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Impact of Global Rankings on Higher Education Research and the Production of Knowledge

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United Nations
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FOREWORD

The UNESCO Forum on Higher Education, Research and Knowledge is pleased to publish this Occasional Paper entitled the *"Impact of Global Rankings on Higher Education Research and the Production of Knowledge"*. This develops a Research Summary, selected as a key presentation, presented by Dr Ellen Hazelkorn, Ireland, at the Global Research Seminar held in Paris, 28 to 29 November 2008 on the theme of *Sharing Research Agendas on Knowledge Systems.* This Seminar gathered together some 100 researchers from over 50 Member States and experts from UNESCO's IGO and NGO partner organizations such as OECD, WHO, FAO and NEPAD, which carry out work in this important area.

It is appropriate to situate this publication in relation to the aims of the UNESCO Forum and, thus, to contextualize current issues related to Higher Education, Research and Innovation research systems (known as HERI). The UNESCO Forum focuses on the role and status of research systems (whether national, regional or global) and international trends in this domain in relation to the challenges posed by the Knowledge Society of the twenty-first century. Located at UNESCO and supported by the Swedish International Development Agency (Sida), the UNESCO Forum provides a platform for researchers, policy-makers and relevant stakeholders to engage critically with the key elements underpinning research systems: (i) policy trends; (ii) infrastructure; (iii) human capacity and (iv) investment.

This project has assured follow-up action for two major UNESCO world conferences, the 1998 World Conference on Higher Education, "*Higher Education in the twenty-first century*" and the 1999 World Conference on Science, "*Science for the twenty-first century*", and links closely to the intergovernmental programme for the *Management of Social Transformation* (MOST), located in the Sector of Social and Human Sciences (SHS), UNESCO.

Today, unprecedented emphasis is being placed on research as the key motor for advancing the knowledge society and its offspring, the knowledge economy. Consequently, *research on the state of research* has moved high on the priority agendas for governments, for their specialized agencies and bodies devoted to this area, and for higher education institutions. Thus, mapping and analyzing their systems has become essential in order to acquire an understanding of their functioning and, therefore, future requirements. This systemic approach necessitates the study of specific issues arising from the various areas involved:

- Comparing methodologies for the study of knowledge systems.
- Case studies related to higher education (notably universities), to the mapping and analysis of research systems.
- Specific dimensions of knowledge systems (*inter alia*: policies, governance, infrastructure, human resources, research output, cooperation agreements and emerging tensions and dynamics).

This Occasional Paper provides an opportunity for an in-depth study of university ranking systems. In recent years, these have emerged as powerful yet controversial instruments which exert considerable influence in the higher education policy-making arena. Ranking systems are important indicators for research universities seeking to brand themselves as world-class entities in this field. At the same time, they have attracted the attention of governments seeking to build higher education systems which assure quality provision in both research and teaching.

The UNESCO Forum expresses its gratitude to the author Dr Ellen Hazelkorn, who is Director of Research and Enterprise, Dean of the Graduate Research School and Director, Higher Education Policy Research Unit (HEPRU), Dublin Institute of Technology, Ireland.

Mary-Louise Kearney,
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Biography of Professor Ellen Hazelkorn

Professor Ellen Hazelkorn is the Director of Research and Enterprise, and Dean of the Graduate Research School, Dublin Institute of Technology, Ireland; she also leads the Higher Education Policy Research Unit (HEPRU). She is a Consultant to the OECD Programme on Institutional Management of Higher Education (IMHE), and is also associated with the International Association of Universities (IAU).

Ellen is Rapporteur for the European Union (EU) Expert Group on Assessment of University-based Research, and a member of the National Digital Research Centre (NDRC) Management Board, the Arts, Humanities and Social Sciences Foresight Working Group [Ireland], and the International Advisory Council of the Irish Research Council for the Humanities and Social Sciences. She is a member of the Executive Committee of the Dean and European Academic Network (DEAN), and the Editorial Boards of *Higher Education Management and Policy* (OECD) and *Higher Education Policy* (IAU).

Professor Hazelkorn has published articles and books on Irish politics and society; digital technologies, gender, work practices and the cultural industries; relations between the media and the state; and higher education policy. Her study, *Developing Research in New Institutions*, was published by OECD (September, 2005). She is studying the *Impact and Influence of Rankings on Higher Education Decision-Making and Academic Behaviour* in association with IMHE and IAU [http://www.oecd.org/edu/imhe/rankings] and working with the Institute for Higher Education Policy (USA) on a 'New Agenda for College and University Ranking'. Her book entitled *Rankings and the Battle for World-Class Excellence: How Rankings are Reshaping Higher Education* will be published in 2009/10.

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Occasional Paper N°15

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> *"It's a reputation race/game, and in this – research is sexy. Reputation, unfortunately, is always based on research and research attracts the best talent".*
>
> *"The easiest way to boost rankings is to kill the humanities".*

Introduction

Higher education (HE), and especially academic research, has become the focus of intense policy and geo-political interest around the world as its role as the engine of economic growth and innovation has soared. Successful economies are deemed to be those which can develop and exploit new knowledge for 'competitive advantage and performance ... through investment in knowledge-based and intellectual assets – research and development (R&D), software, design new process innovation, and human and organizational capital' (Brinkley, 2008). Because higher education is viewed as critical to international competitiveness and individual opportunity, its quality and status have become vital indicators. Accordingly, interest in HE performance has rocketed since the publication of the first global ranking, the Academic Ranking of World Universities (ARWU), by the Institute of Higher Education of the Shanghai Jiao Tong University (SJT) in 2003. This Institute ranks universities according to indicators of academic or research performance including alumni and staff winning high-level awards such as Nobel Prizes, frequently cited researchers and articles published in leading scientific journals. Criteria are: quality of education, quality of faculty, research output, and size of institution.

Today, politicians across the political spectrum regularly refer to rankings as a measure of economic strength and ambition, students use them to help inform their choice, and universities use them to help set and define targets or brand and advertise themselves. Despite methodological flaws, global rankings do more than benchmark performance. They have become an exemplar of the marketization of higher education and the global battle for world-class excellence. By ranking higher education, they provide a framework through which national/supra-national and institutional ambition and competitiveness can be measured as the number of knowledge-producing capacity and talent-catching Higher Education Institutions (HEIs) in the top 20, 50 or 100. By privileging particular disciplines and fields of investigation, outputs and achievements, rankings – like similar research assessment exercises – help to reaffirm a traditional understanding of knowledge production and research, and its international division of labour.

Drawing on research conducted in association with the Organisation for Economic Cooperation and Development (OECD), the International Association of Universities (IAU)

and the Institute of Higher Education Policy (IHEP) (with funding from the Lumina Foundation) (Hazelkorn, 2009), this paper examines the extent to which rankings shape our understanding of what constitutes research and the contribution that individual higher education institutions (HEIs) can and should make. There are four main sections: *Section I* will look at what rankings measure, specifically looking at research; *Section II* will examine how HEIs are responding and the types of changes they are making; and *Section III* examines some policy responses. *Section IV*, the conclusion, will address some of the implications for research and the production of knowledge.

Section I. How Rankings Measure Research

Less than a decade ago, few people outside of the United States of America (USA) had heard of university rankings. Today, all is changed utterly. National rankings exist in over forty countries. Global rankings are recent but they are also more influential; the SJT *ARWU* began in 2003, followed by *Webometrics* and Times QS *World University Ranking* in 2004, the Taiwan *Performance Ranking of Scientific Papers for Research Universities* in 2007, and *US News & World Report*'s (*USNWR) World's Best Colleges and Universities* in 2008. The Centre for Science and Technology Studies (CWTS) at the University of Leiden has developed its own global bibliometric ranking while the European Union (EU) has recently announced its intention to develop a 'new multi-dimensional university ranking system with global outreach' to be piloted in 2010.

Rankings compare HEIs using a range of different indicators, which are weighed differently according to each ranking system (see *Table 1*). Information is generally drawn from three different sources: (1) independent third party sources, e.g. government databases; (2) HEI sources or (3) survey data of students, employers or other stakeholders. Given the absence of reliable publicly-available cross-national comparative data, global rankings (are forced to) measure research in broad brush strokes, rather than the full range of HE activity. As such, they rely heavily on traditional research outputs as captured in the bibliometric and citations databases developed by either Thompson-ISI or Elsevier-Scopus. Research productivity is measured by the number of publications in peer-reviewed journals, and research excellence and impact is measured by the number of citations. Essentially, peer-publications and citations attempt to measure the extent to which research impacts on and influences the global science community. SJT takes this argument one step further by specifically focusing on publications in *Nature* and *Science,* and the number of Nobel or other major prizes winners employed by an individual HEI, as a proxy for scientific excellence. Because the outcome is a derivative of institutional size SJT does attempt to control for this by assigning 10 per cent of its score to this while the Taiwan system accounts for institutional age by assigning a special weighting for publications in the current year. Research capacity (or potential) is measured by faculty output, which is also the reasoning behind prizes.

The Times QS (which is also the basis for *USNWR*'s *World's Best Colleges and Universities*) uses a slightly different approach. It attempts to measure broader HE activity, including student learning, community engagement/innovation and employability, through a combination of peer review and surveys/questionnaires. The former components constitute a relatively small part of the over-all calculation, and arguably 60 per cent of the final score is attributable to research. This is based on the fact that peer appraisal is essentially a reputational calculation based on research standing. *Webometrics* does what its name says; in line with the international movement towards open science, it measures research productivity according to the size and scale of HE web presence.

SJT pioneered global rankings in 2003 as an effort to define the characteristics of a world-class university in order to leverage funding from the Chinese Government in line with the latter's policy aspirations. Its publication reverberated around the world, as government leaders saw a gap opening up between their stated ambition and their perception of what rankings represent. The other systems are arguably either a refinement or rebuttal of the SJT – including the EU proposition which arises from concern that European HEIs have performed poorly relative to the EU's ambitious Lisbon Agenda and concern that European higher education would henceforth be defined by Chinese (or other) criteria. *Table 1* illustrates how the choice of indicators and the weightings attached to them reflect the priorities of each of the producers, while *Table 2* shows that national systems have a much wider range of indicators due to access to richer data. Despite these differences, research and its traditional outputs is the primary and easiest measurement, acting as a proxy for excellence.

Table 1. Comparing what rankings measure

RANKING SYSTEM	INDICATOR DIMENSION	WEIGHTING

SJT *Academic Ranking of World Universities*	• Quality of Education
	• Quality of Faculty
	  • No. Nobel Prize/Field Medal
	  • No. HiCi Researchers
	• Research Output
	  • No. Articles in Nature/Science
	  • No. Articles in Citation Index
	• Size of Institution
		10%
		
		20%
		20%
		
		20%
		20%
		10%

Times QS *World University Ranking*	• Peer Appraisal • Graduate Employability • Teaching Quality/SSR • International Students • International Faculty • Research Quality/Citations per Faculty	40% 10% 20% 5% 5% 20%

Performance Ranking of Scientific Papers for Research Universities	• Research Productivity
	  • No. Articles in last 11 years
	  • No. Articles in current year
	• Research Impact
	  • No. Citations in last 11 years
	  • No. Citations in last 2 years
	  • Aver. no Citations in last 11 years
	• Research Excellence
	  • HiCi index of last 2 years
	  • No. HiCi Papers, last 10 years
	  • No. Articles High-Impact Journals in Current Year
	  • No. Subject Fields where University Demonstrates Excellence
		
		10%
		10%
		
		10%
		10%
		10%
		
		20%
		10%
		10%
		10%

Source: SJT, Times QS, and Higher Education Evaluation and Accreditation Council of Taiwan.

Table 2. Measuring research

INDICATORS USED FOR RESEARCH	RANKING SYSTEM (COUNTRY)
Overall grants (money amount)	Slovakia
Grants per faculty (money amount)	Austria, Germany, Italy
Grants per faculty (absolute numbers)	Italy
Research projects funded by the European Union (EU)	Italy
Participation in int'l research programmes	Poland
Number of publications	Sweden
Publications per researcher	Germany, Slovakia, Switzerland
Citations per faculty	United Kingdom
Citations per publication	Germany, Slovakia, Switzerland
Number of int'l publications	Poland
Percentage of articles cited within first two years after publication	Sweden
Number of publications with 5+ citations	Slovakia
Percentage of articles belonging to top 5 per cent most cited articles (HiCi)	Sweden
Number of patents (absolute number)	Germany
Patents per faculty	Germany
Ratio of pg research students	United Kingdom
Research quality	Germany, United Kingdom
Reputation for research	Austria, Germany

Source: Hendel and Stolz, 2008, p. 181.

The aforementioned has given rise to a bevy of comment and criticism, some of which will be discussed in *Section III* in the context of its impact on our understanding of knowledge production and producers.

Section II. Translating Rankings into Action: Institutional Responses

Arising from the factors discussed in the introduction and despite their short life, there is already strong evidence that rankings are having a profound impact on academic decision-making and behaviour, with implications for the structure of systems and organization of institutions.

According to international research conducted in 2006 and 2008, (Hazelkorn, 2007-08-09; Locke, et al., 2008) higher education leaders around the world believe high-achieving students use rankings to 'shortlist' university choice, especially at the postgraduate level, and stakeholders use rankings to influence their own decisions about funding, sponsorship and graduate recruitment. In return, they believe benefits flow from high ranking: '*by far and away the most important is reputational risk'*. Caught between not wanting 'to place public emphasis on their ranking … and privately trying to avoid slipping' (Griffith and Rask, 2007), HE leaders believe '*rankings are here to stay*' and they have little alternative but to take them '*into account because others do'*. Hence, they are taking the results very seriously and integrating them within their strategic planning processes.

Research shows 63 per cent of respondents said they had taken strategic, organizational, managerial or academic action – and were making significant changes – while only 8 per cent said they had taken no action (Hazelkorn, 2007). This presents a remarkable change from the 20 per cent US University Presidents who claimed they ignored rankings in 2002 (Levin, 2002).

Most significantly, rankings appear to be influencing priorities, including curriculum. However, the biggest changes are apparent in rebalancing teaching/research and undergraduate/postgraduate activity, and re-focusing resource allocation towards those fields which are likely to be more productive, better performers, and indicator sensitive/responsive. Regardless of what kind of HEI, the message is clear: *'research matters more now, not more than teaching necessarily but it matters more right now at this point in time'*.

It is arguable if the actions described below can be directly attributed to rankings as distinct from normal competitive factors, better professional organization, quality enhancement or the value placed on S&T research by research agencies, but there is a strong correlation between them and specific indicators (see *Table 3*).

The simplest and most cost-neutral actions are those that affect brand and institutional data, and choice of publication or language. Most non-native English HEIs are busy encouraging their faculty to publish in the English language highly cited/international journals, and ensuring that a common institutional brand is used on all academic publications. The latter is especially critical for HEIs which have recently merged different organizations/units each of which carried a separate identity or logo. In addition, accurate data collection – whether the focus is research output or international student numbers – is seen as vital. The aim is to ensure that all activity is captured by the ranking organizations and accurately reflected. After this, the costs rise – potentially exponentially.

Table 3. Mapping Institutions Actions against Rankings

	Examples of Actions	Approximate Weighting
Research	• Increase output, quality and citations • Reward faculty for publications in highly-cited journals • Publish in English-language journals • Set individual targets for faculty and departments	SJT = 40%; Times = 20% Taiwan = 70%
Organization	• Merge with another institution, or bring together discipline complementary departments • Incorporate autonomous institutes into host HEI • Establish Centres-of-Excellence & Graduate Schools • Develop/expand English-language facilities, international student facilities, laboratories, dormitories • Establish Institutional Research capability	SJT = 40%; Times = 20%
Curriculum	• Harmonise with EU/US models • Favour science/bio-science disciplines • Discontinue programmes/activities which negatively affect performance • Grow postgraduate activity relative to undergraduate • Positively affect student/staff ratio (SSR) • Improve teaching quality	SJT = 10% Times = 20%
Students	• Target recruitment of high-achieving students, esp. PhD • Offer attractive merit scholarships and other benefits • More international activities and exchange programmes • Open International Office and professionalized recruitment	Times = 15%
Faculty	• Recruit/head-hunt international high-achieving/HiCi scholars • Create new contract/tenure arrangements • Set market-based or performance/merit based salaries • Reward high-achievers • Identify weak performers • Enable best researchers to concentrate on research/relieve them of teaching	SJT = 40% Times = 25% Taiwan = 30%
Public Image/ Marketing	• Professionalize Admissions, Marketing and Public Relations • Ensure common brand used on all publications • Advertisements in *Nature* and *Science* and other high focus journals • Expand internationalisation alliances and membership of global networks	Times = 40%

Source: Adapted from Hazelkorn, 2009.

Because rankings usually reward older and larger comprehensive institutions with a medical school – by aggregating outputs – size does matter; accordingly, institutional restructuring and particularly the reorganization of research including the creation of research institutes and graduate schools – often with special or targeted investment – is pervasive across higher

education. And, most of this activity tends to favour the sciences because this activity is best captured in internationally, publicly-available and verifiable databases. Many HEIs are developing/expanding English-language facilities and capacity through the recruitment of international scholars and students; improving marketing and hence peer knowledge of the institution through expensive/extensive advertisement features, e.g. in *Nature*, glossy brochures or marketing tours, rewarding faculty and Ph.D. students who publish in highly-cited journals, and seeking to positively affect the staff/student ratio. Institutions everywhere are preoccupied with recruiting more high-achieving students, preferably at Ph.D. level who, like international scholars, will be assets in the reputation race.

The arts, humanities and social sciences feel especially vulnerable in this environment. Professional disciplines, e.g. engineering, business and education, which do not have a strong tradition of peer-reviewed publications, are also under pressure. There is little doubt that HEIs are considering the costs associated with remaining in fields/disciplines which are deemed less vital to their profile or perform poorly on comparative indicators. Their choice is boosting the performance of strong areas and perhaps redistributing earned funds to weaker areas later, bringing weaker areas up to the level of the strong or closing them down. There is also evidence of the (relative) strengthening of high science areas, accomplished by using the President's special fund to assign additional faculty to particular units or building new dedicated labs and other facilities, or indirectly by rewarding those departments which are especially productive or secure exemplary funding.

Section III. Translating Rankings into Action: Policy Responses

Rankings are also underpinning national strategic objectives, attitudes towards the higher education system, and the role of individual institutions. Government speeches urge HEIs to be more competitive and responsive to the marketplace and customers, define a distinctive mission, be more efficient and productive, and become world-class. In turn, governments are asking if research and research training (Ph.D.) investment should be concentrated 'through much more focussed funding of research infrastructure in [one or two] high performing institutions' or 'support for an unspecified number of high performing research intensive universities' or 'support for excellent performance, wherever its institutional setting' (Review of HE, 2008).

Reviewing the various 'excellence' and policy initiatives internationally (Salmi, 2008), two policy positions are discernable – reflecting the fact that policies reflect choices.

1. The *neo-liberal model* aims to create greater reputational (vertical) differentiation using rankings as a free market mechanism to drive the concentration of 'excellence' in a small number of research-intensive universities in order to compete globally. China, France, Germany, Japan, Korea and Russia prefer to create a small number of world-class universities, focusing on research performance via competitions for Centres of Excellence (CE) and Graduate Schools. This model has two main forms: Model A which jettisons traditional equity values (e.g. Germany) and Model B (e.g. Japan) which upholds traditional status/hierarchical values. The United Kingdom (UK) attempted another variation of this model by formally distinguishing between teaching and research institutions, but abandoned this relying on the impact of performance measurement, e.g. the UK Research Assessment Exercise (RAE).
2. The *social-democratic model* aims to build a system of horizontally differentiated high performing, globally-focused institutions and student experiences. In contrast to an emphasis

on competition as a driver of excellence, Australia, Ireland and Norway, aim to support 'excellence wherever it occurs' by supporting '*good quality universities*' across the country, using institutional compacts to drive clearer mission differentiation. Rather than elevating a small number of elite institutions to world-class status, the recent Australian Review of Higher Education seeks to build a world-class system so that '*wherever students are in this country, whatever institution they're at, they're getting a world-class education.'(Gillard, 2008;* Review of Australian Higher Education, 2008).

Almost regardless of which strategy is adopted, rankings in their brief life have already left an enduring legacy and transformed quality assurance (QA) and research assessment exercises into tools pursuing world-class excellence. They underpin an almost universal drive by governments around the world to restructure their HE systems, concentrate resources into more efficient, productive and visible 'Centres of Excellence', and drive differentiation. Despite criticism of existing ranking systems, national systems have tended to use the same traditional performance indicators, at least initially, because they are easiest and accessible, to measure input (e.g. research income earned, research active faculty) and output (e.g. peer publications, citations, Ph.D. completions). Increasingly, they are also being linked to resource allocation and accreditation, and used to evaluate the impact of the knowledge production process and research activity. The absence of cross-national comparative data, and appropriate indicators and metrics has already prompted a global race for the optimum system, most notably the EU's classification and search for multi-dimensional ranking projects, and the OECD's assessment of learning outcomes. These trends will intensify as the global economic and financial situation escalates, and pressure grows on policy-makers and higher education to fuel the innovation pipeline.

Section IV: Conclusions and Observations: Some Implications for Research and the Production of Knowledge

Rankings emerged because of what was perceived as the lack of sufficient comparative information about higher education. The initial target user group were students and their parents, but this audience has grown considerably – and now includes, *inter alia*, policymakers and HEIs. The instantaneous global response to the publication of the first global rankings and its imitators has had a significant impact and influence on higher education – accelerating the modernization agenda, providing some public accountability and transparency, emphasizing institutional performance to improve quality, and promoting a global 'reputation race'. But the effect has been more subtle and profound: by using a particular set of metrics to highlight research as the key proxy for higher education quality and excellence, rankings are helping to reshape higher education and reconstruct our understanding of what is research/knowledge production and who/which institutions should contribute.

The progression from simple to complex knowledge has, over decades, been reflected in the emergence of new disciplines, methodologies and ways of thinking, transforming knowledge economies and the way in which knowledge is actually created. Whereas traditional knowledge production, often referred to as Mode 1, was disciplinary or 'curiosity-oriented' usually conducted by individuals in secluded/semi-secluded environment – pejoratively described as 'ivory towers', 'socially robust' or Mode 2 Knowledge is created within the context of being useful. No longer confined to the university, it is interdisciplinary and conducted in active engagement and collaboration with society – the wider community, civil society, industry, and the region. (Gibbons, et al. 1994) Critically for this discussion, Mode 1

research achieves accountability and quality control via the peer-review process, while Mode 2 achieves accountability and quality control via social accountability and reflexivity. It is within this context that there is a growing understanding that the world's 'grand challenges' require collaborative solutions and inter-locking innovation systems:

> *"Interdisciplinary thinking is rapidly becoming an integral feature of research as a result of four powerful 'drivers': the inherent complexity of nature and society, the desire to explore problems and questions that are not confined to a single discipline, the need to solve societal problems, and the power of new technologies"* (Committee on Facilitating Interdisciplinary Research, 2004).

Despite this, rankings and other evaluation/assessment exercises continue to focus on narrow definitions of research, ignore interdisciplinarity and fail to give adequate recognition to social and economic impact, and effectively reward classical conceptions of knowledge conducted by elites in selected institutions. While academics are affected by these policies, they are not innocent victims.

The discussion below provides a preliminary consideration of some ways in which rankings are contributing to the (re)construction of knowledge:

1. Focus on narrow definition of knowledge and scientific disciplines. Given the absence of wide-ranging cross-national comparative data, SJT and Taiwan rankings use quantitative data drawn from bibliometric and citations databases of Thompson-ISI or Elsevier-Scopus. This means there is an inevitable over-emphasis on research and on traditional research outputs because this is the only publicly available data. While there has been some attempt by both systems to correct for size and age of institution, there is nonetheless an inbuilt bias towards older, well-endowed universities with a medical school, with strength in biomedical disciplines. Elsevier-Scopus is slightly better in this regard, but an inherent unfairness against the arts, humanities and social sciences remains due to differences in discipline research methodologies and outputs. The Times QS attempts to measure broader HE activity, e.g. student learning, community engagement/innovation and employability, through a combination of peer review and surveys/questionnaires. This is admirable but peer appraisal is essentially a reputational calculation arguably based on research. Its small sample size, which tends to be over-loaded in English-speaking countries and associates of the Commonwealth, has prompted other criticisms. There is little doubt that there is a huge difficulty in measuring interdisciplinary research, as the metrics are discipline-based. And, essentially, quantification is used as proxy for quality. The effect is to value some disciplines and research as more valuable than other work. Moreover, as Marginson (2008) comments, 'not all path-breaking innovations gain early peer recognition and some are sidelined precisely because they challenge established ideas'. Hence, there is the tendency to distort the focus of research towards that which is more predictable/less risky and more easily measured.

2. Focus on traditional outputs. It is widely accepted that a major lacunae for rankings – and the various bibliometric databases – are their inability to accurately and adequately reflect the way in which different disciplines produce and disseminate knowledge, and increasingly to reflect impact beyond the academy. By quantifying research activity and impact in terms of peer-publication and citations, rankings narrowly define 'impact' as something which occurs only between academic 'peers'. While 'peer review' remains one of

the key cornerstones of the academy, it can also be a gate-keeper to new or oppositional views or perpetuate a popularity contest. *To what extent is the impact of peer-publications felt beyond a relatively select group of 'tribal' academics and how significant is self-referencing or other gaming mechanisms?* (Beecher and Trowler, 2001). Policy is beginning to reflect some of the academy's own concerns; yet as it shifts to focus on outcomes and impact, rankings remain fixated on measuring inputs and outputs. This tension is most apparent during the current global economic and financial crisis, where the policy emphasis is shifting to the 'research, innovation and commercialization eco-system' (Government of Ireland, 2008).

3. Focus on bio-sciences and related (sub) disciplines. The rising importance of rankings to institutional and professional reputation – the latter measured by the citation index and authentication as a HiCi researcher – has underpinned both HE restructuring and prioritization. *Table 3* above has described a wide range of changes occurring across higher education, some of which are tied to the general modernization agenda but are equally relevant to realignment to rankings criteria. Since size matters, there is considerable institutional re-organization, and re-balancing between education and research provisions taking place. Furthermore, because '... research is the activity that differentiates among institutions [and individual faculty], conferring high status and prestige' (Slaughter and Leslie, 1995) rankings have the 'capacity to shape academic careers at the point of hiring and promotion' (Marginson, 2008). This trend is evident in head-hunting academic scholars and Nobel and other prize winners, and new contractual arrangements. But more critically, bibliometric and citation indices have hastened the rush to rank journals as a means of defining a hierarchy of quality. Yet 'absolutely crucial work [can] often appear … in marginal or small-circulation journals' while newer ideas suffer in comparison with long-established fields. Thus, by hierarchically ordering or stratifying theoretical and conceptual knowledge, and their institutions, rankings are helping to reinforce an international academic division of labour and are transforming the language of academic power (Howard, 2008).

4. Measuring 'fundamental' or 'basic' research. Traditionally, research was divided into discrete elements of basic or fundamental research and applied or strategic research (OECD, 2002) – an approach that has underpinned the view that some institutions should concentrate on fundamental research while others focus on applied or development. Over time, these boundaries have blurred and become relatively meaningless, as policy moves to encompass 'the whole innovation chain from education to economic impact' (Schuurmans, 2009). The development component of R&D is now often referred to as 'translational research'. Individuals and research teams move across the RDI spectrum as appropriate. Yet, by concentrating on the fundamental end of the research spectrum as a 'plausible' measurement of research and knowledge creation (Marginson and van der Wende, 2007), rankings misrepresent and pervert the research/innovation process (Rothwell, 1994) leading to the fetishisation of particular forms of knowledge production, producers and outputs. Because the fundamental end of the spectrum is dominated by the bio-sciences, this approach ignores the contribution, for example, of the creative/cultural industries to innovation or the way in which social innovation is bringing about fundamental change to the social economy *via* new forms of mutual action, new ways in which economies can be managed, new forms of consumption, and the organization and financing of government. (See NESTA). Moreover, it is not obvious that investment at the extreme of the research spectrum can create the breadth of patentable knowledge that can be exploited.

5. Building World-Class Universities vs. World-Class Systems. As discussed above, rankings aggregate data from a range of sources to produce a hierarchy of performance. The process has drawn criticism because of, *inter alia*, the difficulties associated with comparing different types of institutions around the world using a common set of metrics and weightings, and the potential to exaggerate minor statistical differences. Regardless of these methodological concerns, HEIs have sought to benchmark and match the criteria in order to be recognized as a world-class university while governments have pursued system reform with distinctions between research-intensive (elite) and teaching intensive (mass) institutions. The competitive need to participate in world-science plus the realization of the costs associated with mass education has been a key factor driving this approach. *But does world-class research only occur in world-class universities, and do world-class researchers only exist in world-class universities?* Many now believe it is not possible to develop sustainable applied or industrial-relevant research without research excellence in the underpinning sciences, and a 'presence in international publications.' (Conlon quoted in Hazelkorn and Moynihan, 2009; see also Lepori and Attar, 2006). Moreover, concentration could reduce national research capacity with 'knock-on consequences for regional economic performance and the capacity for technology innovation' (Lambert Review of Business-University Collaboration, 2003).

Summary

As aforementioned, this is a preliminary discussion. The academic literature has commented on the methodological shortcomings of rankings, asking whether the choice of indicators and weightings are relevant, whether 'peer review' measures quality and whether there is a bias towards science and biomedical disciplines, English-language publications, and traditional research outputs and formats. This paper takes the argument further, suggesting significant implications for our understanding of research and the production of knowledge.

Rankings are an inevitable manifestation of globalization and the marketization of higher education. They have gained popularity because they (appear to) gauge (i) world-class status; (ii) provide accountability; and (iii) measure national competitiveness. However, because linear assumptions of innovation position higher education as the engine of economic growth, rankings have induced governments and HEIs to adopt simplistic solutions and to skew research agendas/policies in order to increase research productivity and efficiency and to better the position of HEIs in the rankings. This is particularly important especially during economic difficulties, when there might be a stronger tendency to measure outputs to ensure value-for-money. The history of rankings shows that measuring the wrong things can produce distortions.

By valuing some research more highly than other research, rankings – and similar systems of research assessment – reproduce classical conceptions of knowledge and power relations. They encourage a return to 'ivory tower' research conducted by elites in selected institutions at a time when complex global problems and policy objectives require the involvement of interdisciplinary teams with diverse perspectives and experiences. As rankings motivate behaviour, decisions and opinions, assessment systems and cross-national comparisons need to be developed with care. The choice of metrics and purpose is critical. Notwithstanding debates about academic freedom, there is a need to ensure a clear alignment between policy and indicators, with serious account taken of both the intended and the unintended consequences – not as a post-evaluation process but embedded in the design phase. Ultimately, it is vital to develop a more complex set of indicators that embrace all disciplines

across the full RDI spectrum in order to encourage more diverse and innovative activity for the benefit of society at large.

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End Note:
Non-attributed quotations are from participants from the 2006 or 2008 study. They were guaranteed anonymity given the sensitivity of the issues involved. No reference is given to country or institutional type except in a general way.