

ISIDRO F. AGUILLO AND ENRIQUE ORDUÑA-MALEA

THE RANKING WEB AND THE “WORLD-CLASS” UNIVERSITIES

*New Webometric Indicators Based on G-Factor,
Interlinking, and Web 2.0 Tools*

INTRODUCTION AND OBJECTIVES

The purpose of this paper is to discuss the new developments in the methodology used for building the Ranking Web of Universities, also called the Webometrics Ranking (WebR). Contrary to other rankings that ignore caveats and shortcomings in order to maintain inter-year stability, the WebR ranking is evolving for improving the reliability of sources, the descriptive power of the quantitative indicators and the justification of unexpected or discrepant results.

The paper intends to show that the WebR ranking offers not only a far larger coverage, including universities in emerging and developing countries, but an evaluation model that takes into account all the academic missions as a whole. The current emphasis on so-called world-class universities, basically research intensive institutions, offers a very narrow overview of the performance and impact of the academic systems of many countries.

The paper's aim is to illustrate that a new generation of web indicators can be used to assess top universities in a very confident way. Multi-dimensional aspects of academic interlinking are explored using G-factor, an indicator that captures the diversity of motivations in the citing behaviour of the academic elite. New scores can be also obtained from open environments, especially through Web 2.0 tools, the 21st century's new scholarly communication channel.

It is expected that findings support the purposes of the WebR ranking, as from a practical point of view universities should move from the “publish or perish” slogan to a more general mantra of “get impact or perish”. The objective is to show that there are no better and cheaper actions nowadays for achieving global impact than developing a strong web presence.

THE RANKING WEB

The Cybermetrics Lab is a research group belonging to the largest Spanish public research institution, the Consejo Superior de Investigaciones Científicas (CSIC). Since mid-1990s the team started to work on the quantitative analysis and evaluation of scientific activities and institutions by developing web indicators

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(Aguillo, 1998). In 2004, following the model of the Academic Ranking of World Universities (ARWU), the group started to publish the WebR (<http://www.webometrics.info/>).

The Ranking was originally designed to promote web publication and support Open Access initiatives (Aguillo et al., 2008), but soon it showed its capabilities to rank universities, providing a good correlation with data published by other organizations (Aguillo et al., 2010). The main discrepancies were due to bad practices in webdomain naming or incorrect strategies and policies, preventing the web presence from being an actual mirror of the institution. This is in fact one of the important added values of the WebR ranking as it identifies and provides practical information for solving these problems.

Contrary to many criticisms pointing out that only websites are really evaluated, the WebR is using web presence as an overall indicator of the performance and impact of the universities, considering all academic missions (see Figure 1) and being powered by link analysis, a tool that allows the capture of the preferences of billions of internet users in a rich and diverse scenario. Motivations for linking include traditional inter-pares citation for research recognition, references from political, economic, industrial or socio-cultural partners of the university, prestigious mentions in media, public websites or electronic forums, and from usage of quality (useful) information or data published and branded by the universities.

MISSIONS UNIVERSITIES	Citations			Patents	
	RESEARCH	TEACHING	COMMUNITY ENGAGEMENT	TECHNOLOGICAL TRANSFER	INTERNATIONALIZATION
WORLD-CLASS	+++	++	+	+++	+++
NATION BUILDING	++	+++	++	+++	++
LOCAL	+	+++	+++	+	+

← Surveys →

Figure 1. Main methods to evaluate impact (laterals) of the academic missions, according to a simple classification of universities

One of the main advantages of the WebR ranking is its large coverage, as about 20,000 higher education institutions from all over the world are analysed (Table 1). Only those universities without independent web presences are excluded (probably less than 2,000 in total).

As shown in Table 1, the WebR ranking uncovers an academic digital gap between the Top US universities and their European counterparts, while Asian universities underperform, due to the generally limited internationally oriented contents they publish on the Web.

The WebR ranking composite indicator is based on a model derived from traditional bibliometric analysis, where the most well-known indicator, the impact factor, takes into account both publication activity and the visibility of papers authored by researchers. This ratio 1:1 between number of publications (“activity”)

and number of citations (the proxy used for describing “visibility” or impact) is preserved in the WebR ranking. In order to make easier the comparison with the other rankings models this is expressed in percentages, so activity amounts for 50% of the total weighting system while visibility accounts for the other 50%.

Table 1. Comparison between the ARWU and Webometrics (WebR) Rankings results (2011). Distribution by region and selected countries

Regions	Top 100		Top 200		Top 500		Top 1000	Total
	ARWU	WebR	ARWU	WebR	ARWU	WebR	WEebR	WebR
<i>Americas</i>	57	75	100	116	184	213	434	6957
US	53	67	89	95	151	172	356	3262
Canada	4	6	8	16	22	24	38	199
<i>Europe</i>	34	16	75	58	204	221	413	5102
UK	10	7	19	10	37	37	67	236
Germany	6	2	14	12	39	47	66	405
Switzerland	4	1	6	3	7	7	10	107
France	3	0	8	1	21	9	53	570
<i>Asia/Pacific</i>	10	9	25	26	108	65	148	6648
Japan	5	2	9	6	23	12	33	716
Australia	4	2	7	6	19	12	28	103
Mainland China and Hong Kong SAR	0	1	2	5	28	14	19	1217
<i>Africa</i>	0	0	0	0	4	1	5	695

Source: ARWU (<http://www.arwu.org/>); WebR (<http://www.webometrics.info/>)

As will be shown later in this chapter, visibility measurement is also inspired by the bibliometric experience with successful citation analysis, using in this case external inlinks instead of bibliographic citations, with the important advantage of the larger (by several orders of magnitude) numbers involved. The data is collected from public commercial search engines that are ubiquitous and very simple to use.

For activity evaluation, taken into account are the different missions of the university, so the total number of webpages is only one of the variables considered. File types counted are clearly focused on different targets, not being used only for publication of formal final research papers but also for supporting teaching activities, to improve public communication of science and community engagement and transferring knowledge to the wider economic and industrial sectors. At the end, three variables are combined for this activity index: total number of webpages, number of rich files, such as pdf, doc, ppt and ps formats, and number of papers.

Compared with other rankings, the web presence is a more objective measurement of overall performance than survey-based systems, it is a proxy useful for sensitively discriminating between thousands of universities (not like others that only are useful for a few dozen) and it is having more immediate impact as it is promoting access to academic web content worldwide.

Until very recently the main objectives of this ranking were to cover as many institutions as possible and to promote web publication for supporting Open Access initiatives. But the focus on full coverage means that the elite universities below the 500th rank are not analysed in detail.

The international ranking of universities have been pursued for the so-called world-class universities a group of about 200 to 500 institutions that typically appear in the top positions in rankings. Most of them are close to the US (or neo-Humboldtian) research-intensive university model, as in these rankings the main mission evaluated is precisely research. Moreover, although research output is a relevant indicator, it is usually research impact (citations, prizes) that is the key variable for the final ranking of the universities.

The Cybermetrics Lab now believes that world-class universities presence on the web could play a significant role as a model to be followed by the rest of institutions worldwide, especially in the task of opening knowledge to broader sectors of the human population. In that sense a new indicator pertaining to the elite should be taken into account.

THE G-FACTOR

The G-factor was originally created by P. Hirst in 2006 for generating an International University Ranking (<http://www.universitymetrics.com/>; discontinued, see Figure 2). It is a web indicator developed for measuring the co-mention of the names of pairs of universities from a list of 300 well-known and prestigious institutions, as the experiment was done using the Google search engine, according to the following syntax example.

“Harvard University” and “the University of Oxford”

The indicator was coined as G-factor, being the sum of all values obtaining for each university in the crossings of the 300*300 matrix (excluding self-mentions and duplicates; the order in the pairs is irrelevant).

Although it is a clever suggestion, the use of mention analysis is problematic as the names of universities are not standardized, and sometimes the same institution uses several variants even in its local language. Also, the motivations for co-mention and the websites where this happens probably are in many situations unrelated to academic activities, undermining the value of the indicator.

Since 2006 (Aguillo et al., 2006) the Cybermetrics Lab explored the possibilities of applying a concept similar to the G-factor. Instead of using mentions, the collection of interlinking data was proposed for a limited group of institutions (about 1,000): that is, a closed source of academic links.

www.universitymetrics.com

[Home](#)

G-Factor International University Ranking 2006: Top 300

The following table shows the G-Factor international ranking for all 300 universities, along with the 2005 international university ranking by Shanghai Tao Jong University.

G-Factor Rank	SJTU 2005 Rank	Institution
1	5	Massachusetts Inst Tech (MIT)
2	1	Harvard Univ
3	4	Univ California - Berkeley
4	3	Stanford Univ
5	8	Princeton Univ
6	15	Univ Pennsylvania
7	17	Univ Washington - Seattle
8	25	Univ Illinois - Urbana Champaign
9	54	Carnegie Mellon Univ
10	43	Rutgers State Univ - New Brunswick
11	2	Univ Cambridge
12	21	Univ Michigan - Ann Arbor
13	16	Univ Wisconsin - Madison
14	12	Cornell Univ
15	73	Univ Arizona
16	6	California Inst Tech
17	27	Swiss Fed Inst Tech - Zurich
18	14	Univ California - Los Angeles
19	32	Univ Minnesota - Twin Cities
20	10	Univ Oxford

Figure 2. Snapshot of the (no-longer public) webpage of the G-factor International University Rankings* as deposited in the Internet Archive Wayback Machine**

Note: * See <http://universitymetrics.com/gfactor2006top300>.

** See <http://wayback.archive.org/web/>.

The WebR ranking (Aguillo et al., 2008) has employed link analysis since 2004 to build a visibility indicator, counting external inlinks to university web domains. Although it is not possible to use Google as it counts only links to individual pages, not to the full domains or subdomains, it was decided that the original name for the indicator should be maintained. Currently (till 2012) it can be derived from Yahoo Search! using the following syntax:

$$\text{Linkdomain:domainuniversityA} + \text{Site:domainuniversityB}$$

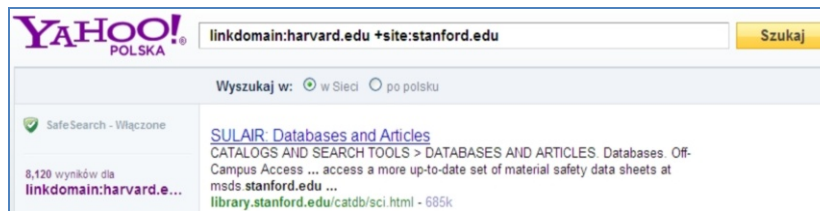


Figure 3. Example of collection of data for determining the G-factor using the Yahoo search engine with the syntax described in the text

Note: In 2012 Yahoo is going to discontinue this service. The Bing database will be used instead so the method will need to be adapted.

The G-factor was one of the components of the visibility indicator in the January 2011 edition of the WebR ranking. Considering the limitations of the Yahoo API licence and the capabilities and time allowed, that initial G-factor was obtained only for the Top 1000 universities as corresponding to the July 2010 edition of the WebR ranking.

NEW LINK-BASED INDICATORS

In the case of G-factor, the referred pages are obviously webpages owned and controlled by the university and the motivation for linking, although diverse, is related to the contents provided in these academic webdomains.

The largest section of the Webspace is not academic. In many cases the referring pages are very diverse, and links came from third parties only slightly related to universities. An overall indicator based on links of unidentified origin could be useful, as it reflects the impact of the university in other non-academic sectors, the success of the so-called third mission, the prestige in society or the relevance for individual citizens. But there are cases of over-linking due to reasons not related to performance or quality that should be excluded: marketing campaigns, portals with external contents, sponsorships, and extra domains, and bad or unethical practices (link farms).

This paper intends to describe not only the use of G-factor but also other link analysis-derived indicators in order to test their possible use in the WebR ranking. Probably the best way to arrange a classification of link-based indicators is to use the origins of such links, taking into consideration the impact of the Web 2.0 and the new tools available. A preliminary proposal is introduced in [Table 2](#).

Table 2. Classification of indicators derived from hypertextual links in the web

<i>Categories</i>		<i>Indicators</i>
General linking		Total inlinks
		External inlinks
		Internal inlinks
Selective linking	by domain	External inlinks
	by site	External inlinks
	by selected sites (G-factor)	External inlinks
Weighted linking		Domain Authority
		Domain MozRank
		Page Rank
		Others

Direct crawling probably offers a more complete alternative to collect these data (Thelwall & Stuart, 2006), but unfortunately to harvest a large section of the Webspaces requires computer and human resources beyond our capabilities. Instead we are using commercial search engines, with powerful crawlers and huge databases for extracting the required information (but see current situation in Thelwall & Sud, 2011).

METHODOLOGY

The main goal of this paper is to test the usefulness of these indicators specially for measuring the impact of the World-class Universities on the Web. The specific objectives are to:

- Describe by means of web indicators a sample of universities (linked group) which covers equally all of the inhabited continents in the world.
- Test the influence of world-class universities in WebR ranking (linking group) in the linked group, at a regional aggregation level.
- Compare the results provided by the different indicators and suggest recommendations regarding their future adoption in the Web ranking.

Two samples of university webdomains (Table 3 and appendices) were selected: The first group (linked) consist of 60 universities (10 each from the following regions: Africa, North America, South America, Asia, Europe and Oceania). The criteria used are based on the appearance and the position of these universities in the WebR ranking (January 2010 edition), taking into consideration each geographical ranking as provided by the editors. The second group (linking) consists of the first 1,000 universities ranked in the WebR ranking.

The population of linked domains (60) were used to test the new set of link indicators, collecting data during December 2010 from the general and specialised search engines as described in Tables 4 and 5.

Table 3. Region, countries and items from linked and linking group of universities

<i>Region</i>	<i>Linked domains</i>		<i>Linking domains</i>	
	<i>Countries</i>	<i>Universities</i>	<i>Countries</i>	<i>Universities</i>
Africa	2	10	1	5
Asia	5	10	13	157
Europe	5	10	28	407
North America	1	10	2	336
Oceania	2	10	3	36
South America	3	10	11	59
<i>Total</i>	18	60	58	1000

Table 4. Link-based indicators according to the source used for compiling them: Open Site Explorer (OSE) Yahoo Site Explorer (YSE) and Yahoo Search! (YS)

Indicators		Search Engine*		
		OSE	YSE	YS
General linking	Total inlinks	x	x	x
	External inlinks		x	x
Selective linking	by domain			x (see Table 2)
	by site			x (see Table 2)
	by selected sites (top 1000)			x (see Fig. 3)
Weighted linking	Domain authority	x		
	Domain MozRank	x		

Note: * OSE (<http://www.opensiteexplorer.org>), YSE (<http://siteexplorer.search.yahoo.com>), and YS (<http://search.yahoo.com>)

Internal inlinks are not explicitly recovered, but could be approximately calculated by subtracting external inlinks from total inlinks. As regards weighted linking, only Domain Authority (<http://apiwiki.seomoz.org/w/page/20902104/Domain%20Authority>) and Domain MozRank (see <http://www.seomoz.org/learn-seo/mozrank>) are considered.

The public figures for Pagerank (PR) are excluded due to its lack of discrimination (its logarithmic scale of 1 to 10 means that most universities even with far different link performances will share the same PR).

The specific domains and sites considered, and commands used with Yahoo! are shown in Table 5 (Academia, Facebook and LinkedIn are social networks, Twitter is a messaging tool and the other three are added value services: the cooperative bookmarking site Delicious, the open encyclopaedia Wikipedia and the video portal YouTube).

In domain linking, there are cases where the Top Level Domain (TLD) of the universities is the same as one of the domains considered, such as the US universities or the American University in Cairo (.edu). The command used for excluding self-links is:

$$\text{Linkdomain:domainA.edu +Site:.edu - Site:domainA.edu}$$

Additionally, Delicious is added as a selective site by using the command "site:domain" in the query box. Data extracted from Open Site Explorer (Page Authority and Domain Authority) do not need any query command.

Table 5. Examples of the strategies used for obtaining the domain and site linking commands in Yahoo! Search

<i>Indicator</i>	<i>Query</i>
Linkage – domain inlink	linkdomain:domain.tld site:.gov
	linkdomain:domain.tld site:.edu
	linkdomain:domain.tld site:.org
	linkdomain:domain.tld site:.com
Linkage – site linking	linkdomain:domain.tld site:academia.edu
	linkdomain:domain.tld site:facebook.com
	linkdomain:domain.tld site:linkedin.com
	linkdomain:domain.tld site:twitter.com
	linkdomain:domain.tld site:delicious.com
	linkdomain:domain.tld site:wikipedia.org
	linkdomain:domain.tld site:youtube.com

RESULTS

Data were obtained for the interlinks between the two populations described. As already observed elsewhere (Aguillo et al., 2008) the role of US universities in the organization of academic Webspaces is very relevant, with local universities also important for national or regional self-organization, as between the Australian or British top institutions (Table 6). Moreover, this data shows some asymmetries among geographical areas. For example, South America receives 4% (8392 links) of their inlinks from Europe, and Europe receives 1.20% (19,210 links) from South America. Despite some methodological differences, this situation has been previously detected (Orduña-Malea, 2011).

Table 6. Interlinking by region

<i>Links to</i>	<i>Links from</i>						<i>Total</i>
	<i>Africa</i>	<i>Asia</i>	<i>Oceania</i>	<i>Europe</i>	<i>South America</i>	<i>North America</i>	
Africa	4.77%	0.28%	0.76%	1.70%	0.08%	92.41%	53023
Asia	0.15%	31.05%	2.65%	8.92%	0.16%	57.07%	1660981
Oceania	0.22%	10.46%	42.69%	27.98%	0.18%	18.46%	291537
Europe	0.66%	2.66%	4.15%	38.47%	1.20%	52.86%	1600813
South America	0.26%	0.91%	2.41%	4.00%	43.65%	48.77%	209798
North America	0.90%	2.99%	4.09%	13.17%	0.64%	78.21%	2306792
Total	37604	660033	334732	1158633	128672	3803270	6122944

As there are even more US universities in the group of world-class universities, the rest of the world's countries should clearly increase the volume of international quality contents to attract more external links in order to avoid enlarging the academic digital gap.

Selective Linking by Selected Sites (G-Factor)

When considering individual universities, the list is also headed by US institutions, attracting most of the links, but the other countries included also perform reasonably well (Table 7).

Again major discrepancies between G-factor and Web Ranking affects mainly non-US universities. They attract large numbers of academic inlinks but their web contents appear not to attract the interests of non-academic websites.

Table 7. Ranking of the top 20 universities according to G-factor

<i>Universities</i>	<i>Domain</i>	<i>G-Factor</i>	<i>Rank Web</i>
Massachusetts Institute of Technology	<i>mit.edu</i>	1430548	1
University of Southampton	<i>soton.ac.uk</i>	437809	32
University of Wisconsin Madison	<i>wisc.edu</i>	399413	6
University of California Berkeley	<i>berkeley.edu</i>	387958	4
Stanford University	<i>stanford.edu</i>	377188	3
Harvard University	<i>harvard.edu</i>	329789	2
National Taiwan University	<i>ntu.edu.tw</i>	321523	12
University of Michigan	<i>umich.edu</i>	217986	7
University of Minnesota	<i>umn.edu</i>	217632	8
Cornell University	<i>cornell.edu</i>	187463	5
University of Cambridge	<i>cam.ac.uk</i>	176134	19
University of Washington	<i>washington.edu</i>	162196	9
Swiss Federal Institute of Technology Zürich	<i>ethz.ch</i>	125897	43
University of Oxford	<i>ox.ac.uk</i>	118458	41
University of Melbourne	<i>unimelb.edu.au</i>	107526	86
Johns Hopkins University	<i>jhu.edu</i>	93097	49
University of Tokyo	<i>u-tokyo.ac.jp</i>	77576	16
University College London	<i>ucl.ac.uk</i>	76201	31
University of Edinburgh	<i>ed.ac.uk</i>	65427	67
National University of Singapore	<i>nus.edu.sg</i>	61120	92

Table 8. General and domain linking correlation

<i>Indicators</i>	<i>External</i>	<i>Total</i>	<i>GOV</i>	<i>EDU</i>	<i>COM</i>	<i>ORG</i>
External inlink	x	0.96	0.91	0.82	0.96	0.92
Total inlink	0.96	x	0.86	0.73	0.92	0.87

Selective Linking by Domain

We used the other link indicators for a deeper analysis. The raw data is provided in the appendices, which provided the basis for performing Spearman correlations. The domain linking results (Table 8) show that the domain .com provides the higher value while the domain .edu, the standard for US universities, shows the lower one.

Although the world-class universities are linking strongly to US universities, these results confirm that non-academic links are more important. Figure 4 addresses this evidence by tailoring the number of external link-ins depending on the Top Level Domain where hyperlinks originate, for the top 30 universities by total external links. These data show the predominance of .com links in the top universities, which correlates with results obtained in Table 8.

As a corollary, the local or non-research oriented universities may not be providing a lot of links, being at the Webspaces periphery of the elite nucleus.

Selective Linking by Site (Platforms)

Table 9 provides interesting evidence about the relevance of certain sources of links, especially those related to Web 2.0. The role of these tools for increasing the visibility and impact of university websites is substantiated. The added-value services (Wikipedia, Delicious and YouTube) clearly outperform the social networks (Facebook, LinkedIn).

Figure 5 shows the performance of each social platform considered regarding the number of inlinks. As for domain linking, we can observe that the platforms that generate more hyperlinks to universities (Delicious and Wikipedia) are the platforms with more correlation with total external links, as showed in Table 9.

Table 9. General and Selective linking correlation

<i>Indicators</i>	<i>Academia</i>	<i>Delicious</i>	<i>Facebook</i>	<i>LinkedIn</i>	<i>Twitter</i>	<i>Wikipedia</i>	<i>YouTube</i>
External inlink	0.68	0.87	0.64	0.72	0.78	0.89	0.88
Total inlink	0.61	0.83	0.55	0.67	0.75	0.84	0.85

Otherwise, drop values are detected in specific universities and platforms (for example, National Taiwan University and National Chiao Tung University in Academia; Universidade de Brasília and Keio University in Facebook; or Cairo University both on Academia and Twitter). This phenomenon might be understood as a function of the promotion of these universities in the corresponding platforms.

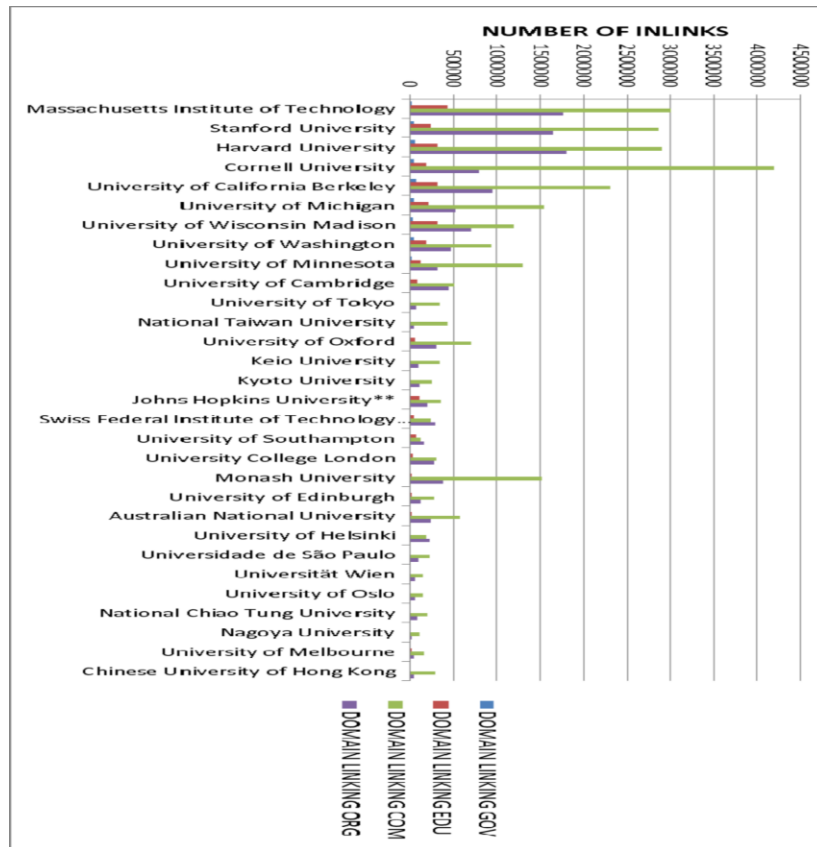


Figure 4. Number of external links for the top 30 universities with more total external links, depending on the top-level domain (TLD) of origin (.gov, .edu, .com and .org)

Weighted Linking (Domain Authority and Domain MozRank)

Sometimes it is assumed that many inlinks to universities are institutional ones, driven by the prestige related to the academic nature of the organization (directories of universities, for example) and not to the actual content of the websites.

Although links to the main pages of universities are common, it can be expected that deeper linking (department or personal pages) is responsible for most of the “citing” behaviour. In this sense, the use of weighted indicators such as Domain Authority (DomA) and Domain MozRank (DMzR) can provide some insights about the linking performance of internal sites within general homepages,

regarding also the nature and importance of the linking sites on the web, in a similar way as PageRank (PR) does.

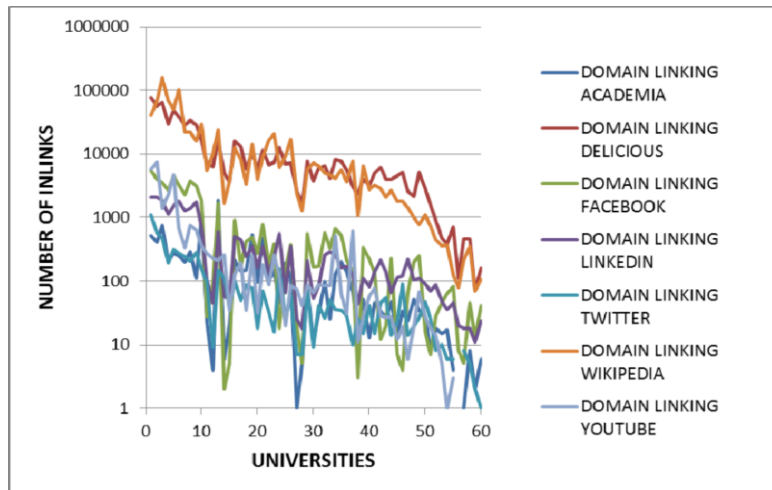


Figure 5. Number of links received for each 60 linked universities depending on the platform of origin

The results from Table 10 indicate that the role of the internal links is limited and when external links are considered (total linking correlation is less good than external linking), which is consistent with the fact that not only are institutional links relevant but also those related to contents nested in directories or different servers to the main institutional one.

Table 10. General and weighed linking correlation

Indicators	DomA	DMzR
External inlink	0.87	0.72
Total inlink	0.78	0.62

Moreover, the correlation between these two indicators is strong (Figure 6), and also can be used to compare the prestige of academic websites. In this case (taking into account that the scale of these indicators is from 0 to 10), no website has fewer than 5 points either in DMzR nor DomA. Otherwise, only one university surpasses 8 points (Keio University, DMrR: 8.04).

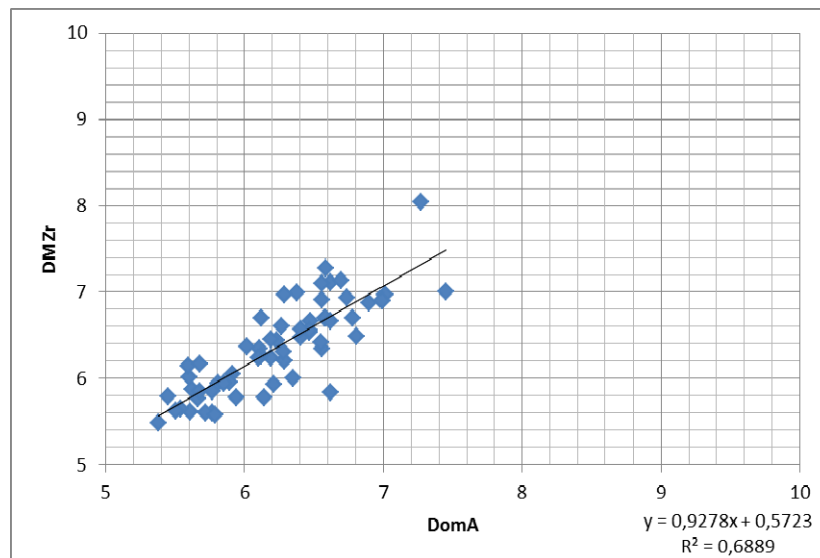


Figure 6. Linear regression between DomA and DMzR

CONCLUSIONS

Academia is changing very fast and rankings should catch up to these changes. Traditional research indicators (bibliometrics) are not taking into account the impact of digital technologies in the university, the new ways of internal and external communication of scholars, researchers and students and the relevance of the Open Access products and services being developed and offered worldwide.

Web publication is especially suited for measuring personal the commitment of both individuals and institutions and it is clearly correlated with investment in resources, excellence in teaching and/or research and the success of community engagement policies. Best practice and plausible medium and long-term strategies should seek to reflect the role of the web.

But to achieve these aims, further webometric developments are needed, including improved indicators for identifying highly linked webdomains and websites, variables with discriminant capabilities for measuring multimedia environments, management systems and the degree of appropriation of Web 2.0 related technologies.

In some cases the success of Open Access initiatives can explain rankings (University of Southampton, National Taiwan University), while in others learning-supporting materials (such as OpenCourseWare from Massachusetts Institute of Technology) explain better the top position. Overall, prestige driven links are also to be considered.

Feasibility issues pertain but a solution can be proposed. If the focus is on world-class universities, not only is data collection easier but the indicators shown

are meaningful enough so that the ranks obtained can be more accurate and reliable. It is because selective linking avoids external links from dubious sites, reducing the noise and giving more importance to the academic websites. G-factor is an important factor for future developments.

Empirical results provide some suggestions for improving rankings. The proposed changes in methodology are oriented to obtain better accuracy in the ranking processes but also to guide further actions by universities in the way they share the knowledge they generate.

Link visibility is the most important indicator in the Webometrics model (50% of the total weight of the composite indicator). Total number of external inlinks has been the preferred set of statistics till now, but in order to reflect explicitly academic impact, the G-factor obtained from interlinking between world-class universities has been tested and supported by evidence. Additionally inlinks from other sources has been tested with positive results, as they not only represent the new academic Web 2.0 environments but also correlate well with global visibility.

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AFFILIATIONS

Isidro F. Aguillo
The Cybermetrics Lab
Spanish National Research Council (CSIC), Spain

Enrique Orduña-Malea
Institute of Design and Manufacturing (IDF)
Polytechnic University of Valencia (UPV), Valencia, Spain

APPENDICES: *Weighted linking (Domain Authority and Domain MozRank)*

UNIVERSITIES	URL	GENERAL LINKING			DOMAIN LINKING			WEIGHTED LINKING		
		EXTERNAL INLINK	TOTAL INLINK	GOV	EDU	EDU (Ex)	COM	ORG	DomA	DMER
University of Cambridge	cam.ac.uk	1328439	163090	3690	81700	500000	446000	6.56	7.10	
University of Oxford	ox.ac.uk	1168145	1882232	2380	57300	698000	306000	6.59	7.28	
Swiss Federal Institute of Technology ETH Zürich	ethz.ch	693353	1161025	2960	45600	241000	299000	6.59	6.70	
Norwegian University of Science and Technology	ntnu.no	318157	535945	143	12600	126000	35500	6.28	6.31	
University of Edinburgh	ed.ac.uk	560159	872048	1030	20700	277000	119000	6.56	6.91	
University of Oslo	uio.no	478144	821696	633	8110	156000	61100	6.23	6.44	
University College London	ucl.ac.uk	637384	987767	10100	27500	304000	276000	6.81	6.49	
University of Helsinki	helsinki.fi	532167	877824	506	11700	188000	235000	6.62	5.84	
Universität Wien	univie.ac.at	511231	728483	480	10100	157000	57500	6.62	6.66	
University of Southampton	sooton.ac.uk	685975	921052	4390	66800	126000	168000	6.48	6.66	
University of Tokyo	u-tokyo.ac.jp	1251464	2905309	1120	9280	349000	79000	6.56	6.35	
Kyoto University	kyoto-u.ac.jp	832699	1693072	744	8630	253000	108000	6.35	6.01	
National Taiwan University	ntu.edu.tw	1195956	2985357	430	4530	425000	50200	5.94	5.78	
University of Hong Kong	hku.hk	362727	735439	1940	9040	198000	54200	6.29	6.21	
Chinese University of Hong Kong	cuhk.edu.hk	374119	786294	1870	5920	297000	44100	6.21	5.94	
Hebrew University of Jerusalem	huji.ac.il	248510	374966	347	19500	121000	503000	6.11	6.35	

THE RANKING WEB AND THE “WORLD CLASS” UNIVERSITIES

APPENDICES: *Continued*

Kero University	895855	1421548	113	2910	348000	96500	7.27	8.04
National University of Singapore	324565	558956	416	47600	195000	75900	6.41	6.48
National Chiao Tung University	422529	957058	106	1520	207000	81700	5.61	5.62
Nagoya University	383689	699458	495	4060	118000	20900	6.14	5.78
Australian National University	536551	841060	915	25600	577000	240000	6.47	6.56
Monash University	578472	802914	300	23000	1520000	382000	6.38	6.99
University of Sydney	300339	546989	422	15900	177000	42100	6.41	6.57
University of New South Wales	315157	560155	430	14100	178000	53100	6.19	6.45
University of Melbourne	380648	668028	4270	15400	159000	48000	6.29	6.97
University of Queensland	271172	492772	556	8720	136000	117000	6.55	6.42
University of Adelaide	203680	251159	368	8140	128000	38800	6.27	6.61
University of Auckland	198581	289587	199	8590	119000	51600	6.02	6.37
Queensland University of Technology	107875	157925	65	4110	39700	13800	6.12	6.70
University of Western Australia	170261	276912	226	11500	80600	27900	6.12	6.26
University of Cape Town	123561	227610	140	7940	50200	18900	6.1	6.24
University of Pretoria	4191	5714	3	1250	1990	1300	5.5	5.63
Stellenbosch University	49779	87397	69	1210	23200	7220	5.85	5.95
University of the Witwatersrand	647	7828	12	271	4920	1710	5.79	5.58
Rhodes University	36912	54745	32	1040	20300	6220	5.68	5.85
University of Kwazulu Natal	27922	46620	22	1620	14800	7420	5.77	5.85
University of the Western Cape	17923	42244	41	813	10900	6930	5.54	5.65
University of South Africa	12291	15834	12	583	10200	2200	5.72	5.60

APPENDICES: *Continued*

Cairo University	cu.edu.eg	21215	25528	12	286	14400	4800	5.38	5.49
American University in Cairo	aucegypt.edu	24012	33368	20	33300	12400	4930	5.68	6.17
Harvard University	harvard.edu	5404266	7100048	61500	2020000	317000	1800000	6.62	7.11
Massachusetts Institute of Technology	mit.edu	7979362	12140652	23800	5330000	427000	3010000	1760000	6.70
Stanford University	stanford.edu	5476147	7363772	43900	2310000	244000	2860000	1640000	7.45
University of California Berkeley	berkeley.edu	4229933	5923457	74000	2200000	317000	2310000	954000	6.9
Cornell University	cornell.edu	4793957	6725718	44700	2050000	189000	4200000	794000	6.7
University of Washington	washington.edu	1879823	2858599	47300	1600000	188000	931000	461000	6.99
University of Minnesota	umn.edu	1760192	2818007	19000	1430000	125000	1300000	328000	6.47
Johns Hopkins University**	jhu.edu	710823	973179	3050	509000	118000	364000	202000	6.58
University of Michigan	umich.edu	2603440	388005	40300	1840000	217000	1540000	517000	7.01
University of Wisconsin Madison	wisc.edu	2366262	3851948	31200	1950000	325000	1200000	696000	6.74
Universidade de São Paulo	usp.br	532113	1229228	351	5690		230000	104000	6.19
Universidade Estadual de Campinas	unicamp.br	193366	626002	129	2210		99300	29600	5.89
Universidad de Chile	uchile.cl	200807	343984	104	2770		140000	16700	5.91
Universidade Federal de Santa Catarina	ufsc.br	137157	334801	53	978		95100	19600	5.45
Universidade Federal do Rio Grande do Sul	ufrgs.br	149629	279505	83	3450		80200	15100	5.77
Universidade Federal do Rio de Janeiro	ufrj.br	182552	357167	72	4450		97600	18700	5.6
Universidad de Buenos Aires	uba.ar	131607	253817	86	1760		101000	19400	5.66
Universidade Federal de Minas Gerais	ufmg.br	97004	207139	24	1280		54000	9330	5.59
Universidade Estadual Paulista	unesp.br	79896	195334	64	532		34400	38300	5.62
Universidade de Brasília	unb.br	220896	303623	47	738		93500	30300	5.81

THE RANKING WEB AND THE “WORLD CLASS” UNIVERSITIES

APPENDICES: *Continued*

UNIVERSITIES	URL	SELECTIVE LINKING						
		ACADEMIA	DELICIOUS	FACEBOOK	LINKEDIN	TWITTER	WIKIPEDIA	YOUTUBE
University of Cambridge	cam.ac.uk	1100	16198	1850	717	151	29800	357
University of Oxford	ox.ac.uk	1820	16301	1700	593	149	24200	211
Swiss Federal Institute of Technology ETH Zürich	ethz.ch	144	12861	175	440	50	8240	192
Norwegian University of Science and Technology	ntnu.no	25	4105	325	294	50	4650	85
University of Edinburgh	ed.ac.uk	476	11459	782	344	69	8940	182
University of Oslo	uio.no	114	7163	373	345	58	17000	83
University College London	ucl.ac.uk	536	10269	490	348	78	14000	246
University of Helsinki	helsinki.fi	146	7416	378	239	16	20800	253
Universität Wien	univie.ac.at	194	6946	152	65	25	9200	20
University of Southampton	soton.ac.uk	149	5787	415	244	88	3290	34
University of Tokyo	u-tokyo.ac.jp	23	7233	28	104	99	5490	272
Kyoto University	kyoto-u.ac.jp	21	3597	5	53	38	3700	34
National Taiwan University	ntu.edu.tw	4	6255	91	45	9	10200	228
University of Hong Kong	hku.hk	31	5999	172	83	41	6560	86
Chinese University of Hong Kong	cuhk.edu.hk	11	3771	166	53	9	7250	65
Hebrew University of Jerusalem	huji.ac.il	67	3010	144	124	10	7600	614
Keio University	keio.ac.jp	6	4962	2	57	112	1680	255
National University of Singapore	nus.edu.sg	98	6628	563	258	26	5000	83
National Chiao Tung University	netu.edu.tw	1	2604	19	25	7	2390	75
Nagoya University	nagoya-u.ac.jp	5	1678	5	18	7	1270	42

APPENDICES: *Continued*

Australian National University	103	6712	183	134	32	16600	86
Monash University	96	5802	269	162	18	3970	31
University of Sydney	200	7720	526	162	34	5620	61
University of New South Wales	124	8234	673	256	36	4160	528
University of Melbourne	84	7641	560	204	75	5820	87
University of Queensland	137	5638	215	171	29	3620	30
University of Adelaide	51	4017	334	111	15	6640	28
University of Auckland	46	5035	134	138	15	3180	77
Queensland University of Technology	34	5113	250	110	27	786	68
University of Western Australia	47	3979	228	66	14	2640	27
University of Cape Town	52	2135	203	104	19	1010	19
University of Pretoria	2	72	13	11	2	71	0
Stellenbosch University	18	909	28	88	8	443	14
University of the Witwatersrand	6	159	41	24	1	109	1
Rhodes University	15	478	46	49	10	357	5
University of Kwazulu Natal	17	385	64	35	6	368	1
University of the Western Cape	1	456	5	18	8	213	3
University of South Africa	8	461	46	18	5	351	0
Cairo University	0	111	8	20	0	79	0
American University in Cairo	4	718	82	45	6	124	3
Harvard University	756	63799	3520	1840	474	159000	1390
Massachusetts Institute of Technology	517	77795	5410	2090	1100	40800	5740
Stanford University	410	56758	3970	2080	574	69200	7410

THE RANKING WEB AND THE “WORLD CLASS” UNIVERSITIES

APPENDICES: *Continued*

University of California Berkeley	berkeley.edu	269	48383	4570	1530	316	49500	4700
Cornell University	cornell.edu	204	29485	2660	1140	191	68100	2290
University of Washington	washington.edu	294	34017	3800	1400	209	21700	750
University of Minnesota	umn.edu	110	28912	3140	1750	282	15900	636
Johns Hopkins University**	jhu.edu	210	15989	900	505	100	12600	125
University of Michigan	umich.edu	247	37574	3260	1790	271	101000	676
University of Wisconsin Madison	wisc.edu	200	28494	2270	1290	239	22000	336
Universidade de São Paulo	usp.br	45	12437	18	546	155	6220	119
Universidade Estadual de Campinas	unicamp.br	33	6200	12	212	45	2890	29
Universidad de Chile	uchile.cl	13	3231	222	81	41	2740	58
Universidade Federal de Santa Catarina	ufsc.br	33	5100	4	122	91	1770	19
Universidade Federal do Rio Grande do Sul	ufrgs.br	14	4506	7	116	23	1790	12
Universidade Federal do Rio de Janeiro	uffj.br	26	3957	20	140	54	2070	27
Universidad de Buenos Aires	uba.ar	24	2597	66	220	14	1460	6
Universidade Federal de Minas Gerais	ufmg.br	27	2884	16	90	47	1090	27
Universidade Estadual Paulista	unesp.br	8	1601	7	71	25	728	18
Universidade de Brasília	unb.br	17	2336	3	44	26	1070	11