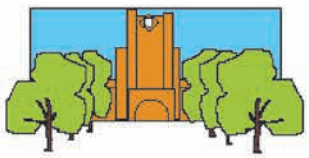

Comparison of Global University Rankings

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Foreword for the English Version

This research report was originally published in Japanese by the Research Institute for Independent Higher Education (RIIHE) which is affiliated with the Association of Private Universities of Japan. The original Japanese report can be downloaded from the RIIHE site (http://www.riihe.jp).

The authors are grateful to Hiromitsu Takizawa, director of the RIIHE, for granting us permission to publish an English and a Chinese version of the report and to Kazuyuki Kitamura, Ph.D., former director of RIIHE, for starting the project.

This report compares the world university ranking of The Times Higher Education Supplement of the UK and that of Shanghai Jiao Tong University of China, and we hope the English and Chinese versions will be useful for international readers.

The Center for Research and Development of Higher Education at the University of Tokyo conducts comparative research on university evaluation and benchmarking through a grant from the Japanese Ministry of Education, Culture, Sports, Science and Technology. This report is one of the outcomes of that research. Please note, however, that the opinions and findings expressed in this report are those of the authors and should not be ascribed to the Center.

I hope that this report will be helpful for those interested in university evaluation and rankings.

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1. Global University Rankings – Current Conditions and Problems

A large number of university rankings have been published in various forms in countries throughout the world, and this has become a sort of a fad.[1] These rankings can be broadly divided into comprehensive university rankings which evaluate universities overall on a comprehensive basis, and rankings for specific fields, such as business school rankings. Most of the comprehensive university rankings only address certain countries or regions, such as "America's Best Colleges" published by *U.S. News and World Report* (hereinafter, "*U.S. News*") and "Asia's Best Universities" published by *Asiaweek*. In contrast, there are many field-specific rankings which exhaustively cover universities worldwide, such as the "Global MBA Rankings" prepared by the *Financial Times*.

For many years, the *Gourman Report* was virtually the only comprehensive university ranking on a global scale. One reason for this is the difficulty of compiling global university rankings, as explained below. Nevertheless, two comprehensive global university rankings have recently been published. One was prepared by Shanghai Jiao Tong University (SJTU), and the other by the *Times Higher Education Supplement*. In this paper, we attempt to objectively examine and compare these two recently released global university rankings. First, however, we begin by reviewing the background to the rise of university rankings and global university rankings.

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[1] See University of Tokyo Center for Research and Development of Higher Education (2003) for a list of the main university rankings.

1.1. The Rise of University Rankings and Their Problems

The Background and Development of Market University Evaluations

Here we define these new kinds of rankings, which aim to sell university evaluations as products, as "market university evaluations" as opposed to the "institutional university evaluations" which are conducted by various public organs.[2] More precisely, institutional evaluations comprise university evaluations conducted by third-party organs as well as self-evaluations by the universities themselves for such purposes as university reform and resource allocation. In contrast, market evaluations are university evaluations conducted for the sale of magazines and university information. Market university evaluations have the following distinctive characteristics.[3]

First, market university evaluations are conducted by a number of magazines and other private-sector evaluation bodies. They present information which has market value, and are sold as competing products on the open market. Accordingly, their destiny is determined by the market. In this point, they differ greatly from institutional evaluations, which are not primarily compiled for sale as products.

Second, these market evaluations reflect consumers' expectations and demands toward universities. Many of the evaluating bodies state that their aim is to contribute to the improvement of university education. So while these market evaluations reflect society's demands toward universities, they may also have positive significance in contributing to university reform.

Third, most market evaluations rank universities in order based on evaluation scores, but market evaluations are not limited to rankings. University evaluations need not

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[2] Kaneko (2000), p. 25.

[3] See Mabuchi, Kobayashi, and Otawa (2002).

necessarily involve ranks or measurements using quantitative yardsticks; there could also be qualitative and descriptive assessments. Regardless, most market university evaluations today do present rankings. This is because of the commercial appeal of quantitative rankings, which are easily understood and appear to be objective.

In the U.S., market university evaluations as typified by the *U.S. News* university ranking have had great commercial success and are becoming ever more popular. Stimulated by the success of *U.S. News*, market university evaluations are now spreading beyond the U.S. to other countries and regions including Japan, Europe, Australia, and China. Especially, university evaluations have been rapidly spreading in Japan since self-evaluation and self-scoring became obligatory when the government amended the Standards for the Establishment of Universities in 1991.

Market university evaluations have diverse important social influences, and their merits and demerits are being widely debated. Aside from their influence on applicants and parents, in many cases market evaluations have also come to affect the management of universities themselves, and this has become an issue of concern.

Among market evaluations, the following types of diverse criticisms have been laid against comprehensive university rankings in particular. There are various background factors as to why comprehensive rankings are flourishing despite such criticisms, and we now explain these factors following figure 1.

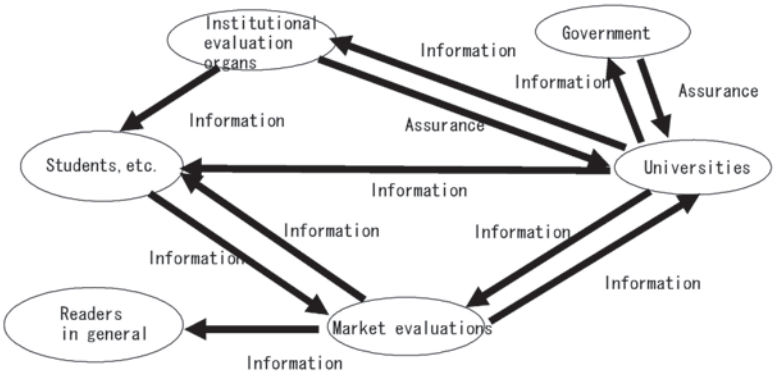
To date the Ministry of Education, Culture, Sports, Science and Technology has guaranteed the minimum quality of Japanese universities by granting permission to establish universities based on the Standards for the Establishment of Universities. Institutional evaluation organs have been evaluating Japanese universities since around the year 2000, and university evaluations by certified evaluation organs became obligatory with the 2002 Central Council for Education report “On Constructing a New System to Guarantee University Quality.” Institutional university

evaluations became obligatory and are advancing along with this "seal of approval" from the Ministry of Education, Culture, Sports, Science and Technology.

On the other hand, in the U.S., university evaluations are conducted and quality is guaranteed through accreditation by accrediting organizations and other specialized bodies, rather than through some sort of guarantee by the U.S. government. While these accreditations are entirely different from government quality assurance, they may also be considered institutional evaluations.

In contrast to these institutional evaluations, the background to the demand for market university evaluations is entirely different. First, for applicants and parents market evaluations provide easily understood university information and evaluations, and at a very reasonable price. Today university education is the second most expensive investment in life, following the cost of home ownership. It is a small price to pay if important information for choosing universities can be had for a trifling sum of money. While market evaluation university information and rankings cannot be entirely trusted, they do provide sufficient reference for peace of mind. (Some have said they act as a security blanket.) For applicants and parents, market university evaluations are just one reference for university selection. For publishers, however, they are commercial success factors because vast numbers of applicants and parents purchase their magazines featuring market university evaluations each year.

Figure 1　Socioeconomic Background to University Evaluations



The universities themselves constitute another major background factor contributing to the demand for market university evaluations. Universities frequently use high ranks for their own publicity purposes. They are in no position to criticize the rankings if they do so only when their rank declines, but immediately incorporate rankings into admissions pamphlets the moment their rank shoots up. And when rankings include selectivity (the percentage of applicants accepted) in their evaluation criteria, they can influence university management as universities may, for example, decide to become more selective in their admissions in an effort to boost their ranks. The social prestige of market university evaluations is actually rising as a result of such changes in university behavior. This is because when universities include market university rankings in their own publicity, they are implicitly stating that they place faith in these rankings.

Moreover, many researchers have recently adopted the *U.S. News* university ranking scores as data in their higher education research, and this is granting legitimacy to the *U.S. News* rankings and making them more and more authoritative. It can even be said that university rankings are being used, in a sense, by those universities and researchers who criticize them.

On the other hand, it is difficult for researchers to rigorously examine the reliability and appropriateness of university rankings. That requires a great deal of time and effort to collect objective data and verify the validity of the rankings, all in an area that is not highly regarded as a field of research. There is also strong skepticism regarding whether or not university rankings are even possible in the first place. Consequently, some believe that in and of themselves efforts to investigate university rankings are simply meaningless, and of no value whatsoever.

Yet since university rankings have become this influential, many research papers on this subject are appearing in the pragmatic U.S.[4] *U.S. News* itself commissioned a think tank to investigate the validity of its rankings, and is constantly revising its evaluation criteria. However this is also a means of giving the impression of sincerity and justifying the *U.S. News* rankings, which results in making the rankings still more authoritative. What is more, if the same evaluation criteria are maintained, then there is no point in releasing the rankings every year since the order does not change all that much. So revising the evaluation standards is also a device to suitably change the rankings and publish them year after year.

Problem Points with Rankings

There has been a great deal of criticism that university evaluations and rankings do not precisely evaluate university education and research. As mentioned above, some also hold that the ranking of universities is fundamentally impossible in and of itself. One factor causing the debate to easily become confused is the mix-up and combination of the concepts regarding university evaluations and university rankings. This is especially true for university rankings. Since these rankings are not a scientific

[4] See Mabuchi, Kobayashi, and Otawa (2002). Subsequent examples include Meredith (2004) and Pike (2004). In 2002, UNESCO-European Centre for Higher Education held an international conference on university rankings and league tables where many research papers on university rankings were presented.

concept to begin with, they are applied inconsistently without any strict definition, and this brings confusion to the discussion. For example, when ranking is conceived of as a score and an ordinal rank, its meaning differs from a ranking in which universities are divided into groups (Rank A, Rank B, etc.). The discussion falls into confusion when many universities are given the same ordinal rank. In such a case the distinction between ordinal rankings and group rankings is vague.

In fact, as discussed later on, SJTU's "Academic Ranking of World Universities" ranks the top 100 universities individually (sometimes awarding the same rank to more than one institution) and then divides the universities with ranks below 100 into groups of 50 or 100. In this paper, considering the two global university rankings compared herein, we define ranking as the individual ordinal ranking of universities (first, second, third, etc.) including cases where the same rank is sometimes given to multiple institutions.

Also, as mentioned above, rankings do not always have to be based on scores. The divisions between ranks can be entirely subjective, especially when universities are ranked into groups. Nevertheless, most rankings are numerical with the ranks determined by scores. This is because this numerical approach of awarding scores and then ranking the schools is easily understood and appears to be objective. There are various criticisms of this approach, and these are problems not only with university rankings, but with rankings in general.

The first criticism is that with the numerical approach items that cannot be quantified are completely ignored. There is also strong criticism regarding items that can be quantified, such as the number of research papers or the percentage of exchange students, since objectively these may not be appropriate measures to indicate the quality of research or the level of internationalization. In particular, many have noted the difficulty of quantifying indicators concerning education, as opposed to research. For example, many hold that class size is actually a more valid indicator of

educational quality than the ST ratio (the number of students per teacher), which is commonly adopted as an education quality indicator. Class size is determined not only by the ST ratio, but by multiple other factors including the number of students enrolled and the number of classes taught by each faculty member. For that reason, there are criticisms that the use of the ST ratio to evaluate educational quality is inappropriate.[5] Looking further, there is also no guarantee that small class size necessarily guarantees high educational quality. So there are various problems with the appropriateness of the indicators adopted as evaluation criteria.

Second, there is a problem with the relation between the score and the ranking. Normally university rankings do not cover all universities, but are limited to a given number of higher-ranking universities. In such cases, the distribution between the scores and the number of universities is often as illustrated by figure 2, which is a hypothetical example. In this type of distribution, the scores and ranks easily become dissociated at the lower scores. This divergence emerges because the scores are proportional measurements while the ranks are relative measurements. In figure 2, there is just one university with a score of 95, but there are 5 universities with a score of 94 and all 5 of these universities are ranked 2nd. Similarly, the figure shows 10 universities ranked 7th, 15 universities ranked 17th, and 20 universities ranked 32nd, so the lower the ranking, the higher the number of universities with the same rank. A score differential of a single point results in only small differences in the ranks of universities near the top, but leads to major differences in the ranks of universities near the bottom (e.g., 1st, 2nd, 7th, 17th, 32nd). For this reason, when scores are transformed into ranks minimal score differentials that are not statistically significant greatly affect the ranks. In fact, this same tendency can be seen in the two global university rankings analyzed by this paper. This is one reason for the gap between stability near the top and fluctuations near the bottom of both of these university rankings.

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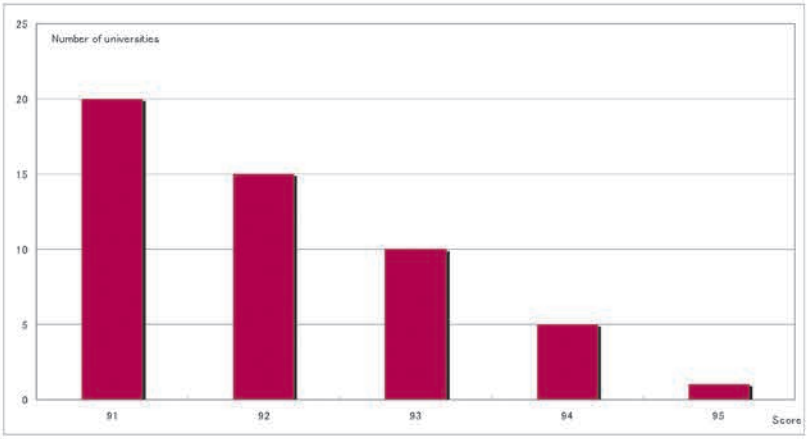
[5] Clotfelter (1996), pp. 182-184.

Figure 2 Relationship between Overall Scores and Ranks



Third, there are criticisms of the subjectivity of the peer reviews or reputation (expert opinions) adopted by many university rankings. Many research findings indicate that such peer reviews are rather stable, and tend not to change. This has also been criticized by those who hold that the peer evaluations do not change enough because they are heavily influenced by past rankings.

Overall, there is no limit to the criticisms of the individual indicators used to compile university rankings. These criticisms are largely based on skepticism regarding rankings themselves and numerical measurements, and are not constructive criticisms aimed at developing superior university evaluation indicators. Yet even if we do not deny the possibility of quantification using individual indicators, there is still a more important issue. Even if there were objective indicators to numerically measure and rank the quality of various aspects of university education and research, would it then be possible to combine these into comprehensive scores and rankings of entire universities? Comprehensive scores use multiple evaluation criteria, calculate the scores for each of these criteria, assign weights to each of the scores, and are then computed as weighted averages. Finally, the comprehensive rankings are determined

based on these comprehensive scores. Under this approach, as explained above, the evaluation criteria are an important issue, but the weights used for the weighted averages are also problematic. For example, who decides the relative importance of class size and the number of research papers published? Simply adding the two together involves a tacit assumption that the two are of equal importance. In fact, comprehensive scores and the rankings based on them are highly sensitive to changes in the weightings.[6] Despite this, the bases for the weights given to the individual indicators in all the comprehensive university rankings are unclear. This also holds true for the two global university rankings analyzed in this paper.

1.2. Problem Points with Global University Rankings

As summarized above, there are strong criticisms of comprehensive university rankings. The difficulties involved increase still further for global comprehensive university rankings, and this is probably the reason why there have been very few efforts to date to compile comprehensive university rankings on a global basis. Then why have global comprehensive university rankings suddenly appeared in recent years, despite these difficulties? This may be because the socioeconomic background to the rise in university rankings applies even more strongly to global evaluations.

Especially with the advance of globalization and the growing mobility of students and researchers, it is becoming increasingly difficult to obtain accurate information about foreign universities. The information disseminated by the universities themselves cannot really be distinguished from advertising, while there are various difficulties with the provision of international university information, including evaluations, by public organs. This is particularly problematic for universities in foreign countries. In other words, university quality assurance is growing increasingly difficult along with the advance of globalization. Moreover, studying abroad is more expensive than studying at universities in one's home country. It is difficult to deny that global

[6] See Mabuchi, Kobayashi, and Otawa (2002) for specific examples.

university rankings are important information for exchange students and researchers seeking to participate in international exchange. Without a doubt, there is a definite demand for such international university information and global university rankings.

However, the fundamental question of whether or not it is even possible to compile global university rankings must first be resolved. Many university rankings incorporate peer reviews (expert opinions), but there are no experts with thorough knowledge of all the universities worldwide, and objective evaluation methods have yet to be established. The advantageous treatment of the English language is often cited as a problem in the establishment of objective criteria. Many rankings make use of Thomson Scientific's ISI Web of Knowledge (hereinafter, "ISI") publications database, and the two global university rankings examined herein recognize that the ISI database is centered on English language papers.

Since no completely objective evaluation criteria have been established, evaluations should be conducted with clear statements of the evaluation criteria characteristics and their specific biases, such as the advantage given to English-speaking countries in certain indicators. The two global university rankings examined in this paper both disclose their evaluation criteria and explain the biases. Regardless, despite these caveats the rankings inevitably take on a life of their own.

One reason why the *Gourman Report*, which has published global university rankings ever since 1967, does not enjoy much credibility among researchers of higher education is that while it displays the scores to two decimal points for each university by curriculum, faculty, and field of study, it does not disclose the specific indicators, evaluation methods, or data adopted under its criteria. Thus, other researchers cannot examine the appropriateness of the *Gourman Report* rankings. For that same reason, we exclude the *Gourman Report* from our investigations in this paper.

As for problems with the rankings, prior investigations of the *U.S. News*, *Asia Week,*

and Japanese university rankings have found that the evaluations of the same schools fluctuate greatly from year to year, so these rankings lack stability over time.[7] Is it conceivable that the rank of the same university could change greatly from year to year? This was the central argument that Gerhard Casper, then president of Stanford University, made in criticizing the *U.S. News* rankings. One reason for the fluctuations is the divergence between scores and ranks as illustrated above. Prior research has also demonstrated problems with reliability, for example, how changes in weights result in large rank changes and how the evaluations of the same universities vary significantly by magazine.

Based on this prior research, we now investigate the characteristics and problem points of the two global university rankings, and also examine the two rankings in comparison with one another.

2. Two Global University Rankings

2.1. The *Times Higher Education Supplement* Ranking

Outline of the Ranking

In November 2004, the *Times Higher Education Supplement* (THES) published a ranking (hereinafter, the "*Times* ranking") of the world's top 200 universities. Harvard University was ranked 1st and the University of California, Berkeley (UC Berkeley) 2nd. Of the British universities, University of Oxford and University of Cambridge were ranked 5th and 6th. The University of Tokyo was ranked 12th and Peking University 17th.

Figure 3 is a donut graph presenting these top 200 universities in three concentric

[7] Mabuchi, Kobayashi, and Otawa (2002), and University of Tokyo Center for Research and Development of Higher Education (2003).

circles representing the top 50, top 100, and top 200 universities (running from the top 50 in the circle closest to the center to the top 200 in the circle furthest from the center), all color coded by region. Divided into five regions, the largest number of these universities are located in Europe, followed by North America, Asia, Oceania, and Latin America. As shown by figure 5, these universities are located in 29 different countries, with the greatest number (62 universities) located in the U.S., followed by the U.K., Germany, Australia, and France. The predominance of the U.S. and Europe is patently clear. Among the Asian countries, six universities are located in Japan and five are located in China.

Figure 3 Regional Distribution of the Times Ranking

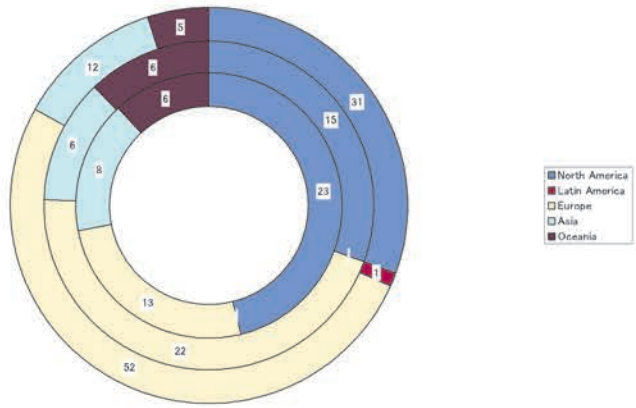
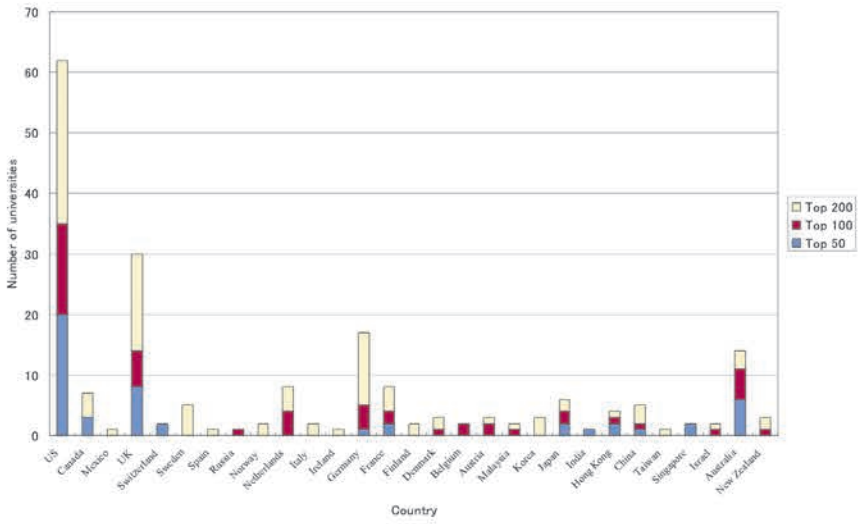


Figure 4 Country Distribution of the Times Ranking



Ranking Criteria

As ranking criteria, the *Times* adopted five indicators that strongly reflect education, research, and international valuations. These were peer reviews, percentage of international faculty, percentage of international students, faculty-student ratio (number of faculty members per student), and number of research citations per faculty member. Except for the peer reviews, the data were all publicly-available information. The peer reviews came from 1,300 researchers in 88 countries who participated in the *Times* ranking survey in August and September 2004.

The indicators were all normalized based on the weights presented in Table 1 so that the top score would equal 2,000 points multiplied by the weights (e.g. 1,000 points for peer review, 100 points for the percentage of international faculty). The sum of these top scores would then equal 2,000 points, but since the top score (for Harvard University) was actually 970 points, the combined scores were then normalized again

to make the top score 1,000 points. There is a slight differential (a maximum of about 1.6 points) between the "final scores" published by the *Times* and normalized total scores computed from the weighted averages, and this differential results from rounding errors since the published scores were all presented as whole numbers.

Table 1 Weights of Each Indicator under the *Times* Ranking

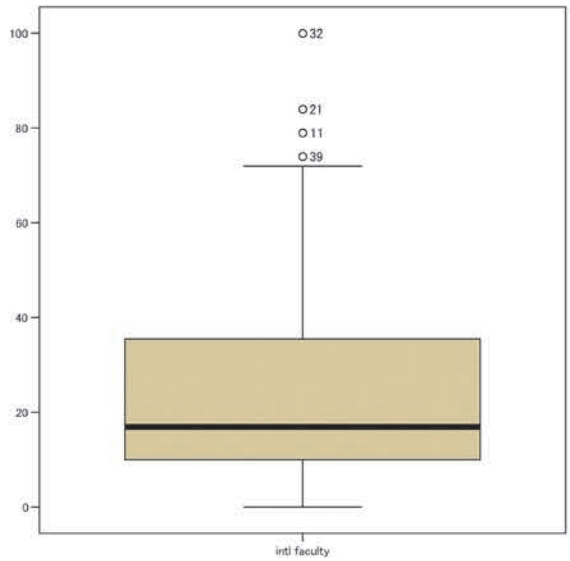
Indicator	Weight
peer review	50%
intl faculty	5%
intl students	5%
faculty/student	20%
citations/faculty	20%

Ranking Characteristics and Problem Points

1) Regarding Indicators Reflecting Internationalization

The indicators reflecting internationalization—the percentage of international faculty members and the percentage of international students—are both given weights of 5 percent, which is not very high. However, these indicators are seldom used in other rankings, so the *Times* ranking may be said to emphasize them. Figure 5 presents the distribution of the percentage of international faculty. As mentioned above, the distribution of each indicator is a general characteristic of the ranking index. There are clear differentials among the scores near the top, while many universities are concentrated near the bottom with scores that are the same or only slightly different.

Figure 5 Percentage of International Faculty



The universities with high percentages of international faculty include Swiss Federal Institute of Technology Lausanne, McGill University, London School of Economics and Political Science (LSE), the University of Hong Kong, Swiss Federal Institute of Technology Zurich (ETH Zurich), and the University of London School of Oriental and African Studies (SOAS).

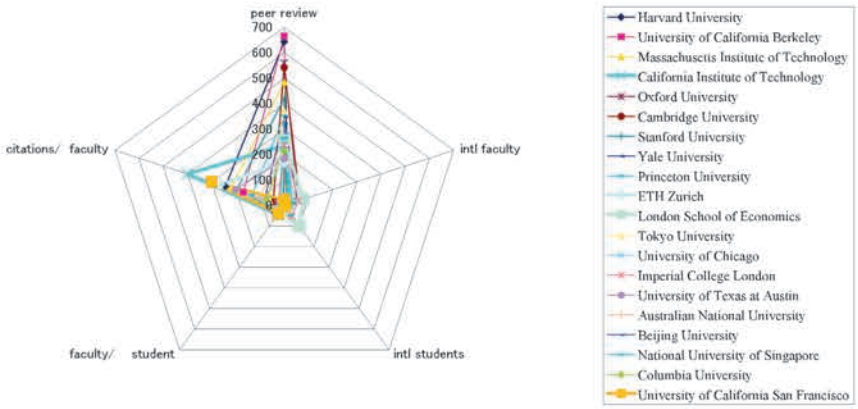
The universities with high percentages of international students include LSE, RMIT University, Curtin University of Technology, University of Science Malaysia, SOAS, and Swiss Federal Institute of Technology Lausanne.

2) Regarding the Influence of University Size

Examining the top 20 universities (figure 6), we observe a trend whereby smaller-scale universities have some advantages. Examples include the California Institute of Technology (ranked 4th) with 2,172 students, LSE (ranked 11th) with 1,000 students, and University of California San Francisco (UCSF, ranked 20th) with 2,600 students. This is apparently because smaller universities tend to have

advantages in the percentage of international students, the percentage of international faculty, and the number of citations per faculty member.

Figure 6　Top 20 Universities

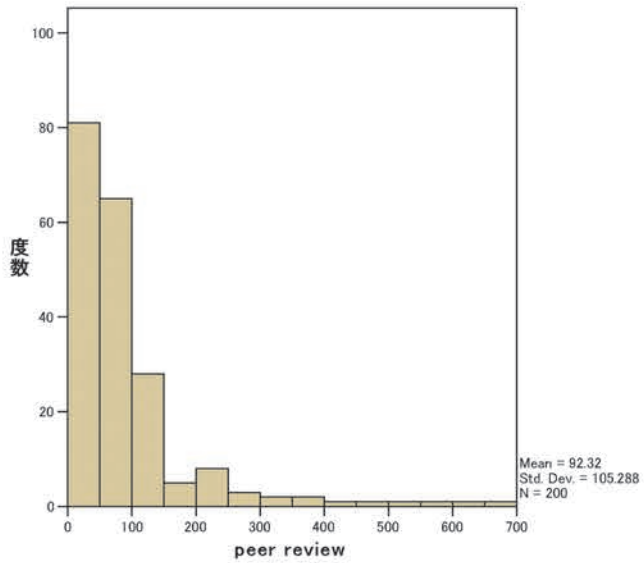


3) Regarding Differences in Ranks from Score Differentials

Here we consider the differences in ranks from score differentials, using peer review scores as an example. For example, the University of Tokyo which is ranked 12th overall has a score of 371 points, while Kyoto University which is ranked 29th overall has a score of 207 points. The two universities have a score differential of 164 points and a rankings differential of 17 ranks. In contrast, Kyoto University and Uppsala University (which is ranked 140th and has a score of 43 points) also have a score differential of 164 points, but a rankings differential of 111 ranks. This illustrates how the difference in ranks from the same score differential greatly increases as the ranks decline. Also, as shown by the figure 7 histogram, for scores between 400 and 700

points a 300 point differential results in a ranks differential of just 5 ranks.

Figure 7 Peer Review Score Distribution



4) Influence of Peer Reviews

Figure 8 compares the rankings of the top 20 universities after the peer review indicator has been removed with their original overall rankings. The *Times* ranking places the greatest emphasis on the peer review indicator, with a weighting of 50 percent of the overall score. Similarly, figure 9 shows the rankings differentials for the top 20 universities as originally ranked and after the peer review indicator has been removed. The universities showing the greatest rankings differentials with and without the peer review component are as follows, divided into two groups. Universities whose original ranks were higher than their ranks without the peer review scores include UC Berkeley (a differential of 14 ranks), Princeton University (8 ranks), and University of Chicago (6 ranks). These are all large-scale universities.

Universities whose original ranks were lower than their ranks without the peer review scores include Swiss Federal Institute of Technology Lausanne (23 ranks), UCSF (17 ranks), and University of California San Diego (16 ranks). These are all small-scale universities or lesser-known universities.

Thus in the *Times* ranking peer reviews have a high weight and greatly affect the rankings of the individual universities. Nevertheless, the specific nationalities and fields of the 1,300 experts who participated in the *Times* peer review remain unknown.

Figure 8 Rankings with and without the Peer Review Indicator

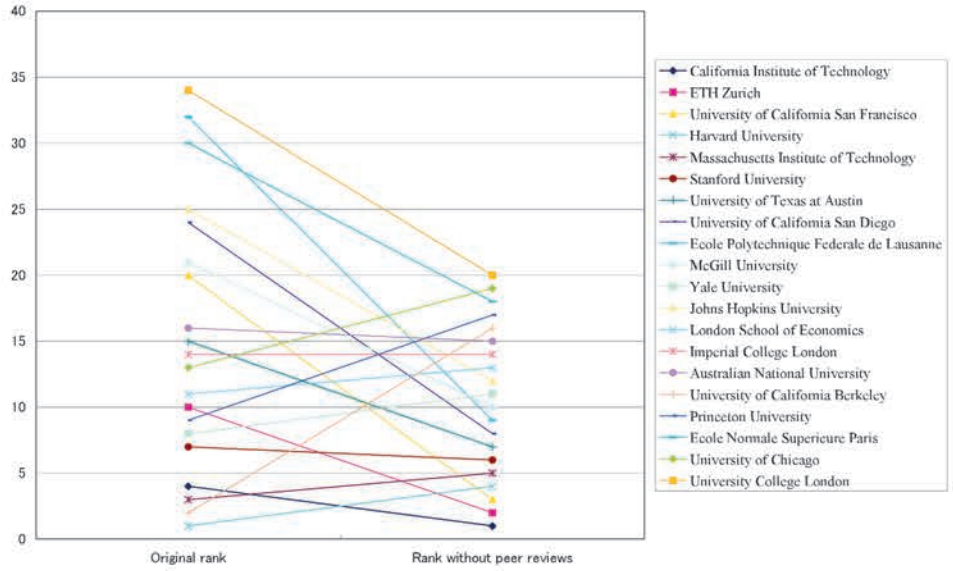
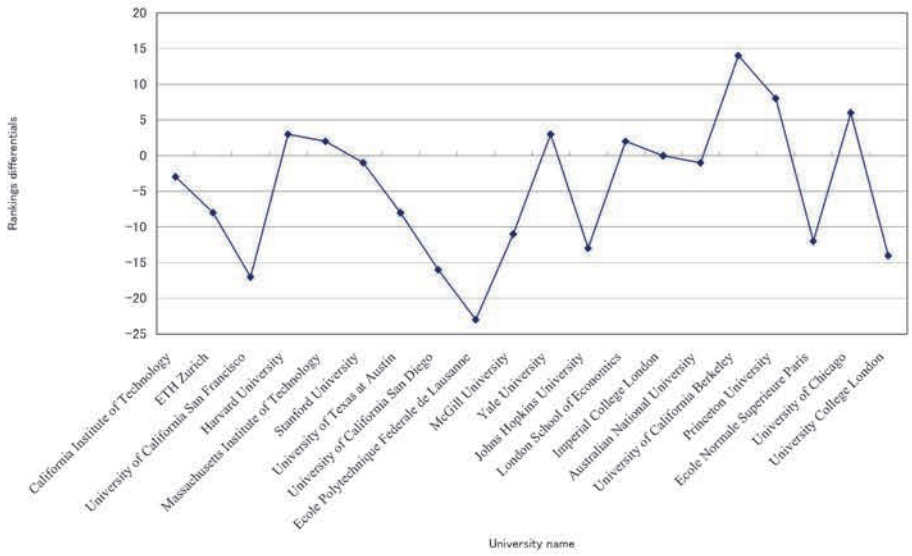


Figure 9 Differentials between Original Rankings and Rankings without the Peer Review Indicator



5) Relations among the Indicators

Table 2 shows that the peer review indicator has the highest correlation coefficient (0.93) with the overall score. Among the indicators themselves, the highest correlation (-0.65) is between the peer reviews and the overall rankings. These indicate that the peer review score has the greatest influence on the final scores for each university.

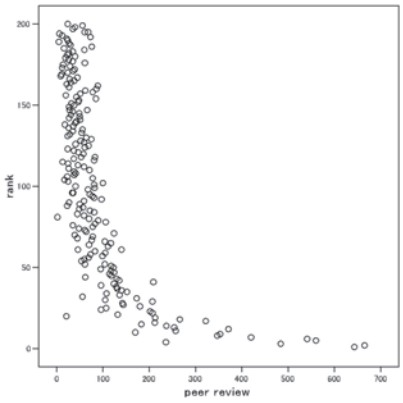
Table 2 Correlations among the *Times* Ranking Indicators

	rank		peer review		intl faculty		intl students		faculty/student		citations/faculty		final	
rank	1.00		-0.65	**	-0.25	**	-0.25	**	-0.33	**	-0.43	**	-0.74	**
peer review	-0.65	**	1.00		0.08		0.00		0.31	**	0.40	**	0.93	**
intl faculty	-0.25	**	0.08		1.00		0.56	**	-0.06		-0.17	**	0.19	**
intl students	-0.25	**	0.00		0.56	**	1.00		-0.08		-0.28	**	0.09	
faculty/stude	-0.33	**	0.31	**	-0.06		-0.08		1.00		0.22	**	0.39	**
citations/facu	-0.43	**	0.40	**	-0.17	**	-0.28	**	0.22	**	1.00		0.63	**
final	-0.74	**	0.93	**	0.19	**	0.09		0.39	**	0.63	**	1.00	

Note: Statistically significant at a level of 10 percent (both sides).

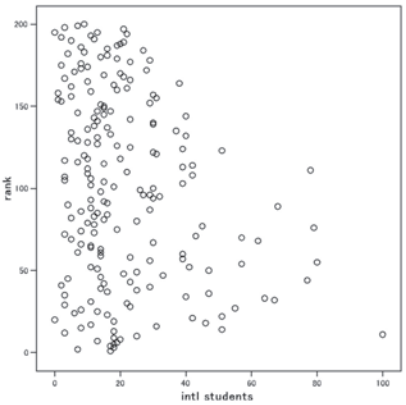
Figure 10 presents a scatter diagram of the peer review scores and the overall ranks.

Figure 10 Correlation between Peer Reviews and Overall Ranks



Also, among the various indicators, the correlation coefficients with the ranks were lowest for the percentage of international faculty and the percentage of international students at -0.25. Figure 11 presents a scatter diagram of the percentage of international students and the overall ranks.

Figure 11 Correlation between Percentage of International Students and Overall Ranks



6) Chinese Universities and Japanese Universities

As shown by the line graphs in figures 12 and 13 and the radar graphs in figures 14 and 15, for Chinese and Japanese universities the influence of the peer review indicator is greatest. The score differentials for the other indicators are not all that great between the University of Tokyo (ranked 12th) and Kyoto University (ranked 29th), or between Beijing University (ranked 17th) and Tsinghua University (ranked 61st), but are highly conspicuous for the peer review indicator. This holds true not only for the Asian universities, but for the other universities as well. Also, the two educational indicators representing internationalization are low in both Japan and China.

Figure 12 Rankings of Chinese Universities with and without the Peer Review Indicator

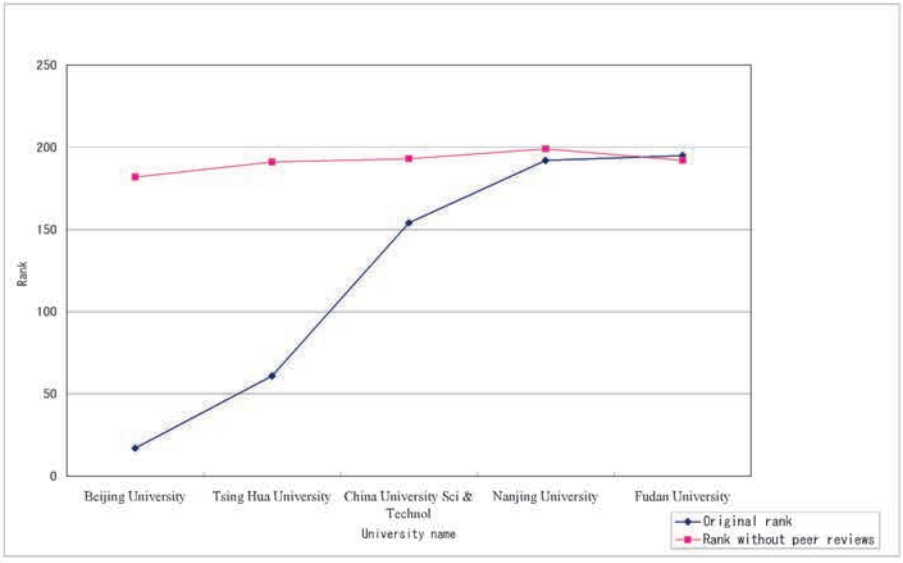


Figure 13 Rankings of Japanese Universities with and without the Peer Review Indicator

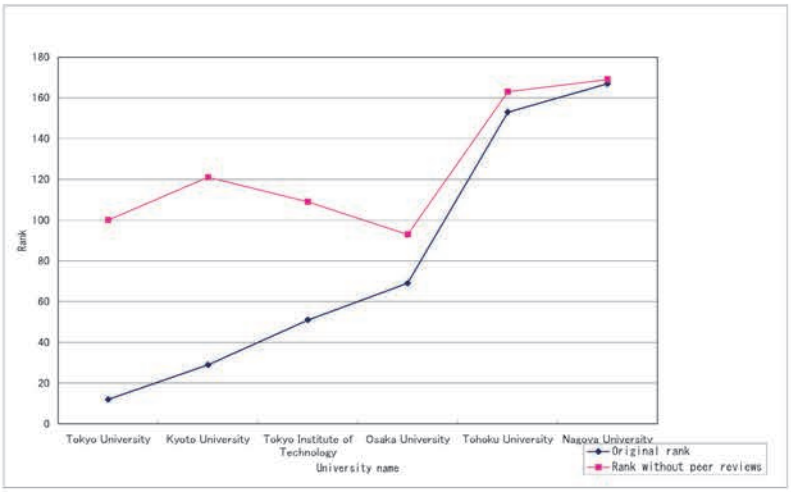


Figure 14 Score Distributions of Each Indicator at Chinese Universities

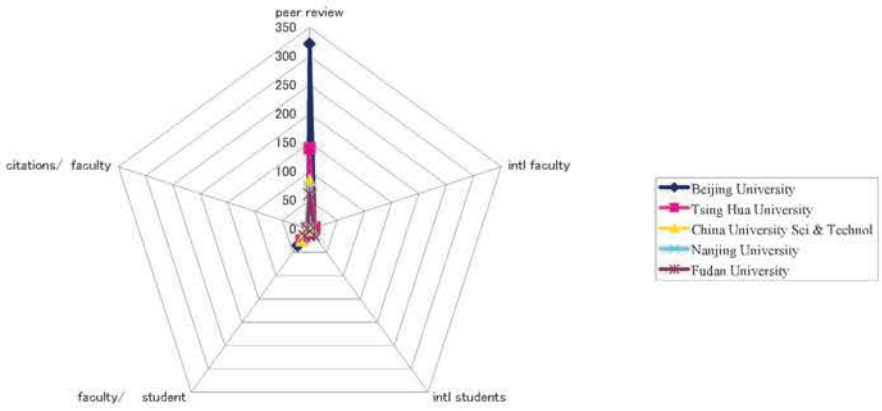


Figure 15 Score Distributions of Each Indicator at Japanese Universities