Research performance evaluation of leading higher education institutions in Malaysia

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We carried out a research performance analysis of leading higher education institutions in Malaysia using bibliometric data from the latest (2014) release of the Scimago Institutions Rankings (SIR). We tracked the complete performance chain: input–output–excellence–outcome–productivity using indicators that represent quantity, quality and productivity dimensions. The quantity dimensions are size-dependent, whereas the quality and productivity dimensions are size-independent. The largest active institutions, the most productive institutions and the fastest improving institutions over the period 2009–2014 were also identified.

Keywords: Bibliometrics, higher educational institutions, performance chain, research performance.

In most countries, the higher education institutions (HEIs) taken together are the biggest contributors to academic research output. In the latest Scimago Institutions Rankings (SIR) World Reports (http://www.scimagoir.com/), all 22 of the top research organizations in Malaysia ranked by output belonged to this sector. These can be considered as significant research-intensive organizations. The first global university rankings of HEIs became available in 2003 when Shanghai Jiao Tong University published the results in what is now known as the Academic Ranking of World Universities (http://www.shanghairanking.com/ARWU2014.html). The Shanghai ARWU rankings, as well as many other similar rankings, e.g. the Leiden rankings, the Taiwan Higher Education Administration Education Council University ranking (HEEACT), and the EU Assessment of University-Based Research (AUBR) are based mainly on research indicators and focus predominantly on indicators related to the research function of the universities.

The SIR rankings stand out in that they are comprehensive and rigorous, and also transparent as they are based on Scopus data. One new feature that has been introduced is the indicator called the scientific talent pool (STP), which is the number of authors from an institution in the total publication output of that institution during a particular period of time. This indicator can be taken as a reasonable proxy of the input that goes into scientific research activity.

The SIR reports also give output indicators which can be interpreted as belonging to quantity (size-dependent) and quality (size-independent) dimensions. This allows us to compute a size-dependent composite performance indicator which is the measure of the outcome of the research effort. The ratio of the outcome to the input then becomes a measure of the productivity of the institution, and this is expected to be a size-independent indicator. Also, note that the ratio of the quantity of output to input is another proxy for productivity but without taking into account the quality of research. We thus have an end-to-end performance analysis based on the input–output–excellence–outcome–productivity depending on six indicators.

The Malaysian higher education system has evolved gradually from its first public university established in 1959 to 20 public universities at present. Since the 1990s, the increasing student demand in Malaysia for university education has led to the changing higher education scenario in the country. The Malaysian parliament passed The Private Higher Educational Institutions Act and the National Accreditation Board Act in November 1996, which led to the establishment of private universities – Multimedia University as well as branch campus of foreign universities such as Monash University, University of Nottingham and University of Newcastle among others. In parallel, there also exist many private colleges with offer split degrees with international universities in various modes.

In 2006, the Ministry of Higher Education (now merged with the Ministry of Education) identified four research universities – University of Malaya (UM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM) and Universiti Putra Malaysia (UPM) as part of the National Higher Education agenda to enhance the traditional teaching universities to promote research activities and postgraduate training, and meet the aspirations of the country to establish world-class universities. In line with this, these four universities were provided an additional research funding of about RM100 million yearly. In 2012, Universiti Teknologi Malaysia (UTM) was identified as the fifth research university in Malaysia. In parallel, the annual research budget to the Ministry of Science, Technology and Innovation (MOSTI) and Ministry of Higher Education (MOHE) has been increased significantly in the last 7 years to assist researchers from universities and research institutions.

Recent bibliometric studies show that Malaysian research productivity has seen an unprecedented growth in research papers indexed by Scopus as well as the Thomson-Reuters Web of Science since 2005.

The latest version of the SIR report which has been released on-line in August 2014, allows us to see the time evolution of leading research institutions over a six-year