. The difference between the sets of top 10% most cited publications in every cluster and every category in the G8 and WoS systems is considerable, namely, 31.7%. However, differences in the universities' *Top 10%* values are not that large. Firstly, 95 universities, or 19% of the total exhibit differences larger than 0.10. Secondly, truly large re-rankings of more than 50 positions are present in 81 universities, or 16.2% of the total.

2. The difference between the sets of top 1% most cited publications in every cluster and every category in the G8 and WoS systems is twenty percentage points greater, namely, 51.7%. Differences in the universities' *Top 1%* values are also very much larger. Firstly, 303 universities, or 60.6% of the total exhibit differences larger than 0.10. Secondly, large re-rankings of more than 50 positions are present in 164 universities, or 32.8% of the total.

The conclusion is clear. Recent results indicate that there are good reasons to move from journallevel to publication-level algorithmically constructed classification systems. At the same time, due to the high skewness of citation distributions, we are witnessing a shift towards citation impact indicators defined over the very upper tail of citation distributions. Personally, we believe that both moves are advisable. However, the results of this paper indicate that this double trend has important consequences in an interesting case: the move from the WoS to the G8 system using the *Top 1%* indicator changes quite considerably the ranking of the 500 universities in the 2013 edition of the Leiden Ranking.

#### APPENDIX I

#### DIFFERENCES BETWEEN THE G8 AND THE (FRACTIONAL) WoS SYSTEM

#### The G8 system

As indicated in the text, let  $\mathbf{x}_j$  be the set of top  $X^{0/0}$  most cited articles in cluster *j* in the G8 system, and let  $\mathbf{X}^{G8} = \bigcup_j \{\mathbf{x}_j\}$  be the union of all such sets, so that the number of articles in  $\mathbf{X}^{G8}$ ,  $N^X$ , is the  $X^{0/0}$  of N.<sup>4</sup> Let  $\mathbf{X}_r^{G8}$  be the set of articles in  $\mathbf{X}^{G8}$  assigned to *v* categories in the WoS system, where v = 1, ..., 6, and let  $N_v$  be the number of articles in  $\mathbf{X}_r^{G8}$ , so that  $\mathbf{X}^{G8} = \bigcup_v \{\mathbf{X}_r^{G8}\}$  and  $N^X = \sum_v N_v$ . For  $v \ge 2$ , we need to expand the set  $\mathbf{X}_r^{G8}$  as follows. For any  $v \ge 2$ , denote by  $\mathbf{X}_r^{G8}(\mathbf{E})$  the *v*-replica of  $\mathbf{X}_r^{G8}$ , so that  $|\mathbf{X}_r^{G8}(\mathbf{E})| = v N_v$ . For example, if v = 2 and  $\mathbf{X}_r^{G8} = (c_{v1}, ..., c_{v5}, ..., c_{vN})$ , we have

$$X_2^{GS}(\mathbf{E}) = (c_{v1}, c_{v1}, \ldots, c_{vi}, c_{vi}, \ldots, c_{vNv}, c_{vNv})$$

with  $|X_2^{GS}(\mathbf{E})| = 2 N_2$ .

#### The WoS system

As indicated in the text, let  $e_k$  be the citation distribution of category k in the WoS system, k = 1, ..., 236, and let  $E = \bigcup_k \{e_k\}$  be the overall citation distribution. Every distinct article in C can be assigned to v categories in the WoS system with  $v \in \{1, ..., 6\}$ . Therefore, every element of citation distribution  $e_k$  consists of a number of citations, say  $e_{kb}$ , and a weight  $w_{kb} = 1/v$  for some  $v \in \{1, ..., 6\}$ . Let  $n_k = \sum_k w_{kb}$  be the number of articles in so that  $N = \sum_k n_k = \sum_k \sum_k w_{kb}$ .

Let  $y_k$  be the set of top X% most cited articles in category k in the WoS system, and let  $X^{WoS} = \bigcup_k \{y_k\}$  be the union of all such sets, so that the number of articles in  $X^{WoS}$  is  $N^X$ , namely, the X% of N. For any  $v \in \{1, ..., 6\}$ , let  $X_v^{WoS}$  be the set of elements in  $X^{WoS}$  with weight equal to 1/v, so that  $X^{WoS} = \bigcup_v \{X_v^{WoS}\}$ . Let  $M_v$  be the number of elements in  $X_v^{WoS}$ , so that we can represent this set by  $X_v^{WoS} = \{(1/v) \ e_{vb} \ l = 1, ..., M_v\}$ , and  $N^X = \sum_v (M_v/v)$ . Finally, for any v we need the citation distribution consisting of the citations received by the elements in  $X_v^{WoS}$ , that is, for any v, we need

$$\boldsymbol{X}_{\boldsymbol{v}}^{\boldsymbol{WoS}}(\mathbf{D}) = \{ e_{vb} \ l = 1, \dots, M_{v} \}.$$

The intersections

Let

 $\bigcap_{I} = X_{I}^{G8} \cap X_{I}^{WoS}(\mathbf{D}),$ 

and for any  $v \ge 2$ , define the intersections

$$\bigcap_{v} = X_{v}^{GS}(\mathbf{E}) \cap X_{v}^{WoS}(\mathbf{D}).$$

<sup>&</sup>lt;sup>4</sup> To simplify matters, we shall assume that all x<sub>i</sub> consists of a whole number of distinct articles. This assumption will be dropped in the example.

Let  $I_v$  be the number of articles in  $\bigcap_{v} v = 1, \dots, 6$ . The number of articles common to the sets  $X^{G8}$  and  $X^{WoS}$  is

 $I = \Sigma_v (I_v / v).$ 

Therefore, the difference between the G8 and the WoS systems according to the X criterion can be expressed as  $100(N^X - N^X)$  $I)/N^{X}$ .

#### AN EXAMPLE

Assume there are 12 distinct articles and four clusters in system G8:

$$c_1 = (0, 1, 3, 12), N_1 = 4;$$
  $c_2 = (1, 6), N_2 = 2;$   $c_3 = (4, 8), N_3 = 2;$   $c_4 = (0, 5, 7, 9), N_4 = 4.$ 

Assume that there are three categories, and that the distinct articles with citations 3, 5, and 7 are assigned to the three of them. Let  $n_k$  be the number of articles in category k, k = 1, 2, 3. The three categories are:

$$e_{I} = (1, 1/3 \text{ of } 3, 1/3 \text{ of } 5, 1/3 \text{ of } 7), n_{I} = 2,$$
  
 $e_{2} = (0, 0, 1/3 \text{ of } 3, 4, 1/3 \text{ of } 5, 6, 1/3 \text{ of } 7, 8), n_{2} = 6,$   
 $e_{3} = (1, 1/3, 1/3 \text{ of } 5, 1/3 \text{ of } 7, 9, 12), n_{3} = 4.$ 

If X = 50%, then

$$x_1 = (3, 12),$$
  $x_2 = (6), x_3 = (8),$   $x_4 = (7, 9),$ 

 $X^{G8} = (3, 6, 7, 8, 9, 12), N^{X} = 6.$ so that

Note that  $X^{G8} = X_1^{G8} \cup X_3^{G8}$ , where  $X_1^{G8} = (6, 8, 9, 12)$ , and  $X_3^{G8} = (3, 7)$ . Therefore,  $X_3^{G8}(E) = (3, 3, 3, 7, 7, 7)$ .

Similarly,

$$y_1 = (1/3 \text{ of } 3, 1/3 \text{ of } 5, 1/3 \text{ of } 7),$$
  $y_2 = (1/3 \text{ of } 4, 1/3 \text{ of } 5, 6, 1/3 \text{ of } 7, 8),$   $y_3 = (9, 12),$ 

so that

Note that 
$$X_1^{Wos}(\mathbf{D}) = (1/3 \text{ of } 4, 6, 8, 9, 12)$$
, and  $X_3^{Wos}(\mathbf{D}) = (3, 5, 5, 7, 7)$ .

Observe that:

$$\cap_I = X_I^{GS} \cap X_I^{WoS}(\mathbf{D}) = (6, 8, 9, 12),$$

and

$$\bigcap_{\mathcal{J}} = X_{\mathcal{J}}^{GS}(\mathbf{E}) \cap X_{\mathcal{J}}^{WoS}(\mathbf{D}) = (3, 7, 7),$$

so that

$$I = I_1 + I_3/3 = 4 + 1 = 5.$$

Therefore, the difference between the G8 and the WoS systems when X = 50% is 100(12-5)/12 = 58.3%.

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## APPENDIX II

Table A. University rankings according to the *Top 1%* indicator in the WoS and G8 classification systems, ordered by the G8 indicator values

Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
		(1)	(2)	(3)	(4)	(5)
1	Massachusetts Institute of Technology	3.86	3.77	1	0	-0.10
2	Princeton University	3.36	3.71	2	0	0.35
3	Harvard University	3.20	2.88	5	2	-0.32
4	Stanford University	2.97	3.14	4	0	0.17
5	University of California, Berkeley	2.90	2.53	7	2	-0.37
6	California Institute of Technology	2.87	2.81	6	0	-0.06
7	London School of Hygiene & Tropical Medicine	2.75	1.58	59	52	-1.18
8	University of California, Santa Barbara	2.54	2.52	8	0	-0.01
9	University of St Andrews	2.43	1.70	44	35	-0.73
10	University of Chicago	2.28	1.89	32	22	-0.39
11	Yale University	2.28	2.15	15	4	-0.13
12	University of California, San Francisco	2.25	1.83	37	25	-0.42
13	University of Oxford	2.17	1.75	40	27	-0.42
14	Northwestern University	2.16	2.19	12	-2	0.03
15	University of Washington - Seattle	2.15	2.27	11	-4	0.12
16	Columbia University	2.13	1.99	24	8	-0.14
17	University of California, San Diego	2.12	1.93	27	10	-0.19
18	New York University	2.09	2.00	23	5	-0.09
19	University of Cambridge	2.09	1.93	28	9	-0.16
20	University of California, Santa Cruz	2.08	2.03	22	2	-0.05
21	Duke University	2.08	1.96	26	5	-0.12
22	University of California, Los Angeles	2.06	2.09	19	-3	0.04
23	École Polytechnique Fédérale de Lausanne	2.05	2.11	18	-5	0.05
24	ETH Zurich	2.03	1.74	42	18	-0.29
25	University College London	2.01	1.62	52	27	-0.38
26	Carnegie Mellon University	2.01	2.44	9	-17	0.44
27	Oregon Health & Science University	1.99	1.56	63	36	-0.43
28	University of Dundee	1.98	2.17	14	-14	0.19
29	Rice University	1.98	3.47	3	-26	1.49
30	University of Pennsylvania	1.97	2.05	20	-10	0.08
31	University of Colorado Boulder	1.97	1.89	33	2	-0.07
32	Georgia Institute of Technology	1.93	2.39	10	-22	0.46
33	Cornell University	1.92	1.92	30	-3	0.00
34	Johns Hopkins University	1.90	1.86	35	1	-0.04
35	Imperial College London	1.89	1.75	41	6	-0.14
36	Delft University of Technology	1.88	1.34	88	52	-0.54
37	Tufts University	1.87	1.92	29	-8	0.05
38	University of North Carolina at Chapel Hill	1.84	1.96	25	-13	0.12
39	ParisTech - École Polytechnique	1.84	1.44	73	34	-0.41
40	Emory University	1.84	1.66	48	8	-0.17
41	University of Michigan	1.82	2.04	21	-20	0.22
42	University of Bristol	1.77	1.59	56	14	-0.18
43	University of California, Irvine	1.77	1.91	31	-12	0.14

0(a)(b)(b)(c)(c)(c)(c)44Ielahn School of Meitsine at Mount Sini $1.75$ $1.66$ $4.9$ $4.4$ $-0.09$ 45Washington University in St. Louis $1.75$ $1.58$ $5.8$ $12$ $-0.01$ 46Kreg's Collegs London $1.75$ $1.58$ $5.8$ $12$ $-0.01$ 47University of Texas Austin $1.73$ $1.72$ $1.48$ $.4$ $-0.00$ 48University of Mansota Anipolia $1.72$ $1.03$ $1.75$ $1.26$ $-0.66$ 59University of Mansota Tuén Chies $1.60$ $1.68$ $4.66$ $-3$ $-0.00$ 51University of Mansota Tuén Chies $1.60$ $1.68$ $4.66$ $-3$ $-0.01$ 52University of Mansota Tuén Chies $1.66$ $1.21$ $1.77$ $-0.46$ 53University of Science $1.67$ $1.81$ $38$ $-4.23$ $0.44$ 54University of Utah $1.66$ $1.67$ $1.81$ $-2.4$ $0.66$ 57Boton University $1.66$ $1.67$ $1.81$ $-2.4$ $0.66$ 58University of Utah $1.66$ $1.67$ $1.87$ $-2.6$ $0.67$ 59University of Utah $1.66$ $1.67$ $1.87$ $0.66$ $-0.67$ 61University of Utah $1.65$ $1.67$ $-2.16$ $0.66$ 62University of Chiefonga $1.57$ $1.53$ $-1.7$ $0.56$ 63University of Chiefonga <th>Rank G8</th> <th>University</th> <th>Value G8</th> <th>Value WoS</th> <th>Rank WoS</th> <th>Re-rankings = Rank WoS-Rank G8</th> <th>(2) - (1)</th>	Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
44       Ichn School of Medicine at Mount Sinai       1.75       1.68       47       3       -0.09         45       Weinging Outliversity in SL Louis       1.75       1.58       58       12       -0.17         47       University of Teass at Austin       1.73       1.72       4.93       -4.4       -0.00         48       University of Kice Sophia Antipolis       1.72       1.03       175       1.26       -0.60         50       University of Minescen, Twin Cities       1.69       1.39       79       2.9       -0.31         51       University of Minescen, Twin Cities       1.67       1.84       38       -1.5       0.13         53       Weizman Instature of Science       1.67       1.84       38       -1.5       0.13         54       Triving Collega, Dubin       1.66       1.64       1.65       1.64       0.65       1.64       0.65       1.64       0.65       1.64       0.65       1.64       0.65       1.64 <th></th> <th>5</th> <th>(1)</th> <th>(2)</th> <th>(3)</th> <th>(4)</th> <th>(5)</th>		5	(1)	(2)	(3)	(4)	(5)
44       Washington University in St. Louis       1.75       1.66       49       4       -0.09         46       Kingto Collage London       1.75       1.28       838       1.2       -0.01         47       University of Tesas at Austin       1.73       1.72       4.3       -4       -0.01         48       University of Microsofth Antipolo       1.72       1.03       175       1.26       -0.06         50       University of Wisconsin Addition       1.68       1.55       84       -32       -0.31         51       University of Wisconsin - Madison       1.68       1.55       84       -32       -0.34         53       Wizzmann Institut of Science       1.67       1.81       38       -13       0.13         54       Trinity Collage, Dublin       1.66       1.52       66       -11       -0.44         54       University of Nechetter       1.66       1.59       34       -22       -0.06         55       University of Nechetter       1.66       1.51       54       -4.03       -0.06         55       University of Nechetter       1.63       1.57       62       -3       -0.06         50       University of California, Riversi	44	Icahn School of Medicine at Mount Sinai	1.77	1.68	47	3	-0.09
44       King's Callage Loadon       1.75       1.88       58       1.2       0.017         47       University Texas Southwestern Mcd Center Dallas       1.73       1.12       4.3       4.4       0.010         48       University Texas Southwestern Mcd Center Dallas       1.73       1.12       1.33       175       126       0.409         50       University of Misconsin - Madison       1.68       1.66       1.53       84       32       0.431         51       University of Misconsin - Madison       1.66       1.53       84       32       0.431         53       Weizmann Institute of Science       1.67       1.81       38       -15       0.11         64       University of Motoster       1.66       1.61       54       -2       -0.00         54       University of Tush       1.66       1.61       54       -2       -0.00         55       University of Tush Anglia       1.64       1.70       45       -13       0.05         61       Anizons State University       1.63       1.57       1.50       66       4.005         62       University of Tush Anglia       1.57       1.51       1.52       1.61       4.025	45	Washington University in St. Louis	1.75	1.66	49	4	-0.09
41       University of Texas at Austin       1.73       1.72       43       4       -0.01         48       University of Nice Sophia Antipolis       1.73       1.86       36       -12       0.13         40       University of Nice Sophia Antipolis       1.72       1.03       175       126       -0.06         50       University of Miscongin - Madison       1.68       1.53       84       32       -0.31         51       University of Miscongin - Madison       1.68       1.53       84       32       -0.34         53       Waizensity of Nice Sophia Antipolis       1.66       1.52       1.67       -0.13       -0.06         54       University of Okehester       1.66       1.52       66       1.1       -0.44         54       University of Take Anglia       1.64       1.70       45       -23       0.02         55       University of California, Riverside       1.61       2.17       1.3       -0.06       -0.06       -0.06       -0.06       -0.06       -0.06       -0.06       -0.06       -0.07       -0.06       -0.07       -0.06       -0.06       -0.07       -0.06       -0.07       -0.06       -0.07       -0.06       -0.07       -0.06	46	King's College London	1.75	1.58	58	12	-0.17
44       University of Nicos Sophia Antipolis       1.73       1.86       36       -12       0.13         49       University of Nicos Sophia Antipolis       1.72       1.13       175       126       -0.60         51       University of Nicos at Urbana Champhign       1.70       1.52       79       22       0.03         51       University of Nicosin - Madison       1.68       1.35       84       2.045       0.04         52       University of Ricosin - Madison       1.66       2.12       1.7       .37       0.46         55       University of Ricosin - Madison       1.66       1.61       1.52       0.66       1.11       -0.14         56       University of Chatheter       1.66       1.61       1.54       -2       0.06         57       Botton Livicersity of Watter       1.63       1.57       0.15       0.15       0.15       0.15       0.15       0.16       0.46       0.57       0.05 <td>47</td> <td>University of Texas at Austin</td> <td>1.73</td> <td>1.72</td> <td>43</td> <td>-4</td> <td>-0.01</td>	47	University of Texas at Austin	1.73	1.72	43	-4	-0.01
44         University of Nince Sophia Antipolis         1.72         1.03         175         126         -0.03           50         University of Minoseta, Twin Chies         1.60         1.68         4.66         -5         -0.01           51         University of Minoseta, Twin Chies         1.68         1.53         84         32         -0.03           53         Weixensin Iostitue of Science         1.66         1.52         66         11         -0.14           54         Trinity College, Dubin         1.66         1.62         1.67         1.81         38         -23         0.04           55         University of Kochester         1.66         1.62         6         11         -0.04         -0.06         57         Boston University         1.63         1.89         34         -23         0.024         -0.06         60         University of East Anglia         1.64         1.70         45         -0.06         60         University of Notre Dame         1.61         2.17         13         47         0.55         -0.06         61         Arizon State University         1.57         1.50         68         5         -0.07         63         University of Chilorina, Riverside         1.57         1.50	48	University Texas Southwestern Med Center Dallas	1.73	1.86	36	-12	0.13
50         University of Minneson, Twin Crites         1.69         1.68         46         .5         -0.01           51         University of Misneson, Twin Crites         1.69         1.68         46         .5         -0.01           52         University of Misneson, Twin Crites         1.67         1.81         38         .93         -0.34           53         Wizmann Institute of Science         1.66         1.62         2.66         11         -0.14           54         University of Rochester         1.66         1.61         54         -2         -0.06           57         Diversity of Clush         1.66         1.61         54         -2         0.06           67         Boston University of Clush         1.63         1.57         2.66         1.3         0.05           58         University of Twente         1.63         1.57         2.15         4.6         0.65         -0.07           61         Arizona State University         1.69         1.57         2.15         4.6         0.65         -0.07           54         Oregon State University         1.55         1.21         1.18         54         -0.21           55         Dizersity of Toknohy         1.	49	University of Nice Sophia Antipolis	1.72	1.03	175	126	-0.69
1       University of Minneson, Twin Cines       1.69       1.68       4.6       -5       -0.01         2       University of Wisconsin - Madison       1.68       1.35       84       32       -0.04         3       Weizmann Institute Ofscince       1.67       1.81       38       1.5       0.13         4       Trinity College, Dubin       1.66       1.62       167       -0.14         5       University of Unh       1.66       1.61       54       -2       0.06         57       Boston University of Tuente       1.63       1.57       62       -3       -0.06         60       University of Tuente       1.61       2.17       1.5       -0.06       -0.05         61       Arizona State University       1.60       2.17       1.5       -4       -0.05         62       University of Purbangh       1.57       1.50       68       5       -0.07         63       University of Eusburgh       1.55       1.30       99       -44       -0.25         64       Oregon State University       1.55       1.30       92       2.6       -0.22         65       Brown University of Edinburgh       1.51       1.52       1.19 <td>50</td> <td>University of Illinois at Urbana-Champaign</td> <td>1.70</td> <td>1.39</td> <td>79</td> <td>29</td> <td>-0.31</td>	50	University of Illinois at Urbana-Champaign	1.70	1.39	79	29	-0.31
1       2       University of Visconsin - Madison       1.68       1.35       84       32       0.043         35       Weizmann Institute of Science       1.67       1.81       38       -15       0.013         34       Timity College, Dublin       1.66       1.52       66       11       -0.04         55       University of Rochester       1.66       1.61       54       -2       -0.06         57       Boston University       1.65       1.89       34       -23       -0.04         58       University of Fast Anglin       1.61       1.17       13       -0.05       -0.06         60       University of Contre Dame       1.61       2.17       13       -47       0.65         61       Arizona State University       1.05       1.55       65       -4       -0.05         62       University of Contren Airestide       1.57       1.50       68       5       -0.07         63       University of Edinburgh       1.55       1.21       118       54       -0.03         64       Oregon State University       1.55       1.30       19       -0.12       -0.72         65       Drexel University       1.51	51	University of Minnesota, Twin Cities	1.69	1.68	46	-5	-0.01
53       Weizmann Institute of Science       1.67       1.81       38       -15       0.11         54       Trinity College, Dublin       1.66       2.12       17       -37       0.46         55       University of Utah       1.66       1.52       66       11       0.41         56       University of Itah       1.65       1.89       34       -23       0.02         78       Doto University of Twente       1.63       1.57       62       -3       -0.06         60       University of Notre Dame       1.61       2.17       13       -47       0.56         61       Arizona State University       1.50       1.55       5       4       -0.05         62       University of California, Riverside       1.57       1.50       1.88       5       -0.37         63       University of Dittsburgh       1.55       1.30       99       34       -0.25         64       Dreasel University       1.55       1.30       99       34       -0.25         65       Down University of Maryburd, College Park       1.51       1.52       67       -33       0.00         70       University of Geneva       1.52       1.41	52	University of Wisconsin - Madison	1.68	1.35	84	32	-0.34
54       Trainy College, Dublin       1.66       2.12       17       -37       0.44         55       University of Rochester       1.66       1.52       66       11       0.01         57       Boston University of Tast Anglia       1.65       1.89       34       -23       0.04         58       University of Flast Anglia       1.64       1.70       45       -13       0.06         60       University of Notre Dame       1.61       2.17       13       -47       0.55         61       Arizona State University       1.60       1.55       65       4       -0.05         62       University of Flasthough       1.57       1.50       68       5       -0.07         63       University of Editionia, Kuerside       1.57       1.50       68       5       -0.07         64       Oregon State University       1.55       1.21       118       54       -0.32         65       Droxel University       1.51       1.50       0.99       34       -0.22         66       Drexel University       1.51       1.51       1.51       -0.32       -0.61       -0.22       -0.23         68       University of Maryland, State Univer	53	Weizmann Institute of Science	1.67	1.81	38	-15	0.13
55       University of Rochester       1.66       1.52       66       11       -0.14         56       University of Utah       1.66       1.61       1.54       -2       0.06         57       Boston University       1.63       1.64       1.70       45       -13       0.05         59       University of Vente       1.63       1.57       62       3       -0.06         60       University of Coltroma, Reverside       1.57       1.55       65       4       -0.05         61       Arizona State University       1.60       1.55       65       4       -0.05         62       University of Editoma, Reverside       1.57       2.15       1.66       4.6       0.57         63       Brown University of Editoma, Reverside       1.57       2.15       1.6       -4.6       0.57         64       Oregon State University       1.55       1.30       99       34       -0.25         65       Brown University of Editohungh       1.53       1.13       141       74       -0.32         70       University of Geneva       1.52       1.19       125       57       -0.32         71       Veniversity of Geneva       1.51	54	Trinity College, Dublin	1.66	2.12	17	-37	0.46
56       University of Utah       1.66       1.61       54       -2       -0.06         57       Boston University of East Anglia       1.65       1.89       34       -23       0.24         58       University of Twente       1.63       1.57       62       3       -0.06         60       University of Notre Dame       1.61       2.17       13       -47       0.56         61       Arizona State University       1.60       1.55       55       4       -0.05         62       University of California, Riverside       1.57       2.15       1.6       -46       0.67         63       University of Pittsburgh       1.55       1.30       99       34       -0.02         64       Oregon State University       1.55       1.30       99       34       -0.02         65       Dexel University of Edinburgh       1.53       1.13       141       74       -0.39         65       Derexel University       1.54       1.33       92       26       -0.21         67       University of Edinburgh       1.51       1.52       67       -3.3       0.01         70       University of Marjand, College Park       1.51       1.52<	55	University of Rochester	1.66	1.52	66	11	-0.14
57       Boston University of East Anglia       1.65       1.89       34       -23       0.24         58       University of East Anglia       1.64       1.70       45       -13       0.05         59       University of Kotre Dame       1.61       2.17       13       -47       0.56         61       Arizona State University       1.60       1.55       65       4       0.05         62       University of Editomia, Riverside       1.57       1.50       68       5       -0.07         63       University of Editomia, Riverside       1.57       1.50       68       5       -0.07         64       Oregon State University       1.54       1.33       92       2.6       -0.21         67       University of Editohungh       1.53       1.13       1.41       7.4       -0.33         68       University of Geneva       1.52       1.49       7.8       9       -0.12         70       University of Maryland, College Park       1.51       1.52       67       -3.3       0.01         71       Pensylvania State University       1.54       1.51       1.52       67       -3.3       0.01         70       University of Maryland,	56	University of Utah	1.66	1.61	54	-2	-0.06
58       University of East Anglia       1.64       1.70       45       -13       0.05         59       University of Twente       1.63       1.57       62       3       -0.06         60       University of Chiroma, State University       1.60       1.55       .65       4       -0.05         61       Anizona State University       1.61       1.57       2.15       1.6       -46       0.057         63       University of California, Riverside       1.57       1.50       68       5       -0.07         64       Oregon State University       1.55       1.21       118       54       -0.23         65       Brown University       1.55       1.30       99       34       -0.25         66       Drexel University       1.53       1.13       141       74       -0.32         76       University of Geneva       1.52       1.19       125       57       -0.32         70       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsytwain State University       1.61       1.53       -1.18       -0.22       7       -0.22         73       University of South	57	Boston University	1.65	1.89	34	-23	0.24
59       University of Twente       1.63       1.57       62       3       -0.06         60       University of Notre Dame       1.61       2.17       13       -47       0.56         61       Arizona State University       1.60       1.55       65       4       -0.05         62       University of California, Riverside       1.57       2.15       1.6       -4.6       0.57         63       University of Pittsburgh       1.55       1.21       118       54       -0.03         64       Oregon State University       1.55       1.30       090       34       -0.22         66       Drexel University of Edinburgh       1.53       1.13       141       74       -0.33         68       University of Geneva       1.52       1.19       125       57       -0.32         61       Lancaster University       1.50       1.61       53       -1.8       0.011         71       Pennsylvania State University       1.50       1.61       53       -1.8       0.011         72       University of Toronto       1.48       1.61       130       57       -0.32         74       Eindhoven University       1.47       1.48	58	University of East Anglia	1.64	1.70	45	-13	0.05
60       University of Notre Dame       1.61       2.17       13       4.7       0.56         61       Arizona State University       1.60       1.55       6.5       4       -0.05         62       University of California, Riverside       1.57       2.15       1.6       -4.6       0.57         63       University of Editionia, Riverside       1.57       1.50       6.8       5       -0.07         64       Oregon State University       1.55       1.21       118       5.4       -0.03         65       Brown University of Edinburgh       1.53       1.13       1.41       7.4       -0.39         66       Driversity of Edinburgh       1.53       1.13       1.41       7.4       -0.39         67       University of Geneva       1.52       1.19       1.25       5.7       -0.32         68       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsylvania State University       1.50       1.61       53       -1.8       0.11         72       University of Teonto       1.48       1.22       116       44       0.26         73       Methaset University       1.	59	University of Twente	1.63	1.57	62	3	-0.06
61       Arizona Štate University of California, Riverside       1.57       2.15       1.6       4.6       0.057         62       University of Pittsburgh       1.57       2.15       1.6       4.6       0.077         63       University of Pittsburgh       1.55       1.21       118       54       0.047         64       Oregon State University       1.55       1.30       99       34       -0.25         66       Drexel University of Edinburgh       1.53       1.13       141       74       -0.39         68       University of Ganeva       1.52       1.19       125       57       -0.32         69       Lancaster University       1.52       1.40       78       9       -0.12         70       University of Mayland, College Park       1.51       1.52       67       -3       0.01         71       Pensylvania State University       1.50       1.61       53       -18       0.11         72       University of Southampton       1.48       1.16       130       57       -0.32         73       University of Melbourne       1.47       1.34       89       13       -0.13         74       Eindhoven University       1.44	60	University of Notre Dame	1.61	2.17	13	-47	0.56
62       University of California, Riverside       1.57       2.15       16       -46       0.057         63       University of Pittsburgh       1.57       1.50       68       5       -0.07         64       Oregon State University       1.55       1.21       118       54       -0.34         65       Brown University       1.55       1.30       99       34       -0.25         66       Drexel University       1.54       1.33       92       26       -0.21         67       University of Edinburgh       1.53       1.13       141       74       -0.39         68       University of Maryland, College Park       1.52       1.91       125       57       -0.32         70       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsylvania State University       1.50       1.61       53       -1.48       0.11         72       University of Torono       1.48       1.22       116       44       -0.26         73       University of Melbourne       1.47       1.34       89       13       -0.13         74       Eindhoven University       1.47       1.46	61	Arizona State University	1.60	1.55	65	4	-0.05
63       University of Pittsburgh       1.57       1.50       68       5       -0.07         64       Oregon State University       1.55       1.21       118       54       -0.34         65       Brown University       1.55       1.30       99       34       -0.25         66       Direxel University       1.54       1.33       92       26       -0.21         67       University of Edinburgh       1.53       1.13       141       74       -0.39         68       University of Maryland, College Park       1.52       1.40       78       9       -0.12         70       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsylvania State University       1.50       1.61       53       -18       0.11         72       University of Maryland, College Park       1.51       1.52       67       -0.32         74       Eindhoven University of Technology       1.48       1.61       130       57       -0.32         74       Eindhoven University of Melbourne       1.47       1.47       1.46       71       -6       0.00         74       University of Southampton       <	62	University of California, Riverside	1.57	2.15	16	-46	0.57
64       Oregon State University       1.55       1.21       118       54       -0.34         65       Brown University       1.55       1.30       99       34       -0.25         66       Drexel University       1.54       1.33       92       26       -0.21         67       University of Edinburgh       1.53       1.13       141       74       -0.39         68       University of Geneva       1.52       1.19       125       57       -0.32         69       Lancaster University       1.52       1.40       78       9       -0.12         70       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsylvania State University       1.50       1.61       53       -18       0.11         72       University of Southampton       1.48       1.16       130       57       -0.32         74       Eindhoven University       1.47       1.47       1.47       1.43       93       -0.13         75       McMaster University       1.47       1.46       71       -6       0.00         76       University of Kutgart       1.45       1.37 <td< td=""><td>63</td><td>University of Pittsburgh</td><td>1.57</td><td>1.50</td><td>68</td><td>5</td><td>-0.07</td></td<>	63	University of Pittsburgh	1.57	1.50	68	5	-0.07
65       Brown University       1.55       1.30       99       34       -0.25         66       Drexel University       1.54       1.33       92       26       -0.21         67       University of Edinburgh       1.53       1.13       141       74       -0.39         68       University of Geneva       1.52       1.19       125       57       -0.32         69       Lancaster University       1.52       1.40       78       9       -0.12         70       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsylvania State University       1.50       1.61       53       -1.18       0.11         72       University of Southampton       1.48       1.22       116       44       -0.26         73       University of Technology       1.48       1.31       95       21       -0.17         75       McMaster University       1.47       1.47       1.48       3       -0.33         74       Eindhoven University       1.47       1.47       1.48       9       13       -0.13         75       McMaster University       1.45       1.37	64	Oregon State University	1.55	1.21	118	54	-0.34
66         Drexel University         1.54         1.33         92         26         -0.21           67         University of Edinburgh         1.53         1.13         141         74         -0.39           68         University of Geneva         1.52         1.19         125         57         -0.32           69         Lancaster University         1.52         1.19         125         57         -0.32           70         University of Maryland, College Park         1.51         1.52         67         -3         0.01           71         Pennsylvania State University         1.50         1.61         53         -18         0.11           72         University of Southampton         1.48         1.16         130         57         -0.32           74         Eindhoven University         1.47         1.47         1.34         89         13         -0.13           75         McMaster University         1.47         1.47         1.34         89         13         -0.13           76         University of Stuttgart         1.45         1.37         80         2         -0.00           78         McMaster University         1.47         1.46         71 </td <td>65</td> <td>Brown University</td> <td>1.55</td> <td>1.30</td> <td>99</td> <td>34</td> <td>-0.25</td>	65	Brown University	1.55	1.30	99	34	-0.25
67       University of Edinburgh       1.53       1.13       141       74       -0.39         68       University of Geneva       1.52       1.19       125       57       -0.32         69       Lancaster University       1.52       1.40       78       9       -0.12         70       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsylvania State University       1.50       1.61       53       -18       0.11         72       University of Toronto       1.48       1.22       116       44       -0.26         73       University of Southampton       1.48       1.11       130       57       -0.32         74       Eindhoven University of Technology       1.48       1.31       95       21       -0.17         75       McMaster University       1.47       1.47       1.48       33       -0.32         76       University of Melbourne       1.47       1.34       89       13       -0.13         76       University of Southern California       1.45       1.36       82       -0.09         79       University of Colorado Denver       1.45       1.29	66	Drexel University	1.54	1.33	92	26	-0.21
68         University of Geneva         1.52         1.19         125         57         -0.32           69         Lancaster University         1.52         1.40         78         9         -0.12           70         University of Maryland, College Park         1.51         1.52         67         -3         0.01           71         Pennsylvania State University         1.50         1.61         53         -18         0.11           72         University of Toronto         1.48         1.22         116         44         -0.26           73         University of Southampton         1.48         1.16         130         57         -0.32           74         Eindhoven University of Technology         1.48         1.31         95         21         -0.17           75         McMaster University         1.47         1.47         1.34         89         13         -0.13           76         University of Melbourne         1.47         1.34         89         13         -0.13           77         Durham University         Oburbam California         1.45         1.36         82         3         -0.08           80         University of Southern California         1.45	67	University of Edinburgh	1.53	1.13	141	74	-0.39
69       Lancaster University       1.52       1.40       78       9       -0.12         70       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsylvania State University       1.50       1.61       53       -18       0.11         72       University of Toronto       1.48       1.22       116       44       -0.26         73       University of Southampton       1.48       1.16       130       57       -0.32         74       Eindhoven University of Technology       1.48       1.31       95       21       -0.17         75       McMaster University       1.47       1.47       1.48       33       -0.30         76       University of Melbourne       1.47       1.46       71       -6       0.00         78       University of Stuttgart       1.45       1.37       80       2       -0.09         79       University of Colorado Denver       1.45       1.36       82       3       -0.08         80       University of Calado Denver       1.45       1.29       101       20       -0.12         81       Baylor College of Medicine       1.45 <td< td=""><td>68</td><td>University of Geneva</td><td>1.52</td><td>1.19</td><td>125</td><td>57</td><td>-0.32</td></td<>	68	University of Geneva	1.52	1.19	125	57	-0.32
70       University of Maryland, College Park       1.51       1.52       67       -3       0.01         71       Pennsylvania State University       1.50       1.61       53       -18       0.11         72       University of Toronto       1.48       1.22       116       44       -0.26         73       University of Southampton       1.48       1.16       130       57       -0.32         74       Eindhoven University of Technology       1.48       1.31       95       21       -0.17         75       McMaster University       1.47       1.17       128       53       -0.30         76       University of Melbourne       1.47       1.34       89       13       -0.13         77       Durham University       1.47       1.46       71       -6       0.00         78       University of Southern California       1.45       1.37       80       2       -0.09         79       University of Colorado Denver       1.45       1.10       149       69       -0.34         81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Virginia       1.44	69	Lancaster University	1.52	1.40	78	9	-0.12
71       Pennsylvania State University       1.50       1.61       53       -18       0.11         72       University of Toronto       1.48       1.22       116       44       -0.26         73       University of Southampton       1.48       1.16       130       57       -0.32         74       Eindhoven University of Technology       1.48       1.31       95       21       -0.17         75       McMaster University       1.47       1.47       1.34       89       13       -0.13         70       University of Melbourne       1.47       1.34       89       13       -0.13         70       University of Stuttgart       1.45       1.37       80       2       -0.09         79       University of Southern California       1.45       1.36       82       3       -0.034         80       University of Colorado Denver       1.45       1.10       149       69       -0.34         81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Virginia       1.44       1.48       70       -13       0.04         84       Stony Brook University of NY	70	University of Maryland, College Park	1.51	1.52	67	-3	0.01
72       University of Toronto       1.48       1.22       116       44       -0.26         73       University of Southampton       1.48       1.16       130       57       -0.32         74       Eindhoven University of Technology       1.48       1.31       95       21       -0.17         75       McMaster University       1.47       1.17       128       53       -0.30         76       University of Melbourne       1.47       1.34       89       13       -0.13         77       Durham University       1.47       1.46       71       -6       0.00         78       University of Stuttgart       1.45       1.37       80       2       -0.09         79       University of Colorado Denver       1.45       1.36       82       3       -0.08         80       University of Colorado Denver       1.45       1.10       149       69       -0.34         81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Lausanne       1.44       1.48       70       -13       0.04         84       Stony Brook University Notterdam       1.41       1.35	71	Pennsylvania State University	1.50	1.61	53	-18	0.11
73       University of Southampton       1.48       1.16       130       57       -0.32         74       Eindhoven University of Technology       1.48       1.31       95       21       -0.17         75       McMaster University       1.47       1.17       128       53       -0.30         76       University of Melbourne       1.47       1.34       89       13       -0.13         77       Durham University       1.47       1.46       71       -6       0.00         78       University of Stuttgart       1.45       1.37       80       2       -0.09         79       University of Southern California       1.45       1.36       82       3       -0.08         80       University of Colorado Denver       1.45       1.10       149       69       -0.34         81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Virginia       1.44       1.48       70       -13       0.04         84       Stony Brook University, State University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41<	72	University of Toronto	1.48	1.22	116	44	-0.26
74       Eindhoven University of Technology       1.48       1.31       95       21       -0.17         75       McMaster University       1.47       1.17       128       53       -0.30         76       University of Melbourne       1.47       1.34       89       13       -0.13         77       Durham University       1.47       1.46       71       -6       0.00         78       University of Stuttgart       1.45       1.37       80       2       -0.09         79       University of Colorado Denver       1.45       1.36       82       3       -0.08         80       University of Colorado Denver       1.45       1.10       149       69       -0.34         81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Lausanne       1.44       1.48       70       -13       0.04         84       Stony Brook University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41       1.28	73	University of Southampton	1.48	1.16	130	57	-0.32
75       McMaster University       1.47       1.17       128       53       -0.30         76       University of Melbourne       1.47       1.34       89       13       -0.13         77       Durham University       1.47       1.46       71       -6       0.00         78       University of Stuttgart       1.45       1.37       80       2       -0.09         79       University of Southern California       1.45       1.36       82       3       -0.08         80       University of Colorado Denver       1.45       1.10       149       69       -0.34         81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Virginia       1.44       1.41       1.21       121       39       -0.23         83       University of Lausanne       1.44       1.48       70       -13       0.04         84       Stony Brook University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41	74	Eindhoven University of Technology	1.48	1.31	95	21	-0.17
76University of Melbourne1.471.348913-0.1377Durham University1.471.4671-60.0078University of Stuttgart1.451.37802-0.0979University of Southern California1.451.36823-0.0880University of Colorado Denver1.451.1014969-0.3481Baylor College of Medicine1.451.2910120-0.1682University of Virginia1.441.2112139-0.2383University of Lausanne1.441.4870-130.0484Stony Brook University, State University of NY1.431.6550-340.2285Erasmus University Rotterdam1.411.35850-0.0686Ohio State University1.411.2810216-0.1387University of Miami1.401.2510720-0.1588Dartmouth College1.401.5664-240.1589University of Zurich1.401.33901-0.0790Case Western Reserve University1.381.1613444-0.2291RWTH Aachen University1.381.30987-0.08	75	McMaster University	1.47	1.17	128	53	-0.30
77Durham University1.471.4671-60.0078University of Stuttgart1.451.37802-0.0979University of Southern California1.451.36823-0.0880University of Colorado Denver1.451.1014969-0.3481Baylor College of Medicine1.451.2910120-0.1682University of Virginia1.441.2112139-0.2383University of Lausanne1.441.4870-130.0484Stony Brook University, State University of NY1.431.6550-340.2285Erasmus University Rotterdam1.411.35850-0.0686Ohio State University1.411.2510720-0.1588Dartmouth College1.401.33901-0.0790Case Western Reserve University1.381.1613444-0.2291RWTH Aachen University1.381.30987-0.08	76	University of Melbourne	1.47	1.34	89	13	-0.13
78       University of Stuttgart       1.45       1.37       80       2       -0.09         79       University of Southern California       1.45       1.36       82       3       -0.08         80       University of Colorado Denver       1.45       1.10       149       69       -0.34         81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Virginia       1.44       1.21       121       39       -0.23         83       University of Lausanne       1.44       1.48       70       -13       0.04         84       Stony Brook University, State University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41       1.28       102       16       -0.13         87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38	77	Durham University	1.47	1.46	71	-6	0.00
79       University of Southern California       1.45       1.36       82       3       -0.08         80       University of Colorado Denver       1.45       1.10       149       69       -0.34         81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Virginia       1.44       1.21       121       39       -0.23         83       University of Lausanne       1.44       1.48       70       -13       0.04         84       Stony Brook University, State University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41       1.28       102       16       -0.13         87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38	78	University of Stuttgart	1.45	1.37	80	2	-0.09
80University of Colorado Denver1.451.1014969-0.3481Baylor College of Medicine1.451.2910120-0.1682University of Virginia1.441.2112139-0.2383University of Lausanne1.441.4870-130.0484Stony Brook University, State University of NY1.431.6550-340.2285Erasmus University Rotterdam1.411.35850-0.0686Ohio State University1.411.2810216-0.1387University of Miami1.401.2510720-0.1588Dartmouth College1.401.5664-240.1589University of Zurich1.401.33901-0.0790Case Western Reserve University1.381.1613444-0.2291RWTH Aachen University1.381.30987-0.08	79	University of Southern California	1.45	1.36	82	3	-0.08
81       Baylor College of Medicine       1.45       1.29       101       20       -0.16         82       University of Virginia       1.44       1.21       121       39       -0.23         83       University of Lausanne       1.44       1.48       70       -13       0.04         84       Stony Brook University, State University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41       1.28       102       16       -0.13         87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.56       64       -24       0.15         89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	80	University of Colorado Denver	1.45	1.10	149	69	-0.34
82       University of Virginia       1.44       1.21       121       39       -0.23         83       University of Lausanne       1.44       1.48       70       -13       0.04         84       Stony Brook University, State University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41       1.28       102       16       -0.13         87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.56       64       -24       0.15         89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	81	Baylor College of Medicine	1.45	1.29	101	20	-0.16
83       University of Lausanne       1.44       1.48       70       -13       0.04         84       Stony Brook University, State University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41       1.28       102       16       -0.13         87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.56       64       -24       0.15         89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	82	University of Virginia	1.44	1.21	121	39	-0.23
84       Stony Brook University, State University of NY       1.43       1.65       50       -34       0.22         85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41       1.28       102       16       -0.13         87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.56       64       -24       0.15         89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	83	University of Lausanne	1.44	1.48	70	-13	0.04
85       Erasmus University Rotterdam       1.41       1.35       85       0       -0.06         86       Ohio State University       1.41       1.28       102       16       -0.13         87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.56       64       -24       0.15         89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	84	Stony Brook University. State University of NY	1.43	1.65	50	-34	0.22
86       Ohio State University       1.41       1.28       102       16       -0.13         87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.56       64       -24       0.15         89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	85	Erasmus University Rotterdam	1.41	1.35	85	0	-0.06
87       University of Miami       1.40       1.25       107       20       -0.15         88       Dartmouth College       1.40       1.56       64       -24       0.15         89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	86	Ohio State University	1.41	1.28	102	16	-0.13
88       Dartmouth College       1.40       1.56       64       -24       0.15         89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	87	University of Miami	1.40	1.25	107	20	-0.15
89       University of Zurich       1.40       1.33       90       1       -0.07         90       Case Western Reserve University       1.38       1.16       134       44       -0.22         91       RWTH Aachen University       1.38       1.30       98       7       -0.08	88	Dartmouth College	1.40	1.56	64	-24	0.15
90 Case Western Reserve University       1.38       1.16       134       44       -0.22         91 RWTH Aachen University       1.38       1.30       98       7       -0.08	89	University of Zurich	1.40	1.33	90	1	-0.07
91 RWTH Aachen University     1.38     1.30     98     7     -0.08	90	Case Western Reserve University	1.38	1.16	134	44	-0.22
	91	RWTH Aachen University	1.38	1.30	98	7	-0.08

Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
		(1)	(2)	(3)	(4)	(5)
92	Technical University of Denmark	1.38	1.40	76	-16	0.02
93	University of Arizona	1.37	1.34	87	-6	-0.03
94	University of Exeter	1.37	1.16	135	41	-0.21
95	Katholieke Universiteit Leuven	1.36	1.06	167	72	-0.31
96	Newcastle University	1.36	1.14	139	43	-0.23
97	University of British Columbia	1.35	1.21	119	22	-0.14
98	Vrije Universiteit Brussel	1.35	0.80	273	175	-0.54
99	Tulane University	1.34	1.63	51	-48	0.29
100	Indiana University Bloomington	1.34	1.17	126	26	-0.17
101	University of California, Davis	1.34	1.30	97	-4	-0.03
102	Florida State University	1.33	1.10	150	48	-0.23
103	University of Auckland	1.32	0.93	216	113	-0.39
104	University of Massachusetts Amherst	1.32	1.57	60	-44	0.25
105	Vanderbilt University	1.32	1.35	83	-22	0.04
106	Australian National University	1.30	1.11	145	39	-0.19
107	University of Massachusetts Medical School	1.30	1.80	39	-68	0.50
108	George Washington University	1.30	1.23	115	7	-0.07
109	University of Glasgow	1.30	1.08	158	49	-0.22
110	Technische Universität München	1.29	1.08	157	47	-0.21
111	Utrecht University	1.29	1.25	108	-3	-0.04
112	University of Amsterdam	1.29	1.25	105	-7	-0.03
113	Wageningen University and Research Centre	1.27	1.16	132	19	-0.11
114	Northeastern University	1.27	1.33	91	-23	0.06
115	University of Sheffield	1.26	1.20	124	9	-0.07
116	McGill University	1.26	1.14	137	21	-0.12
117	Georgetown University	1.26	1.01	186	69	-0.25
118	VU University Amsterdam	1.25	1.27	103	-15	0.02
119	University of Bath	1.25	1.23	113	-6	-0.02
120	University of Aberdeen	1.25	1.43	75	-45	0.18
121	Purdue University - Lafayette	1.24	1.29	100	-21	0.05
122	Philipps-Universität Marburg	1.24	1.01	184	62	-0.23
123	Université Libre de Bruxelles	1.24	1.05	169	46	-0.19
124	University of Copenhagen	1.24	1.23	112	-12	0.00
125	University of Ferrara	1.23	1.00	188	63	-0.23
126	University of Hawaii, Manoa	1.23	1.03	177	51	-0.20
127	Rutgers State University at New Brunswick	1.23	1.57	61	-66	0.34
128	University of York	1.22	1.26	104	-24	0.04
129	Oueen Mary, University of London	1.22	1.06	165	36	-0.16
130	Yeshiva University	1.22	1.48	69	-61	0.26
131	University of Paris-Sud 11	1.21	1.33	93	-38	0.12
132	Goethe University Frankfurt	1.21	1.34	86	-46	0.13
133	University of Göttingen	1.21	0.89	232	99	-0.32
134	University Texas Health Science Center San Antonio	1.21	1.60	55	-79	0.39
135	University of Hong Kong	1.20	1.31	96	-39	0.11
136	University of Basel	1.20	1.21	117	-19	0.02
137	University of Vienna	1.19	1.07	164	27	-0.13
138	University of Southern Denmark	1.18	0.99	193	55	-0.20
139	University of Bern	1.18	1.09	154	15	-0.09

Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
		(1)	(2)	(3)	(4)	(5)
140	University of Warwick	1.18	0.88	235	95	-0.30
141	Universitat Politècnica de Catalunya	1.18	0.69	325	184	-0.48
142	Colorado State University	1.17	1.06	166	24	-0.12
143	Technische Universität Berlin	1.17	0.94	213	70	-0.23
144	Virginia Commonwealth University	1.17	1.09	152	8	-0.07
145	University of Otago	1.16	0.68	330	185	-0.49
146	University of Connecticut	1.16	0.94	209	63	-0.21
147	University of Queensland	1.16	1.14	138	-9	-0.02
148	Michigan State University	1.16	1.44	72	-76	0.28
149	University of Central Florida	1.15	0.97	198	49	-0.18
150	Ludwig-Maximilians-Universität München	1.15	1.11	144	-6	-0.04
151	University of Vermont	1.15	0.70	320	169	-0.45
152	University of Cincinnati	1.15	1.24	111	-41	0.09
153	Ghent University	1.15	1.04	171	18	-0.11
154	Washington State University	1.15	0.75	299	145	-0.39
155	University College Dublin	1.14	0.86	248	93	-0.29
156	Universität Regensburg	1.14	1.07	162	6	-0.07
157	Stockholm University	1.14	1.09	153	-4	-0.05
158	University of Strathclyde	1.14	0.88	241	83	-0.26
159	Paris Diderot University	1.14	0.88	238	79	-0.26
160	University of Helsinki	1.14	0.94	210	50	-0.20
161	Université Montpellier 2	1.13	1.16	133	-28	0.03
162	University of Groningen	1.13	1.02	180	18	-0.11
163	University of Sussex	1.13	0.81	269	106	-0.31
164	Wake Forest University	1.12	1.08	156	-8	-0.04
165	University of Leeds	1.12	0.95	208	43	-0.18
166	Politecnico di Torino	1.12	0.70	324	158	-0.43
167	University of Reading	1.12	0.99	192	25	-0.13
168	Texas A&M University - College Station	1.12	0.96	201	33	-0.15
169	Swedish University of Agricultural Sciences	1.12	0.79	281	112	-0.33
170	University of Parma	1.12	0.99	194	24	-0.13
171	University of Illinois at Chicago	1.12	1.03	173	2	-0.08
172	University of Bergen	1.11	0.87	242	70	-0.24
173	Medical University of Vienna	1.11	0.80	276	103	-0.31
174	University of New South Wales	1.10	0.85	253	79	-0.25
175	University of Trieste	1.10	0.80	274	99	-0.30
176	University of Sydney	1.10	0.86	247	71	-0.24
177	Joseph Fourier University	1.10	0.88	237	60	-0.22
178	University of Manchester	1.10	1.07	161	-17	-0.03
179	North Carolina State University	1.10	1.10	148	-31	0.00
180	University of Montreal	1.10	0.93	214	34	-0.17
181	University of Iowa	1.10	0.89	233	52	-0.21
182	University of New Mexico	1.10	1.33	94	-88	0.23
183	University of Bremen	1.09	0.83	265	82	-0.26
184	University of Barcelona	1.09	0.84	261	77	-0.25
185	Aix-Marseille University	1.09	0.98	195	10	-0.11
186	University of Delaware	1.09	1.05	168	-18	-0.03
187	Karolinska Institute	1.09	1.02	179	-8	-0.07

Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
	2	(1)	(2)	(3)	(4)	(5)
188	University of Ottawa	1.09	1.11	146	-42	0.02
189	Leiden University	1.09	1.24	110	-79	0.15
190	Maastricht University	1.08	0.95	207	17	-0.14
191	National University of Singapore	1.08	1.40	77	-114	0.32
192	Universitat Politècnica de València	1.08	1.25	106	-86	0.17
193	Karlsruhe Institute of Technology	1.08	1.23	114	-79	0.15
194	University of Georgia	1.07	1.03	178	-16	-0.05
195	University of Liverpool	1.07	0.81	271	76	-0.26
196	University of Strasbourg	1.07	0.91	223	27	-0.16
197	Wayne State University	1.06	0.67	336	139	-0.39
198	University Claude Bernard Lyon 1	1.06	0.83	264	66	-0.23
199	Monash University	1.06	0.94	211	12	-0.12
200	Iowa State University	1.06	1.21	120	-80	0.15
201	Technische Universität Darmstadt	1.06	0.82	266	65	-0.23
202	Virginia Polytechnic Institute and State University	1.05	1.00	187	-15	-0.05
203	University of Bordeaux 1 Science and Technology	1.05	1.07	160	-43	0.02
204	University of Duisburg-Essen	1.05	0.70	322	118	-0.35
205	Johannes Gutenberg Univ Mainz	1.05	0.97	199	-6	-0.08
206	University of Maryland, Baltimore	1.05	1.04	170	-36	0.00
207	Queen's University	1.04	1.11	147	-60	0.06
208	University of Liège	1.04	0.80	277	69	-0.25
209	University of Birmingham	1.04	0.66	338	129	-0.38
210	Queen's University Belfast	1.04	0.89	231	21	-0.15
211	George Mason University	1.04	0.97	200	-11	-0.07
212	University of South Carolina	1.04	1.43	74	-138	0.40
213	Cardiff University	1.04	0.78	290	77	-0.26
214	Gottfried Wilhelm Leibniz Universität Hannover	1.03	0.67	337	123	-0.36
215	Indiana University - Purdue University Indianapolis	1.03	1.15	136	-79	0.12
216	University of Gothenburg	1.02	0.83	263	47	-0.19
217	Giessen University	1.02	0.51	392	175	-0.50
218	University of Western Ontario	1.02	0.73	307	89	-0.28
219	Aarhus University	1.01	0.95	205	-14	-0.06
220	Simon Fraser University	1.01	0.75	300	80	-0.26
221	University of Milan Bicocca	1.01	0.70	321	100	-0.31
222	University of Hamburg	1.01	0.85	254	32	-0.16
223	Massey University	1.01	0.91	222	-1	-0.10
224	Heidelberg University	1.01	0.84	259	35	-0.16
225	Friedrich-Alexander-Universität Erlangen-Nürnberg	1.01	1.25	109	-116	0.24
226	University of Western Australia	1.01	0.95	206	-20	-0.06
227	Paris Descartes University	1.00	0.60	361	134	-0.40
228	University of Bonn	1.00	0.96	202	-26	-0.04
229	University of Nottingham	1.00	1.01	185	-44	0.01
230	University of Ulm	0.99	0.68	329	99	-0.32
231	University of Pavia	0.99	0.85	250	19	-0.14
232	Norwegian University of Science and Technology	0.99	0.91	220	-12	-0.08
233	Indian Institute of Technology Kharagpur	0.99	0.73	309	76	-0.26
234	University Pierre and Marie Curie	0.99	0.84	260	26	-0.15
235	University of Medicine and Dentistry of New Jersey	0.99	1.00	189	-46	0.01

(b)         (c)         (c)         (c)         (c)         (c)         (c)           236         University of Tubingen         0.98         0.95         2.04         -3.3         0.08           238         University of Fundia         0.98         0.68         3.32         94         0.03           248         University of Fundia         0.98         0.68         3.32         94         0.03           244         Authon University         0.97         0.07         0.70         3.23         8.2         -0.23           242         University of South Florida at Tampa         0.97         0.81         2.70         2.77         -0.42           244         University of Newcade         0.97         0.81         2.70         2.71         -0.42           245         Vienan University of Technology         0.96         0.54         3.85         1.99         -0.42           246         Vienersity of Licologic de Louvain         0.96         0.54         3.86         1.01         0.11           247         University at Befin         0.93         0.102         1.81         -6.68         0.00           254         University of Maconsity Nimagen         0.94         1.12	Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
226         University of Dialogan         0.98         0.92         218         -1.8         -0.07           237         University of Pengja         0.98         0.68         332         94         0.33           238         University of Pengja         0.98         0.68         332         94         0.33           249         University of Douth Indexita Tampa         0.97         0.70         323         62         0.62           241         University of Newesstle         0.97         0.16         1.31         -111         0.11           243         University of Scatched         0.97         0.16         0.31         -61         -0.22           245         University of Scatched         0.96         0.73         3.11         67         -0.22           245         University of Indiage de Lowain         0.96         0.84         262         1.5         -0.12           246         University of Indiage de Lowain         0.95         1.12         1.81         -6.80         0.00           250         Radboud University an Borin         0.95         1.12         1.43         -0.40         0.22           251         University of Chamas         0.03         1.03         <		-	(1)	(2)	(3)	(4)	(5)
227       University of Fluxson       0.98       0.05       2.24       -3.3       -0.03         238       University of Fluxson       0.98       0.87       2.44       .5       -0.11         240       Auto University       0.97       0.70       3.23       8.2       -0.28         241       Auton University of South Florida a Tampa       0.97       1.06       131       -111       0.19         231       University of Adelaide       0.96       0.73       3.11       6.6       -0.24         244       University of Honology       0.96       0.94       3.85       1.93       -0.42         247       University of Honology       0.96       0.84       2.62       1.5       -0.12         248       Hambold-University at Berlin       0.95       0.66       2.49       1       -0.00         249       Gity University of Hong Kong       0.95       1.02       1.81       -68       0.07         251       Kansas State University Marking Kong       0.94       1.12       1.43       -0.10       0.11       2.23       1.60       0.25       3.84       7.6       0.25         251       Kansas State University of Kansas       0.93       0.03	236	Université Bordeaux Segalen	0.98	0.92	218	-18	-0.07
28         University of Prongia         0.98         0.87         244         5         0.11           29         University         0.98         0.45         4405         165         0.52           24         Auborn University         0.97         0.70         323         82         0.28           24         University of Morkina at Tampa         0.97         0.81         270         0.27         -0.15           244         University of Morkina at Tampa         0.97         0.81         270         0.27         -0.15           244         University of Technology         0.96         0.73         3.11         6.7         -0.24           245         Vienna University of Technology         0.96         0.73         3.11         6.7         -0.24           244         University of Mong Kong         0.93         0.86         2.49         1         -0.09           246         Rathoad University Injengen         0.94         1.17         1.27         -1.23         0.23           251         Kansa State University Of Mong Kong         0.93         1.03         1.76         -7.8         0.11           252         Viersity at Buffalo, State University Y         0.94         0.48 <td>237</td> <td>University of Tübingen</td> <td>0.98</td> <td>0.95</td> <td>204</td> <td>-33</td> <td>-0.03</td>	237	University of Tübingen	0.98	0.95	204	-33	-0.03
229         University of Houston         0.98         0.47         244         5         -0.11           240         Auburn University         0.97         0.70         323         8.2         -0.28           241         Luiversity of South Hoida at Tarpa         0.97         0.16         131         -111         0.19           243         University of Nexosube         0.97         0.81         270         277         -0.15           244         University of Adelaide         0.96         0.73         311         6.7         -0.24           245         Vienna University of Technology         0.96         0.93         316         4.9         0.01           246         Delicenico di Milano         0.96         0.34         385         1.9         0.42           247         University of Exponde de Lowain         0.96         0.34         386         249         1         -0.03           246         Raboud University Nimegen         0.91         1.12         143         -0.48         0.02           251         Kanasa Shate University NY         0.94         0.65         346         94         -0.23           252         University of Madoa         0.92         0.07	238	University of Perugia	0.98	0.68	332	94	-0.30
240         Auto University         0.98         0.45         405         165         0.52           241         University of South Florida at Tampa         0.97         0.13         1.31         0.11         0.12           242         University of South Florida at Tampa         0.97         0.13         1.31         0.11         0.12           244         University of Technology         0.96         0.98         196         4.49         0.00           245         Vienne University of Technology         0.96         0.98         196         4.49         0.01           244         University of Indep de Louvain         0.96         0.94         3.85         1.39         0.42           247         University of Enong Kong         0.95         0.86         2.49         1         -0.00           250         Radhoud University Nignegen         0.94         1.17         127         -123         0.23           251         University of Monona de Madrid         0.94         0.42         0.40         0.42         0.40         0.41         2.2         0.40         2.43         -0.03         0.41         -0.25         3.41         2.00         0.33         1.64         -0.42         0.40	239	University of Houston	0.98	0.87	244	5	-0.11
244       Auburn University of Neurestique Tampa       0.97       0.70       323       8.2       0.22         244       University of Neurestique Tampa       0.97       1.16       131       -111       0.19         213       University of Neurestique Tampa       0.97       0.81       270       2.27       0.15         214       University of Adelaide       0.96       0.73       311       6.7       0.424         214       University Technology       0.96       0.54       385       1.99       0.422         214       University of Hong Kong       0.96       0.84       262       1.5       0.012         214       Humbold-University Tambolde University and Marin       0.94       1.17       1.77       -1.23       0.23         215       Kansas State University of Markit au Berlin       0.94       0.65       346       94       0.02         223       University of Markit au Berlin       0.94       0.65       346       94       0.22         223       University of Markit au Berlin       0.94       0.65       346       94       0.22         233       University of Stath Carolina       0.93       0.87       243       -102       0.00	240	Aalto University	0.98	0.45	405	165	-0.52
242       University of Newcastle       0.97       1.16       1.31       -111       0.19         243       University of Newcastle       0.97       0.81       270       2.7       0.15         244       University of Technology       0.96       0.98       196       -49       0.01         245       Vieneral University of Technology       0.96       0.84       326       1.5       0.12         244       Iniversity of Milano       0.96       0.84       326       1.6       0.12         244       Iniversity of Indepa de Louvain       0.96       0.84       326       1.6       0.12         245       Ralboud University Fingen       0.94       1.17       127       -123       0.23         251       Kansas State University       0.94       0.12       181       -66       94       -0.22         252       University of Milano       0.94       0.12       133       -168       0.07         252       University of South Carolina       0.93       1.03       176       -7.8       0.10         255       Greinple University of South Carolina       0.92       0.96       203       -55       0.04         256       Temple Univer	241	Auburn University	0.97	0.70	323	82	-0.28
243       University of Newcasele       0.97       0.81       270       0.15         244       University of Technology       0.96       0.73       311       67       0.02         245       Vienna University of Technology       0.96       0.98       196       -40       0.01         246       Policenic of Milano       0.96       0.54       385       1.90       0.42         247       University of Hong Kong       0.95       1.02       181       -6.8       0.07         258       Ruboul University Nismegen       0.94       1.17       712       1.23       0.23         251       Kansas State University Nismegen       0.94       1.12       143       -108       0.17         252       University of Kansas       0.93       1.03       1.76       -7.8       0.03         253       University of South Carolina       0.92       0.97       0.25       0.42       2.00         254       University of South Carolina       0.92       0.74       3.04       47       0.18         255       Temple University       0.22       0.27       -0.03       3.05       1.5       0.04         256       University of Calogac       0.91 </td <td>242</td> <td>University of South Florida at Tampa</td> <td>0.97</td> <td>1.16</td> <td>131</td> <td>-111</td> <td>0.19</td>	242	University of South Florida at Tampa	0.97	1.16	131	-111	0.19
244       University of Adehaide       0.06       0.73       311       67       -0.42         245       Vienna University of Technology       0.96       0.98       136       -49       0.01         247       University catholique de Louvain       0.96       0.84       262       15       -0.12         248       Hamboldt-University and Berlin       0.95       0.86       249       1       -0.09         240       Gity University of Hong Kong       0.95       1.02       181       -66       0.07         250       Radboad University Nijmegen       0.94       1.17       127       -123       0.23         251       University of Adahidt       0.94       0.65       346       94       -0.29         253       University of Mansa       0.93       0.06       328       75       0.02         254       University of South Carolina       0.93       0.87       243       -12       0.05         255       Medical University of South Carolina       0.92       0.90       229       -27       0.03         255       Medical University of Cologae       0.91       0.86       340       481       -0.12         256       Ruhersity of Leiceste	243	University of Newcastle	0.97	0.81	270	27	-0.15
245       Vienna University of Technology       0.96       0.98       196       -49       0.01         246       Politecnico di Milano       0.96       0.84       262       15       0.12         244       Humboldt-Università ca Berlin       0.95       0.86       249       1       -0.00         210       Ralboad University of Hong Kong       0.91       1.02       1.81       -6.8       0.07         215       Kansas State University       0.94       1.12       1.43       -108       0.17         225       University of Kansas       0.93       1.03       176       -778       0.10         225       University of South Carolina       0.93       0.87       2.23       -0.78       0.40         225       University of South Carolina       0.93       0.87       2.43       -1.2       0.40         235       Medical University of South Carolina       0.92       0.90       2.92       -27       -0.03         236       Temple University of Palova       0.92       0.66       340       81       -0.22         237       University of Calogae       0.91       0.14       140       -122       0.33         240       University of Malo	244	University of Adelaide	0.96	0.73	311	67	-0.24
246         Politecnico di Milano         0.96         0.54         385         139         -0.42           247         Universito catholique de Louvain         0.96         0.84         262         15         -0.12           248         Humboldt-University au Berlin         0.95         0.86         249         1         -0.09           249         City University of Hong Kong         0.94         1.17         1.23         0.23           251         Kansas State University Nijmegen         0.94         1.12         143         -108         0.17           252         University at Buffalo, State University NY         0.94         0.66         346         -94         -0.25           254         University of South Carolina         0.93         0.87         243         -12         -0.05           255         Medical University of South Carolina         0.92         0.74         344         -7         -0.18           250         University of Laicester         0.92         0.74         344         -7         -0.18           250         University of Laicester         0.92         0.66         340         81         -0.22           260         University of Calogate         0.91         0.8	245	Vienna University of Technology	0.96	0.98	196	-49	0.01
247       University Carbolique de Louvain       0.96       0.84       262       15       -0.12         248       Humbolit-Universiti za Berlín       0.95       0.02       181       -0.68       0.07         250       Radboud University Nijmegen       0.94       1.17       127       -1.23       0.23         251       Kansas State University       0.94       0.12       143       -108       0.07         252       University at Buffalo, State University NY       0.94       0.68       328       75       -0.25         254       University of Kansas       0.93       0.07       243       -12       -0.03         255       Medical University of South Carolina       0.92       0.90       229       -27       -0.03         256       Temple University of Padova       0.92       0.74       304       47       -0.18         258       Medical University of Cologae       0.91       0.85       228       -2       -0.03         258       Ruhr-Universität Bochum       0.92       0.66       340       48       -0.26         260       University of Cologae       0.91       1.14       140       -122       0.23         261       Indu Un	246	Politecnico di Milano	0.96	0.54	385	139	-0.42
248       Humboldr-Universitiz as Berlin       0.95       0.86       249       1       -0.09         249       City University of Hong Kong       0.95       1.02       1.81       -6.6       0.07         250       Radboud University Nijmegen       0.94       1.12       143       -108       0.17         252       University at Mufalo, State University NY       0.94       0.65       346       94       -0.22         253       University of Sante University NY       0.94       0.68       328       75       -0.03         254       University of Sante University NY       0.94       0.68       328       75       -0.25         255       Medical University of South Carolina       0.93       0.03       1.63       -12       -0.05         256       Temple University of South Carolina       0.92       0.90       203       -55       0.04         258       University of Leicester       0.92       0.96       203       -55       0.04         260       University of Tennesce       0.91       0.46       34       -0.07         261       Laval University       0.91       0.91       2.93       2.40       0.01         262       University of	247	Université Catholique de Louvain	0.96	0.84	262	15	-0.12
249       City University of Hong Kong       0.95       1.02       181       -68       0.07         250       Radboud University Nijmegen       0.94       1.17       127       123       0.03         251       Kansas State University       0.94       0.65       346       94       -0.29         253       University at Buffalo, State University NY       0.94       0.68       328       75       -0.25         254       University of Kansas       0.93       0.87       243       -12       -0.05         255       Medical University of South Carolina       0.93       0.87       243       -12       -0.05         255       University of Padova       0.92       0.90       229       -27       -0.03         256       University of Padova       0.92       0.96       203       -55       0.04         258       University of Cologne       0.91       0.85       258       -22       -0.07         261       Laval University       0.91       0.91       1.83       -78       0.01         262       University of Cologne       0.91       0.91       0.24       -40       0.01         262       University of Cologne       0.91 <td>248</td> <td>Humboldt-Universität zu Berlin</td> <td>0.95</td> <td>0.86</td> <td>249</td> <td>1</td> <td>-0.09</td>	248	Humboldt-Universität zu Berlin	0.95	0.86	249	1	-0.09
250       Radboud University Nijmegen       0.94       1.17       127       -123       0.23         251       Kansas Statu University       0.94       1.12       143       -108       0.17         252       University of Kansas       0.94       0.65       346       94       -0.22         253       University of Kansas       0.93       1.03       176       -78       0.01         254       University of South Carolina       0.93       0.87       243       -12       -005         256       Temple University       0.92       0.90       229       -27       -0.03         257       University of Leicester       0.92       0.96       304       47       -0.18         258       University of Cologne       0.91       0.85       258       -2       -0.07         260       University of Cologne       0.91       0.14       140       -122       0.23         263       Paul Sabatier University       0.91       0.13       306       43       -0.17         264       Land University       0.91       0.73       306       43       -0.22         265       Hebrew University       0.91       0.91       224	249	City University of Hong Kong	0.95	1.02	181	-68	0.07
251       Kansas State University       0.94       1.12       143       -108       0.17         252       University at Buffalo, State University NY       0.94       0.68       328       75       -0.25         253       University of Kansas       0.93       1.03       176       -78       0.10         255       Medical University of South Carolina       0.93       0.87       243       -12       -0.05         256       Temple University of South Carolina       0.92       0.90       229       -27       -0.03         257       University of Padova       0.92       0.94       304       47       -0.18         258       University of Cologne       0.92       0.96       203       -55       0.04         259       Ruhr-University of Cologne       0.91       0.085       258       -2       -0.07         261       Laval University       0.91       0.11       183       -78       0.10         262       University of Tennessee       0.91       1.14       140       -122       0.23         263       Paul Sabater University       0.91       0.91       0.73       306       43       0.01         264       Honoma Universi	250	Radboud University Nijmegen	0.94	1.17	127	-123	0.23
252       University at Buffalo, State University NY       0.94       0.65       346       94       -0.29         255       University at Buffalo, State University NY       0.94       0.68       328       75       -0.25         254       University of Kansas       0.93       1.03       176       -78       0.00         255       Medical University of South Carolina       0.93       0.87       243       -12       -0.05         255       Temple University of Padova       0.92       0.90       229       -27       -0.03         256       Temple University of Padova       0.92       0.74       304       47       -0.18         258       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University of Cologne       0.91       0.81       140       -122       0.22         263       Paul Sabatier University       0.91       0.73       306       43       -0.17         264       Lund University of Jerusalem       0.90       0.93       217       -49       0.02         267       Therice University of Jerusalem       0.90       0.91       227       -40       0.01         266	251	Kansas State University	0.94	1.12	143	-108	0.17
253       University of Kansas       0.94       0.68       328       75       -0.25         254       University of Kansas       0.93       1.03       176       -78       0.10         255       Medical University of South Carolina       0.93       0.87       243       -12       -0.03         256       Temple University of Padova       0.92       0.90       229       -27       -0.03         257       University of Licester       0.92       0.96       203       -55       0.04         258       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University       0.91       1.01       183       -78       0.10         262       University of Cologne       0.91       0.14       140       -122       0.23         263       Paul Sabatier University       0.91       0.73       306       43       -0.17         264       Land University       0.91       0.91       2.24       -40       0.01         265       Hebrew University of Jerusalem       0.90       0.93       217       -49       0.02         267       Freice Universitit Berlin       0.90       0.93 <td>252</td> <td>Universidad Autónoma de Madrid</td> <td>0.94</td> <td>0.65</td> <td>346</td> <td>94</td> <td>-0.29</td>	252	Universidad Autónoma de Madrid	0.94	0.65	346	94	-0.29
254       University of Kansas       0.93       1.03       176       -78       0.10         255       Medical University of South Carolina       0.93       0.87       243       -12       0.05         256       Temple University of South Carolina       0.92       0.90       229       -27       -0.03         257       University of Leicester       0.92       0.96       203       -55       0.04         258       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University of Tennessee       0.91       1.01       183       -78       0.010         262       University of Tennessee       0.91       0.73       306       43       -0.17         264       Lund University       0.91       0.91       224       -40       0.01         265       Hebrew University of Jerusalem       0.90       0.93       217       -49       0.02         266       Thomas Jefferson University       0.90       0.93       217       -40       0.01         268       University of Antwerp       0.89       0.89       230       -39       0.00         270       University of Materloo       0.89	253	University at Buffalo, State University NY	0.94	0.68	328	75	-0.25
255       Medical University of South Carolina       0.93       0.87       243       -12       -0.05         256       Temple University       0.92       0.90       229       -27       -0.03         257       University of Padova       0.92       0.74       304       47       -0.18         258       University of Licester       0.92       0.66       340       81       -0.26         260       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University       0.91       1.01       183       -7.8       0.10         262       University of Tennesce       0.91       0.73       306       43       -0.17         264       Land University       0.91       0.91       224       -40       0.00         265       Hebrew University of Jerusalem       0.90       0.91       227       -40       0.01         266       Homas Jefferson University       0.90       0.91       227       -40       0.01         268       University of Antwerp       0.89       0.89       230       -39       0.00         270       University of Metreloo       0.89       0.79       <	254	University of Kansas	0.93	1.03	176	-78	0.10
256       Temple University       0.92       0.90       229       -27       -0.03         257       University of Laicester       0.92       0.74       304       47       -0.18         258       University of Leicester       0.92       0.66       340       81       -0.26         260       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University of Cologne       0.91       0.91       1.01       183       -78       0.10         262       University of Cologne       0.91       1.01       183       -78       0.10         263       Paul Sabatier University       0.91       0.91       224       -40       0.01         264       Hebrew University of Jerusalem       0.90       0.94       212       -53       0.03         265       Hebrew University of Jerusalem       0.90       0.91       227       -40       0.01         265       Hebrew University of Calgary       0.89       0.68       331       63       -0.22         260       University of Antwerp       0.89       0.74       303       33       -0.15         271       University of Metrata       0	255	Medical University of South Carolina	0.93	0.87	243	-12	-0.05
257       University of Padova       0.92       0.74       304       47       -0.18         258       University of Leicester       0.92       0.96       203       -55       0.04         259       Ruhr-Universität Bochum       0.92       0.66       340       81       -0.26         260       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University       0.91       1.01       183       -78       0.01         262       University of Tennessee       0.91       0.73       306       43       -0.17         264       Lund University       0.91       0.73       306       43       -0.17         265       Hebrew University of Jerusalem       0.90       0.91       224       -40       0.01         265       Hohrew University of Jerusalem       0.90       0.93       217       -49       0.02         267       Freic University of Calgary       0.89       0.68       331       63       -0.22         269       University of Alberta       0.89       0.74       303       33       -0.16         271       University of Materloo       0.89       0.79       <	256	Temple University	0.92	0.90	229	-27	-0.03
258       University of Leicester       0.92       0.96       203       -55       0.04         259       Ruhr-Universität Bochum       0.92       0.66       340       81       -0.26         260       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University of Tennessee       0.91       1.01       183       -78       0.10         262       Paul Sabatier University       0.91       0.73       306       43       -0.17         264       Lund University of Jerusalem       0.90       0.94       212       -53       0.03         265       Hebrew University of Jerusalem       0.90       0.94       212       -53       0.03         266       Thomas Jefferson University       0.90       0.91       227       -40       0.01         268       University of Alberta       0.89       0.68       331       63       -0.22         269       University of Alberta       0.89       0.74       303       33       -0.15         271       University of Materloo       0.89       0.79       286       15       -0.00         272       Chalmeres University of Technology       0.88<	257	University of Padova	0.92	0.74	304	47	-0.18
259       Ruhr-Universitä Bochum       0.92       0.66       340       81       -0.26         260       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University       0.91       1.01       183       -78       0.01         262       University of Tennessee       0.91       1.14       140       -122       0.23         263       Paul Sabatier University       0.91       0.73       306       43       -0.17         264       Lund University       0.91       0.91       224       -40       0.01         265       Hebrew University of Jerusalem       0.90       0.93       217       -49       0.02         266       Thomas Jefferson University       0.90       0.91       227       -40       0.01         268       University of Calgary       0.89       0.68       331       63       -0.22         269       University of Alberta       0.89       0.74       303       33       -0.15         271       University of Matterbo       0.89       0.77       293       21       -0.11         272       Chalmers University of Technology       0.88       0.82	258	University of Leicester	0.92	0.96	203	-55	0.04
260       University of Cologne       0.91       0.85       258       -2       -0.07         261       Laval University       0.91       1.01       183       -78       0.10         262       University of Tennessee       0.91       1.14       140       -122       0.23         263       Paul Sabatier University       0.91       0.73       306       43       -0.17         264       Lund University       0.91       0.91       0.24       -40       0.01         265       Hebrew University of Jerusalem       0.90       0.94       212       -53       0.03         266       Thomas Jefferson University       0.90       0.91       227       -40       0.01         266       University of Calgary       0.89       0.68       331       63       -0.22         267       Freie University of Antwerp       0.89       0.79       286       15       -0.10         270       University of Materloo       0.89       0.77       293       21       -0.11         273       University of Technology       0.88       0.52       388       115       -0.36         274       University of Waterloo       0.89       0.77	259	Ruhr-Universität Bochum	0.92	0.66	340	81	-0.26
261       Laval University       0.91       1.01       183       -78       0.10         262       University of Tennessee       0.91       1.14       140       -122       0.23         263       Paul Sabatier University       0.91       0.73       306       43       -0.17         264       Lund University       0.91       0.91       0.91       224       -40       0.01         265       Hebrew University of Jerusalem       0.90       0.94       212       -53       0.03         266       Thomas Jefferson University       0.90       0.93       217       -40       0.01         268       University of Calgary       0.89       0.68       331       63       -0.22         269       University of Alberta       0.89       0.74       303       33       -0.15         271       University of Waterloo       0.89       0.79       286       15       -0.10         272       Chalmers University of Technology       0.88       0.52       388       115       -0.36         274       University of Waterloo       0.88       0.82       267       -7       -0.07         275       Sarathad University of Technology <td< td=""><td>260</td><td>University of Cologne</td><td>0.91</td><td>0.85</td><td>258</td><td>-2</td><td>-0.07</td></td<>	260	University of Cologne	0.91	0.85	258	-2	-0.07
262       University of Tennessee       0.91       1.14       140       -122       0.23         263       Paul Sabatier University       0.91       0.73       306       43       -0.17         264       Lund University       0.91       0.91       0.91       224       40       0.01         265       Hebrew University of Jerusalem       0.90       0.94       212       -53       0.03         266       Thomas Jefferson University       0.90       0.93       217       -49       0.02         267       Freie Universität Berlin       0.90       0.91       227       -40       0.01         268       University of Calgary       0.89       0.68       331       63       -0.22         269       University of Antwerp       0.89       0.89       230       -39       0.00         270       University of Waterloo       0.89       0.74       303       33       -0.15         271       University of Technology       0.88       0.82       267       -7       -0.07         275       Saarhand University       0.88       0.88       0.82       267       -0.13         274       University of Kustasa - Lincoln       0.87<	261	Laval University	0.91	1.01	183	-78	0.10
263       Paul Sabatier University       0.91       0.73       306       43       -0.17         264       Lund University       0.91       0.91       0.91       224       -40       0.01         265       Hebrew University of Jerusalem       0.90       0.94       212       -53       0.03         266       Thomas Jefferson University       0.90       0.91       227       -40       0.01         266       University of Calgary       0.89       0.68       331       63       -0.22         269       University of Altwerp       0.89       0.89       230       -39       0.00         270       University of Materpo       0.89       0.74       303       33       -0.15         271       University of Materloo       0.89       0.79       286       15       -0.10         272       Chalmers University of Technology       0.88       0.77       293       21       -0.11         273       University of Victoria       0.88       0.82       267       -7       -0.07         275       Saarland University       0.88       0.82       267       -7       -0.07         275       Saarland University       0.88	262	University of Tennessee	0.91	1.14	140	-122	0.23
264Lund University0.910.91224-400.01265Hebrew University of Jerusalem0.900.94212-530.03266Thomas Jefferson University0.900.93217-490.02267Freie Universität Berlin0.900.91227-400.01268University of Calgary0.890.6833163-0.22269University of Antwerp0.890.89230-390.00270University of Alberta0.890.7430333-0.15271University of Watedoo0.890.7928615-0.10272Chalmers University of Technology0.880.7729321-0.11273University of Technology0.880.82267-7-0.07275Saarland University0.880.880.82267-7-0.07275Saarland University0.880.880.88236-400.01277University of Münster0.880.880.88236-400.01277University of Missouri0.870.80275-2-0.07278University of Florida0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Florida0.860.13142-1390.27282University of Fl	263	Paul Sabatier University	0.91	0.73	306	43	-0.17
265       Hebrew University of Jerusalem       0.90       0.94       212       -53       0.03         266       Thomas Jefferson University       0.90       0.93       217       -49       0.02         267       Freie Universitä Berlin       0.90       0.91       227       -40       0.01         268       University of Calgary       0.89       0.68       331       63       -0.22         269       University of Antwerp       0.89       0.89       230       -39       0.00         270       University of Mberta       0.89       0.74       303       33       -0.15         271       University of Waterloo       0.89       0.79       286       15       -0.10         272       Chalmers University of Technology       0.88       0.77       293       21       -0.11         273       University of Victoria       0.88       0.82       267       -7       -0.07         275       Saarland University       0.88       0.88       0.82       267       -2       -0.07         275       Saarland University       0.88       0.87       0.80       275       -2       -0.07         275       Saarland University	264	Lund University	0.91	0.91	224	-40	0.01
266       Thomas Jefferson University       0.90       0.93       217       -49       0.02         267       Freie Universitä Berlin       0.90       0.91       227       -40       0.01         268       University of Calgary       0.89       0.68       331       63       -0.22         269       University of Antwerp       0.89       0.89       0.89       230       -39       0.00         270       University of Alberta       0.89       0.74       303       33       -0.15         271       University of Waterloo       0.89       0.79       286       15       -0.10         272       Chalmers University of Technology       0.88       0.77       293       21       -0.11         273       University of Victoria       0.88       0.82       267       -7       -0.07         275       Saarland University       0.88       0.88       0.36       -40       0.01         277       University of Niester       0.88       0.88       236       -40       0.01         276       University of Niesouri       0.87       0.80       275       -2       -0.07         278       University of Missouri       0.87	265	Hebrew University of Jerusalem	0.90	0.94	212	-53	0.03
267       Freie Universitä Berlin       0.90       0.91       227       -40       0.01         268       University of Calgary       0.89       0.68       331       63       -0.22         269       University of Antwerp       0.89       0.89       230       -39       0.00         270       University of Alberta       0.89       0.74       303       33       -0.15         271       University of Waterloo       0.89       0.79       286       15       -0.10         272       Chalmers University of Technology       0.88       0.77       293       21       -0.11         273       University of Victoria       0.88       0.52       388       115       -0.36         274       University of Victoria       0.88       0.82       267       -7       -0.07         275       Saarland University       0.88       0.88       0.82       267       -96       0.13         276       University of Münster       0.88       0.88       0.80       275       -2       -0.07         275       Saarland University of Münster       0.86       0.87       0.80       275       -2       -0.07         278       Universi	266	Thomas Jefferson University	0.90	0.93	217	-49	0.02
268University of Calgary0.890.6833163-0.22269University of Antwerp0.890.890.89230-390.00270University of Alberta0.890.7430333-0.15271University of Waterloo0.890.7928615-0.10272Chalmers University of Technology0.880.7729321-0.11273University of the Witwatersrand0.880.82267-7-0.07275Saarland University0.880.880.82267-7-0.07275Saarland University0.880.880.88236-400.01277University of Nünster0.880.88236-400.01278University of Münster0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Florida0.860.6534563-0.21282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	267	Freie Universität Berlin	0.90	0.91	227	-40	0.01
269University of Alberta0.890.89230-390.00270University of Alberta0.890.7430333-0.15271University of Waterloo0.890.7928615-0.10272Chalmers University of Technology0.880.7729321-0.11273University of the Witwatersrand0.880.52388115-0.36274University of Victoria0.880.82267-7-0.07275Saarland University0.880.880.7530126-0.13276University of Münster0.880.880.36-400.01277University of Nebraska - Lincoln0.870.80275-2-0.07278University of Missouri0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Florida0.860.6534563-0.21282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	268	University of Calgary	0.89	0.68	331	63	-0.22
270University of Alberta0.890.7430333-0.15271University of Waterloo0.890.7928615-0.10272Chalmers University of Technology0.880.7729321-0.11273University of the Witwatersrand0.880.52388115-0.36274University of Victoria0.880.82267-7-0.07275Saarland University0.880.7530126-0.13276University of Münster0.880.88236-400.01277University of Münster0.870.80275-2-0.07278University of Missouri0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Freiburg0.861.13142-1390.27282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	269	University of Antwerp	0.89	0.89	230	-39	0.00
271University of Waterloo0.890.7928615-0.10272Chalmers University of Technology0.880.7729321-0.11273University of the Witwatersrand0.880.52388115-0.36274University of Victoria0.880.82267-7-0.07275Saarland University0.880.7530126-0.13276University of Münster0.880.88236-400.01277University of Nebraska - Lincoln0.870.80275-2-0.07278University of Missouri0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Freiburg0.861.13142-1390.27282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	270	University of Alberta	0.89	0.74	303	33	-0.15
272Chalmers University of Technology0.880.7729321-0.11273University of the Witwatersrand0.880.52388115-0.36274University of Victoria0.880.82267-7-0.07275Saarland University0.880.880.82267-7-0.07275Saarland University0.880.880.82267-7-0.07276University of Münster0.880.880.88236-400.01277University of Nebraska - Lincoln0.870.80275-2-0.07278University of Missouri0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.860.97197-830.11281University of Florida0.860.6534563-0.27282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	271	University of Waterloo	0.89	0.79	286	15	-0.10
273University of the Witwatersrand0.880.52388115-0.36274University of Victoria0.880.82267-7-0.07275Saarland University0.880.880.7530126-0.13276University of Münster0.880.88236-400.01277University of Nebraska - Lincoln0.870.80275-2-0.07278University of Missouri0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Freiburg0.861.13142-1390.27282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	272	Chalmers University of Technology	0.88	0.77	293	21	-0.11
274University of Victoria0.880.82267-7-0.07275Saarland University0.880.7530126-0.13276University of Münster0.880.88236-400.01277University of Nebraska - Lincoln0.870.80275-2-0.07278University of Missouri0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Freiburg0.861.13142-1390.27282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	273	University of the Witwatersrand	0.88	0.52	388	115	-0.36
275       Saarland University       0.88       0.75       301       26       -0.13         276       University of Münster       0.88       0.88       236       -40       0.01         277       University of Nebraska - Lincoln       0.87       0.80       275       -2       -0.07         278       University of Missouri       0.87       1.02       182       -96       0.15         279       Martin Luther University of Halle-Wittenberg       0.87       0.60       364       85       -0.27         280       University of Florida       0.86       0.97       197       -83       0.11         281       University of Freiburg       0.86       1.13       142       -139       0.27         282       Medical College of Wisconsin       0.86       0.65       345       63       -0.21         283       University of Guelph       0.86       0.85       252       -31       0.00	274	University of Victoria	0.88	0.82	267	-7	-0.07
276University of Münster0.880.880.88236-400.01277University of Nebraska - Lincoln0.870.80275-2-0.07278University of Missouri0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Freiburg0.861.13142-1390.27282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	275	Saarland University	0.88	0.75	301	26	-0.13
277University of Nebraska - Lincoln0.870.80275-2-0.07278University of Missouri0.871.02182-960.15279Martin Luther University of Halle-Wittenberg0.870.6036485-0.27280University of Florida0.860.97197-830.11281University of Freiburg0.861.13142-1390.27282Medical College of Wisconsin0.860.6534563-0.21283University of Guelph0.860.85252-310.00	276	University of Münster	0.88	0.88	236	-40	0.01
278       University of Missouri       0.87       1.02       182       -96       0.15         279       Martin Luther University of Halle-Wittenberg       0.87       0.60       364       85       -0.27         280       University of Florida       0.86       0.97       197       -83       0.11         281       University of Freiburg       0.86       1.13       142       -139       0.27         282       Medical College of Wisconsin       0.86       0.65       345       63       -0.21         283       University of Guelph       0.86       0.85       252       -31       0.00	277	University of Nebraska - Lincoln	0.87	0.80	275	-2	-0.07
279       Martin Luther University of Halle-Wittenberg       0.87       0.60       364       85       -0.27         280       University of Florida       0.86       0.97       197       -83       0.11         281       University of Freiburg       0.86       1.13       142       -139       0.27         282       Medical College of Wisconsin       0.86       0.65       345       63       -0.21         283       University of Guelph       0.86       0.85       252       -31       0.00	278	University of Missouri	0.87	1.02	182	-96	0.15
280       University of Florida       0.86       0.97       197       -83       0.11         281       University of Freiburg       0.86       1.13       142       -139       0.27         282       Medical College of Wisconsin       0.86       0.65       345       63       -0.21         283       University of Guelph       0.86       0.85       252       -31       0.00	279	Martin Luther University of Halle-Wittenberg	0.87	0.60	364	85	-0.27
281       University of Freiburg       0.86       1.13       142       -139       0.27         282       Medical College of Wisconsin       0.86       0.65       345       63       -0.21         283       University of Guelph       0.86       0.85       252       -31       0.00	280	University of Florida	0.86	0.97	197	-83	0.11
282         Medical College of Wisconsin         0.86         0.65         345         63         -0.21           283         University of Guelph         0.86         0.85         252         -31         0.00	281	University of Freiburg	0.86	1.13	142	-139	0.27
283 University of Guelph         0.86         0.85         252         -31         0.00	282	Medical College of Wisconsin	0.86	0.65	345	63	-0.21
	283	University of Guelph	0.86	0.85	252	-31	0.00

Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
		(1)	(2)	(3)	(4)	(5)
284	Chinese University of Hong Kong	0.85	0.77	294	10	-0.08
285	Technical University of Lisbon	0.85	0.59	367	82	-0.26
286	Nanyang Technological University	0.85	1.08	159	-127	0.23
287	University of Würzburg	0.85	0.79	283	-4	-0.06
288	University of Alabama at Birmingham	0.85	0.88	239	-49	0.03
289	Universidade Nova de Lisboa	0.84	0.91	225	-64	0.07
290	Henri Poincaré University	0.84	0.59	370	80	-0.26
291	Hong Kong University of Science and Technology	0.84	1.09	155	-136	0.24
292	Umeå University	0.84	0.70	319	27	-0.13
293	Technische Universität Dresden	0.83	0.91	226	-67	0.08
294	Ewha Womans University	0.83	0.89	234	-60	0.05
295	University of Rennes 1	0.83	0.64	347	52	-0.19
296	Pohang University of Science and Technology	0.83	1.20	123	-173	0.38
297	University of Bologna	0.82	0.76	296	-1	-0.06
298	Heinrich Heine Univ Düsseldorf	0.81	1.04	172	-126	0.23
299	Uppsala University	0.80	0.73	308	9	-0.07
300	University of Wollongong	0.80	1.07	163	-137	0.26
301	Dalhousie University	0.80	0.60	362	61	-0.21
302	University of Oslo	0.80	0.77	292	-10	-0.03
303	Oklahoma State University - Stillwater	0.80	0.61	353	50	-0.19
304	University of Kentucky	0.80	0.87	246	-58	0.07
305	University of Cape Town	0.80	0.81	268	-37	0.02
306	Hannover Medical School	0.80	0.90	228	-78	0.10
307	University of Santiago de Compostela	0.79	1.03	174	-133	0.10
308	University of Texas Medical Branch at Galveston	0.79	0.60	356	48	-0.19
309	University of Surrey	0.79	0.60	360	51	-0.19
310	Southeast University	0.78	1.59	57	-253	0.17
311	University of Aveiro	0.78	0.71	316	5	-0.07
312	Louisiana State University	0.78	0.77	295	-17	-0.01
312	Technion - Israel Institute of Technology	0.78	0.65	343	30	-0.12
314	University of Tokyo	0.78	0.05	312	_2	-0.12
315	Montpellier 1 University	0.77	1.00	190	-2	-0.05
316	Morupenet Fonversity	0.77	0.79	278	-125	0.25
317	University of Jena	0.77	0.75	330	-30	0.02
318	University of Porto	0.77	0.00	280	38	-0.11
310	Universidad Autónoma de Bargelona	0.77	0.79	200	-50	0.05
320	Harbin Institute of Technology	0.76	0.78	207	-50	0.02
320	Loughborough Llaiversity	0.76	0.55	402	91	-0.21
321	Dolying University	0.75	0.40	402	101	-0.29
322	Linivoraity of Valencia	0.75	0.91	257	-101	0.10
323	Other and Consider University Mandahara	0.73	0.60	337	54	-0.14
324 205	Clamage University Magdeburg	0.74	0.48	401	/ / E 2	-0.27
325		0.74	0.81	2/2	-53	0.07
326	University of Louisville	0.74	0.75	298	-28	0.01
32/	Dallan University of Technology	0.74	0.92	219	-108	0.18
328	Kiel University	0./4	0.//	291	-37	0.03
329	K1H Koyal Institute of Technology	0.73	0.70	318	-11	-0.03
330	University of Genoa	0.73	0.66	341	11	-0.07
331	University of Torino	0.72	0.59	368	37	-0.13

Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
	-	(1)	(2)	(3)	(4)	(5)
332	University of Florence	0.72	0.79	282	-50	0.07
333	Lanzhou University	0.72	0.79	285	-48	0.07
334	University Paris-Est Créteil Val de Marne	0.72	1.09	151	-183	0.38
335	University of Rostock	0.72	0.72	313	-22	0.00
336	Hong Kong Polytechnic University	0.71	0.68	327	-9	-0.03
337	University of Lisbon	0.71	0.30	452	115	-0.41
338	University of Milan	0.71	0.71	314	-24	0.01
339	Amirkabir University of Technology	0.71	0.88	240	-99	0.17
340	West Virginia University	0.71	0.53	387	47	-0.18
341	Tel Aviv University	0.70	0.73	310	-31	0.03
342	University of Turku	0.69	0.63	350	8	-0.07
343	Central South University	0.69	0.61	355	12	-0.09
344	University of Tasmania	0.69	0.44	413	69	-0.26
345	Universität Leipzig	0.69	0.79	284	-61	0.10
346	University of Manitoba	0.69	0.56	374	28	-0.13
347	University of Modena and Reggio Emilia	0.68	0.58	372	25	-0.10
348	Complutense University	0.68	0.60	363	15	-0.08
349	University of Warsaw	0.67	0.52	389	40	-0.16
350	Innsbruck Medical University	0.67	0.87	245	-105	0.20
351	Aristotle University of Thessaloniki	0.67	0.35	435	84	-0.31
352	University of Eastern Finland	0.66	0.62	352	0	-0.04
353	Tsinghua University	0.65	0.93	215	-138	0.28
354	University College Cork	0.65	0.85	255	-99	0.20
355	Stellenbosch University	0.65	0.33	441	86	-0.31
356	University of Oklahoma	0.64	0.55	376	20	-0.09
357	Tokyo Institute of Technology	0.64	0.78	288	-69	0.14
358	Queensland University of Technology	0.64	0.33	442	84	-0.31
359	National Technical University of Athens	0.64	0.31	451	92	-0.33
360	Tokyo Medical and Dental University	0.64	0.65	344	-16	0.01
361	Osaka University	0.63	0.67	335	-26	0.04
362	Kyoto University	0.63	0.74	305	-57	0.10
363	University of Mississippi	0.63	0.45	408	45	-0.18
364	Sharif University of Technology	0.62	0.44	412	48	-0.19
365	University of Naples Federico II	0.61	0.48	398	33	-0.13
366	Ben-Gurion University of the Negev	0.61	0.36	434	68	-0.25
367	Banaras Hindu University	0.61	0.44	410	43	-0.17
368	Xiamen University	0.60	0.85	256	-112	0.25
369	University of Zaragoza	0.60	0.59	365	-4	-0.01
370	Federal University of Rio de Janeiro	0.60	0.30	453	83	-0.30
371	University of Burgundy	0.60	0.65	342	-29	0.06
372	Pontifical Catholic University of Chile	0.60	0.68	333	-39	0.08
373	Indian Institute of Science	0.60	0.54	386	13	-0.06
374	National Sun Yat-sen University	0.60	0.50	395	21	-0.10
375	Bar-Ilan University	0.59	0.21	476	101	-0.38
376	University of Science Malavsia	0.59	1.37	81	-295	0.77
377	Texas Tech University	0.59	0.71	315	-62	0.13
378	East China University of Science and Technology	0.58	0.74	302	-76	0.16
379	University of KwaZulu-Natal	0.58	0.85	251	-128	0.28

(b)         (c)         (c)         (c)         (c)         (c)           380         University of Phsa         0.57         0.59         366         1.15         0.02           382         University of Evalle         0.57         0.54         383         1         0.03           383         Naming University         0.56         0.048         440         0.11           384         Shandong University         0.55         0.62         351         -33         0.07           385         Loncoreow Moscow State University         0.55         0.61         354         -433         0.06           386         University         0.55         0.61         354         -414         0.28         -0.13           389         Sun Yat-sen University         0.53         0.55         736         -12         0.00           391         Tohoka University         0.53         0.46         403         12         0.00           392         University of Data         0.51         0.57         573         -20         0.08           3939         University of Comba         0.51         0.57         0.73         -20         0.08           3939 <t< th=""><th>Rank G8</th><th>University</th><th>Value G8</th><th>Value WoS</th><th>Rank WoS</th><th>Re-rankings = Rank WoS-Rank G8</th><th>(2) - (1)</th></t<>	Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
380         University of Exit         0.58         0.41         417         37         0.17           381         University of Sexille         0.57         0.54         383         1.1         0.03           382         University of Sexille         0.57         0.54         383         1.4         0.03           383         Naming University         0.55         0.56         0.48         400         1.6         0.08           384         Lonnonoov Moscow State University         0.55         0.62         351         3.5         0.07           387         York University         0.53         0.64         416         2.8         -0.03           388         University of Oricolo         0.54         0.41         416         2.8         -0.01           390         Tohoka University         0.53         0.55         3.78         -1.2         0.02           391         Viniversity of Ani Aldo Moro         0.51         0.51         3.04         4.4         0.01           392         University of Chrin Aldo Moro         0.51         0.51         3.04         4.4         0.01           393         University of Chrin Aldo Moro         0.50         0.64         3.83			(1)	(2)	(3)	(4)	(5)
381         University of Na         0.57         0.59         366         1.5         0.02           382         Narping University         0.56         0.68         334         4.9         0.11           384         Shandong University         0.56         0.68         334         4.00         1.6         -0.08           385         Lonconcow Miscow State University         0.55         0.62         351         -0.07         3.04         4.03         -0.07         -0.04         -0.05         0.04         3.64         -0.03         -0.07         -0.04         -0.05         0.07         -0.04         -0.05         0.01         -0.06         -0.05         0.01         -0.06         0.01         -0.07         0.02         -0.06         0.05         -0.07         0.01         -0.07         0.02         -0.07         0.02         -0.07         0.01         -0.07         0.01         -0.07         0.01         -0.07         0.01         -0.07         0.01         -0.07         0.01         -0.07         0.01         -0.07         0.01         -0.07         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	380	Università Cattolica del Sacro Cuore	0.58	0.41	417	37	-0.17
332         University of Scolle         0.57         0.54         343         343         Nanjag University         0.56         0.68         354        9         0.11           343         Shandong University         0.55         0.66         432         47         0.20           368         Force Advanced Instituto of Science and Technology         0.55         0.61         354         -33         0.00           388         University of Oxiebo         0.54         0.61         416         2.8         -0.13           398         Sun Yate-sen University         0.53         0.53         0.57         378         42         0.012           301         Sagaya University         0.53         0.54         0.44         416         2.8         -0.12           302         University of Oxia         0.53         0.57         373         -20         0.05           304         University of Oulu         0.51         0.51         309         -4         0.01           303         University of Canada         0.51         0.51         304         -48         -47         0.44           304         University of Combra         0.50         0.60         358         -39	381	University of Pisa	0.57	0.59	366	-15	0.02
383       Nating University       0.56       0.048       340       1.6       0.018         384       Shandong University       0.55       0.02       351       0.077       0.020         386       Korca Advanced Institute of Science and Technology       0.55       0.02       351       0.35       0.017         387       York University       0.53       0.041       416       2.8       -0.13         388       University of Oxicelo       0.54       0.41       416       2.8       -0.13         389       Sun Yatssen University       0.53       0.55       378       -12       0.02         391       Tokoku University       0.53       0.56       0.57       373       -20       0.05         302       University of Odu       0.51       0.57       373       -20       0.05         303       University of Odu       0.51 <td< td=""><td>382</td><td>University of Seville</td><td>0.57</td><td>0.54</td><td>383</td><td>1</td><td>-0.03</td></td<>	382	University of Seville	0.57	0.54	383	1	-0.03
384         Shandong University         0.56         0.48         400         16         -0.08           385         Lomonsov Moscow State University         0.55         0.62         331         -35         0.07           387         York University         0.55         0.61         354         -33         0.06           388         University of Oreich         0.53         0.41         416         28         -0.13           399         San Yat-see University         0.53         0.55         0.41         416         28         -0.13           319         Sagoya University         0.53         0.55         0.44         0.41         20.42         -0.42           310         University of Bari Aldo Moro         0.52         0.40         421         2.9         -0.42           320         University of Chuh         0.51         0.51         0.51         390         -4         0.01           340         University of Chuh         0.51         0.44         348         -7         0.17           370         University of Cambra         0.50         0.40         433         -35         0.41           380         University of Cambra         0.50         0.40	383	Nanjing University	0.56	0.68	334	-49	0.11
388         Lomonosov Moscow Stat: University         0.55         0.36         432         4.7         -0.20           386         Korea Advanced Institute of Science and Technology         0.55         0.61         354         -33         0.06           387         York University         0.53         0.64         354         -33         0.06           388         University of Oxiclo         0.54         0.41         416         2.8         -0.13           398         Tohoka University         0.53         0.55         3.78         -12         0.02           391         Nagoya University         0.51         0.51         0.64         403         12         -0.07           392         University of Oain         0.51         0.51         0.51         0.36         4.4         0.01           394         University of Oain         0.51         0.51         0.36         4.33         4.7         0.14           395         University of Coinban         0.50         0.33         443         4.7         0.14           396         University of Coinban         0.50         0.40         2.97         -3         0.01           400         University of Coinban         0.	384	Shandong University	0.56	0.48	400	16	-0.08
386         Korea Advanced Institute of Science and Technology         0.55         0.61         354         -33         0.00           388         University of Oxido         0.54         0.61         354         -33         0.00           388         University of Oxido         0.53         0.51         122         -267         0.67           309         Tohoku University         0.53         0.54         403         12         -0.07           301         Nagoya University         0.53         0.54         403         12         -0.07           302         University of Dari Aldo Moro         0.52         0.40         421         29         -0.12           303         University of Dari Aldo Moro         0.51         0.51         390         -44         0.01           303         University of Taras         0.50         0.60         358         -39         0.10           304         University of Taras         0.50         0.60         358         -39         0.10           305         University of Tohan         0.50         0.40         420         21         -0.10           400         Katorant Coinnba         0.50         0.40         420         -0.12 </td <td>385</td> <td>Lomonosov Moscow State University</td> <td>0.55</td> <td>0.36</td> <td>432</td> <td>47</td> <td>-0.20</td>	385	Lomonosov Moscow State University	0.55	0.36	432	47	-0.20
387         Yok University         0.55         0.61         354         0.33         0.00           388         University of Oviedo         0.54         0.41         416         28         0.01           399         Sun Yat-sen University         0.53         0.55         378         1.22         2.67         0.67           300         Tohoku University of Bari Aldo Moro         0.52         0.40         421         29         0.01           301         University of Oulu         0.51         0.57         373         2.0         0.05           304         University of Canada         0.51         0.64         348         4.47         0.14           305         University of Platas         0.50         0.33         443         4.01           305         University of Coimban         0.50         0.40         421         2.01         0.01           308         University of Coimban         0.50         0.40         438         4.7         0.14           306         University of Coimban         0.50         0.40         419         18         0.00           400         Spienza University of Rome         0.50         0.40         419         18.00	386	Korea Advanced Institute of Science and Technology	0.55	0.62	351	-35	0.07
388         University of Oviedo         0.54         0.41         416         28         -0.13           398         Sun Yarsenity         0.53         1.21         122         -0.267         0.07           390         Toboku University         0.53         0.55         378         -12         0.02           391         Nagoya University         0.53         0.46         403         12         -0.07           392         University of Dari Aklo Moro         0.52         0.40         421         29         -0.12           394         University of Dari Aklo Moro         0.51         0.64         348         -47         0.14           395         Linkörping University         0.50         0.35         443         47         -0.17           397         University of Tatras         0.50         0.40         420         21         -0.10           398         Evistor University         0.50         0.40         420         21         -0.10           398         Evistor University of Rome         0.50         0.40         420         21         -0.10           403         East Chira Normal University         0.50         0.40         43         -0.02 <t< td=""><td>387</td><td>York University</td><td>0.55</td><td>0.61</td><td>354</td><td>-33</td><td>0.06</td></t<>	387	York University	0.55	0.61	354	-33	0.06
389         Sun Yat sen University         0.53         1.21         122         2.67         0.07           390         Toboku University         0.53         0.55         378         1.2         0.00           391         Ragoya University         0.53         0.64         4405         1.2         0.01           392         University of Bari Aldo Moro         0.51         0.57         373         -20         0.03           394         University of Camada         0.51         0.51         300         -4         0.01           395         Linköping University         0.51         0.64         348         -47         0.14           396         University of Platras         0.50         0.33         443         -47         0.14           396         University of Coimbra         0.50         0.40         420         21         -0.01           400         Spicnza University         0.50         0.49         397         -3         -0.01           401         Sapicnza University         0.50         0.49         470         -0.3         -0.01           402         University of Rome         0.50         0.40         419         -0.3         -0.01	388	University of Oviedo	0.54	0.41	416	28	-0.13
390       Tokoku University       0.53       0.55       378       -12       0.00         391       Nagoya University       0.53       0.46       403       12       0.00         302       University of Dah       0.51       0.57       373       2.20       0.00         304       University of Oula       0.51       0.51       0.51       390       -4       0.01         305       Iniversity of Oula       0.51       0.51       0.51       348       -47       0.14         305       University of Datras       0.50       0.50       0.60       3433       -55       -0.10         308       University of Domba       0.50       0.60       3433       -55       -0.11         308       Kyushu University       0.50       0.40       420       21       -0.01         400       Keio University of Rome       0.50       0.40       440       -0.42       -0.01         401       Sapienza University of Rome       0.43       0.44       0.43       -0.03       -0.01         402       University of Tehran       0.49       0.17       489       -0.7       -0.20         402       University of Tehran       0.4	389	Sun Yat-sen University	0.53	1.21	122	-267	0.67
391         Nagoya University         0.53         0.46         403         12         -0.07           392         University of Bari Aldo Mozo         0.52         0.40         421         29         -0.12           394         University of Ouhu         0.51         0.57         373         -20         0.05           394         University of Eari Aldo Mozo         0.51         0.51         390         -4         0.01           395         Linkoping University         0.50         0.64         348         -47         0.14           395         University of the Basque Country         0.50         0.60         358         -39         0.10           398         University of Coimbra         0.50         0.40         420         21         -0.01           400         Keio University         0.50         0.49         397         -3         -0.01           401         Sapienza University of Rome         0.50         0.40         419         18         -0.02           402         University of Rome         0.48         0.45         406         3         -0.03           403         East China Normal University         0.48         0.45         446         -21	390	Tohoku University	0.53	0.55	378	-12	0.02
392       University of Bari Aldo Moro       0.52       0.40       421       29       -0.12         393       University of Oulu       0.51       0.57       373       -20       0.05         394       University of Colu       0.51       0.50       0.44       400       0.14         395       Linköping University       0.51       0.64       348       -47       0.14         395       University of Partas       0.50       0.33       443       47       0.17         397       University of Combra       0.50       0.40       420       21       -0.10         400       Kajotexrity of Rome       0.50       0.40       440       18       -0.01         401       Sapienza University of Rome       0.50       0.40       419       18       -0.00         402       University of Tehran       0.49       0.17       489       87       -0.32         403       Bast China Normal University       0.48       0.42       406       24       -0.16         404       National and Kapodistrian University of Athens       0.48       0.54       384       -21       0.06         404       Conbruk National University of Athens       0.47 <td>391</td> <td>Nagoya University</td> <td>0.53</td> <td>0.46</td> <td>403</td> <td>12</td> <td>-0.07</td>	391	Nagoya University	0.53	0.46	403	12	-0.07
939       University of Oula       0.51       0.57       373       -20       0.05         394       University of Canada       0.51       0.51       0.51       390       -4       0.01         395       Linkcping University       0.51       0.64       348       -47       0.14         396       University of Patras       0.50       0.33       443       47       0.17         397       University of the Basque County       0.50       0.40       420       21       -0.10         400       Keio University       0.50       0.40       420       21       -0.10         400       Keio University of Rome       0.50       0.40       419       18       -0.09         401       Sapienza University of Rome       0.50       0.40       419       18       -0.09         402       University of Rome       0.50       0.40       419       18       -0.09         402       University of Rome       0.50       0.40       419       18       -0.09         403       National Kapodistrian University       0.48       0.45       406       -0.16       -0.16         404       National Kapodistrian University       0.47	392	University of Bari Aldo Moro	0.52	0.40	421	29	-0.12
394       Universidad de Granada       0.51       0.51       390       -4       0.01         395       Linkoping University       0.51       0.64       348       -47       0.14         396       University of the Basque Country       0.50       0.33       443       47       0.11         397       University of Coimbra       0.50       0.36       433       35       0.01         398       University of Coimbra       0.50       0.40       420       21       -0.10         400       Keio University of Rome       0.50       0.40       419       18       -0.00         401       Sapienza University of Rome       0.50       0.40       419       18       -0.00         402       University of Tehran       0.49       0.17       449       87       -0.01         403       Sational Traiwan University       0.48       0.45       406       -0.03       -0.03         404       National and Kapodistrian University       0.48       0.45       344       -21       0.06         405       National University       0.47       0.63       349       -57       0.16         406       Chombuk National University       0.47	393	University of Oulu	0.51	0.57	373	-20	0.05
395       Linköping University of Patras       0.51       0.64       348       47       0.14         396       University of Patras       0.50       0.33       443       47       0.01         397       University of Coimba       0.50       0.60       358       -59       0.10         398       University of Coimba       0.50       0.40       420       21       -0.10         400       Keio University of Rome       0.50       0.40       419       18       -0.00         401       Lapieral University of Rome       0.50       0.40       419       18       -0.00         402       University of Tehran       0.49       0.17       489       87       -0.32         403       East China Normal University of Athens       0.48       0.45       406       32       -0.00         404       National Taiwan University       0.47       0.63       349       -57       0.16         405       National Taiwan University       0.47       0.63       349       -57       0.16         406       Kational Taiwan University       0.47       0.55       380       -50       0.33         408       University of Rome Tor Vergata       0.47	394	Universidad de Granada	0.51	0.51	390	-4	0.01
396         University of Patras         0.50         0.33         443         47         -0.17           397         University of the Basque Country         0.50         0.60         358         -39         0.10           398         University of Coimbra         0.50         0.40         420         21         -0.10           400         Keio University         0.50         0.49         397         -3         -0.01           401         Sapienza University of Rome         0.50         0.49         397         -3         -0.01           401         Sapienza University of Rome         0.50         0.49         397         -3         -0.01           402         University of Flohan         0.49         0.17         489         87         -0.33           403         East China Normal University         0.48         0.45         406         -3         -0.03           404         National and Kapodistrian University         0.48         0.32         446         42         -0.16           407         University of Nantes         0.47         0.63         349         -57         0.16           407         University of Nantes         0.47         0.55         380	395	Linköping University	0.51	0.64	348	-47	0.14
397       University of the Basque Country       0.50       0.60       358       -39       0.10         398       University of Coimbra       0.50       0.36       433       35       -0.14         4399       Kyushu University       0.50       0.40       420       21       -0.10         400       Keico University       0.50       0.40       419       18       -0.00         401       Sapienza University of Rome       0.50       0.40       419       18       -0.00         402       University of Tehran       0.49       0.17       489       87       -0.23         403       East China Normal University of Athens       0.48       0.54       384       -21       0.06         405       National Taiwan University of Athens       0.47       0.63       349       -57       0.16         407       University of Rome Tor Vergata       0.47       0.50       396       -11       0.02         408       University of Sakatchevan       0.47       0.59       371       -40       0.12         409       Shanghai Jiao Tong University       0.46       0.54       381       -31       0.08         410       University of Sakatchevan	396	University of Patras	0.50	0.33	443	47	-0.17
398       University of Coimbra       0.50       0.36       433       35       -0.14         399       Kyushu University       0.50       0.40       420       21       -0.10         400       Keio University       0.50       0.40       419       18       -0.00         401       Sagientza University of Rome       0.50       0.40       419       18       -0.00         402       University of Tehran       0.49       0.17       489       87       -0.32         403       East China Normal University       0.48       0.45       406       3       -0.03         404       National and Kapodistrian University       0.48       0.45       346       42       -0.16         405       National University       0.47       0.63       349       -57       0.16         407       University of Nantes       0.47       0.50       396       -11       0.02         408       University of Nantes       0.47       0.50       394       -14       0.03         409       Shanghai Jiao Tong University       0.47       0.55       380       -30       0.08         411       Griffith University       0.46       0.54       <	397	University of the Basque Country	0.50	0.60	358	-39	0.10
399       Kyushu University       0.50       0.40       420       21       -0.10         400       Keio University of Rome       0.50       0.49       397       -3       -0.01         401       Sapienza University of Rome       0.50       0.40       419       18       -0.09         402       University of Tehran       0.49       0.17       489       87       -0.03         403       East China Normal University       0.48       0.45       406       42       -0.16         405       National Taiwan University       0.48       0.52       446       42       -0.16         406       Chonbuk National University       0.47       0.63       349       -57       0.16         407       University of Rome Tor Vergata       0.47       0.50       394       -14       0.03         408       University of Rome Tor Vergata       0.47       0.50       380       -30       0.08         411       University of Sastachewan       0.47       0.50       381       -31       0.00         410       University of Palermo       0.46       0.54       381       -31       0.00         413       University of Ljubljana       0.45	398	University of Coimbra	0.50	0.36	433	35	-0.14
400         Keio University         0.50         0.49         397        3         -0.01           401         Sapienza University of Rome         0.50         0.40         419         18         0.00           402         University of Tehran         0.49         0.17         489         87         -0.32           403         East China Normal University         0.48         0.45         406         42         -0.16           405         National and Kapodistrian University         0.48         0.45         384         -21         0.06           406         Chonbuk National University         0.47         0.63         349         -57         0.16           407         University of Same Tor Vergata         0.47         0.50         396         -11         0.02           408         University of Saskatchewan         0.47         0.50         394         -44         0.03           410         University of Saskatchewan         0.47         0.55         380         -30         0.08           411         Griffth University         0.46         0.54         381         -31         0.00           413         University of Ljubljana         0.46         0.31         450<	399	Kyushu University	0.50	0.40	420	21	-0.10
401       Sapienza University of Rome       0.50       0.40       419       18       -0.09         402       University of Tehran       0.49       0.17       489       87       -0.32         403       East China Normal University       0.48       0.45       406       3       -0.03         404       National and Kapodistrian University       0.48       0.32       446       42       -0.16         405       National Taiwan University       0.48       0.34       384       -21       0.06         406       Chonbuk National University       0.47       0.63       349       -57       0.16         407       University of Rome Tor Vergata       0.47       0.50       396       -11       0.02         408       University of Saskatchewan       0.47       0.50       394       -14       0.03         401       University of Saskatchewan       0.47       0.55       380       -30       0.08         411       University of Palermo       0.46       0.59       371       -40       0.12         412       National Tsing Hua University       0.46       0.54       381       -31       0.06         413       University of Ljubijana	400	Keio University	0.50	0.49	397	-3	-0.01
402         University of Tehran         0.49         0.17         489         87         -0.32           403         East China Normal University         0.48         0.45         406         3         -0.03           404         National and Kapodistrian University         0.48         0.32         446         42         -0.16           405         National Taiwan University         0.47         0.63         349         -57         0.16           407         University of Nantes         0.47         0.50         396         -11         0.02           408         University of Rome Tor Vergata         0.47         0.50         394         -14         0.03           409         Shangbai Jao Tong University         0.47         0.60         359         -50         0.13           410         University of Saskatchewan         0.47         0.60         359         -50         0.13           410         University         0.46         0.54         381         -31         0.08           411         Griffth University         0.46         0.54         381         -31         0.08           413         University of Palermo         0.46         0.54         381         <	401	Sapienza University of Rome	0.50	0.40	419	18	-0.09
403       East China Normal University       0.48       0.45       406       3       -0.03         404       National and Kapodistrian University       0.48       0.32       446       42       -0.16         405       National Taiwan University       0.48       0.54       384       -21       0.00         406       Chonbuk National University       0.47       0.63       349       -57       0.16         407       University of Rome Tor Vergata       0.47       0.50       396       -11       0.02         408       University of Rome Tor Vergata       0.47       0.50       394       -144       0.03         409       Shanghai Jiao Tong University       0.47       0.60       359       -50       0.13         410       University of Saskatchewan       0.47       0.55       380       -30       0.08         411       Griffith University       0.46       0.59       371       -40       0.12         412       National University       0.46       0.54       381       -31       0.08         413       University of Libuljana       0.46       0.31       450       36       -0.15         414       University       0.45<	402	University of Tehran	0.49	0.17	489	87	-0.32
404       National and Kapodistrian University       0.48       0.32       446       42       -0.16         405       National Taiwan University       0.48       0.54       384       -21       0.06         406       Chonbuk National University       0.47       0.63       349       -57       0.16         407       University of Nantes       0.47       0.50       396       -11       0.02         408       University of Rome Tor Vergata       0.47       0.60       359       -50       0.13         410       University of Sastatchewan       0.47       0.55       380       -30       0.08         411       Griffith University       0.46       0.59       371       -40       0.12         412       National Tsing Hua University       0.46       0.54       381       -31       0.08         413       University of Palermo       0.46       0.46       404       -9       0.00         414       University of Lipbljana       0.45       0.28       458       43       -0.17         416       National University       0.45       0.17       317       -101       0.26         415       Paleman National University       0.45<	403	East China Normal University	0.48	0.45	406	3	-0.03
405       National Taiwan University       0.48       0.54       384       -21       0.06         406       Chonbuk National University       0.47       0.63       349       -57       0.16         407       University of Nantes       0.47       0.50       396       -11       0.02         408       University of Rome Tor Vergata       0.47       0.50       394       -14       0.03         409       Shanghai Jiao Tong University       0.47       0.60       359       -50       0.13         410       University of Saskatchewan       0.47       0.55       380       -30       0.08         411       Griffith University       0.46       0.54       381       -31       0.08         413       University of Palermo       0.46       0.46       404       -9       0.00         414       University of Ljubljana       0.46       0.31       450       36       -0.15         415       Pusan National University       0.45       0.28       458       43       -0.17         416       Natki University       0.45       0.51       393       -24       0.06         418       Scoul National University       0.45       0.	404	National and Kapodistrian University of Athens	0.48	0.32	446	42	-0.16
406         Chonbuk National University         0.47         0.63         349         -57         0.16           407         University of Nantes         0.47         0.50         396         -11         0.02           408         University of Rome Tor Vergata         0.47         0.50         394         -14         0.03           400         Shanghai Jiao Tong University         0.47         0.60         359         -50         0.13           410         University of Saskatchewan         0.47         0.55         380         -30         0.08           411         Griffith University         0.46         0.59         371         -40         0.12           412         National Tsing Hua University         0.46         0.54         381         -31         0.008           413         University of Palermo         0.46         0.46         404         -9         0.00           414         University of Ljubljana         0.46         0.31         450         36         -0.15           415         Pusan National University         0.45         0.17         129         -287         0.72           416         Nankai University         0.45         0.51         393	405	National Taiwan University	0.48	0.54	384	-21	0.06
407University of Nantes $0.47$ $0.50$ $396$ $-11$ $0.02$ 408University of Rome Tor Vergata $0.47$ $0.50$ $394$ $-14$ $0.03$ 409Shanghai Jiao Tong University $0.47$ $0.60$ $359$ $-50$ $0.13$ 410University of Saskatchewan $0.47$ $0.55$ $380$ $-30$ $0.08$ 411Griffith University $0.46$ $0.59$ $371$ $-40$ $0.12$ 412National Tsing Hua University $0.46$ $0.54$ $381$ $-31$ $0.08$ 413University of Palermo $0.46$ $0.46$ $404$ $-9$ $0.00$ 414University of Ljubljana $0.46$ $0.31$ $450$ $36$ $-0.15$ 415Pusan National University $0.45$ $0.28$ $458$ $43$ $-0.17$ 416Nankai University $0.45$ $0.51$ $393$ $-24$ $0.00$ 418Scoul National University $0.45$ $0.71$ $317$ $-101$ $0.26$ 419Chonnam National University $0.43$ $0.25$ $467$ $47$ $-0.18$ 421Kanazawa University $0.43$ $0.34$ $438$ $17$ $-0.09$ 422Flinders University $0.43$ $0.51$ $391$ $-31$ $0.08$ 423Fudan University $0.43$ $0.51$ $391$ $-31$ $0.08$ 424University of Lübeck $0.42$ $0.48$ $399$ $-25$ $0.06$ 425Kobe	406	Chonbuk National University	0.47	0.63	349	-57	0.16
408University of Rome Tor Vergata $0.47$ $0.50$ $394$ $-14$ $0.03$ 409Shanghai Jiao Tong University $0.47$ $0.60$ $359$ $-50$ $0.13$ 410University of Saskatchewan $0.47$ $0.55$ $380$ $-30$ $0.08$ 411Griffith University $0.46$ $0.59$ $371$ $-40$ $0.12$ 412National Tsing Hua University $0.46$ $0.54$ $381$ $-31$ $0.08$ 413University of Palermo $0.46$ $0.46$ $404$ $-9$ $0.00$ 414University of Lipubljana $0.46$ $0.31$ $450$ $36$ $-0.15$ 415Pusan National University $0.45$ $0.28$ $458$ $43$ $-0.17$ 416Nankai University $0.45$ $0.51$ $393$ $-24$ $0.06$ 418Scoul National University $0.45$ $0.71$ $317$ $-101$ $0.26$ 419Chonnam National University $0.43$ $0.25$ $467$ $47$ $-0.18$ 420Istanbul University $0.43$ $0.34$ $438$ $17$ $-0.09$ 422Flinders University $0.43$ $0.51$ $391$ $-31$ $0.08$ 423Fudan University $0.43$ $0.51$ $391$ $-31$ $0.08$ 424University of Lübeck $0.42$ $0.48$ $399$ $-25$ $0.06$ 425Kobe University $0.42$ $0.39$ $423$ $-2$ $-0.03$ 426Federal	407	University of Nantes	0.47	0.50	396	-11	0.02
409Shangha Jiao Tong University $0.47$ $0.60$ $359$ $-50$ $0.13$ 410University of Saskatchewan $0.47$ $0.55$ $380$ $-30$ $0.08$ 411Griffith University $0.46$ $0.59$ $371$ $-40$ $0.12$ 412National Tsing Hua University $0.46$ $0.54$ $381$ $-31$ $0.08$ 413University of Palermo $0.46$ $0.46$ $404$ $-9$ $0.00$ 414University of Ljubljana $0.46$ $0.46$ $404$ $-9$ $0.00$ 414University of Ljubljana $0.46$ $0.31$ $450$ $36$ $-0.15$ 415Pusan National University $0.45$ $0.28$ $458$ $43$ $-0.17$ 416Nankai University $0.45$ $0.51$ $393$ $-24$ $0.06$ 418Secul National University $0.45$ $0.71$ $317$ $-101$ $0.26$ 419Chonnam National University $0.43$ $0.25$ $467$ $47$ $-0.18$ 420Istanbul University $0.43$ $0.34$ $438$ $17$ $-0.09$ 422Flinders University $0.43$ $0.51$ $391$ $-31$ $0.08$ 423Fudan University $0.43$ $0.51$ $391$ $-31$ $0.08$ 424University of Lübeck $0.42$ $0.48$ $399$ $-25$ $0.06$ 425Kobe University $0.42$ $0.48$ $399$ $-25$ $0.06$ 425Kobe University of	408	University of Rome Tor Vergata	0.47	0.50	394	-14	0.03
410       University of Saskatchewan       0.47       0.55       380       -30       0.08         411       Griffith University       0.46       0.59       371       -40       0.12         412       National Tsing Hua University       0.46       0.54       381       -31       0.08         413       University of Palermo       0.46       0.46       404       -9       0.00         414       University of Ljubljana       0.46       0.31       450       36       -0.15         415       Pusan National University       0.45       0.28       458       43       -0.17         416       Nankai University       0.45       0.17       129       -287       0.72         416       Nankai University       0.45       0.51       393       -24       0.06         418       Seoul National University       0.45       0.51       393       -24       0.06         419       Chonnam National University       0.45       0.51       393       -24       0.06         420       Istanbul University       0.43       0.25       467       47       -0.18         420       Istanbul University       0.43       0.34       4	409	Shanghai Jiao Tong University	0.47	0.60	359	-50	0.13
411       Griffith University       0.46       0.59       371       -40       0.12         412       National Tsing Hua University       0.46       0.54       381       -31       0.08         413       University of Palermo       0.46       0.46       404       -9       0.00         414       University of Ljubljana       0.46       0.31       450       36       -0.15         415       Pusan National University       0.45       0.28       458       43       -0.17         416       Nankai University       0.45       0.51       393       -24       0.00         418       Scoul National University       0.45       0.71       317       -101       0.26         419       Chonnam National University       0.43       0.25       467       47       -0.48         420       Istanbul University       0.43       0.34       438       17       -0.09         422       Flinders University       0.43       0.51       391       -31       0.08         422       Flunders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.51       391	410	University of Saskatchewan	0.47	0.55	380	-30	0.08
412National Tsing Hua University0.460.54381-310.08413University of Palermo0.460.46404-90.00414University of Ljubljana0.460.3145036-0.15415Pusan National University0.450.2845843-0.17416Nankai University0.450.17129-2870.72417Yonsei University0.450.51393-240.06418Scoul National University0.450.71317-1010.26419Chonnam National University0.430.2546747-0.18420Istanbul University0.430.3443817-0.09422Flinders University0.430.51391-310.08423Fudan University0.430.76297-1260.33424University of Lübeck0.420.48399-250.06425Kobe University0.420.39423-2-0.03426Federal University of Santa Catarina0.420.1049670-0.31426Federal University of Santa Catarina0.420.1049670-0.31427University of Santa Catarina0.410.344369-0.07	411	Griffith University	0.46	0.59	371	-40	0.12
413       University of Jubljana       0.46       0.46       404       -9       0.00         414       University of Ljubljana       0.46       0.31       450       36       -0.15         415       Pusan National University       0.45       0.28       458       43       -0.17         416       Nankai University       0.45       1.17       129       -287       0.72         417       Yonsei University       0.45       0.51       393       -24       0.06         418       Seoul National University       0.45       0.71       317       -101       0.26         419       Chonnam National University       0.43       0.25       467       47       -0.18         420       Istanbul University       0.43       0.34       438       17       -0.09         422       Flinders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         424       University of Lübeck       0.42       0.39       423       <	412	National Tsing Hua University	0.46	0.54	381	-31	0.08
414University of Ljubljana0.460.3145036-0.15415Pusan National University0.450.2845843-0.17416Nankai University0.451.17129-2870.72417Yonsei University0.450.51393-240.06418Seoul National University0.450.71317-1010.26419Chonnam National University0.430.2546747-0.18420Istanbul University0.430.3443817-0.09421Kanazawa University0.430.51391-310.08422Flinders University0.430.76297-1260.33423Fudan University0.420.48399-250.06425Kobe University0.420.39423-2-0.03426Federal University of Santa Catarina0.420.1049670-0.31427Universidade Federal de Minas Gerais0.410.344369-0.07	413	University of Palermo	0.46	0.46	404	-9	0.00
415Pusan National University0.450.2845843-0.17416Nankai University0.451.17129-2870.72417Yonsei University0.450.51393-240.06418Seoul National University0.450.71317-1010.26419Chonnam National University0.440.41418-1-0.03420Istanbul University0.430.2546747-0.18421Kanazawa University0.430.3443817-0.09422Flinders University0.430.51391-310.08423Fudan University0.430.76297-1260.33424University of Lübeck0.420.48399-250.06425Kobe University0.420.39423-2-0.03426Federal University of Santa Catarina0.420.1049670-0.31427Universidade Federal de Minas Gerais0.410.344369-0.07	414	University of Liubliana	0.46	0.31	450	36	-0.15
416       Nankai University       0.45       1.17       129       -287       0.72         417       Yonsei University       0.45       0.51       393       -24       0.06         418       Seoul National University       0.45       0.71       317       -101       0.26         419       Chonnam National University       0.44       0.41       418       -1       -0.03         420       Istanbul University       0.43       0.25       467       47       -0.18         421       Kanazawa University       0.43       0.34       438       17       -0.09         422       Flinders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34 <td< td=""><td>415</td><td>Pusan National University</td><td>0.45</td><td>0.28</td><td>458</td><td>43</td><td>-0.17</td></td<>	415	Pusan National University	0.45	0.28	458	43	-0.17
417       Yonsei University       0.45       0.51       393       -24       0.06         418       Seoul National University       0.45       0.71       317       -101       0.26         419       Chonnam National University       0.44       0.41       418       -1       -0.03         420       Istanbul University       0.43       0.25       467       47       -0.18         421       Kanazawa University       0.43       0.34       438       17       -0.09         422       Flinders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         426       Federal de Minas Gerais       0.41       0.34       436       9       -0.07	416	Nankai University	0.45	1.17	129	-287	0.72
418       Seoul National University       0.45       0.71       317       -101       0.26         419       Chonnam National University       0.44       0.41       418       -1       -0.03         420       Istanbul University       0.43       0.25       467       47       -0.18         421       Kanazawa University       0.43       0.34       438       17       -0.09         422       Flinders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34       436       9       -0.07	417	Yonsei University	0.45	0.51	393	-24	0.06
419       Chonnam National University       0.44       0.41       418       -1       -0.03         420       Istanbul University       0.43       0.25       467       47       -0.18         421       Kanazawa University       0.43       0.34       438       17       -0.09         422       Flinders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34       436       9       -0.07	418	Seoul National University	0.45	0.71	317	-101	0.26
420       Istanbul University       0.43       0.25       467       47       -0.18         421       Kanazawa University       0.43       0.34       438       17       -0.09         422       Flinders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34       436       9       -0.07	419	Chonnam National University	0.44	0.41	418	-1	-0.03
421       Kanazawa University       0.43       0.34       438       17       -0.09         422       Flinders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34       436       9       -0.07	420	Istanbul University	0.43	0.25	467	47	-0.18
422       Flinders University       0.43       0.51       391       -31       0.08         423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34       436       9       -0.07	421	Kanazawa University	0.43	0.34	438	17	-0.09
423       Fudan University       0.43       0.76       297       -126       0.33         424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34       436       9       -0.07	422	Flinders University	0.43	0.51	391	-31	0.08
424       University of Lübeck       0.42       0.48       399       -25       0.06         425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34       436       9       -0.07	423	Fudan University	0.43	0.76	297	-126	0.33
425       Kobe University       0.42       0.39       423       -2       -0.03         426       Federal University of Santa Catarina       0.42       0.10       496       70       -0.31         427       Universidade Federal de Minas Gerais       0.41       0.34       436       9       -0.07	424	University of Lübeck	0.42	0.48	399	-25	0.06
426Federal University of Santa Catarina0.420.1049670-0.31427Universidade Federal de Minas Gerais0.410.344369-0.07	425	Kobe University	0.42	0.39	423	-2	-0.03
427  Universidade Federal de Minas Gerais 0.41 0.34 436 9 -0.07	426	Federal University of Santa Catarina	0.42	0.10	496	70	-0.31
	427	Universidade Federal de Minas Gerais	0.41	0.34	436	9	-0.07

Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
		(1)	(2)	(3)	(4)	(5)
428	University of Tsukuba	0.41	0.42	415	-13	0.01
429	State University of Campinas	0.41	0.28	460	31	-0.12
430	Waseda University	0.40	0.30	454	24	-0.10
431	University of Murcia	0.40	0.33	440	9	-0.06
432	Indian Institute of Technology Madras	0.39	0.28	459	27	-0.11
433	Hanyang University	0.38	0.28	462	29	-0.10
434	University of Belgrade	0.38	0.18	484	50	-0.20
435	University of Siena	0.37	0.38	424	-11	0.01
436	University of Zagreb	0.37	0.28	461	25	-0.09
437	University of Science and Technology of China	0.37	0.99	191	-246	0.62
438	Hokkaido University	0.37	0.27	464	26	-0.10
439	Technical University of Madrid	0.36	0.19	479	40	-0.17
440	National Cheng Kung University	0.36	0.56	375	-65	0.20
441	Hacettepe University	0.35	0.19	483	42	-0.17
442	Cairo University	0.35	0.13	493	51	-0.22
443	Federal University of Rio Grande do Sul	0.35	0.32	445	2	-0.02
444	University of Pretoria	0.35	0.23	471	27	-0.11
445	National Chung Hsing University	0.34	0.85	257	-188	0.50
446	Hiroshima University	0.34	0.30	455	9	-0.05
447	Saint Petersburg State University	0.34	0.18	486	39	-0.17
448	Jagiellonian University in Krakow	0.34	0.38	429	-19	0.04
449	Zhejiang University	0.34	0.39	422	-27	0.05
450	Korea University	0.34	0.59	369	-81	0.25
451	University of Buenos Aires	0.34	0.22	472	21	-0.11
452	Kyungpook National University	0.34	0.38	425	-27	0.05
453	University of Catania	0.33	0.22	475	22	-0.11
454	National Chiao Tung University	0.33	0.55	379	-75	0.22
455	Kyung Hee University	0.33	0.25	468	13	-0.08
456	Wuhan University	0.33	0.42	414	-42	0.09
457	Mahidol University	0.33	0.32	448	-9	-0.01
458	Tongji University	0.32	0.22	474	16	-0.10
459	Chulalongkorn University	0.32	0.54	382	-77	0.22
460	Okayama University	0.32	0.19	481	21	-0.13
461	Ankara University	0.30	0.19	480	19	-0.10
462	Universidade de São Paulo	0.30	0.29	457	-5	-0.01
463	Sungkyunkwan University	0.29	0.32	447	-16	0.03
464	National Central University	0.29	0.29	456	-8	0.00
465	University of Science and Technology Beijing	0.29	0.44	411	-54	0.15
466	National Autonomous University of Mexico	0.29	0.25	469	3	-0.04
467	Chiba University	0.28	0.38	430	-37	0.09
468	Charles University in Prague	0.28	0.18	485	17	-0.10
469	Xi'an Jiaotong University	0.28	0.34	439	-30	0.06
470	South China University of Technology	0.27	0.79	279	-191	0.52
471	Huazhong University of Science and Technology	0.26	0.20	478	7	-0.07
472	Tianjin University	0.25	0.45	407	-65	0.20
473	Inha University	0.25	0.12	495	22	-0.13
474	Jilin University	0.24	0.69	326	-148	0.44
475	Federal University of Paraná	0.24	0.20	477	2	-0.04

Rank G8	University	Value G8	Value WoS	Rank WoS	Re-rankings = Rank WoS-Rank G8	(2) - (1)
		(1)	(2)	(3)	(4)	(5)
476	University of Ulsan	0.24	0.38	426	-50	0.14
477	Universidade Estadual Paulista	0.24	0.17	487	10	-0.07
478	China Agricultural University	0.23	0.34	437	-41	0.11
479	Tehran University of Medical Sciences	0.23	0.07	499	20	-0.16
480	Middle East Technical University	0.23	0.38	428	-52	0.15
481	Chang Gung University	0.22	0.17	488	7	-0.05
482	University of Chile	0.22	0.17	490	8	-0.05
483	Chungnam National University	0.22	0.26	466	-17	0.05
484	Federal University of São Paulo	0.22	0.14	492	8	-0.08
485	National University of La Plata	0.22	0.24	470	-15	0.02
486	Ege University	0.21	0.31	449	-37	0.10
487	Beijing Normal University	0.20	0.33	444	-43	0.13
488	Sichuan University	0.20	0.38	431	-57	0.18
489	National Yang-Ming University	0.19	0.28	463	-26	0.08
490	Konkuk University	0.19	0.38	427	-63	0.20
491	Federal University of Viçosa	0.18	0.14	491	0	-0.04
492	University of Malaya	0.17	0.22	473	-19	0.05
493	King Saud University	0.16	0.09	498	5	-0.08
494	Nihon University	0.16	0.10	497	3	-0.06
495	Gazi University	0.16	0.13	494	-1	-0.03
496	Shanghai University	0.16	0.44	409	-87	0.28
497	Northwestern Polytechnical University	0.15	0.01	500	3	-0.14
498	Hunan University	0.13	0.78	287	-211	0.66
499	Tarbiat Modares University	0.11	0.19	482	-17	0.08
500	Catholic University of Korea	0.08	0.27	465	-35	0.20
	Average	0.98	0.93			
	SD	0.55	0.55			
	CV	0.56	0.59			

Table 1. Differences in % between the top most cited articles in the G8, G6 and WoS classification systems in the dataset consisting of 3.6 million of distinct articles

	Most cited articles:						
	<b>Top 50%</b>	Top 10%	Top 1%				
G8 vs G6	9.0%	20.4%	31.1%				
G8 vs WoS	12.7%	31.7%	51.7%				
G6 vs WoS	11.2%	27.0%	44.7%				

	First 100 universities	Remaining 400 universities	Total
	(1)	(2)	(1+2)
>50 positions	11	153	164
26-50	21	111	132
16-25	15	52	67
6-15	22	54	76
1-5	25	28	53
Unchanged	6	2	8
Total	100	400	100

Table 2.A. University ranking differences according to the *Top 1%* indicator in going from the WoS to the G8 systems

Table 2.B. University differences in Top 1% values in going from the WoS to the G8 systems

	First 100 universities	400 remaining universities	WoS values - G8 values
>0.20	31	125	156
>0.10 and ≤0.20	31	116	147
>0.05 and ≤0.10	18	86	104
≤0.05	20	73	93
Total	100	400	100

Table 2.C. Main gainers and losers in the change from the WoS to the G8 system (only universities in the top 100 according to the G8 system are considered) according to the *Top 1%* indicator

	University	Rank G8	<b>Re-ranking positions</b>	$WoS_{Top  1\%}$ - $G8_{Top  1\%}$
Gair	ners			
1	London School of Hygiene & Tropical Medicine	7	52	-1.18
2	Delft University of Technology	36	52	-0.54
3	University of Nice Sophia Antipolis	49	126	-0.69
4	Oregon State University	64	54	-0.34
5	University of Edinburgh	67	74	-0.39
6	University of Geneva	68	57	-0.32
7	University of Southampton	73	57	-0.32
8	McMaster University	75	53	-0.30
9	University of Colorado Denver	80	69	-0.34
10	Katholieke Universiteit Leuven	95	72	-0.31
11	Vrije Universiteit Brussel	98	175	-0.54
Lose	ers			
1	Rice University	29	-26	1.49

Table 3.A. University ranking differences according to the *Top 10%* indicator in going from the WoS to the G8 systems

	First 100 universities	Remaining 400 universities	Total
	(1)	(2)	(1+2)
>50 positions	0	81	81
26-50	7	107	114
16-25	13	74	87
6-15	36	81	117
$\leq$ 5 positions	44	57	101
Total	100	400	100

Table 3.B. University differences in *Top 10%* values in going from the WoS to the G8 systems

	First 100 universities	400 remaining universities	WoS values - G8 values
>0.20	1	16	17
>0.10 and ≤0.20	12	66	78
>0.05 and ≤0.10	27	124	151
≤0.05	60	94	254
Total	100	400	100



Figure 1. Scatter plot of the 500 LR universities' *Top 1%* values when we use the WoS or the G8 classification systems. Chinese universities (excluding Hong Kong) are indicated in red.