UNIVERSITY RANKING IN THE FIELD OF BUSINESS AND MANAGEMENT: THE STABILITY ISSUES

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Abstract: *University Ranking agencies have started to displace the attention from global academic rankings to more specific rankings in a particular scientific field, thus creating "Rankings by Subject". QS, among other widely accepted ranking methodologies, accepted the new direction and thus created a new set of rankings: the QS World University Rankings by Subject. This paper provides stability analysis of the ranking in the field of Business and Management, which is one of the 36 subject specific rankings QS publishes. The courses offered by schools and universities in the field of business and business related subjects, although very appealing to future students, have been regarded with scepticism by scholars and experts. Therefore, a statistically sound and stable ranking of institutions is needed. This paper conducted the uncertainty and sensitivity analysis on the QS ranking in the field of Business and Management to analyse the effects of its weighting scheme. The results show that QS ranking is relatively stable, whereas the universities in the bottom of the ranking proved to be more sensitive to different model assumptions.*

Keywords: UNIVERSITY RANKING, RANKING BY SUBJECT, QS RANKING, CIDI METHODOLOGY, BUSINESS AND MANAGEMENT, UNCERTAINTY AND SENSITIVITY

1. Introduction

Business and related subjects (finance, accounting, management, and economics) are one of the most popular fields of study at the graduate level (QS, 2014). Therefore, universities and schools specialized in business and management are constantly competing to draw national and international students to their B.Sc., M.Sc., or Ph.D. courses. At the same time, the rise of interest in this particular field of science has led to the creation of a variety programs and curriculums (Butz & Askim-Lovseth, 2015; Lyubovnikova, Napiersky, & Vlachopoulos, 2015; Reficco & Jaén, 2015; Wisneski, Ozogul, & Bichelmeyer, 2015). Even though these programs are rich in volume and comprehensive, the question remains whether they are competent to prepare students for "real-life" situations that they will encounter after graduation; e.g. to develop and sustain their businesses in a turbulent market (Welch & Welch, 2015).

Putting aside the supply and demand for academic business studies and courses, the discussion about the perceived relevance or perhaps irrelevance of business schools in addressing business needs arises (Butler, Delaney, & Spoelstra, 2015; Paton, Chia, & Burt, 2014). Some authors believe that there is much evidence to suggest that business schools' research and education positively contribute to the business community and that the provided education helps future entrepreneurs deal with managerial problems (Koljatic & Silva, 2015; Vermeulen, 2007). Also, the role of faculty members and scholars from business schools in the knowledge transfer should be taken into account. A recent study by Amara, Halilem, and Traoré (2015) showed that nearly three-quarters of faculty members in business schools provide expert opinion to companies. Their valuable advice might increase the companies' level of competitiveness and productivity, thus having an indirect impact on the level of the country's economic activity. However, on the other hand, the feeling is spreading that the current business school model needs to engage some modifications if business schools want to be providers of solutions to the multi-faceted global issues the world is facing and thereby regain their legitimacy (Dyllick, 2015). Also, some authors think that these schools cannot engage with the real problems such as climate change, financial crisis, sustainability, social and ethical issues, and many others, and, therefore, these authors question their contribution to the economy (Dyllick, 2015; Mingers, 2015; Koljatic & Silva, 2015).

Whatever the future modifications of business schools' curriculum are, it is crucial for potential prospective students to acquire information which of these schools are outstanding. A number of studies were conducted driven on questions: "Which issues do students think are important when choosing a higher education institution, and how are they related to the factors taken into consideration in ranking institutions?" (Mårtensson & Richtnér, 2015, p. 1). Some of the key factors that emerged are academic reputation, job prospects, teaching quality, and information provided through media (Hamsley-Brown, 2012). The main idea behind rankings is the assumption that if the student decided to study in the particular field, then why not study at the school that is seen as the best among the best? At the same time, it cannot be denied that there is a strong competition among universities, within and among countries for high positioning on ranking lists (Reficco & Jaén, 2015). Better place on the ranking list can help them attract and retain prospective students, prominent academics, and of course, donors and relevant experts from the industry.

Different stakeholders have explicit criteria when ranking universities. Also, when ranking universities in different scientific fields, divergent indicators should be used, or the same indicators should be weighted accordingly. Namely, one indicator in the ranking process does not provide the same amount of valuable information in the case of, for example, medicine and literature. These conclusions led to the need for devising field specific university rankings (Mårtensson & Richtnér, 2015). Several world acknowledged rankings, such as ARWU, THE, and QS, have turned towards ranking universities by subject. Herein, we examined the QS World University Ranking list, since it is one of the most popular ranking methodologies. In 2015, QS has released 36 detailed specific ranking lists for scientific fields - Rankings by Subject (QS Subject, 2015). The particular interest of our research was the ranking in the field Business and Management.

In the presented paper, we addressed the issue of stability of the QS university ranking in the field of Business and Management. Namely, several studies have been conducted to analyse the stability of university rankings. The study by Saisana, d'Hombres, and Saltelli (2011) concluded that the majority of university rankings is highly sensitive to methodology assumptions. Also, a more recent study showed that QS World University Rankings is sensitive to weighting assumptions (Dobrota et al., 2016). As ranking methodologies motivate institutions to improve their ranks and initiate debate which might lead to reform, it is important to provide as much as possible stable ranking methodologies. Therefore, the presented paper aims at exploring the stability of QS Rankings by Subject in the field of Business and Management.

The following chapter sees the introduction of the QS World University Rankings in the field of Business and Management methodology along with the basic concepts of the uncertainty and sensitivity analysis. The results are given in Section 3 while the concluding remarks are provided in the final chapter.

2. Methodology

2.1. QS Ranking by Subject - Business and Management

The QS World University Rankings by Subject ranks the world's top universities in individual subject areas, covering 36 subjects as of 2015 (QS Subject, 2015). The rankings are aimed at prospective students seeking to identify the world's leading schools in their chosen field of study. Three extensive datasets are used to rank universities' performance in specific academic disciplines: QS's major global surveys of academics and employers, and research citations data from Scopus (QS Subject, 2015). They are described by four indicators: *Academic Reputation, Employer Reputation, Citations per Paper,* and *H-index Citations*.

QS Ranking by Subject in the field of Business and Management is the primer interest of this research. According to the 2015 results, the London Business School is the top-ranked university followed by the Harvard University, INSEAD, and Stanford University. The overall ranking list consists of 200 world's universities, whereas the list of the top 30 ranked universities in the field of Business and Management including scores and ranks is given in Table 1.

What makes the QS ranking by subject stand out is the adaptive weighting scheme. Namely, the four above-mentioned indicators are used in all rankings whereas they are differently weighted depending on the ranking. The weighting scheme for the QS Business and Management Ranking by Subject is as following: *Academic Reputation* 50%, *Employer Reputation* 30%, *Citations per Paper* 10%, and *H-index Citations* 10%. The specific weighting scheme is also shown in Table 2.

2.2. Uncertainty and sensitivity of the QS Business and Management Subject

Together, the uncertainty and sensitivity analysis are a method for measuring the stability and permanence of the particular ranking system (Paruolo, Saisana, & Saltelli, 2013; Saltelli et al., 2008). The uncertainty analysis tackles the question of the influence of input indicators while the sensitivity analysis provides insight of the effects of different model assumptions on the overall result. The sensitivity of the ranking is based on the relative contribution of the

Table 1: The top 30 ranked universities by QS World Ranking for the field of Business and Management including their scores and ranks

University	Score	Rank
London Business School	96.84	1
Harvard University	96.21	2
INSEAD	95.63	3
Stanford University	91.97	4
University of Pennsylvania	91.33	5
Massachusetts Institute of Technology (MIT)	90.86	6
Università Commerciale Luigi Bocconi	89.94	7
University of Oxford	89.67	8
London School of Econom. and Pol. Sci. (LSE)	89.63	9
Copenhagen Business School	88.47	10
National University of Singapore (NUS)	88.38	11
University of California, Berkeley (UCB)	87.13	12
HEC Paris School of Management	86.76	13
University of Cambridge	86.76	14
The University of Melbourne	85.78	15
University of Chicago	85.39	16
Rotterdam School of Management, Erasmus Univ.	85.33	17
The Hong Kong Univ. of Science and Technology	85.13	18
The Univ. of New South Wales (UNSW Australia)	84.37	19
New York University (NYU)	84.35	20
Columbia University	83.71	21
University of California, Los Angeles (UCLA)	83.52	22
University of Michigan	82.54	23
The University of Hong Kong	82.31	24
Northwestern University	82.08	25
Yale University	82.03	26
The University of Warwick	81.96	27
The Chinese University of Hong Kong	81.01	28
La Salle Universitat Ramon Llull	80.87	29
The University of Manchester	80.58	30

Table 2: QS World Ranking in the field of Business and Management weighting scheme, mean relative contributions, and their standard deviations

Indicators	QS B&M Weights	Mean Relative Contribution	Rel. Con. Standard Deviation
Academic Reputation (AR)	0.5	0.469	0.02549
Employer Reputation (ER)	0.3	0.309	0.02553
Citations per Paper (CpP)	0.1	0.113	0.01320
H-index Citations (HiC)	0.1	0.109	0.01640

indicators. The analysis of the relative contribution of the indicators to each university's score can provide useful information as to whether some indicators dominate the overall scores (Saisana & D'Hombres, 2008). The uncertainty and sensitivity of ranks have been previously used with a lot of success for the analysis of different university ranking methodologies (Dobrota et al., 2016; Dobrota & Dobrota, 2015).

The relative contribution is calculated as a ratio of an indicator score and the overall composite score multiplied by the appropriate indicator weight (Paruolo, Saisana, & Saltelli, 2013). Using the Monte Carlo simulation method, the score results are simulated a number of times (usually 1000 or 10000 times), using the average contributions and their standard deviations. Furthermore, according to uncertainty and sensitivity methodology (Saisana & D'Hombres, 2008), the obtained entity ranks are counted, thus measuring the amount of uncertainty of the ranking results.

Mean relative contributions of indicators of QS World Ranking in the field of Business and Management, as well as corresponding standard deviations of relative contributions are given in Table 2. As shown in the table, there are some differences among original weights and calculated relative contributions by uncertainty and sensitivity methodology. *Academic Reputation* is originally weighted 50% but has a bit lower relative contribution 46.9%. On the other hand, *Employer Reputation*, *Citations per Paper*, and *H-index Citations* have higher relative contributions than their original weights, by approximately 1%.

In our research, the above-presented mean relative contributions and their standard deviations were the inputs for Monte Carlo simulation. The QS Business and Management ranks were simulated 1000 times, whereas the obtained results are presented in the following section.

3. Results and discussion

The results of uncertainty and sensitivity for QS World Ranking in the field of Business and Management are given in Figure 1.
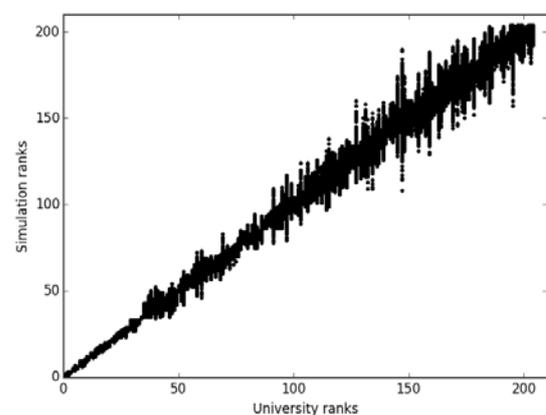

Fig. 1 Uncertainty and sensitivity of the QS World Ranking in the field of Business and Management

Table 3: Uncertainty and sensitivity of QS Business & Management Ranking ranks for 15 first ranked universities

University	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
London Business School	967	33														
Harvard University	33	965	2													
INSEAD		2	998													
Stanford University				1000												
University of Pennsylvania					922	76	2									
Massachusetts Institute of Technology (MIT)					78	922										
Università Commerciale Luigi Bocconi							915	84	1							
University of Oxford						2	81	812	105							
London School of Economics and Political Science (LSE)							2	104	893	1						
Copenhagen Business School									1	586	413					
National University of Singapore (NUS)										413	587					
University of California, Berkeley (UCB)												575	375	50		
University of Cambridge												398	411	191		
HEC Paris School of Management												27	214	715	44	
University of Chicago														43	938	19

It is evident that certain amount of instability can be recognized. Namely, the results are stable at the beginning of the ranking, up to the 40th rank, whereas afterwards the level of instability increases towards the end of the ranking. The most conspicuous example of the measured level of uncertainty is the position of the university ranked 150, whose ranks oscillations are the widest. We can conclude that QS World Ranking in the field of Business and Management gives stable results for highly ranked universities, but not very stable results for lower ranked universities.

We additionally analysed the top ranked universities to examine the credibility of the QS World University Ranking in the field of Business and Management. The frequency matrix of the universities' ranks based on 1000 conducted simulations, for the 15 top ranked universities, is presented in Table 3.

In 96.7% of simulations, first ranked London Business School has found itself in the first position. Harvard University took second place in more than 96% of simulations while INSEAD took third place in almost all simulations. Stanford University is the only university that took the same position in all 1000 simulations – the 4th place. On the other hand, among the presented universities, the HEC Paris School of Management has the most unstable rank, as it was ranked from 12th to 15th place. All in all, the positions of these top ranked universities appear to be very stable, so we can easily conclude that London Business School is rightfully the first ranked in the official QS ranking.

4. Conclusion

After making the first significant decision in their academic career and choosing business and management as their field of specialization, future students are asked another difficult question: which of the many schools to enroll? Therefore, it is crucial that ranking institutions provide them information about potential universities and schools and deliver them rankings in specific scientific fields. To answer the emerging market, world acknowledged international university rankings devised subject-specific rankings.

Business schools could be a major contribuor to the economic development. Namely, a university/industry nexus should be created in which university business schools work with their client corporations to refine and redefine what is essential to the latter's business success (Paton et al., 2014). Also, business schools provide valuable contribution to practice by offering counterintuitive viewpoints that challenge business mind-sets providing them a new perspective (Chia, 2014). Having all above-mentioned in mind, it can be concluded that there is a need for a stable ranking of business schools which will direct the students towards the best ones in which they will acquire valuable managerial and economical skills.

Since QS World University Ranking list is one of the most popular university ranking lists, we took this specific methodology in consideration. Although QS provided rankings in 36 subjects for the year 2015, we placed our interest on the QS Business and Management Ranking, the particular field of the QS methodology which specifies for the business, entrepreneurship, and a perspective society. The main goal of our analysis was to examine the credibility of this ranking list by determining the level of uncertainty and sensitivity of university ranks caused by the changes in the weighting scheme (Saisana & D'Hombres, 2008; Saltelli et al., 2008).

Results of our research show that QS ranking is relatively stable for top-ranked universities, with a low level of uncertainty and sensitivity to different model assumptions, while for lower ranked universities there is a certain degree of instability. Additionally, we gave particular attention to the ranks of the top 15 universities in QS Business and Management ranking list. Namely, the frequency matrix showed that highly ranked universities have had stable ranks within all 1000 simulations.

This paper examined the stability of the well-known QS World Ranking in the field of Business and Management in the case of the change of the weighting scheme and provided results that indicate that the ranking is quite stable. However, one must note that the weighting is just one step in the complex process of creating a ranking methodology. Other steps in the process of creation a composite measure that have been marked as the stepping stone are the process of choosing indicators that will enter the framework and the type of normalization (Nardo et al., 2005). Therefore, one direction of further studies could be the analysis of the effect of different normalization types if the original data were provided. On the other hand, some authors discuss whether the business schools curriculums and the topics they focus on are sufficient and satisfying and whether the students are perhaps abridged by narrow curriculum (Nicholls & Hair, 2015; Butz & Askim-Lovseth, 2015). Accordingly, the other direction of the study could be the introduction of more specific indicators which could measure the level up to which the curriculum covers particular business topics of high public interest.

The presented paper has several benefits that should be pointed out. Firstly, it assesses a subject specific ranking of high interest for both students and future employers. Secondly, it provides an insight into the uncertainty and sensitivity of the QS World Ranking in the field of Business and Management. Finally, it provides evidence that the current ranking is trustworthy, especially in the top of the ranking. We believe that this paper might trigger more in-depth analysis of subject specific university rankings and their methodologies.

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