World University Rankings: What Is in for Top Ten East Asian Universities?

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Abstract

Background: World university rankings have been around for a decade and there are several such systems competing for the attention of higher education institutions. A frequent criticism is that they have a bias toward English-speaking countries and sciences; Europe and the Latin America have been vocal about this and are working on alternatives.

Aims: This article aims to present detailed comparative information of top ten East Asian universities vis-à-vis world-class universities as well as universities matched on ranking positions.

Sample: Ten top East Asian universities, ten world-class universities, and twenty universities matched with the East Asian universities on overall ranking.

Method: Mean comparisons, factor analysis, and multiple regression were performed on the data of the three sets of universities.

Results: Findings show large gaps that need to be bridged to reach world-class status. And, the East Asian and matched universities are found to have very different profiles. The gaps and differences are attributable to national higher education goals and handicap in English.

Conclusion: East Asian universities need to bridge the gaps in specific indicators to improve on their standings in the world context.

Keywords: East Asian, Factor analysis, University ranking
Introduction

World university ranking (WUR) has a short history of just a decade, started in 2003 with the Academic Ranking of World Universities (ARWU) at the Shanghai Jiao Tong University in the People’s Republic of China (Liu, Cheng & Liu, 2005) with the seemingly simple question of “What makes excellent universities?” It was soon followed by QS-THE World University Rankings (QSWUR), a joint effort of the Quacquarelli Symonds and the Times Higher Education. The ranking results were published in collaboration with Times Higher Education. Then, in 2009, the Times Higher Education broke away from QSWUR and partnered with Thomson Reuters to publish the Times Higher Education World University Ranking (THEWUR). The influence of WUR has been summarized recently by Holmes (2012) thus,

ARWU is driven ultimately by the need to emulate the West and beat it at its own game…The QS rankings emphasize reputation rather than bibliometrics and are unique in including an assessment of graduate quality by employers…The Times Higher Education World University Rankings 2011-12 are now unashamedly focused on the world’s elite and have little to say about teaching quality. But…they do make an attempt to measure expertise in the arts and humanities and to give due weight to the social sciences.

Recent/Other Developments

Two new rankings were released; these are in fact sub-sets of existing rankings using the same methodology. First is the QS Top 50 Under 50 (QS Topuniversities, 2012) which re-ranked ‘young’ universities established since 1962 according to their positions in the QS World University Rankings 2011. In addition to providing ranking results, information of the universities’ size, research intensity, and focus are also available. The second is THE 100 Under 50 (Time Higher Education, 2012) which also ranked ‘young’ universities and used the same 13 indicators but with the weight on academic prestige slightly reduced.

In contrast, a new ranking with a new focus is the U21 Ranking of National Higher Education Systems (Williams et al., 2012) to rank 48 countries on their higher education systems on four indicators, i.e., Resources, Environment, Connectivity, and Output based on Salmi’s (2011) model. This introduces a new conceptualization when compared with the existing systems (Soh, 2012c, 2012d).

While the WUR systems mentioned above are
mainly *general* ranking of academic excellence, there are *specialized* ranking systems for various disciplines and regions. Often, these are subsets of a narrower scope comparing likes with likes within specific subjects such as medicine, MBA, Engineering, etc.

A specialized WUR system which differs from most other systems is the Webometrics (Ranking Web of Universities, n.d.), started in 2004 and recently it has updated its methodology. This system has three noteworthy features. First, it ranks the universities with the intention “to motivate both institutions and scholars to have a web presence that reflects accurately their activities”. In this sense, it does not restrict itself to only academic achievements though this could well be a main focus. Secondly, unlike the other WUR systems, Webometrics does not request nor accept data provided by the universities themselves. Thus, its data is gathered totally independent of the universities. Thirdly, unlike most other systems which combined raw scores (percentages), Webometrics normalizes the raw data for its indicators (Presence 20%, Impact 50%, Openness 15%, and Excellence 15%) before weighting and summing. This ensure that the consistency between the assigned and attained weights; inconsistency in this aspect is a common methodological flaw of other WUR systems (Soh, Being considered).

Another noteworthy WUR system is the CHE University Ranking (CHE Centrum für Hochschulentwicklung, 2012). The Centre for Higher Education Development (CHE) publishes four sets of WUR, including *CHE University Ranking*, *CHE Research Ranking*, *CHE Excellence Ranking*, and *CHE/dapm Employability Rating*. As the first ranking result was published in 1998, it is not a recent development, but it has some special features worthy of attention. This is a specialized system in that (1) it covers only German higher education institutions; (2) it has the first year students as the focus; (3) it started with ranking of business administration and chemistry and gradually expands to include other subjects. Methodology-wise, *CHE University Ranking* is strictly subject-related and multi-dimensional; it gives picture of universities from different perspectives and groups rather than ranks them to avoid spurious precision. In short, it has a disbelief of weighting, summing, and micro-ranking; this is very different from many other WUR systems and the problems of weighting, summing, and micro-ranking have been evidenced in a series of statistical analyses of extant data (Soh, 2012a, 2012b, 2011a, 2011b).

Nevertheless, the dissatisfaction with the three currently popular WUR systems has prompted the search for alternatives, especially in non-English speaking regions (Marshall, 2008; Obasi, 2008; Rauhvargers, 2011). In the Netherlands, Jobbins (2011) reports on the *Leiden Ranking* of the Centre of Science and Technology. It covers 500 universities and focuses on publications and citations of scientific research papers. In Hungary, according to Holdsworth (2008), more than 500 higher education researchers and student groups attending the Third Annual International Trends in Quality Assurance Conference agreed that rankings had ‘perverse effects’ and there is a need for a more effective strategy.

In Latin America, Hurtado (2012) and Marginson (2012) reported, countries met for the first-ever regional meeting to discuss the impact, scope and limitations of WUR. The focus was on the undesirable effects of rankings for Latin American universities and the needed changes. Two fundamental criticisms are that the WUR does not given due consideration to
the full range of universities’ contributions, nor their overall performance and that most rankings follow the Anglo-Saxon research model and use English-based databases, whereas Latin American universities are strong in social sciences and humanities with their academic staff mostly publishing in Spanish or Portuguese.

In Taiwan, the Higher Education Evaluation and Accreditation Council (HEECAT, 2011) published in 2007 its *Performance Ranking of Scientific Papers for World Universities* which was purely bibliometric. This new system is used together with the ARWU and THEWUR by Altbach and Samli (2011) in their case studies of world-class research universities. For 37 universities from the four Chinese-speaking regions, 22 appear in all three systems studied by Huang (2011). For these, as the present writer calculated, the HEEACT rankings correlates $r=0.90$ and $r=0.69$ with those of ARWU and THE-QS, respectively.

In the Gulf region, universities have been rather passive in the ranking game. For instance, there are no Arabian universities in the top 200 of the THEWUR 2011-2012 and there are only five in the top 200 of the QSWUR 2011-2012 list (Hussain & Soh, Under review). There may be various reasons for this passivity. According to Naidoo (2011), one of these could be the general scepticism about the value of WUR among the Gulf academics.

Perhaps as a response to the regional dissatisfaction, the *US News Best Universities Rankings* (U.S.News & World Report, 2012) released rankings of Asian and Latin American universities. The data is based on the QSWUR with some modifications to identify the top universities within the two regions. For the Asian universities, the original QSWUR indicators were used, but for Latin American universities an additional indicator is a Staff-with-PhD score. It also reports subject rankings for various disciplines including Arts & Humanities, Engineer & Technology, Life Sciences, Natural Sciences, and Social Sciences.

**Criticisms**

There have been criticisms on conceptual and methodological grounds on WUR. Two comprehensive reviews are the European University Association report (Rauhvargers, 2011) and the OECD-World Bank conference (Marshall, 2011). Technical issues have been recently uncovered in a series of articles by the present writer (Soh, 2012a, 2011b) including spurious precision in assigning different rankings based on miniscule score differences in the decimals, inconsistency between the assigned and attained indicator weightings, the dubious assumption of mutual compensation among indicators and, above all, the absence of reliability statistics to indicate the trustworthiness of the overall scores and hence the validity of the ranking results.

Unfortunately, the criticisms seem to have fallen on deaf ears and the WUR systems perpetuate the same methodologies and even apply it to subsets of extant data (i.e., the ‘young’ universities rankings). If such criticisms are not taken seriously and improvements do not take place in good time, then as Lincoln (2012) vehemently says, “Rankings: an idea whose time has come, and gone.” Thus, for WUR to be really useful, instead of (or over and above) providing ammunition for the meaningless competition, it should provide information more relevant to the needs of rank-users and should fit local situations as well as contribute to the growth of higher education systems.

However, a feature common among the commentaries on WUR is that they tend to be
rhetorics, though supported by observations and reasons. They are more perceptive and insightful opinions than statistical re-analysis of extant data. Statistical scrutiny of WUR has appeared only recently as exemplified by the factor-analytical studies of Saisana and D’Hombres (2008) and Steiner (n.d.). They used the data of ARWU and THEWUR to uncover the underlying dimensions of the indicators. Another statistical study of interest is by Jarocka (2012) who re-analyzed the ARWU using k-mean clustering and demonstrated that broad grouping would make better sense than the league table. This approach has also been suggested by the present writer (Soh, 2012a, 2012b) inter alia.

In sum, at the time of writing, the WUR systems treat ranking as a form of social surveys and do not employ more rigorous statistical analysis. The simplistic arithmetic processing does not do justice to the resources put in by all parties concerned for ranking. They tacitly assume that the analyses are totally valid and free from conceptual and methodological issues. The studies cited above begin to show that this assumption does not stand up to the test when more sophisticated analyses were performed with a social research perspective. Although the studies did not appear only yesterday, but they seem to have been ignored by the WUR systems which merely do more of the same and thus perpetuate the problems and aggravate the issues. It is the more advanced techniques that uncover the limitations which are normally oblivious to the rankers and rank-users. At this moment, WUR results seem to be pyrite mistaken as gold.

As summarized above, the picture of WUR seems to be fuzzy and blur, if not bleak. However, “International rankings of higher institutions are here to stay”, so begins the report of the recent UNESCO Global Forum on Rankings and Accountability in Higher Education: Uses and Misuses, held in Paris, May 2011. While the issues and problems identified are being grappled with by rankers as responsible organizations, hopefully, universities the world over continue to look at ranking results and anticipate the next ones. Used wisely, the information helps universities to reflect on their own strengths and short-comings and work toward increasingly academic excellence. In this context, the present article aims to provide a new and clear perspective for East Asian universities to evaluate their performance vis-à-vis selected universities with an international perspective.

**Top Ten East Asian Universities**

What follows is an analysis (or rather re-analysis) of the results of top 10 universities in East Asia in the THEWUR 2011-2012. The analysis looks into not only the overall scores and relative rankings but also on the indicator scores for a more insightful comparison. This may help to pinpoint where more effort, resource, and time can be devoted to narrow the gap between the East Asian universities and those of world-class status. It also helps by comparing the top 10 universities with other universities of same ranking to find out in what ways they differ.

To these ends, standard statistical tools were used to re-analyze the data to uncover the hidden trends and tendencies. Specifically, the groups of universities were compared on the Overall and also on indicator means via the independent t-test for an evaluation of the probability of chance occurrence of the observed differences; this was followed by the corresponding standardized mean difference (Cohen, 1988) for an evaluation of the magnitude of the observed differences. Note that the probability
and magnitude of an observed difference are two different though related concepts involved in mean comparisons; a fact that has more often than not been neglected.

To uncover the underlying dimensions or structure of a set of indicators, exploratory factor analysis was run, specifically the principal component analysis followed by varimax rotation. This correlation-based technique organizes indicators into a smaller number of factors (dimensions) which can be more parsimoniously and meaningfully interpreted. And, to ascertain the consistency between the assigned indictor weights and the actually attained weights, multiple regression analysis was run. Comparisons were then made between the unstandardized b-weights and the standardized beta-weights of each indicator in terms of percentages for which gross differences signal inconsistencies.

Universities Compared

In THEWUR 2011-2012 (Times Higher Education, 2011), there are 17 East Asian universities within the top 200 ranks. They are from China (3), Hong Kong (4), Japan (5), Korea (3), and Singapore (2). The top 10 were chosen for this study, with eight universities in the top 100 and two below. They occupied the ranks from 30 to 119 and scored between 74.3 and 51.0 on Overall. These will first be compared with the top 10 of world ranking and then with 20 other universities matched on Overall.

The world-class universities by definition occupied the ranks from 1 to 10 and they scored between 94.8 and 90.2 on Overall. Of these, six universities are from the United States, three from the United Kingdom, and one from Austria. For comparison with universities beyond the region matched on Overall, for each East Asian university, one immediately above it and another below were selected. These 20 matched universities ranked 29 to 121, with 16 within the top 100 and four below. They scored between 74.9 and 50.4 on Overall. The great majority of the matched universities were from the United States (12), the rest were two each from the United Kingdom and Australia, and one each from France, Germany, Israel, and Switzerland. Thus, these universities well represent the world’s universities in terms of geographic regions. The three sets of universities are listed in Table A1 in Appendices and Table A2 shows the profiles of the top 10 East Asian universities.

Comparisons with Top Ten World-Class Universities

If the East Asian universities aspire to attain academic excellence of world-class universities, they need to bridge the gaps between the two sets of higher education institutions. Such gaps are indicated by mean differences in Overall and its constituent indictors.

When compared with the top 10 world-class universities, the top 10 East Asian universities scored much lower on Overall and four of the five indicators (Table 1). The t-values are statistically significant at the 0.05 level. An exception is found for Industry Income for which the two sets of universities do not differ. For this indicator, a medium effect size is in favour of the East Asian universities.
As Table 1 shows, the effect sizes in terms of Cohen’s d (1988) are very large in magnitude. For Teaching and Research, the differences are as large as 1.5 times the standard deviation. This indicates that if the top East Asian universities are considered as standing at the 50th percentile, then top world-class universities are standing at the 94th percentile. The situation for Citation is even more severe as the effect size shows the difference to be 2.7 times the standard deviation. This means that the while East Asian universities stand at the 50th percentile, the world-class universities stand at the 99th percentile. These findings indicate that the East Asian universities have a long distance to cover in terms of Teaching, Research, and especially Citation if they aspire to be world-class universities.

Comparisons with Matched World Universities

The findings above may not be very encouraging to the top East Asian universities. But, this does not mean the situation will not change, especially in view of the value East Asian peoples placed on education and their vigorous adaptation of science and technology, over and above their preparedness to undergo hardship for long-term goals. It is therefore useful to find out whether the East Asian universities are like universities in other part of the world matched with them on academic excellence. Information on this may help the East Asian universities to identify their strengths and weaknesses vis-à-vis their peers and thereby plan to move up from where they now are. For this, as Table 2 shows, the top East Asian universities and the matched world universities did not differ on Overall; in other words, the two set of universities have been well-matched by design.

Table 2

<table>
<thead>
<tr>
<th>Matched (N=20)</th>
<th>East Asian (N=10)</th>
<th>t</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Overall</td>
<td>62.7</td>
<td>8.2</td>
<td>62.7</td>
</tr>
<tr>
<td>Teaching</td>
<td>54.1</td>
<td>11.1</td>
<td>69.2</td>
</tr>
<tr>
<td>Research</td>
<td>53.4</td>
<td>16.0</td>
<td>67.4</td>
</tr>
<tr>
<td>Citation</td>
<td>83.2</td>
<td>20.1</td>
<td>54.6</td>
</tr>
<tr>
<td>International mix</td>
<td>50.9</td>
<td>24.0</td>
<td>47.1</td>
</tr>
<tr>
<td>Industry Income</td>
<td>52.9</td>
<td>19.3</td>
<td>77.3</td>
</tr>
</tbody>
</table>

Note. t-values in bold are statistically significant (p<.05)
Comparisons show the top East Asian universities scored higher on three of the five indicators. On Teaching, they scored far higher than the matched universities and the effect size is a very large 1.14, indicating that if the matched universities stand at the 50th percentile, the East Asian ones stand at the 87th percentile. For Research, the difference in favour of the East Asian universities has also a very large effect size, indicating a difference between the 50th and 85th percentiles. Another difference in favour of the East Asian universities is for Industry Income; the very large effect size indicates a difference of 41 percentile. On the other hand, the East Asian universities lose out on Citation for which a very large effect size indicates that there is a gap of 47 percentile. However, the two sets of universities did no differ significantly on International Mix.

These findings suggest the East Asian universities are quite a different kind of higher education institutions when compared with the matched universities. It is obvious that as a strategy to improve ranking, the East Asian universities need to sustain their current levels of superiority in instruction and research while continue to enjoy the good relationships with their business community. And, above all these, they should strive to improve on publications so as to enhance their rankings in the prestigious international indices.

**Factor Structure**

To understand better how the five indicators operated to influence the Overall on which ranking was based, it is useful to investigate the factor structure of them based on how the indicators correlated. This was achieved by submitting the indicators scores for the total 200 universities to a factor analysis, specifically the principal component analysis with varimax rotation. This resulted in three orthogonal factors explaining 85.5% of the total variance for the five indicators (Table 3).

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Factor Structure of Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
</tr>
<tr>
<td></td>
<td>Main Function Factor</td>
</tr>
<tr>
<td>Teaching</td>
<td>.948</td>
</tr>
<tr>
<td>Research</td>
<td>.939</td>
</tr>
<tr>
<td>Citation</td>
<td>.342</td>
</tr>
<tr>
<td>International mix</td>
<td>-</td>
</tr>
<tr>
<td>Industry Income</td>
<td>.476</td>
</tr>
<tr>
<td>Total variance explained</td>
<td>42.5%</td>
</tr>
</tbody>
</table>

The first factor explaining 42.5% total variance is loaded with very high loadings by Teaching and Research and low loadings of Citation and Industry Income. This is a factor of the main function of the university in instruction and research. This factor is therefore named main Function Factor.

The second factor explaining 22.5% total variance is loaded heavily by Citations with a sizable negative loading from Industry Income. If Industry Income is taken as an indication of the service provided by the university to the local business community, then this factor suggests that there is a conflict between serving the academic and the business communities. In view of the fact that citation is an off-shoot of research and publication, the factor is named Auxiliary Function Factor.
The third factor explaining 20.2% total variance is loaded heavily by International Mix. As there is only one loading variable, this factor is rather unstable and needs further verification by new data. This is however named Internationalism Factor.

When seen together with the findings of mean comparisons in Table 2, since the East Asian universities have advantages in the indicators making up the Main Function Factor, more effort and resources can be directed at improving on variables making up the Auxiliary Function Factor. However, since this is a bi-polar factor, improving on Citation will cost some loss in Industry Income. Whether so doing goes against the philosophies, higher education goals, and financial arrangements deserves careful consideration and balancing.

**Discrepancies in Assigned and Attained Weights**

Up till this point, the discussion assumes that the Overall is what it promised to be, that is, the total score was derived from the five indicators in the correct proportions as assigned by the ranker. If this is not true, some indicators will be more influential than they should be and, correspondingly, others less. When these happen, the meaning of Overall is not what it is meant to be and therefore misinforming.

To verify this, Overall was regressed on the five indicators for the 200 universities. The standardized beta-weights in Table 4 show the relative contributions of the indicators to Overall, controlling for differences in the standard deviations of the indicator scores. As can be seen from Table 4, the attained weights deviate from the assigned weights. Discrepancy indices were calculated as (Attained weight - Assigned weight)/(Assigned weight) and expressed as a percentage. Thus, an indicator with a negative index is less influential than it is intended by the ranker, and vice versa.

**Table 4**

*Multiple Regression Analysis (N=200)*

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Assigned weight (%)</th>
<th>Standardized Beta-weight</th>
<th>Attained weight (%)</th>
<th>Discrepancy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching</td>
<td>30.0</td>
<td>.381</td>
<td>27.4</td>
<td>-8.7</td>
</tr>
<tr>
<td>Research</td>
<td>30.0</td>
<td>.460</td>
<td>33.1</td>
<td>+10.3</td>
</tr>
<tr>
<td>Citation</td>
<td>32.5</td>
<td>.390</td>
<td>28.1</td>
<td>-13.5</td>
</tr>
<tr>
<td>International Mix</td>
<td>2.5</td>
<td>.116</td>
<td>8.4</td>
<td>+236.0</td>
</tr>
<tr>
<td>Industry Income</td>
<td>5.0</td>
<td>.041</td>
<td>3.0</td>
<td>-40.0</td>
</tr>
</tbody>
</table>

The results show that Teaching was under-weighted by a factor of 9%, Citation by 14%, and Industry Income by 40%. On the other hand, Research was over-weighted by 10% and International Mix by as much as more than 200%. Thus, the negative indices indicate that the universities were short-changed for their scores for Teaching, Citation, and Industry Income when the indicator scores were used to calculate the Overall. At the same time, the Overall scores for Research and International Mix were inflated.

Working with the current paradigm with the discrepancies uncovered, the East Asian universities were disadvantaged in their high scores for Teaching. If they were to improve on Citation to enhance their Overall scores to attain higher rankings, they will have to put in much more effort than necessary. This is a double-penalty to the East Asian universities. As
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for International Mix and Industry Income, since the assigned weights are rather low in the calculation of Overall, the discrepancies should not affect too much to be worrisome.

**Within the Region**

With the findings above indicating the strengths and weaknesses of the East Asian universities in the two world contexts, it is useful to look inward at the relative strengths and weaknesses. The profiles of the five political/administrative entities are shown in Table 5. Firstly, the average ranks vary from 40 (Singapore) to 94 (Korea). This means the universities are ranked within the top 100. With this, the ranking in descending order is Singapore, Hong Kong, China, Japan, and then Korea. The corresponding Overall means vary from 70.9 to 54.5.

### Table 5

**Profiles of the East Asian Nations**

<table>
<thead>
<tr>
<th>University</th>
<th>Rank 2011</th>
<th>Overall</th>
<th>Teaching</th>
<th>Research</th>
<th>Citation</th>
<th>Intern. Mix</th>
<th>Industry Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>China (N=2)</td>
<td>60.0</td>
<td>62.6</td>
<td>78.2</td>
<td>67.1</td>
<td>44.2</td>
<td>42.6</td>
<td>99.9</td>
</tr>
<tr>
<td>Hong Kong (N=2)</td>
<td>57.8</td>
<td>64.9</td>
<td>65.0</td>
<td>68.5</td>
<td>61.7</td>
<td>65.4</td>
<td>65.2</td>
</tr>
<tr>
<td>Japan (N=4)</td>
<td>77.3</td>
<td>60.7</td>
<td>70.1</td>
<td>68.9</td>
<td>53.7</td>
<td>22.5</td>
<td>72.4</td>
</tr>
<tr>
<td>Korea (N=1)</td>
<td>94.0</td>
<td>54.5</td>
<td>64.2</td>
<td>54.6</td>
<td>47.7</td>
<td>29.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Singapore (N=1)</td>
<td>40.0</td>
<td>70.9</td>
<td>65.7</td>
<td>79.0</td>
<td>63.4</td>
<td>93.0</td>
<td>60.7</td>
</tr>
</tbody>
</table>

At the indicator level for Teaching, China scored the highest at 78.2 followed by Japan at 70.1, with Hong Kong, Korea, and Singapore hovering around 65.0. Although the differences in scores may not be very large, they suggest that the more traditional instruction adopted in China and Korea were perceived to be more effective by the academic community which provided the survey data.

For Research, Singapore scored the highest at 79.0 which is far ahead of the others, with China, Hong Kong, and Japan scoring around 68.0, and Korea has a 54.6 far below. This may well reflect the differences in the goals set for higher education with great emphasis on research in Singapore.

Citation has been identified as a critical indicator for ranking. On this, the two highest scores go to Hong Kong and Singapore, followed by Japan with a 10-point gap. Much lower scores around 45.0 go to China and Korea. As Hong Kong and Singapore were ex-British colonies, for this historical reason, they are stronger in English Language and this is an advantage to them since the prestigious citation indices are mainly for research papers published in English. In the context of WUR, this works against the other East Asian universities and deserves attention.

On International Mix, Singapore scored the highest at 93.0, far ahead of the others. The next highest score goes to Hong Kong at 65.4. China, Japan, and Korea have scores at 42.6 and below. Again, Singapore and Hong Kong have an advantage over the others partly because of English Language which makes them more accessible and receptive to international academic staff and student. In short, China, Japan, and Korea might have been handicapped in this respect to a larger extent because of language of instruction.

Finally, for Industry Income, Korea and China have the highest at 100.0, while Hong Kong, Japan,
and Singapore are far behind. This difference may well reflect the differences in the goals, functions, and financial arrangements for Korea and China as compared with Hong Kong, Japan, and Singapore.

With such profiles, it may be foretold that Singapore and Hong Kong are more likely to forge ahead in WUR, riding on the advantages of obviously higher scores for Citation and, in the case of Singapore, also for Research. This is further enhanced by their current high rankings. The advantage of English Language competence of the academic staff and, to a lesser extent International Mix, might have contributed to the advantage not enjoyed by China, Japan, and Korea.

Following the same line of thinking, the next in line could be Japan with her higher Citation score than China’s, where the two are on par in Research, although China has a higher score for Teaching. In spite of China’s higher rank, the difference in Overall is a rather small 1.9 and this may not bring about advantage over Japan. These leave Korea trailing behind.

**Discussion and Conclusion**

For the case studies of top-research universities in Altbach and Salmi (2011), the number of articles published in top journals increased by 343% over 10 years between 1999 and 2009. The Hong Kong University of Science and Technology and the National University of Singapore are among the selected universities and their publication increased to 196% and 220%, respectively during the same period of time. Moreover, graduate students of the student populations vary from 13% to 58%, with a median of 33%. These show the intensive effort of the promising universities in research and publication which logically can be expected to enhance citation and thereby ranking. In these aspects, the analysis show that the top East Asian universities lag behind not only the world-class universities but also the matched universities.

Several factors might have contributed to the gaps in research, publication, and citation. Firstly, although research is traditionally a basic function of university, but the emphasis on this varies with the goals of setting up higher education institutions in different countries, since universities have functions other than research to fulfill so as to meet the countries social and economic development needs which vary from country to country. For the East Asian universities to shift the emphasis more to research just to gain higher rankings means re-aligning the goals; and, this may not be palatable or feasible to some of the universities in terms of national priorities. This means each of the top East Asian universities need to weight carefully the pros and cons of so doing. Even within a country, different universities have different emphases, for instance, the Hong Kong University and the Hong Kong University of Science and Technology surely will not overlap their role; so are Peking University and Tsinghua University in China.

Secondly, the choice of research areas and the specific research topics actively worked on may also contribute to the short-coming in publication and citation. Journals, like other things in life, have also fads and fashions that come and go with time. To stand a better chance of being published and cited, research papers must deal with problems and issues of current interest and concerns of the world communities of specialized scholars so as to be seen as ‘contributing new knowledge’. If, for gaining higher ranking positions, the East Asian universities re-focus their research, this may possibly neglect
problems and issues which are more domestically relevant and need be handled. This is a dilemma not easy to resolve as universities do not exist for their own sake (the oft-voiced ‘academic freedom’) but are supported by the communities (largely through the governments) for social good.

Perhaps, not so much for universities in Hong Kong and Singapore, the handicap in English is obvious since many journals and citation indices use this language. Academics in other East Asian countries might have published highly citable papers reporting excellent research in journals of their own countries in their own languages, but these are not accessible to researchers in the international arena. In a sense, they are short-changed for the credit they deserve. Until such time when non-English journals and indices are more accessible to scholars who do not read Chinese, Korean, and Japanese, strategies need be sought to overcome, partially if not totally, the language barrier. Some possible ones are these:

- Translate papers written originally in Chinese, Korean, and Japanese into English for publication in English-based journals, but avoid duplicate submission which is normally disallowed.
- Provide translation assistance and encourage staff to write their papers using English, to be polished for language. This can be done by a co-author facile in English.
- Encourage co-publication by local non-English speaking staff and guest staff facile in the language. (By the way, there may be a question of ownership of which university has the IP right when a paper is written by a visiting professor as co-author.)
- Encourage joint papers by local scholars working with those in other countries, especially English-speaking ones.
- Improve on the English proficiency of local scholars to enable them writing in English.
- Providing abstracts written in English when publishing in Chinese, Koreas, and Japanese. Depending on the need, more information in English can be supplied by the author through translation or other form of language assistance. For example, several Chinese articles about humor appeared in this journal last year (Yue & Hui, 2011, etc.-Editor).

For the time being, without overcoming the language hurdle, the top East Asian universities will continue to be disadvantaged in WUR. If this is still important to them, they have to play the game within the current paradigm.

One caution, though. As the factor analysis shows, Citation and Industry Income have opposite signs in the factor loadings. This indicates that the two indicators work antagonistically, contrary to what THEWUR assumed to be additive. The implication is that, under the present paradigm, when the East Asian universities improve on publication and citation, it may work against their reputation among the domestic business community; hopefully this does not become a zero sum game. The antagonistic relationship between the two indicators can be understood as they compete for the same resources. When scholars spend more time and energy to do academic research that leads to publication and citation, they have less to service the businesses. Thus, a balance needs be strike between the two functions. With careful planning, it may be possible to find ways to kill two birds with one stone, by doing research in selected areas such that the research serves the needs of the business communities and
at the same time has theoretical value to interest the academic communities.

Although the top East Asian universities have much to catch up with the world-class universities, optimism was expressed in an interview by the new president of the Nanyang Technological University, Singapore (How to soar up the world university rankings, 20 November 2011) thus:

UWN: With such rapid change, will we soon see Asian universities overtake Western universities in research?

Andersson: It’s only a matter of time. Asia has only been on the research map for 10, maybe 15 years, with the exception of Japan. If you build a Google or Microsoft company it can go very fast in the business world. In the academic world things happen much more slowly and it’s an evolution rather than revolution... I would predict in 10 to 15 years we will see several Asian universities in the top 20 ranks. I hope NTU will be one of them.

The average age of the 10 world-class universities is 405.6 (SD 300.5, median 320) and that of the top 10 East Asian universities is 99.2 (SD 37.7, median 109.5). By comparison, the East Asian universities are very young. They obviously have much to do to catch up with the elders.

Caveat

Admittedly, a limitation of the present re-analysis is that it deals with the data of only one WUR system, that is, THEWUR. The specific findings grounded in the THEWUR data may not be exactly reproduced if data of other ranking systems were re-analyzed. However, it can be argued that since systems like ARWU and QS WUR employed the same weight-and-add approach albeit with different indicators, similar problems exist and findings will be highly similarly had their data been re-analyzed. Therefore, THEWUR is used here just for illustration purpose, while similar studies of the same problems and issues of the other WUR systems are being awaited.

References


Soh, K. C. (Being considered). Misleading university ranking misinforms: cause and cure for discrepancies between nominal and attained weights.

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### Appendices

#### Table A1

**List of Universities Compared**

<table>
<thead>
<tr>
<th>Top 10 East Asian Universities</th>
<th>Top 10 World Universities</th>
<th>Matched World Universities</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Tokyo</td>
<td>California Institute of Technology</td>
<td>University of Texas at Austin</td>
</tr>
<tr>
<td>University of Hong Kong</td>
<td>Harvard University</td>
<td>University of Illinois at Urb. Champ.</td>
</tr>
<tr>
<td>National University of Singapore</td>
<td>Stanford University</td>
<td>University of California San Diego</td>
</tr>
<tr>
<td>Peking University</td>
<td>University of Oxford</td>
<td>University of California Santa Barbara</td>
</tr>
<tr>
<td>Kyoto University</td>
<td>University of Vienna</td>
<td>Australian National University</td>
</tr>
<tr>
<td>Hong Kong U. of Sc. and Techn.</td>
<td>Princeton University</td>
<td>Washington University in St Louis</td>
</tr>
<tr>
<td>Tsinghua University</td>
<td>University of Cambridge</td>
<td>University of Manchester</td>
</tr>
<tr>
<td>Korea Advanced Inst. of Technology</td>
<td>Massachusetts Inst. of Technology</td>
<td>Brown University</td>
</tr>
<tr>
<td>Tokyo Institute of Technology</td>
<td>Imperial College London</td>
<td>Pennsylvania State University</td>
</tr>
<tr>
<td>Osaka University</td>
<td>University of Chicago</td>
<td>Boston University</td>
</tr>
</tbody>
</table>

*Note: Universities are listed in descending order of the original ranking*

#### Table A2

**Profiles of the Top 10 East Asian Universities**

<table>
<thead>
<tr>
<th>University</th>
<th>Rank 2011</th>
<th>Overall</th>
<th>Teaching</th>
<th>Research</th>
<th>Citation</th>
<th>Intern. Mix</th>
<th>Industry Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Tokyo</td>
<td>30</td>
<td>74.3</td>
<td>86.1</td>
<td>80.3</td>
<td>69.1</td>
<td>23.0</td>
<td>76.6</td>
</tr>
<tr>
<td>University of Hong Kong</td>
<td>34</td>
<td>72.3</td>
<td>74.0</td>
<td>80.1</td>
<td>60.5</td>
<td>93.7</td>
<td>64.1</td>
</tr>
<tr>
<td>National University of Singapore</td>
<td>40</td>
<td>70.9</td>
<td>65.7</td>
<td>79.0</td>
<td>63.4</td>
<td>93.0</td>
<td>60.7</td>
</tr>
<tr>
<td>Peking University</td>
<td>49</td>
<td>65.6</td>
<td>82.3</td>
<td>64.1</td>
<td>51.0</td>
<td>51.7</td>
<td>99.9</td>
</tr>
<tr>
<td>Kyoto University</td>
<td>52</td>
<td>64.8</td>
<td>76.4</td>
<td>72.0</td>
<td>56.3</td>
<td>21.1</td>
<td>71.7</td>
</tr>
<tr>
<td>Hong Kong U of Sc &amp; Tech</td>
<td>62</td>
<td>61.7</td>
<td>51.0</td>
<td>58.6</td>
<td>71.0</td>
<td>80.1</td>
<td>59.0</td>
</tr>
<tr>
<td>Tsinghua University</td>
<td>71</td>
<td>59.5</td>
<td>74.1</td>
<td>70.1</td>
<td>37.4</td>
<td>33.4</td>
<td>99.8</td>
</tr>
<tr>
<td>Korea Adv Inst of Technology</td>
<td>94</td>
<td>54.5</td>
<td>64.2</td>
<td>54.6</td>
<td>47.7</td>
<td>29.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Tokyo Inst of Technology</td>
<td>108</td>
<td>52.8</td>
<td>56.0</td>
<td>58.9</td>
<td>49.5</td>
<td>24.9</td>
<td>66.3</td>
</tr>
<tr>
<td>Osaka University</td>
<td>119</td>
<td>51.0</td>
<td>61.8</td>
<td>56.5</td>
<td>40.0</td>
<td>21.1</td>
<td>75.0</td>
</tr>
</tbody>
</table>

*Source: Times Higher Education World University Ranking 2011-2012*