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Inconsistencies and Doubtful of World University Rankings

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ABSTRACT

University rankings have become a trend to gauge the credibility and quality of the university. The university rating has generated much debate about the usefulness, method and accuracy of the assessment results. There are some institution who issued university rankings such as QS, 4ICU, CWUR and Webometrics. The universities were assessed depending on research indicators and opinion surveys. There are many anomalies in ranking gap values between universities as well some clumsiness of values at certain regions. The inadequacy of those tabulation indicators to assess most universities will look purely for reasons of obvious statistical instability. Statistically, there are three regions of ranking gap values: low, medium and high. Standard deviation of ranking gap values for universities in USA and UK is 6-7, Japan is 16, South Korea is 70, and Singapore, Malaysia and Indonesia are no applicable. Those values indicate inconsistency of judgment and invalid and inaccuracy data used in the assessment

KEY WORDS: *World University Ranking, Indicators Tab, QS, CWUR.*

NOMENCLATURE

ASEAN	Association of Southeast Asian Nations
CWUR	Center of World University Ranking
MIT	Massachusetts Institute of Technology
QS	Quacquarelli Symonds
4ICU	4 International Colleges & Universities

1.0 INTRODUCTION

Currently, the university ranking has indeed become a trend in the world including ASEAN countries such as Indonesia, Malaysia, Singapore, Thailand, etc. Many universities in the world are ambitious to pursue the rankings. In order to raise the point of one indicator, a university makes reshuffle and organizational restructuring such as the dramatic merging of the faculty in a very short time, thereby spending a lot of money and effort. Reshuffle, restructuring and merging have an impact on work, sensitivity and confusion to academic staff.

This is evident from government policy to use world university rankings as the official reference of university rankings of the world and encourage universities to get involved. The governments also provide assistance both material and non-material to some universities that have the potential to rank well.

There are two things behind the growing interest in the use of ranking in the world of higher education. First is ranking as a form of accountability. Both the government and the community as supporters and users of higher education would want to know the quality of universities. Ranking is considered an effective way to meet these demands. Ranking can be a government reference in policy making especially in the determination of programs and the allocation of funds for higher education. Also, it can be used by the community to determine the best college choice for their children.

Second is rank as magnet which is widely used as an university strategy to achieve other goals such as prestige, funds, students and also good well known lecturers. As education needs continue to increase, competition between universities cannot be inevitable. Colleges are constantly making every effort to be the best. Ranking becomes an effective and efficient system alternative to meet this need.

By getting the legitimacy of its position as the best, a college will gain greater trust from the government, the private sector, as well as the community. This certainly has an impact on the

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increased cooperation with the government and the private sector that will increase the college coffers. In addition, more and more students and lecturers are interested to enter. As a result, these colleges have a greater chance to get the best students and lecturers.

Universities and governments such as Malaysia, Singapore, Indonesia, and others are increasingly using rankings to improve their status, attracting foreign students, professors and investment, and in many cases, setting policies designed to improve their rankings. While ratings are meant to measure quality, for all intents and purposes, most of them capture institutional wealth, wealth accumulated over time or declared as socio-economic wealth.

The university rankings basically are rankings of institutions in higher education which have been ranked on the basis of various combinations of various factors such as academic reputation, output of research, alumni employment, publication, and others [1].

Use of ranking in the world of higher education is not without problems. This issue has generated much debate about usability and ranking accuracy [2]. In determining the ranking of universities, the rankings are based on the level of popularity of the world's universities on the site. There is no direct indicator about the quality of education. So rather than objectively assessing the quality of an institution, the university ranking tends to be a more subjective race of popularity.

The university ranking also often focuses only on factors such as external funding revenues, number of publications, the proportion of lecturers with doctoral or professor qualifications, and the quality of students. Unfortunately, these factors do not necessarily indicate the quality of a university. For example, the number of publications is not necessarily in harmony with the quality or usefulness of the article.

The wisdom of seeing and using ranking to see the quality of institutions and higher education is a must [3]. Governments, universities, and the public can still use the ranking as a reference. However, it must be critical to ensure that the ranking is transparent and accountable on the criteria it uses. In order to review the universities raking issue, a study on universities ranking has been conducted by taken Book Published Index as parameter. Results of study are compared with the QS and CWUR rankings.

From table 1, column 3, it is the result that come from QS ranking and column 4 from CWUR rankings. There were 10 universities from seven countries as follows: USA, UK, Japan, South Korea, Singapore, Malaysia and Indonesia to be considered in this study. For each university, we take the ranking difference between QS and CWUR rankings and put it into column 5 as the gap.

2.0 UNIVERSITIES RANKING METHODOLOGY

The university rankings began in 2004 and were based on a combination of indicators that takes into account both the volume and content of the Web, the visibility and impact of web publishing in accordance with the number of external links received. Various rankings consider combinations of measures of funding and endowment, research excellence and/or influence, specialization expertise, admissions, student options, award numbers, internationalization, graduate employment, industrial linkage, historical reputation and other criteria. Various rankings mostly are evaluating on institutional output by research. Some rankings evaluate institutions within a single country, while others assess institutions worldwide. There are several university ranking systems at present, Centre of World University Ranking (CWUR), Webometrics, QS, Times Higher Education and 4ICU.

2.1 Center for World University Rankings

The CWUR has been doing university rankings in the world since 2012. The Center for World University Rankings (CWUR) publishes the only global university ranking that measures the quality of education and training of students as well as the prestige of the faculty members and the quality of their research without relying on surveys and university data submissions [4, 5]. CWUR uses seven objective and robust indicators to rank the world's top 1000 universities:

1. Quality of Education, measured by the number of a university's alumni who have won major international awards, prizes, and medals relative to the university's size (15%)
2. Alumni Employment, measured by the number of a university's alumni who have held CEO positions at the world's top companies relative to the university's size (15%)
3. Quality of Faculty, measured by the number of academics who have won major international awards, prizes, and medals (15%)
4. Research Output, measured by the the total number of research papers (15%)
5. Quality Publications, measured by the number of research papers appearing in top-tier journals (15%)
6. Influence, measured by the number of research papers appearing in highly-influential journals (15%)
7. Citations, measured by the number of highly-cited research papers (10%)

2.2 Webometrics

The Webometrics Ranking of World Universities" is an initiative of the Cybermetrics Lab, a research group belonging to the Consejo Superior de Investigaciones Científicas (CSIC), the largest public research body in Spain [6]. The original aim of the Ranking is to promote academic web presence, supporting the Open Access initiatives for increasing significantly the transfer of scientific and cultural knowledge generated by the universities to the whole Society. The Webometrics are based its ranking on four indicators, namely

1. Impact
2. Presence
3. Openness
4. Excellence

These four factors are rated from the academic sites of each university [6]. These four indicators are used by Webometrics as a representative for an in-depth evaluation of the university's performance in the eyes of the community by considering its activities, results, relevance, and impact.

Through the first indicator (*impact*) has weighing 50 percent. The Webometrics calculates how many external links are received from third parties. Many links will make a university recognized with regard to institutional prestige, academic

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performance, information value, and usability levels of the site services provided.

The last three indicators (*presence*, *openness*, and *excellence*) have weighting 50 percent with equivalent allocation. The *presence* indicator is used to calculate the number of university web pages indexed by search engines, Google. The *openness* indicator shows the published research data volume in rich files format, such as *pdf*, *doc*, *docx*, and *ppt* on the site, according to Google Scholar search engine. Meanwhile, the last indicator (*excellence*) is used to calculate the number of academic works successfully published in international journals, such as those listed in Scimago Lab. This indicator is considered able to show the quality of research from the college.

All indicators are claimed not to evaluate design issues, usability, or number of clicks on their academic sites. These four indicators are used by Webometrics as a representative for an in-depth evaluation of the university's performance in the eyes of the community by considering its activities, results, relevance, and impact.

2.3 4ICU

4 International Colleges & Universities (4ICU) is a search engine and directory that assesses the popularity of sites owned by 11,307 colleges worldwide that have been accredited and spread over 200 countries [7]. The 4ICU based its rating based on mapping conducted by five ranking sites, namely Google Page Rank, Alexa Traffic Rank, Majestic Seo Citation Flow, Majestic Seo Citation Flow, and Majestic Seo Trust Flow [8]. These five sites also do ranking based on various technical indicators of the site or blog. 4ICU lists colleges with popular sites. That is, colleges are considered popular because the site is indexed in search engines and easily searchable.

The benefits, in addition to upholding information disclosure to the public, Webometrics and 4ICU ratings show colleges that are diligent in publishing scientific work of lecturers and researchers. College leaders are encouraged to apply professional website management with due regard to the quality and quantity of their publications. Another important thing is the civitas academic colleges are encouraged to be productive in research.

The disadvantage is that these rankings are vulnerable to make-up by a number of colleges for their site to be seen as qualified. If you want to cheat, then a number of technical steps can be done to boost the college ranking.

2.4 QS

QS World University Rankings is an annual publication of university rankings conducted by Quacquarelli Symonds (QS) [9]. QS World University Rankings was formerly known as THE-QS World University Rankings, in collaboration with Times Higher Education (THE) magazine to publish an international league table from 2004-2009 before the two of them began announcing their own version..

The QS World University Ranking publishes the annual ranking of world universities by measuring the following parameters.

1. Academic Reputation
2. Employer Reputation
3. Faculty Student
4. Citations per Faculty
5. International Faculty
6. International Students

The undue allocation of loads for subjective indicators and having highly fluctuating results is a major criticism of this ranking [9]. Several individual indicators from the Times Higher Education Survey (THES) data base the overall score, the reported staff-to-student ratio, and the peer ratings demonstrate unacceptably high fluctuation from year to year [10]. This instability can only strengthen the existing critique of the overall ranking system by earlier evaluators, such as van Raan (2005) [11], who highlighted the invalidity of yet another component of these totals, the bibliometric component (the citation-based scores)

At this time, the QS ranking has become a benchmark for universities in every country. The Ministry of Civilization of every country in ASEAN has spent a lot of money to pursue the ranking. During this time, the ranking of QS World University Ranking is also used by Ministry of Research, Technology and Higher Education of the Republic of Indonesia as one of the benchmarks of universities in Indonesia to a world-class university.

3.0 2018 QS AND CWUR WORLD UNIVERSITIES RANKING

3.1 Data Collection

Data was collected from QS and CWUR rankings for seven countries as shown in Figure 1 and Figure 2, there were 10 universities taken to be studied, and pick up the ranking from both university ranking systems then put it into Table 1.

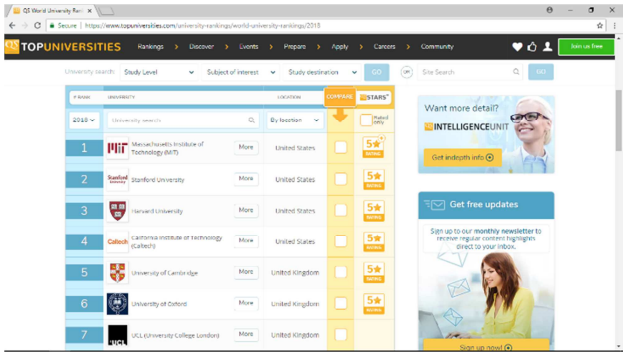

Figure 1: Collecting data from QS ranking [12]

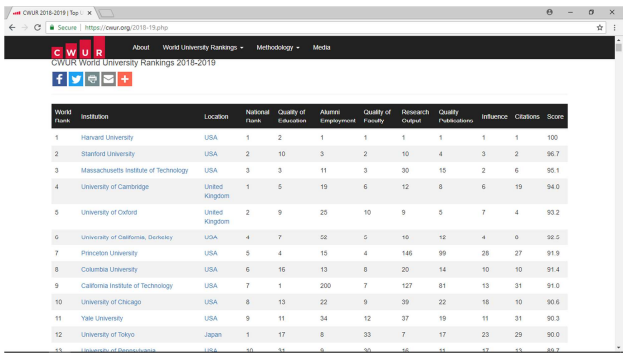

Figure 2: Collecting data from CWUR ranking [13]

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3.2 Determine Standard Deviation

The university ranking is analyzed standard deviation based on based on QS and CWUR rankings. The standard deviation is numerically equal to the square root of the variance [14]:

$$\sigma = \sqrt{\frac{\Sigma(x_i - x)^2}{n}} \quad (4.1)$$

Where; x_i is gap value based on Qs and CWUR as shown in Table.1, x is mean gap value based on Qs and CWUR and n is number of sample. In this study, sample was taken 5 for each region.

4.0 WORLD UNIVERSITY RANKING ANALYSIS

From the data shown at Table 1, the gap value was calculated by subtracting QS ranking with CWUR. The gap values show not constant, which mean there were shown inaccuracy of the data. The standard deviation of universities at Table 2 was calculated from every country by using the gap values from Table 1.

From Table 3, CWUR system have 7 criteria. Besides, QS ranking at Table 4, there are 6 criteria. Both table set MIT University as the reference. The QS ranking criteria result a little bit ambiguous, some country in Southeast Asia, such as Malaysia and Indonesia, the mark for every university is slightly different, somehow there were some problem in collecting data or manipulating data.

4.1 Ranking Gap Value

The selected world university ranks are shown in Table.1. Each version world university rankings such as QS and CWUR gives a different ranking value for same university. According to the Table.1, there are three regions of ranking gap. The first region is America (USA) and Europe (UK) which are very small gap value. Than it is followed by universities in East Asia such as Japan and Korea with medium gap value and the latest region with biggest gap value is universities in ASEAN. That shows that there is inconsistency of judgment and invalid and inaccuracy data used in the assessment.

Based on the CWUR version, Singapore, Malaysia and Thailand became the only Southeast Asian countries on the list to be represented by the 103rd National University of Singapore, the 451rd University of Malaya and the 471rd Mahidol University, respectively. As shown in Table.2, the National University of Singapore has NA of quality of education, 148 of alumni employment, NA of quality of faculty, 38 of research output, 92 of quality publications, 94 of influence and 85 of citations. The University of Malaya has NA of quality of education, 342 of alumni employment, NA of quality of faculty, 225 of research output, 397 of quality publications, 879 of influence and 673 of citations. Mahidol University has NA of quality of education, > 1000 of alumni employment, NA of quality of faculty, 424 of research output, 480 of quality publications, 312 of influence and 888 of citations.

From Table 1, Indonesian universities are currently far behind from other universities in ASEAN. The University of Indonesia rating for example which is among the top 10 best universities in ASEAN has declined. Although Indonesia through the University of Indonesia was ranked 9th and 10th best universities in ASEAN, their rank according to the QS World University Ranking are still far below that of neighboring countries such as Nanyang Technological University of Singapore which is the first best university in ASEAN, while the second rank is occupied University of Singapore. Subsequently, the University of Malaya, Universiti Putra Malaysia, Universiti Kebangsaan Malaysia, Universiti Sains Malaysia, Universiti Teknologi Malaysia, Chulalongkorn University, Universitas Indonesia and Institut Teknologi Bandung.

According to CWUR, none of the Indonesian universities have entered into the top 1000 rankings. In contrast, University of Indonesia actually entered the 277rd, Bandung Institute of Technology is also ranked in the 331rd based on QS ranking,

Table 1: 2018 World University rankings based on QS and CWUR [11, 12]

No	Institution	QS	CWUR	Gap Values	Country
1	Massachusetts Institute of Technology	1	3	-2	
2	Harvard University	3	1	2	
3	Stanford University	2	2	0	
4	University of California, Berkeley	27	4	23	
5	Princeton University	13	5	8	
6	University of Cambridge	5	4	1	
7	University of Oxford	6	5	1	
8	University College London	7	21	-14	
9	Imperial College London	8	30	-22	

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10	University of Edinburgh	23	34	-11	
11	University of Tokyo	28	12	16	
12	Kyoto University	36	26	10	
13	Osaka University	63	53	10	
14	Nagoya University	116	113	3	
15	Tohoku University	76	120	-44	
16	Seoul National University	36	60	-24	
17	Korea Advanced Institute of Science and Technology	41	295	-254	
18	Sungkyunkwan University	108	218	-110	
19	Yonsei University	106	222	-116	
20	Korea University	90	237	-147	
21	Nanyang Technological University	11	-		
22	National University of Singapore	15	103	-88	
23	Universiti Malaya	114	451	-337	
24	Universiti Putra Malaysia	229	-	-	
25	Universiti Kebangsaan Malaysia	230	-	-	
26	Universiti Sains Malaysia	264	-	-	
27	Universiti Teknologi Malaysia	253	-	-	
28	Chulalongkorn University	245	-	-	
29	Universitas Indonesia	277	-	-	
30	Institut Teknologi Bandung	331	-	-	
31	Mahidol University	334	471	-137	

Resource: QS, CWUR.

4.0 STANDARD DEVIATION OF UNIVERSITY RANKING GAP

Using data shown in Table.1, standard deviation of ranking gap for universities in USA, UK, Japan, South Korea, Singapore, Malaysia and Indonesia are calculated as shown in Table.2. The Table shows that the standard deviation varies where USA (6.1) and UK (7.1) have the lowest values, going up followed by Japan (15.5) and Korea (69.8), the latest and the highest universities in ASEAN. This indicates that there is bias data were used to predict the university ranking which is different for every region. This shows which ranking by CWUR and QS has a very large bias. In order to evaluate this bias results, value for each indicator for QS and CWUR should be analyzed as shown in Table.3 and Table.4.

Table 2: Standard deviation of university rankings based on selected regions

No	Regions	Standard Deviation (σ)
1	Universities in USA	6.1
2	Universities in UK	7.1
3	Universities in Japan	15.5

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4	Universities in South Korea	69.8
5	Universities in Singapore	-
6	Universities in Malaysia	-
7	Universities in Indonesia	-

Based on CWUR as shown in Table 3, the Quality of Education of universities in ASEAN is out of range. In contrast, the Academic Reputation in QS Rankings for the universities in Singapore is almost the same as Massachusetts Institute of Technology.

By taking Massachusetts Institute of Technology as a benchmark point there is some clumsiness of points that can be concluded as follows

1. The Academic Reputation criteria for National University of Singapore and Seoul National University based on CWUR and QS rankings are very different. QS provides rankings for National University of Singapore (-0.20) and Seoul National University (-3.80) which is not far from the rankings with Massachusetts Institute of Technology, but on the contrary, CWUR delivers rankings beyond the threshold value (-) for both universities.
2. With the same criteria, other universities such as Universiti Malaya, QS provides (-36.10) but CWUR does not include in the rank number (-) limits.
3. Judging from Quality Publications, CWUR gives the rankings for Tokyo University (2) which is very close to Massachusetts Institute of Technology but instead QS gives Citations per Faculty same rank for Tokyo University (-27.60) and National University of Singapore (-27.00).
4. Quality of Faculty The ranking given by QS for National University of Singapore (0.00) is the same as Massachusetts Institute of Technology, but instead CWUR assigns National University of Singapore rankings beyond the threshold value (-) well below MIT. With the same criteria review, QS gives rankings for Tokyo University (-87.70) very far below National University of Singapore (0.00). Other universities such as Universiti Malaya and Universiti Putra Malaysia, QS rank (-44.1) are far over Tokyo University, but CWUR does not include Universiti Malaya and Universiti Putra Malaysia within the range (-).
5. When viewed by International Faculty criterion, Tokyo University rank (-87.70) is very different from Indonesia (-6.10). This comparison shows the internationalization of Tokyo University much lower that Universitas Indonesia.
6. Academic Reputation and Employer Reputation of all universities in the country of Indonesia, Malaysia and Thailand is very far under the MIT with a ranking of -40 - -77. This figure greatly undermines the reputation of the university in ASEAN countries outside of Singapore.
7. Employer Reputation National University of Singapore (-0.90) based on QS, but Alumni Employment National University of Singapore (137) is very far below Massachusetts Institute of Technology. It shows the rankings for Academic Reputation and Employer Reputation is highly biased.
8. Quality of Faculty for all universities in ASEAN is beyond the CWUR value limit, but specifically for National University of Singapore is 0.0 equals Massachusetts Institute of Technology. The result of this ranking indicates the absence of source data synchronization.

Table 3: CWUR Ranking Criteria of selected universities 2018-2019 [12]

Institution	Quality of Education	Alumni Employment	Quality of Faculty	Research Output	Quality Publications	Influence	Citations
Massachusetts Institute of Technology	0	0	0	0	0	0	0
University of Tokyo	14	-3	30	-23	2	21	21
Seoul National University	-	9	-	-11	24	144	121
National University of Singapore	-	137	-	8	17	92	77
Universiti Malaya	-	331	-	195	382	877	665
Mahidol University	-	-	-	394	465	310	890

Table 4: QS Ranking Criteria of selected universities 2018-2019 [11]

Institution	Academic Reputation	Employer Reputation	Faculty Student	Citations per Faculty	International Faculty	International Students
Massachusetts Institute of	0.00	0.00	0.00	0.00	0.00	0.00

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Technology						
Nanyang Technological University	-9.70	-7.40	-5.00	-12.30	0.00	-12.00
National University of Singapore	-0.20	-0.90	-8.20	-27.00	0.00	-14.80
University of Tokyo	0.00	-0.50	-5.80	-27.60	-87.70	-70.00
Seoul National University	-3.80	-7.30	-12.30	-33.30	-77.90	-81.50
Universiti Malaya	-36.10	-42.30	-6.50	-67.20	-44.10	-34.30
Universiti Putra Malaysia	-59.00	-66.80	-32.70	-80.10	-44.10	-21.10
Universiti Kebangsaan Malaysia	-52.60	-66.40	-19.10	-86.10	-55.90	-57.10
Universiti Sains Malaysia	-54.10	-59.10	-35.70	-80.20	-64.00	-58.00
Universiti Teknologi Malaysia	-69.90	-64.40	-14.70	-82.70	-72.20	-36.70
Chulalongkorn University	-41.40	-55.10	-71.90	-91.10	-84.30	-92.20
Universitas Indonesia	-63.90	-48.70	-50.90	-98.00	-6.10	-90.00
Institut Teknologi Bandung	-63.80	-58.30	-56.10	-96.60	-57.90	-92.90
Mahidol University	-64.90	-76.70	-50.40	-91.30	-84.90	-90.00

5.0 CONCLUSION

In conclusion, this paper discusses on the world university rank indicators tab. Input data was collected from 2018 world rankings published by QS and CWUR. By comparing value of each indicator between CWUR and QS, it was founded that there are three ranking gap regions. The first region is North America (USA) and Europe (UK) which are very small ranking gap value. Than it is followed by universities in East Asia such as Japan and Korea which is medium gap value and the latest region with biggest gap value is universities in ASEAN. Those values indicate inconsistency of judgment and invalid and inaccuracy data used in the assessment.

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