To Rank or To Be Ranked: The Impact of Global Rankings in Higher Education

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Global university rankings have cemented the notion of a world university market arranged in a single "league table" for comparative purposes and have given a powerful impetus to intranational and international competitive pressures in the sector. Both the research rankings by Shanghai Jiao Tong University and the composite rankings by the Times Higher Education Supplement *have been widely publicised and already appear to have generated incentives in favour of greater system stratification and the concentration of elite researchers. However, global comparisons are possible only in relation to one model of institution, that of the comprehensive research intensive university, and for the most part are tailored to science-strong and English-speaking universities. Neither the Shanghai nor the* Times *rankings provide guidance on the quality of teaching. It is important to secure "clean" rankings, transparent, free of self-interest, and methodologically coherent, that create incentives to broad-based improvement.*

Keywords: *university rankings; globalisation; competition; stratification; quality*

GLOBALISATION, COMPETITION, AND STRATIFICATION

One generation ago, international relations in higher education, although often generative of new developments, were largely marginal to the ongoing, day-to-day operations of higher education institutions (HEIs) and systems, except in scientific research. Now the growing impact of the global environment in and through higher education systems and institutions is inescapable. Cross-border flows, relations, cooperation, and competition have become essential dimensions of national policy

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making and of the strategic apparatus of executive and disciplinary leaders in individual HEIs. With global university rankings (Shanghai Jiao Tong University Institute of Higher Education [SJTUIHE], 2005; "World University Rankings," 2005), especially the global ranking of research performance, higher education itself has entered an era of open global competition between nations and between individual HEIs as global actors in their own right. Increasingly, national higher education systems and HEIs are judged by where they stand in global terms. Across the world, national policy makers and HEIs must take account of a global higher education environment in which international comparisons are constantly made, resources and educational status are unequally distributed, the English language and institutions from the Anglo-American nations (especially the United States) are often dominant, and the process of Europeanisation is opening up new possibilities.

The rise of global referencing does not signify that higher education has simply become a single worldwide network of HEIs. In global markets, studies of international student choice making indicate that, on the whole and with the partial exception of the small group of HEIs, the Harvards and Oxfords that are household names all over the world, the national identity of HEIs continues to be more important in the eyes of the world than the institutional identity of the individual HEIs (Organization for Economic Cooperation and Development, 2004, p. 266). Even advanced levels of deregulation and decoupling from national system requirements take place only at the behest of national governments, all of which retain an ordering function in relation to their higher education systems. In most, though not all, nations, government remains the principal financer, and the public sector is the majority provider of HEIs overall. Though the role of the private sector is growing worldwide (Levy, 2002)—and in some nations it constitutes a majority of HEIs—in most nations foreign providers (which are all defined as part of the private sector when operating outside their own national jurisdiction) play only a marginal role, except in purely online education, which overall enrols but a small proportion of students. In the multilateral General Agreement on Trade in Services and World Trade Organization negotiations, a national interest bias is strongly apparent. All of the Organisation for Economic Cooperation and Development (OECD) governments have chosen to retain firm control over the national character of the systems under their jurisdiction. Among the exporting nations, a typical stance is to expect a greater degree of deregulation in foreign nations than the exporter is prepared to countenance at home.

Yet globalisation also has transformative implications for the internal relations between nation-states and their HEIs. In one sense, the single worldwide logic of global rankings is confirmed in that within global networks universities directly deal with each other in their own right. The model of stand-alone global actors was long practised among individual researchers and scholars and has always shaped the dealings of certain leading universities (mostly in the United States and the United Kingdom) with the rest of the world. It is now much more widespread. Global linkages,

especially in research and in cross-border education, are facilitating the more autonomous evolution of individual institutions. This process has been encouraged in many nations by policies of corporatisation and partial devolution based on governance by steering from a distance and more plural income raising, a model of provision that reflects informal cross-border norms influenced by practices in the English-speaking nations and the policy templates of the World Bank. No doubt such changes at the national level facilitate an engagement with global trends that provides individual HEIs with more strategic options. Indeed, in many nations, corporatisation and devolution are explicitly designed to further the cross-border effectiveness of HEIs, and, in some nations, HEIs operate on a relatively independent basis in their cross-border dealings. Everywhere, research-intensive universities, especially the leading ones, tend to enjoy more autonomy than do other HEIs, in this and all respects. Overall, the "strategic policies of national governments continue to play a major role in setting the frames for international communication, cooperation and mobility as well as for international competition" (Teichler, 2004, p. 21); and in some nations cross-border relations are formally articulated via the national authorities, which carries some danger that openness to global developments will be inhibited. But in an electronically networked world, direct faculty-to-faculty relationships, and HEI-to-HEI relationships, as expressed in messaging, knowledge transfers, trade, and people mobility, always tend to move beyond the ken and control of regulated cross-border relationships in governance and policy. Nation-states cannot fully comprehend all the cross-border linkages of HEIs and are unwise to attempt this.

GLOBAL UNIVERSITY RANKINGS

Global university rankings have cemented the notion of a world university competition or market capable of being arranged in a single "league table" for comparative purposes and given a powerful impetus to intranational and international competitive pressures in the sector. Global comparisons are possible only in relation to one model of institution: that of the comprehensive research-intensive university. This model of HEI is the only one sufficiently widespread throughout the world to lend itself to the formation of a single competition, though there is nevertheless significant variation in the size and scope of leading research universities, which range from small establishments focused on graduate education and research to very large, access-based national universities such as those of Mexico and Buenos Aires in Argentina. The rankings devised thus far have tended to favour the former kind of university rather than the latter. In this and other ways, such as the reliance on English-language research literatures, the rankings systems are loaded in favour of some universities and systems at the expense of others. Any system of rankings is purpose-driven, with outcomes shaped by the assumptions and values built into the methods of comparison and calculation. In that sense, all rankings systems are both incomplete as a description of the reality of higher education (e.g., the performance

of a nation's research-intensive universities says nothing about the performance of its specialist business schools or its technical training institutes) and contain built-in bias. This does not rob rankings of their power, however.

The most globally influential global rankings are those prepared by the Shanghai Jiao Tong University (SJTU), first issued in 2003. The second set of global rankings, prepared by the *Times Higher Education Supplement,* was first published in 2004. Both sets of rankings were intuitively plausible because they confirmed the reputations of the leading American and British universities, the household names such as Harvard, Stanford, Yale, Berkeley, MIT, Cambridge, and Oxford. *The Economist* ("Brains Business," 2005) cited the Jaio Tong group as the "World Super-League." Table 1 lists the top 20 universities as determined by SJTU and the *Times Higher Education Supplement.* The *Times Higher Education Supplement* "Super-league" is the more plural of the two, with 12 American universities in the top 20 rather than the 17 in the SJTU table, 4 U.K. universities rather than 2, and universities from four other nations (France, Japan, China, and Australia) rather than the one (Japan) in the Jiao Tong listing. The *Times* places 21 to 25 are also held by universities from nations other than the United States and the United Kingdom.

The global rankings immediately secured great prominence in higher education, policy, and public arenas and have already had discernable effects in institutional and policy behaviours. Although there is disquiet about the impact of the rankings and some instances of critique of the methods (particularly in HEIs and nations where performance was worse than expected), there have been few concerted efforts to discredit the rankings process, which appears to have secured public credibility. Given this, research universities know that they must succeed within the terms of the measures. The rankings have generated a strong drive to improve comparative position, particularly in the SJTU rankings, which are seen as more credible. Within national systems, the rankings have prompted strong desires to achieve high-ranking research universities both as a symbol of national achievement and prestige and as engines of economic growth in a global knowledge economy. There has been a growing emphasis on strategies of institutional stratification and concentration of research resources, some of which predated the rankings. At the same time, global rankings have stimulated global competition for leading researchers and the best younger talent. All of these responses have both cemented the role of the rankings themselves and further intensified competitive pressures.

SJTU RANKINGS

The SJTU rankings are not holistic university rankings, though they have been widely interpreted as such, notwithstanding the strenuous efforts by the SJTU group. In compiling its "Academic Ranking of World Universities," the SJTU group made a deliberate decision to focus on research performance. It was considered impossible to

Table 1 **The Global Super-League: The World's Leading Universities, as Measured by the Shanghai Jiao Tong University (2006) and the *Times Higher Education Supplement* (2005)**

Shanghai Jiao Tong Research University Rankings				*Times Higher Education Supplement* University Rankings			
	University	Points	Nation		University	Points	Nation
1	Harvard U	100.0	United States	1	Harvard U	100.0	United States
2	U Cambridge	72.6	United Kingdom	2	Massachusetts IT (MIT)	86.9	United States
3	Stanford U	72.5	United States	3	U Cambridge	85.8	United Kingdom
4	U California, Berkeley	72.1	United States	4	U Oxford	83.9	United Kingdom
5	Massachusetts IT (MIT)	69.7	United States	5	Stanford U	83.4	United States
6	California IT ("Caltech")	66.0	United States	6	U California, Berkeley	80.6	United States
7	Columbia U	61.8	United States	7	Yale U	72.7	United States
8	Princeton U	58.6	United States	8	California IT ("Caltech")	71.5	United States
9	U Chicago	58.6	United States	9	Princeton U	64.8	United States
10	U Oxford	57.6	United Kingdom	10	Ecole Polytechnique	61.5	France
11	Yale U	55.9	United States	11	Duke U	59.1	United States
12	Cornell U	54.1	United States	11	London School of Economics	59.1	United Kingdom
13	U California, San Diego	50.5	United States	13	Imperial College London	59.0	United Kingdom
14	U California, Los Angeles	50.4	United States	14	Cornell U	58.1	United States
15	U Pennsylvania	50.1	United States	15	Beijing U	56.3	China
16	U Wisconsin–Madison	48.8	United States	16	Tokyo U	55.1	Japan
17	U Washington (Seattle)	48.5	United States	17	U California, San Francisco	54.9	United States
18	U California, San Francisco	47.7	United States	17	U Chicago	54.9	United States
19	Tokyo U	46.7	Japan	19	U Melbourne	54.5	Australia
20	Johns Hopkins U	46.6	United States	20	Columbia U	53.9	United States

Note: U = university; IT = institute of technology.

compare teaching and learning on a worldwide basis, "owing to the huge differences between universities and the large variety of countries, and because of the technical difficulties inherent in obtaining internationally comparable data" (Liu & Cheng, 2005, p. 133). Nor did the SJTU group want to use subjective measures of opinion or data that were sourced from the universities themselves. It was believed that the only data sufficiently reliable for the purpose were broadly available and internationally comparable data of measurable research performance. An additional rationale for the use of research performance data is that, arguably, research is already the most important single determinant of global university reputation and the only indicator available that is unambiguously merit based. The SJTU group has widely consulted throughout the higher education world on the calculation of the index and the compilation of the data. The successive annual measures appear to be increasingly robust.

The major part of the SJTU index is determined by publication and citation performance in the sciences, social sciences, and humanities: 20% by citation in leading journals, 20% by articles in *Science* and *Nature*, and 20% by the number of "HiCi" researchers in the institution, researchers named in the Thomson and Institute for Scientific Information (ISI) classification of the leading 250 to 300 researchers in their broad field of study, of which nearly all are science-based disciplines, on the basis of citation performance (ISI, 2006). Another 30% of the index is determined by the location of the winners of Nobel Prizes and Fields Medals in mathematics, during their training (10%) and in their current employment (20%). The remaining 10% of the index is determined by taking the total derived from the above data and dividing by the number of staff. As such, the SJTU rankings favour universities that are large and comprehensive enough to amass strong research performance over a broad range of research fields while carrying relatively few staff who are research inactive. They also favour universities that are particularly strong in the sciences, favour universities from English-language nations because English is the language of research (non–English-language work is both published less and cited less), and favour universities from the United States because of nationally circular citation patterns: Americans tend to cite Americans (Altbach, 2006). Of the HiCi researchers, 3,614 are located in the United States, compared to 224 in Germany, 221 in Japan, 162 in Canada, 138 in France, 101 in Australia, 94 in Switzerland, 55 in Sweden, 20 in China, and none in Indonesia (ISI, 2006). Among the U.S. universities, Harvard and its affiliated institutes alone have 168 HiCi researchers, more than the whole of France or Canada. Stanford has 132 HiCi researchers, more than all the Swiss universities together, University of California, Berkeley has 82, and MIT has 74. There are 42 at the University of Cambridge in the United Kingdom. A limitation of the citation data is that they date from the second half of the 1990s. The SJTU index is open to the criticism in that it measures past research output, not present research capacity. However, it is difficult to see how to create a reliable metric of present capacity. Another criticism that has been made is that Thomson, the publishing

company that comprises the Thomson and ISI database and that determines which journals should receive an ISI rating, has a vested interest in selecting Thomson-published journals ahead of other journals. It is impossible to assess whether this factor affects the composition of the database.

The Nobel Prize criterion is perhaps the most controversial, as the prize is submission-based and at times has been open to claims that an element of politicking enters the decisions; that is, scientific merit is not the only determining factor. Like the citation measures, the Nobel Prize criterion also works in favour of a small, select group of nations. David Bloom (2005, p. 35) notes that of the 736 Nobel Prizes awarded as of January 2003, 670 (91.0%) went to people from high-income countries as defined by the World Bank, and a majority went to people from the United States, with 3.8% from Russia or the Soviet Union and Eastern Europe and 5.2% from emerging and developing nations. People from the latter group had by far their best prospect of winning a Nobel Prize in the categories of literature (10.1%) or peace (19.8%), but these areas are excluded from the SJTU index of research performance. Furthermore, of the 9 scientists who originated from emerging or developing countries and who won Nobel Prizes in chemistry, physics, physiology, or medicine, 4 were working in universities in the United States and 2 in the United Kingdom and Europe.

THE *TIMES HIGHER EDUCATION SUPPLEMENT* RANKINGS OF UNIVERSITIES

The *Times Higher Education Supplement* has set out to provide a holistic ranking of HEIs, self-described as "the best guide to the world's top universities" ("World University Rankings," 2005). The rankings appear to have been designed to service the market in cross-border degrees in which many U.K. universities are very active. A high value is placed on institutional reputation and on the level of "internationalisation" of HEIs, and in the outcome, the rankings tend to favour HEIs with a strong presence in the degree market. A total of 40% of the *Times* index is composed of an opinion survey of academics around the world, and another 10% of a survey of "global employers." There are two internationalisation indicators: the proportion of students who are international (5%) and the proportion of staff who are international (5%). Another 20% is determined by the student–staff ratio, which is treated as proxy for teaching "quality." The remaining 20% of the *Times* index is composed of research citations per staff member using the Thomson and ISI database.

The emphasis on reputation tended to favour the best-known universities in many nations. Along the way, the *Times* rankings boosted the number of leading British universities and reduced the number of U.S. universities in the world's top 100 from the 53 in Jiao Tong to just 31. However, the *Times Higher Education Supplement* rankings are open to a number of methodological criticisms. The two surveys are nontransparent: It is not specified who has been surveyed or what questions were

asked. Furthermore, the *Times* student internationalisation indicator rewards supplier strategies of volume building rather than the quality of student demand or the quality of programs. Teaching quality cannot be adequately assessed using a resource quantity indicator such as the student–staff ratio. And research plays a relatively minor part in determining the *Times* rankings. An HEI's marketing division is better rewarded than its researchers. This does not square well with the way that higher education is understood in most nations. Furthermore, by favouring HEIs active in the cross-border degree market, the *Times* rankings created anomalies. They inflated the performance of Australian universities, which achieved 12 universities in the world's top 100. Canada, a similar system in many respects, achieved only 3 universities in the top 100. Arguably, Canadian higher education is stronger in terms of system size, resources per student, level of participation, and research performance, though the Canadian system is weaker in the export market than is Australia's system.

Subsequently, *Newsweek* ("World's Most Global," 2006) prepared a composite system of rankings that combines the research publication and citation measures from SJTU with the measures of internationalisation, student–staff ratios, and citations per head from the *Times* and that adds a metric for library holdings. By removing the reputational surveys from the *Times* index, *Newsweek's* data appear more plausible.

SPECIAL FOCUS ON RESEARCH IN GLOBAL RANKINGS

Research is not only the most globalised of all activities in higher education, but research capacity is also a key marker in the higher education landscape because the research standing of HEIs and nations feeds into both their capacity to produce globally salient outputs and their generic attractiveness to other HEIs, to prospective students, and to economic capital. The SJTUIHE global university rankings provide data that enable the research performance of individual HEIs and the upper research level of national systems to be compared. The data are largely based on measurable quantitative and qualitative indicators of research outputs, plus the incidence of Nobel Prizes and Fields Medals in mathematics. These data are helpful in mapping the global position of nations and HEIs, especially to the extent that higher education is imagined as a competition among nations and among HEIs for status and resources.

The SJTU data show that 54 of the world's leading research universities are located in the United States, led by Harvard at number one. The United Kingdom provides the University of Cambridge at number two and 11 of the top 100 research universities. When Canada (4) and Australia (2) are added, the English-speaking nations constitute 71% of the top 100. A further 22 are located in Western Europe, 6 in Japan, and 1 in each of Israel and Russia. The principal Western European

nations, in terms of the number of universities in the global 100, are Germany (5), France and Sweden (4 each), Switzerland (3), and the Netherlands (2). China and India have none of the top 100 research universities. India has just 2 in the top 500. China, including Hong Kong, has 19 of the top 500.

Sometimes, for historical reasons and where resources and status have been concentrated in particular institutions, individual HEIs play a larger role in the world than the global resource position of the nation would suggest. One such case is the Moscow State University, ranked as 70th in the world in the SJTU rankings but one of just two Russian universities named in the top 500 research universities (SJTU-IHE, 2006). The opposite example is China, which at this point lacks the level of research university performance commensurate with its standing as a world economic power, though its policy aims to redress the imbalance. For the most part, however, there is a broad correlation between a nation's overall economic capacity and the standing of its research universities. Table 2 maps each nation's share of global economic capacity against its share of the SJTU top 100 and top 500 research universities. National economic capacity is calculated by multiplying national income with national income per head, thus taking into account both quantitative economic weight and the intensity of wealth as measured by income per person. Each nation's share of global economic capacity is calculated by comparing its national economic capacity to the global total. The nations whose university systems are above-average performers in research terms, relative to national economic capacity, are Israel, Sweden, Switzerland, the United Kingdom, Netherlands, Canada, Finland, Denmark, Australia, and the United States. The United States performs very well in its share of the top 100 research universities, but, interestingly, it underperforms in its share of the world's top 500. This indicates the stratification effects of a highly competitive system. In the United States, there is a concentration of research resources in the leading universities at the expense of the regional knowledge economies. Germany does well at the level of the top 500, indicating that there is a broad-based research capacity across the national system, but less well in its share of the top 100. Japan underperforms relative to economic capacity on both measures. China, Korea, Singapore, Belgium, Spain, Norway, Hungary, New Zealand, Brazil, South Africa, and others are strong in the top 500 group relative to economic capacity but have no top 100 research universities.

It is significant that in the nations that do best relative to economic capacity, aside from the United States (which is so often the exception in national patterns of higher education), the private sector plays a relatively minor role in the sector, and, in most of these cases, especially in OECD Europe, research resources are broadly distributed across the public university sector. Several nations that underperform at the top 100 level have large private sectors and a highly stratified research effort, including Japan, Korea, Poland, Brazil, and Mexico. This underlines the dependence of

Table 2 Nations' Share of the Top 500 and 100 Research Universities, as Measured by Shanghai Jiao Tong University, Compared to Their Share of World Economic Capacity, 2003 to 2005

Nation	Gross National Income (GNI) 2003[a]	Population 2003	GNI per Head 2003[b]	Share of World Economic Capacity (%)	Share of Top 500 Research Universities 2005 (%)	Share of Top 100 Research Universities 2005 (%)
United States	10,978	290.8	37,750	41.8	33.6	53.0
United Kingdom	1,643	59.3	27,690	4.6	8.0	11.0
Germany	2,279	82.5	27,610	6.3	8.0	5.0
Japan	3,629	127.6	28,450	10.4	6.8	5.0
Canada	950	31.6	30,040	2.9	4.6	4.0
France	1,652	59.8	27,640	4.6	4.2	4.0
Sweden	239	9.0	26,710	0.6	2.2	4.0
Switzerland	237	7.4	32,220	0.8	1.6	3.0
Australia	572	19.9	28,780	1.7	2.8	2.0
Netherlands	463	16.2	28,560	1.3	2.4	2.0
Italy	1,546	57.6	26,830	4.2	4.6	1.0
Israel	130	6.7	19,440	0.3	1.4	1.0
Austria	241	8.1	29,740	0.7	1.2	1.0
Finland	143	5.2	27,460	0.4	1.0	1.0
Denmark	167	5.4	31,050	0.5	1.0	1.0
Norway	173	4.6	37,910	0.7	0.8	1.0
Russian Federation	1,284	143.4	8,950	1.3	0.4	1.0
China[c]	6,410	1,288.4	4,980	3.2	6.5	0.0
Spain	910	41.1	22,150	2.0	4.5	0.0
Korea	862	47.9	18,000	1.6	4.0	0.0
Belgium	300	10.4	28,920	0.9	3.5	0.0
China Hong Kong	195	6.8	28,860	0.6	2.5	0.0
Taiwan	—	—	—	—	2.5	0.0
New Zealand	86	4.0	21,350	0.2	2.5	0.0
Brazil	1,326	176.6	7,510	1.0	2.0	0.0
South Africa	464	45.8	10,130	0.5	2.0	0.0
India	3,062	1,064.4	2,880	0.9	1.5	0.0
Ireland	123	4.0	30,910	0.4	1.5	0.0
Poland	428	38.2	11,210	0.5	1.5	0.0
Singapore	103	4.3	24,180	0.3	1.0	0.0
Hungary	140	10.1	13,840	0.2	1.0	0.0
Turkey	475	70.7	6,710	0.3	1.0	0.0
Greece	220	11.0	19,900	0.4	1.0	0.0

(continued)

Table 2 (continued)

Nation	Gross National Income (GNI) 2003[a]	Population 2003	GNI per Head 2003[b]	Share of World Economic Capacity (%)	Share of Top 500 Research Universities 2005 (%)	Share of Top 100 Research Universities 2005 (%)
Mexico	919	102.3	8,980	0.8	0.5	0.0
Argentina	420	36.8	11,410	0.5	0.5	0.0
Chile	155	15.8	9,810	0.2	0.5	0.0
Czech Republic	159	10.2	15,600	0.3	0.5	0.0
Portugal	185	10.4	17,710	0.3	0.5	0.0
All other nations[d]	8,219	2,338.2	3,456	2.9	0.0	0.0
World total	51,401	6,272.5	8,190	100.0	100.0	100.0

Source: World Bank (2006); Shanghai Jiao Tong University Institute of Higher Education (2006).
Note: World economic capacity is measured as an aggregate of the individual nation's economic capacity, defined as GNI multiplied by GNI per head. All nations without any top 500 research universities are treated as one unit.
a. Billions of U.S. dollars, purchasing power parity.
b. U.S. dollars, purchasing power parity.
c. China Hong Kong is separately listed.
d. Population and GDP data include Taiwan.

research capacity on public investment, given the public good character of research (Stiglitz, 1999).

Other measures of the worldwide distribution of research output confirm the SJTU map of research performance. The United States alone produced almost a third of the world output of scientific articles in 2001, and "its scientific literature accounted for 44% of citations in the world scientific literature" (Vincent-Lancrin, 2006, p. 16). Likewise, the potential for productive synergies between university research and industry is unequally distributed. "Rich countries, home to 15% of the world's population, are responsible for over 90% of the patents granted" (Bloom, 2005, p. 25). These patterns are replicated in research publishing. In 2001, scientists and social scientists in the United States published 200,870 articles in major journals. The volume of the articles from Japan was 57,420, the United Kingdom 47,660, Germany 43,623, France 31,317, and Switzerland 8,107. By contrast, in Indonesia, a midlevel developing nation with two thirds of the population of the United States, there were 207 articles. There were 11,076 from India and 20,978 from China (National Science Board [NSB], 2006).

Though inequalities among nations in scientific capacity will persist, the specific patterns change over time. Table 3 provides each OECD nation's number and share of articles published in science and engineering fields, including medicine and

Table 3 Output of Published Articles in Science and Engineering (Including Medicine and Social Sciences), Organisation for Economic Co-operation and Development Nations, and Selected Comparators, 1988 and 2001

Nation	Total Population 2003 (Millions)	Number of Published Science and Engineering Articles		Proportion of Total World Output of Science and Engineering Articles		Change in Number of Articles 1988 to 2001[a]
		1988	2001	1988 (%)	2001 (%)	
United States	290.8	177,682	200,870	38.1	30.9	113.1
Japan	127.6	34,435	57,420	7.4	8.8	166.7
United Kingdom	59.3	36,509	47,660	7.8	7.3	130.5
Germany	82.5	29,292	43,623	6.3	6.7	148.9
France	59.8	21,409	31,317	4.6	4.8	146.3
Canada	31.6	21,391	22,626	4.6	3.5	105.8
Italy	57.6	11,229	22,313	2.4	3.4	198.7
Spain	41.1	5,432	15,570	1.2	2.4	286.6
Australia	19.9	9,896	14,788	2.1	2.3	149.4
Netherlands	16.2	8,581	12,602	1.8	1.9	146.9
Korea	47.9	771	11,037	0.2	1.7	1,431.5
Sweden	9.0	7,573	10,314	1.6	1.6	136.2
Switzerland	7.4	5,316	8,107	1.1	1.2	152.5
Belgium	10.4	3,586	5,984	0.8	0.9	166.9
Poland	38.2	4,030	5,686	0.9	0.9	141.1
Finland	5.2	2,789	5,098	0.6	0.8	182.8
Denmark	5.4	3,445	4,988	0.7	0.8	144.8
Austria	8.1	2,241	4,526	0.5	0.7	202.0
Turkey	70.7	507	4,098	0.1	0.6	808.3
Greece	11.0	1,239	3,329	0.3	0.5	268.7
Norway	4.6	2,192	3,252	0.5	0.5	148.4
Mexico	102.3	884	3,209	0.2	0.5	363.0
New Zealand	4.0	2,075	2,903	0.4	0.4	139.9
Czech Republic	10.2	2,746	2,622	0.6	0.4	95.5
Hungary	10.1	1,714	2,479	0.4	0.4	144.6
Portugal	10.4	429	2,142	0.1	0.3	499.3
Ireland	4.0	790	1,665	0.2	0.3	210.8
Slovak Republic	5.4	—	955	—	0.1	—
Iceland	—	69	174	—	—	252.2
Luxembourg	—	—	—	—	—	—
China	1,295.2	4,619	20,978	1.0	3.2	454.2
Russian Federation[b]	143.4	—	15,846	—	2.4	—
India	1,064.4	8,882	11,076	1.9	1.7	124.7

(continued)

Table 3 (continued)

Nation	Total Population 2003 (Millions)	Number of Published Science and Engineering Articles		Proportion of Total World Output of Science and Engineering Articles		Change in Number of Articles 1988 to 2001[a]
		1988	2001	1988 (%)	2001 (%)	
Taiwan	—	1,414	8,082	0.3	1.2	571.6
Brazil	176.6	1,766	7,205	0.4	1.1	408.0
Israel	6.7	4,916	6,487	1.1	1.0	132.0
Argentina	36.8	1,423	2,930	0.3	0.5	205.9
Singapore	4.3	410	2,603	0.1	0.4	634.9
South Africa	45.8	2,523	2,327	0.5	0.4	92.2
Chile	15.8	682	1,203	0.1	1.9	176.4
Egypt	67.6	1,130	1,548	0.2	0.2	137.0
Indonesia	214.7	59	207	—	—	350.8
Pakistan	148.4	235	282	0.1	—	120.0
Bangladesh	138.1	95	177	—	—	186.3
Nigeria	136.5	886	332	0.2	0.1	37.5
World total	6,272.5	466,419	649,795	100.0	100.0	139.3

Source: National Science Board (2006); World Bank (2006).

a. 1988 = 100.

b. The number of articles from the USSR was 31,625 in 1988, 6.8% of world output. The number of articles from Russia declined from 21,612 (3.8%) in 1994 to 15,846 (2.4%) in 2001.

social sciences, in 1988 and 2001, plus data for all other nations producing more than 1,000 articles in 2001 and four emerging nations with populations of more than 100 million but little scientific infrastructure. OECD Europe, excluding the United Kingdom, published 29.4% of the world's articles in 2001, compared to 44.6% in all English-speaking countries. The data show that there has been some pluralisation of scientific publication since 1988. The number of articles from South Korea remarkably increased from 771 in 1988 to 11,037 in 2001, from 0.2% to 1.7% of the world's output. The number of articles from China also grew rapidly, from 4,619 articles (1.0%) in 1988 to 20,978 (3.2%) in 2001. Likewise, Taiwan's share rose from 0.3% to 1.2%, and Singapore's share rose from 0.1% to 0.4%. The U.S. share of world scientific articles fell from 38.1% in 1988 to 30.9% in 2001. In 1999, the total output of scientific articles from Western Europe moved past that of North America. Between 1988 and 2001, the total output of articles from North America rose by 13% compared to 59% in Western Europe and 119% in Asia (NSB, 2006, p. 16; Vincent-Lancrin, 2006).

METHODOLOGICAL PROBLEMS AND POLICY LIMITATIONS

Rankings are also used in many national systems to provide data supporting student choice making and in some nations guide allocations of public funds and also simply to feed public appetites for data on institutional status. It is no coincidence that media companies have often been in the forefront of rankings development: Comparative rankings are entertaining in their own right, regardless of the administrative uses to which the data are put and the effects they might have. In the United States, the annual *U.S. News & World Report (USNWR)* survey, which commenced in 1983, has become very influential in determining institutional prestige and influencing flows of students, faculty, and resources. In China, several systems of national rankings are in use (Liu & Liu, 2005). Global and national rankings are now the subject of a burgeoning research literature, which is appropriate given their importance. The comparison of 10 rankings by Van Dyke (2005) concludes that although the rankings share broad principles and approaches, they considerably differ in detail related to aims, systems, cultures, and availability and reliability of data. A common problem is that most rankings systems purport to "evaluate universities as a whole" (Van Dyke, 2005, p. 106). As Rocki (2005) notes in reflecting on the Polish experience, "The variety of methodologies, and thus of criteria used, suggest that any single, objective ranking could not exist" (p. 180). Dill and Soo (2005) compare 5 rankings system. They find that the tables vary in their validity, comprehensiveness, comprehensibility, relevance, and functionality, although they conclude that, nevertheless, definitions of academic quality are tending to converge. This is disputed by Usher and Savino (2006), who cover 19 league tables and university rankings systems from around the world. Like Van Dyke (2005), they make the point that the different rankings systems are driven by different purposes and are associated with different notions of what constitutes university quality: "Quality in higher education is a highly contested notion" (p. 9). They also note that there is an arbitrary character in the weightings used to construct composite indexes covering different aspects of quality or performance: "The fact that there may be other legitimate indicators or combinations of indicators is usually passed over in silence. To the reader, the author's judgment is in effect final" (p. 3).

A recurring difficulty is that no ranking or quality-assessment system has been able to generate data based on measures of the "value added" during the educational process, and few focus on teaching and learning at all (Dill & Soo, 2005, pp. 503, 505), though data in these areas would be most useful for prospective students. Indicators such as student selectivity and research performance have become proxies for quality, yet these qualities drive the reputation of an HEI more than they drive its educational program. There is no *necessary* connection whatsoever between the quality of teaching and learning and the quantity and quality of research (let alone the level of student selectivity). Dill and Soo (2005) remark that

"empirical research . . . suggests that the correlation between research productivity and undergraduate instruction is very small and teaching and research appear to be more or less independent activities" (p. 507). As Altbach (2006) states, "There are, in fact, no widely accepted methods for measuring teaching quality, and assessing the impact of education on students is so far an unexplored area as well" (p. 2; see also Guarino, Ridgeway, Chun, & Buddin, 2005, p. 149). When criteria such as research and student selectivity are adopted as the base of a holistic rankings of institutions for market purposes, the terms of interinstitutional competition are defined by credentialism, not the formative role of higher education, as if students' only concern is the status of their degrees, not what they learn. However, U.S. and U.K. research suggests that only some potential students are primarily interested in the prestige ranking of HEIs, and, interestingly, these students tend to be disproportionately drawn from high-achieving and socially advantaged groups (Dill & Soo, 2005, p. 513). It is as if those students who expect to participate and to succeed in higher education are primarily interested in their status position within the sector, whereas others, such as those from first-generation higher education families, might be more conscious of the absolute benefits of participation and less focused on the map of relative advantage within the sector. This area would benefit from further research, conducted on a comparative basis.

Reputational surveys such as that of the *Times* are open to the charge that they often recycle reputation (Guarino et al., 2005, p. 149) rather than rewarding known quality and degenerate simply into "popularity contests" (Altbach, 2006). "Raters have been found to be largely unfamiliar with as many as one third of the programs they are asked to rate" (Brooks 2005, p. 7). One problem here is that well-known university "brands" tends to generate "halo" effects. One American survey of students found that Princeton was ranked in the top 10 law schools in the country. But Princeton did not have a law school (Frank & Cook, 1995, p. 149). And whether individual students are primarily concerned with status or not, and regardless of the particular selection of qualities that each ranking scheme measures, any system of global rankings must function as a reputation maker that entrenches competition for prestige as a principal aspect of higher education, and this is an effect that tends to feed on itself over time. In effect, the SJTU and *Times* rankings tend to both reproduce and exacerbate the existing vertical differences in the higher education landscape. Globally,

> the fact is that essentially all of the measures used to assess quality and construct rankings enhance the stature of the large universities in the major English-speaking centres of science and scholarship and especially the United States and the United Kingdom. (Altbach, 2006, p. 3)

What is more open is the extent to which the prestige fostered by rankings is grounded in real differences in HEI quality or merely recycles the status order, whether ranking feeds into a process of continuous improvement in quality and

student servicing or not, and whether there are downsides of rankings from the points of view of students, HEIs, systems, or public interest.

In the United States, over the years HEIs have learned to target their behaviour to maximise their *USNWR* position. This has had perverse effects from the public interest viewpoint, for example, the manipulation of student entry to maximise student scores and refusal rates and the growth of merit-based student aid at the expense of needs-based aid (Kirp, 2004). Despite this, there has been little challenge to the continued functioning of the *USNWR* survey, which has entrenched itself in the public domain. It is likely that global HEI rankings will prove to be just as irresistible. Certainly, they are highly unlikely to go away. The worst-case outcome is that there will again be policy downsides, as in the American rankings system, without a compensating dynamic of quality improvement or better data for students.

The central limitation of rankings is twofold. First, whether rankings are specifically derived from existing reputation or not, they tend to foster holistic reputational judgments of HEIs that are not strictly mandated by the data used to compile the rankings and the methods used to standardise and weight the data. "League tables" become highly simplistic when they are treated as summative. But this normally is the case. The desire for rank ordering overrules all other considerations. For example, a common problem is that in rankings systems HEIs are rank ordered even where differences in the data are not statistically significant. Second, HEIs have different goals and missions and are internally differentiated. This again suggests that it is invalid to measure and compare individual HEIs as a whole and still less to compare different HEIs in a national system on a holistic basis, let alone to compare HEIs across national and regional borders. A better approach to rankings begins from the recognition that all rankings are partial in coverage and contain biases and that all rankings are purpose driven. It is valid to engage in rankings, provided they are tailored to specific and transparent purposes and interpreted only in the light of those purposes. At the same time, the different purposes and their corresponding data should not be combined, using arbitrary weightings, in the search for the chimera of a holistic order. Composite approaches "muddy the waters" and undermine the validity of the information. The link between purpose and data is lost. For example, it is valid in itself to seek data based on reputational surveys, as reputation is an important indicator of competitive position. What is invalid is to mix the subjective data with objective data, such as those about resource levels or research performance.

EUROPEAN RESPONSES TO RANKINGS

In Europe, the weak representation of European higher education in the two global rankings systems—only 9 European universities in the SJTU top 50 and 12 in the *Times Higher Education Supplement* top 50—has prompted policy reflection and action in both European Union and national government circles. This rankings performance is often cited in public proposals for greater investment in the European

higher education and research area and proposals for the further concentration of funding in networks and centres of excellence. Germany is focused on building a top 10 group of research universities. The European Union has proposed the European Institute of Technology, which would draw together existing research bases in a megauniversity or network that is capable of challenging the superior rankings position of the U.S. universities. At the same time, European higher education does not have the long-standing tradition of league tables such as in the United States, and the global rankings have also met with considerable scepticism and critique. Nevertheless, in Europe it has become clear that a global higher education market is emerging, consistent with the introduction of market-type steering models at the national level. One widely recognised implication is the importance of transparent consumer information and measures to secure consumer protection. Moreover, it is clear that there will be strong policy pressure to ensure that the additional investments in higher education and R&D provided as part of the Lisbon strategy will be located in successful institutions that have demonstrated their capacity to generate high dividends on the investment. This favours the systematic use of rankings and other kinds of comparison as a guide to policy.

Thus, from a public policy perspective, rankings are inevitable because those who finance and use higher education want to know which academic institutions are doing well (Altbach, 2006). But if policy-useful rankings are to emerge, problems of methodology and issues of ownership remain to be dealt with. In 2004, an expert group was established to develop a set of principles of quality and good practice in higher education rankings. This International Ranking Expert Group (IREG) was founded by the UNESCO European Centre for Higher Education in Bucharest and the Institute for Higher Education Policy in Washington. Together with the Centre for Higher Education Development (CHE), whose own rankings are discussed below, IREG published its Principles on Ranking of HEIs in May 2006 (see UNESCO/IHEP, 2006). The Berlin principles focus on the purposes and goals of ranking, the design and weighting of indicators, the collection and processing of data, and the presentation of ranking results. They are meant to set a framework for the elaboration and dissemination of rankings, to support the continuous improvement and refinement of the methodologies used, and to guide those producing rankings to hold themselves accountable for the quality in their own data collection, method, and dissemination.

THE CHE RANKING SYSTEM

Given the potentials and problems of rankings, the following minimum design requirements are suggested (van der Wende, 2006). Rather than seeking to construct spurious holistic measures, policy-related research should facilitate a broad range of comparative measures, corresponding to the different purposes. Institutions should not be ranked as a whole but should have their various functions separately considered,

including the different aspects of research and teaching and the different disciplines, locations, and discrete service functions. The systems of rankings should be based on a transparent balance of facts about performance and perceptions of performance based on peer review. Ranking methods should generate information relevant for different stakeholders and provide data and information that are internationally accessible and comparative. Because "quality is in the eye of the beholder," ranking should be interactive for users, particularly students. Users should be able to interrogate the data on institutional performance using their own chosen criteria. In terms of ownership, it is important that institutions are involved themselves and committed to maximum openness. HEIs, operating within a European framework of cooperation, should establish an independent agent to collect, process, and analyse data and undertake publication with a designated media partner.

The present system of rankings that most nearly meets these requirements is that which was developed by the CHE in Germany (www.che.de) and issued in conjunction with the publisher Die Zeit. This system includes data on all HEIs in Germany and is now also encompassing Switzerland and Austria. The Netherlands and Belgium (Flanders) are preparing to join the system, and some Nordic institutions are also showing interest. The CHE ranking system is thus well positioned to develop into a Europe-wide system. It has also some attracted attention from other parts of the world. It was recently described by the Canadian-based Education Policy Institute as best practice in higher education rankings and "nothing short of brilliant" (Usher & Savino 2006; see also Van Dyke, 2005). The chief strategic virtue of the CHE rankings, one with far-reaching implications for the character of competition in higher education, is that it dispenses with the spurious holistic (overall or summative) rank ordering of HEIs and instead provides a great range of data in specific areas, including single disciplines. As CHE states, there is no "one best university" across all areas, and "minimal differences produced by random fluctuations may be misinterpreted as real differences" in holistic rankings systems. The CHE data are made available though an interactive, Web-enabled database that permits each student to examine and rank his or her chosen institutions based on his or her own chosen criteria (CHE, 2006).

The Commission on the Future of Higher Education in the United States is working on a comparable concept that would allow consumers to rank colleges based on variables of their choosing, allowing customised rankings similar to those developed by CHE and Die Zeit. The new system would serve as a very different kind of alternative to the *USNWR* rankings (Field, 2006).

STRATIFICATION, CLASSIFICATIONS, AND TYPOLOGIES

The extended and intensified competition fostered by global rankings and their echoes at the regional and national levels have a number of secular effects with

inevitable consequences, unless these effects are modified by policy intervention. First, ranking and competition together enhance vertical differentiation between research-intensive HEIs and others and among the different grades of research-intensive HEIs in what in many cases have been unitary national university systems (e.g., in China; Yang, 2005, p. 196). In some nations, the tendency to vertical differentiation is already being exacerbated by the new emphasis on concentration and internal system stratification, designed to secure a stronger SJTU position for selected HEIs. If some HEIs build research strength only through the weakening of other HEIs, this would seem to constitute little gain in national capacity overall, unless improved SJTU rankings for particular HEIs can open a broader set of global strategic options and/or generate economies of scale and scope at the national level. Second, intensified competition on the basis of research performance will exacerbate demand for high-quality scientific labour, with likely effects also on mobility and price. There already appears to be an increase in the mobility of ISI-defined HiCi researchers, though this has yet to be subject to detailed empirical investigation. Thus, one likely outcome of the intensified global competition and its mediation by rankings is to increase the stratification of research labour and the academic professions both within national labour markets and between global and national labour markets. The instrumental importance of HiCi and other productive researchers in composing the SJTU index strongly suggests that the global element in labour markets will grow in importance, though by how much is difficult to judge.

Third, and paradoxically, in addition to tendencies to vertical differentiation, intensified global competition may become associated with a certain flattening of national system typologies so as to lead to more unitary systems. Both rankings systems, particularly SJTU, reinforce the status of the comprehensive research-intensive university model (Clarke, 2005, p. 196). The effect of the SJTU rankings is to tell HEIs everywhere that global ranking is the measure of prestige and that research performance is the high road to better global rankings. Correspondingly, the absence of specialised rankings in vocational education and in teaching functions reduces the status attached to specialisation in those domains. There is no reason to assume that competition in itself will generate specialisation, unless the incentive structure favours this. In addition, certain conjunctural developments favour a drift toward homogeneity: The trend to corporate autonomy in many nations provides some HEIs with greater freedom in determining their mission according to a market logic, whereas in Europe some polytechnics might seek to reshape themselves to fit the new common program structure secure. This draws attention to the importance of policy measures to sustain existing typologies or to develop new ones as required.

In this context, a basic policy requirement in Europe is the development of a typology of HEIs. The European Higher Education Area is in size comparable to that of the U.S. higher education system and is even more complex, as it is primarily organised

at national and regional levels, each with its own legislative conditions and cultural and historical frames and with a vast array of different languages in which the various forms, types, and missions of HEIs may be expressed. It is generally agreed that diversity as such should be conserved and even increased. The European Commission (2003) states,

> European universities have for long modelled themselves along the lines of some major models, particularly the ideal model of the university envisaged nearly two centuries ago by Alexander von Humboldt, in his reform of the German university, which sets research at the heart of the university and indeed makes it the basis of teaching. Today the trend is away from these models and towards greater differentiation. (pp. 5-6)

Diversity is seen to be as important as autonomy to widen access and improve quality. But to make diversity useful, it needs to be more understood, by publicly defining the missions and characters of HEIs. Hence, the need to develop a typology of HEIs exists. Such a typology will allow individual HEIs to design their own missions and profiles while at the same time offering the various stakeholders more transparency about the characterising dimensions of those institutions (van Vught et al., 2005).

The proposed multischeme typology acknowledges that institutions can be grouped and compared in a variety of ways. The heart of the typology will be formed by the various characteristics on which differences and similarities of institutions are mapped, each highlighting a different aspect of the profile of the institution. In this way, the typology will be made up of a number of parallel "schemes," each based on a different characteristic (van Vught et al., 2005, pp. 14-17). The preliminary work on this typology was carried out in conjunction with a review of the U.S. Carnegie Classification of HEIs, including the reasons for and principles of its revision in 2005, when the single classification system was replaced by a set of multiple, parallel classifications (Sapp & McCormick, 2006). Both the revised Carnegie Classification and the new European typology would be similar in employing a multischeme approach aiming to optimise the information-producing advantages of classification while minimising its downsides; that is, its potential to be used as a ranking mechanism.

In China, the classification of HEIs also is being reconsidered, using the original framework of the Carnegie Classification, now known as the "basic classification," in conjunction with the indicators developed by the SJTU to define a "world class university" (Liu, 2006). The OECD Institutional Management in Higher Education programme is planning an international seminar in late 2006 on ranking and typologies and classifications to compare approaches, practices, and effects across the continents.

CONCLUSIONS

Rankings of HEIs and programs are a global phenomenon, related to the demand for transparent information on the quality of teaching provision and the standing of HEIs offering it. They are also related to and further stimulate competition among institutions across national borders. The different rankings systems taken together provide data of considerable private and public importance, with both positive and negative effects. Most systems of rankings tend to emphasise vertical differences between institutions and between nations, differences of power and authority. At the same time, they obscure horizontal differences, differences of purpose and type. Despite the attractions of horizontal diversity in higher education, league tables have a compelling popularity, regardless of questions of validity, of the uses to which the data are put, and of the effects in system organisation. Rankings are easily recalled, as league tables, and have quickly become part of commonsense knowledge of the sector. It is expected that more regions and nations will see the development of rankings in the future.

Given that global university rankings are a potent device for framing higher education on a global scale, it seems better to enter rather than to abstain from the debate on this framing. It also seems better to take stock of rankings on a multilateral basis rather than solely to individually respond to them. In that respect, the discussion of rankings and the related discussion of typologies in Europe is promising. We are early in the history of international and global rankings. Systems are yet to become firmly established. The development of internationally agreed-on principles for good practice is crucial.

From the common policy viewpoint, it is important to secure "clean" rankings—transparent, free of self-interest, and methodologically coherent. Many methodological challenges still need to be addressed and overcome, and the potential perverse effects need to be anticipated and avoided. The strategic and policy implications need to be better understood, in particular that (a) in the strongest of the present ranking systems, the SJTU table, institutional status is predominantly defined by research performance, without clear evidence on its relationship with teaching quality; that (b) the impact of rankings on stratification and diversification of higher education systems is great; and that (c) the potential link to national systems in relation to accountability and quality assurance and decisions on the allocation of funds is great. To the extent that rankings become instrumental in system organisation, they are likely to have a powerful effect in shaping missions and priorities. Only some rankings systems are designed so as to contribute to broad-based improvement in higher education in the core activities. It is vital that rankings systems are crafted so as to serve the purposes of higher education, rather than purposes being reshaped as an unintended consequence of rankings.

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