University Global Ranking Systems

By Martin Kirk

Universities may have been around for over 1,000 years, but we have never been under more pressure to justify the investment society makes in us. This is an interesting challenge. The public believe we do good work but once they move beyond the undergraduate part of the academy the value of research is a bit of an unknown.

The new reality is that 'knowledge for knowledge's sake' is no longer sufficient justification for the investment in university research. Governments are targeting funding to specific areas of research (e.g. green energy, genomics, business) and looking for direct and measurable socio-economic benefits.

Governments and universities are now looking at global ranking systems and other assessment tools to measure their competitiveness and the return on investment made in research. This article seeks to educate the reader on the basics of global ranking systems, including what measures the systems use, how they differ, their limitations and what this means for us as the research administration community. My hope is that a better informed research community will allow us to understand the important context around global rankings and assessment systems.

Why do ranking and assessment systems exist? The university global rankings have become a gold standard measure of national competitiveness and innovativeness. The first serious ranking system was the Academic Ranking of World Universities (ARWU/Shanghai) compiled by the Shanghai Jiao Tong University. The purpose of the ARWU system, funded by the Chinese government, was to measure the gap between their own universities and world class institutions. The other two most influential ranking systems are the Times Higher Education (THE) World University Rankings and the QS World University Rankings

The big three ranking systems (ARWU, THE and QS) are worth looking at more closely to see how institutions vary in their rankings by each system. Figures 1 - 3 examine the actual indicators and weightings within each ranking system.

Let us examine the profile of an institution that will rank highest in each system.

ARWU/Shanghai http://www.arwu.org The university that will rank highest in the ARWU system will be among the elite institutions of the world, been in existence for a long time, enjoy substantial funding to hire the very best researchers (Nobel and Fields awardees – 25% of total score), be very large with a huge professoriate of world, top ranking, highly productive (publishing) professors with a strong focus on health research and natural, physical and social sciences. This is a highly quantitative system, and is entirely focused on research.

QS http://www.iu.qs.com/university-rankings/world-university-rankings The university that will rank highest in the QS system has been in existence

Figure 1. ARWU/Shanghai World Ranking indicators

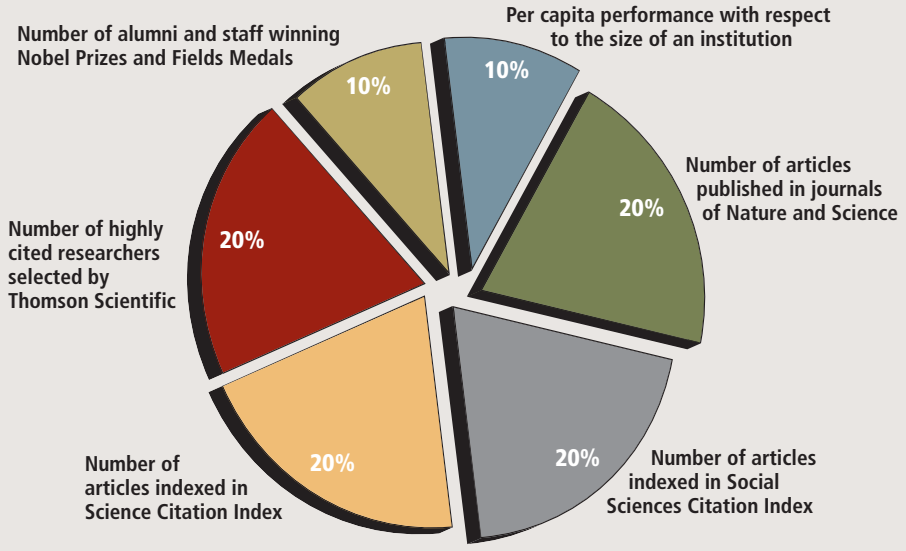
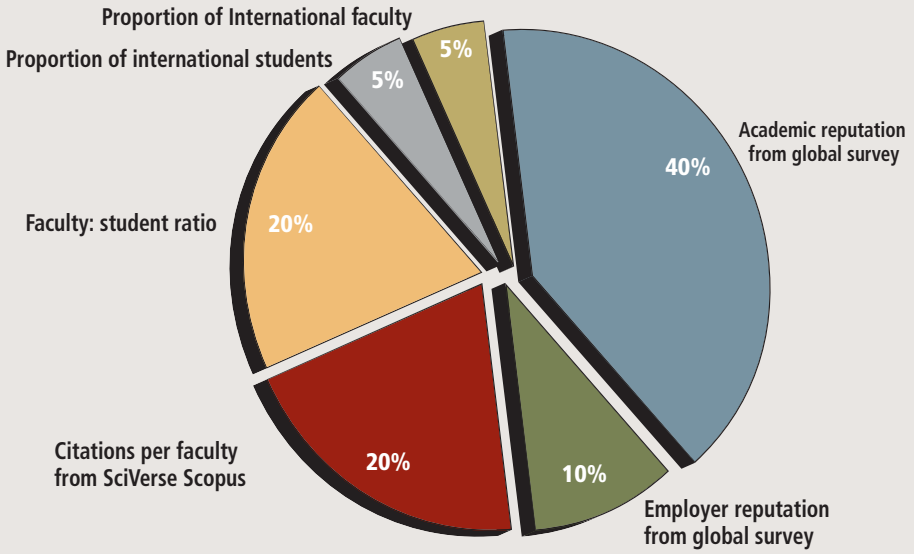


Figure 2. QS World Ranking indicators



for a long time and has a very strong global brand recognition and reputation. It does not need to be large but must have a high quality professoriate that are prolific publishers and publishing in traditional scholarly journals. Thus, a focus on medicine, science, and engineering will score highest. This institution will enjoy a large proportion of international faculty and students. The QS system is less on the elitist side of the continuum in rating research excellence in that it looks at the productivity i.e. citations/research instead of citation impact which would measure impact on peer researchers rather than raw productivity. The QS system relies on much more subjective criteria (reputational surveys) for a large portion (50%) of the overall score and also brings students into the picture e.g. faculty to student ratio.

THE http://www.timeshighereducation.co.uk/world-university-rankings
The institution that scores highest in the THE system is a large university that has been in existence for a long time, has a global reputation for excellence in teaching and research, a large number of faculty in medicine, science and engineering where research funding is highest and many publications in traditional scholarly journals. This institution has a high degree of international students and faculty and strong partnership with industry as well as a successful technology transfer group.

The upper reaches of all three ranking systems are very consistent and include: Harvard, Stanford, MIT, Oxford and Cambridge. Other institutions further down the ranking are usually fairly consistent. The University of British Columbia (for example), ranged from 30 (THE) position to 39 (ARWU) in 2012. The University of Toronto ranged from 19 (QS) to 27 (ARWU) in 2012. These are all old, established, well-funded, institutions brimming with world class, top ranking faculty. One can clearly see that the three systems have significant differences in profile and one would expect to see dramatic variation in how institutions rank in each system (see table 1) once we move further down the rankings.

Table 1 illustrates some of the consistent rankings (UBC and Toronto) and inconsistent rankings (the others) from the three systems demonstrating that different metrics can cause widely contradictory rankings. For example, Nanyang and Tsinghua likely do poorly in the ARWU rank likely because, although they are superb research institutions, they are fairly new and have less absolute research output. Karolinska does well in ARWU and THE but likely poorly in QS probably related to poor performance in the reputational survey metric (i.e. although it is a superb research institute it does not have the global brand recognition it deserves based on scholarly output/impact). The University of Copenhagen does well in ARWU and QS but poorly in THE, which may relate to the teaching environment metric.

These ranking systems also rely heavily on bibliometrics which ignore a very large part of the academy (e.g. social sciences, humanities and

Figure 3. The Times Higher Education (THE) World Ranking indicators:

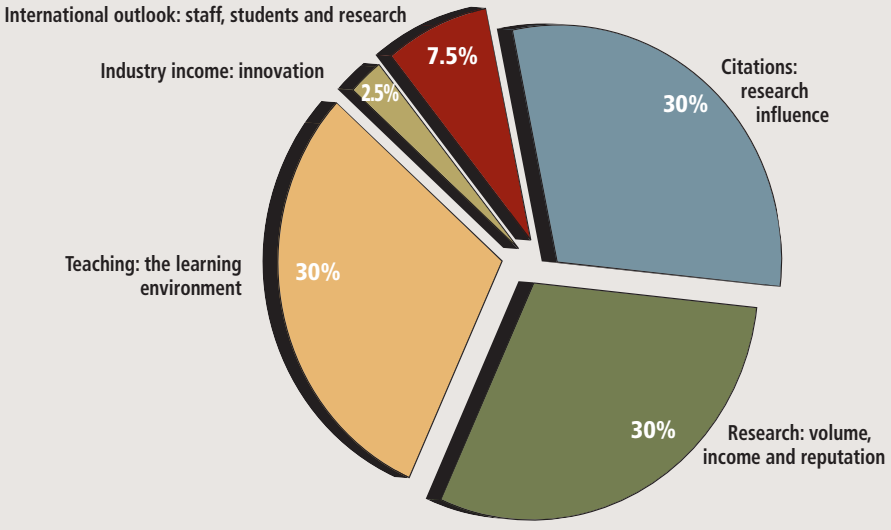


Table 1. 2012 Ranking of Select Universities in the ARWU, QS and THE Systems

Institution	ARWU	QS	THE
University of British Columbia	39	45	30
University of Toronto	27	19	21
McGill University	63	18	34
Pennsylvania State University	49	101	61
University of Washington	16	59	24
Tsinghua University	151-200	48	71
Karolinska Institute	42	221	42
Nanyang University	201-300	47	86
University of Copenhagen	44	51	135

Research Administration... By the NUMBERS

11.5%...

FY12 "R01 equivalent" NIH proposal success rate for first timers.

$2,004,482,000...

Total R&D expenditures at Johns Hopkins University, tops on the NSF FY10 *HERD Survey*.

348...

Number of National Academy Members at Harvard University, number one in the U.S., as reported in the *2011 CMUP Top American Research Universities Report.*

891...

Number of Doctorates awarded at UC Berkeley, number one in the U.S., as detailed in that same *2011 CMUP Top American Research Universities Report.*

39...

Number of years Patrick Green (*Vanderbilt University*) has been a member of NCURA.

Sources:
http://report.nih.gov/success_rates/index.aspx
http://nsf.gov/statistics/nsf12330
http://mup.asu.edu

Want to share numbers? Email Derek Brown at derekbrown@wsu.edu

fine arts) that do not routinely publish in the traditional scholarly journals. Clearly, a university that focuses more on the social sciences than the medical, science and engineering disciplines will be disadvantaged. On the other end of the spectrum are the "reputational" survey type indicators that are clearly more subjective.

Another issue is that some ranking systems focus on absolute research productivity (e.g. ARWU) and so favor the very large research universities. Other ranking systems favor relative research productivity measures (e.g. THE, Leiden and HEEACT. See url below for details of other ranking systems.) so they are studying the efficiency of an institution to produce impact/output as opposed to merely the total output. http://www.shanghairanking.com/resources.html

The real shortcomings of some of the ranking systems are them relying on quantitative metrics (input or output versus impact) that only tell part of the story. They also rely on subjective surveys. The global research community is struggling with this very same issue since our governments do not necessarily value activity and want evidence of research impact that makes life better for society and tax payers/voters.

One has to bear in mind that these global ranking systems focus on a very small number (~3%; 500 of 17,000) of global institutions, representing the world's elite research institutions. However, are these rankings a useful indicator of the world's innovation capacity?

The future of research impact metrics will certainly continue to focus on quantitative key performance indicators (KPIs) but will surely include a hybrid model where activity (funding, publications) is considered along with research peer impact (citation, citation impact, h-index, etc.) and some form of evolved research impact statements (as used in the UK, REF assessment) with embedded quantitative data that are assessed and scored. The success of the hybrid impact statement/scoring will depend on the transparency of the assessment process and the fairness of the scoring, etc.

How does this impact research administrators? The most important piece of advice to take away from this piece is that as we (professional research administrators) are being pushed to develop research impact metrics and institutional KPI's, we need to bear in mind the subtleties of the various ranking and assessment systems. We need to remember that we have large number of scholars that carry out very important research of great value but do not publish in the traditional scholarly journals, so they may not rank well in the purely quantitative measure, e.g. bibliometrics. We also need to ensure that the scorecards we build contain metrics that capture qualitative evaluation of direct research impact and that, overall, we are not creating a reward scheme that creates perverse incentives.

My hope for the future is that we work together as a global research administration/management community to create a new scorecard of research impact metrics that measures what we believe to be important indicators of research impact, excellence, and societal value. N

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