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A Benchmarking Analysis of University League Tables Using the AHP Based on Students' Perception: UAE Case

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Abstract

Benchmarking is an important technique that universities seek to implement to obtain superior performances. This paper attempts to ascertain benchmarking criteria from the point of view of the students who were involved in benchmarking processes within four United Arab Emirates Universities (UAE-Us). The students in the four UAE-Us are investigated during the period of October 2009 till May 2011 to identify priorities and apply weights for multiple criteria decision-making in the context of choosing a university. The students' priorities and rankings for choosing a university are tested under the Analytic Hierarchy Process (AHP) model. AHP and benchmarking techniques make the implementation and analysis studies more effective and easy and applicable to universities. Further, AHP is used to calculate the relative weights of each criterion, sub- criteria and specific sub-criteria, to prioritize them, and finally to select the important benchmarking criteria within each of the four universities investigated. The overall findings suggest that university reputation and campus are the dominant criteria, while research evaluation performance seems less important within these four universities.

Key Terms: Benchmarking University; AHP; Pairwise Comparison; Multi-Criteria Analysis.

Data availability: Data are available from the author upon request.

1. Introduction

Benchmarking is one of the public and private sectors-grown "managerialist" tools whose application and significance are rapidly increasing in many developed countries public and private sectors. Despite its prevalence, the nature, the process and the outcomes of benchmarking in public services remain unclear (Wolfram Cox et al., 1997; Davis, 1998; Ball et al., 2000; Fowler and Campbell, 2001; Jones, 2001, 2002; Northcott et al., 2005). In general, benchmarking enables universities improve their scores on both national and international league tables (Usher and Savino, 2006). Furthermore, the world-wide expansion of access to university league tables has also created an increasing national and global demand for consumer information on academic quality of undergraduate and post graduate levels (Dill and Soo, 2005).

University league tables may be considered a type of ''organizational report system'' that provides explicit organizational rankings (Gormley and Weimer 1999). Such tables have been produced by commercial entities such as newspapers and magazines as well as by governmental agencies. Dill and Soo (2005) added that university rankings or "league tables," a novelty as recently as 15 years ago, are today a standard feature in most countries with large higher education systems. Moreover, "League tables" are not synonymous with "performance indicators," although the two bear more than a passing resemblance to one another. Performance indicators are usually published by governments or institutions themselves either to show how well an institution (or a system of institutions) does compared to some kind of benchmark or simply for the sake of "transparency." League tables, on the other hand, while similarly compiled and arranged on the basis of indicators, are designed specifically as a comparative measure, pitting institutions against each other.

This paper should be considered in the light of developing good practice in quality enhancement developments within UAE-Us. Accordingly, the current work of this paper focuses on three main criteria – namely the campus, reputation and evaluation of research performances. Most universities seek to benchmark each of these at some stages of their business life. In general,

this paper presents the results of students' judgements about the importance of various benchmarking criteria. In this sense, two research questions are developed to investigate the evaluation of benchmarking criteria for a university. These research questions are: first, in what sense does AHP examine students' views in terms of the relative importance criteria and sub-criteria which influence benchmarking judgments and processes? And second, does the responsibility of university to settle upon its goals cause the university to be more concerned with some benchmarking criteria and less concerned with others?

These questions are answered in the context of UAE-Us through empirical fieldwork. Further, the present paper contributes to the notion that a decision support system such as AHP can be a viable approach to determining benchmarking criteria as well as improving the quality of UAE-Us decisions toward benchmarking implementation. It also identifies the implications that AHP was considered suitable in this study for guidance in the analysis of the data, and it enabled the researcher to understand the phenomenon of benchmarking implementation at a deeper level of meaning and consequence in UAE-Us.

This paper is organized in four sections. First, it highlights the selection model to determine benchmarking criteria, construction of model hierarchy and pairwise comparison matrices is addressed. Second, the research methods – a questionnaire and semi-structured interviews - are explained. Third, results of AHP application are examined by means of questionnaire, semi-structured interviews. Finally, concluding results, contribution and limitations are set out.

2. Literature review

Organizations in many developing countries (e.g., universities and institutions) had been characterized by the low amount of actual rate of return or facilities service. Salem (2005) indicated that several decisions in many universities or institutions of many developing countries appeared to have been taken without adequate feasibility research and others had not

been revised or updated at different stages of construction. In implementing their development strategies, developing countries need new management tools, such as benchmarking (Salem, 2008), but at the same time they are surrounded by a complex environment in terms of increases in university or institute size. Requirements for consumer information on academic quality has led to the development of university rankings in many countries of the world, (Dill and Soo, 2005; Khan et al., 2002). More generally, demands for increased consumer information in education institutions have not come only from the students, but also from other stakeholders such as governments wary of rising costs, employers in need of competent graduates, and the public at large eager for information about the quality of education and labour market prospects (Shattock, 2007).

Moreover, the discussions of recent changes in the management and organization of higher education often express concerns about the loss or at least diminution of long-established academic traditions. Some of these traditions still bear the hallmarks of the medieval origins of the university (Ward, 2007). A millennium of evolution has seen the original institutional form take on many variations as it has adapted to changing times and to different national cultures. But globalization has affected the university in new and unprecedented (Shattock, 2007). Also, the rapid growth in the number of international students with qualifications from more than one country, the internationalization of disciplinary research and the use of English as the primary medium of scholarly discourse are all sources of convergence (OECD, 2007).

Changes in higher education worldwide do seem to confront shared issues as well as those specific to distinctive national arrangements. The expansion of public expenditures in higher education has been associated with demands for enhanced university ranking and effectiveness. These demands have required a more active managerial approach to the administration of universities and increased pressures for universities to seek revenues and good benchmarking criteria (Ward, 2007). These pressures sometimes conflict with the academic values that have inspired and sustained the university throughout its history. These values include academic freedom, learning environment, research performance, university's facilities,

university geographical location, moral and ethical probity as well as a commitment to ensure fairness in access and a commitment to respond to social concerns. Although universities have not always been true to these values and commitments, they remain the bedrock of higher education's identity and institutions need to be alert to any pressures that diminish their influence (Hazelkorn, 2007). Despite these values commitment, higher education systems throughout the world are being called upon to educate more students, provide more support for them, address workforce needs, solve social, scientific and technical problems and do all of it better, more efficiently, and in physical facilities and surroundings appropriate to the task.

Furthermore, higher education served only social elites (Dell and Soo, 2005). At this point, higher education systems underwent a massification based on a more egalitarian view of the purposes of universities, raising many conflicts about the compatibility of access and quality of programs and research. This massification has, however, raised the political discourse about tuition fees and rising costs of higher education to a national and/or international level where it has become a matter of fiscal debate (Usher and Savino, 2006).

The paper also reviews relevant literature on university league tables from other countries with particular attention to the impacts of the ranking systems on university behavior as well as related research on university choice decisions making among students (OECD, 2005). In this concern, university league tables systems can be conducted either on a national or international scale. National league tables levels are ones in which all or nearly all of a country's universities are measured against one another. This was the original university ranking format such as, the type pioneered by the US News and World Report in 1981 and which has been widely copied in other countries. At present, national-level rankings exist in Australia (the Melbourne Institute), Canada (Maclean's), Germany (CHE/DAAD rankings), Italy (La Repubblica), Spain (Excelencia), the United Kingdom (the Times, the Guardian, the Financial Times and the Telegraph) and the United States (US News and World Report and the Washington Monthly)

(Shattock, 2007; Usher and Savino, 2006).

University league tables are lists of certain groupings of institutions, comparatively ranked according to a common set of criteria, sub-criteria, and specific sub-criteria in descending order. In this study and throughout the fieldwork it appeared that many UAE-Us try to create good learning and research environment and give priority to the importance of some criteria (e.g., learning environment, research environment, university reputation) to be adopted at the universities.

3. Methodology

3.1 The selection model to determine benchmarking (university ranking) criteria

One difficulty universities may face when implementing benchmarking is a multicriteria decision one (Salem, 2008). A methodology which can address this problem is the pairwise comparison model in AHP, which Saaty developed in the 1970s (Saaty, 1980). Since that time a wealth of literature has existed to provide a discussion of AHP applications in many research areas, such as accounting and auditing (Hassell and Arrington, 1989; Arrington et al., 1984), electric utility industry, medicine, and business (Golden et al., 1989). While AHP has seen limited application in benchmarking, Korpela and Tuominem (1996) indicated that AHP had previously been used for benchmarking by Eyrich (1991).

3.2 Construction of model hierarchy

This section outlines the model hierarchy developed for three criteria, nine sub-criteria and eighteen specific sub-criteria. A hierarchy is the fundamental structure used by AHP theorists to deal with multiple-criteria decision-making. It involves identifying the elements of a problem, grouping the elements into homogeneous sets, and organising these sets into different levels.

This basic hierarchy can aid in identifying criteria, sub-criteria and specific sub-criteria. However, hierarchy in this study is based on two major levels:

University criteria - the criteria in this level, which are used for the evaluation of the various activities, are identified as university campus, university reputation and research evaluation performances. These three criteria which are associated with university's well being make up the second level of the hierarchy.

Activities level (level three): these include sets of sub-criteria (geographical location, campus atmosphere, facilities, etc). There are also sets of specific sub-criteria at the low levels of this hierarchy (suitable weather, shopping in the area, etc.). All of those are presented in Figure-1 and compared in the questionnaire (see Appendix 1).

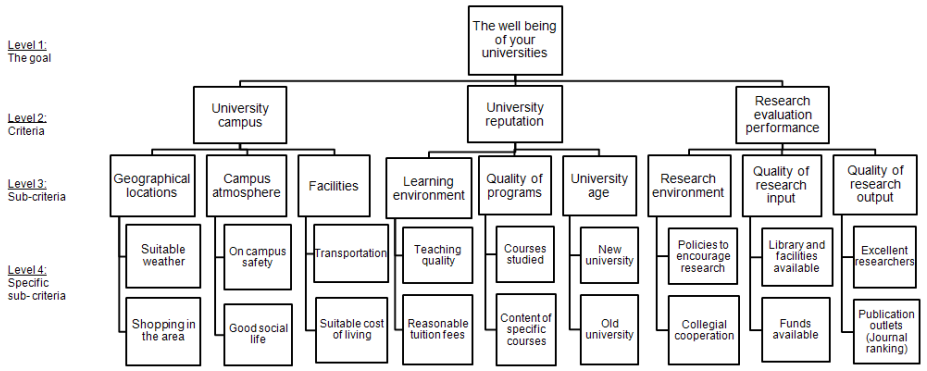
Furthermore, evaluation of all pairwise comparisons (using the Saaty's 9-point scale) is used. Consider for example the evaluation of sub-criteria or specific sub-criteria against the criteria. This involved many pairwise matrices across the hierarchy levels.

3.3 Pairwise comparison matrices

Once the hierarchical structure has been formed, the judgmental process by students begins across all elements. For each level of the hierarchy, beginning at the top and working down, a comparison matrix for the components is obtained. However, the input matrix of pairwise comparisons shows the extent to which one element is preferred over another by students in determining the criterion, sub-criterion and specific sub-criterion across all levels shown in the hierarchy within each of the four universities.

(Figure-1)

An Analytical Hierarch of the selection of university campus, reputation and research evaluation performance (Elements within all levels in this hierarch are developed by the researcher)



In this study, the evaluation model used was that suggested by Saaty (1990, 1995) for determining the criteria, sub-criteria, and specific sub-criteria to be benchmarked within each of the four universities. The following formula developed by Saaty (1980, 1995) could be applied for this pairwise comparison:

$$AW = \lambda_{max} W$$

Where A is the pairwise comparisons matrix, W is the normalised weight vector and λ_{max} (lambda max) is the maximum eigenvalue of matrix A. The maximum eigenvalue can be used to estimate consistency in a matrix, as reflected in the proportionality of preferences (Saaty 1995, 1980). Specifically, the closer λ_{max} is to the number of elements n in the matrix A, the more consistent the matrix will be. However, the deviations from consistency are expressed by the following equation and the measure of inconsistency is called the consistency index (CI) (Albayrak, 2004; Lee et al., 2002; Saaty, 1995).

$$\text{Consistency index (CI)} = (\lambda_{max} - n) / (n - 1)$$

4. Data Collection

The population for this study consists of four UAE-Us in different locations and were involved in benchmarking process at the time of this study. The sample of this study consists of variety of colleges (e.g., sciences, engineering, medicine, business administration, communication, and law colleges). As a condition of obtaining access for data collection, this study was unable to mention the real name of the universities under investigation and analysing the empirical data. This is because of sensitivity of data collection from these universities. Accordingly, the researcher adopted a new name for each of the anonymous universities to be used in presenting data collected for this study. The letters 'W', 'X', 'Y', and 'Z' are used to refer to these universities and their activities.

The data for this study was collected from four UAE-Us (using a questionnaire and semi-structured interviews). The semi-structured interviews were conducted with students to obtain general information about the universities' criteria, sub-criteria and specific sub-criteria which could improve the quality of UAE-Us decisions toward benchmarking implementation within these four universities. The questionnaire was distributed personally to 80 participants in the four universities. To secure effective participation, an opportunity to discuss the questionnaire was offered to the participants through the researcher's personal attendance. Accordingly, in some cases completion of the questionnaire could be considered as a semi-structured interview, because the discussion enriched the researcher's knowledge of the respondents' answers, instead of having to rely solely on what was written in the questionnaire. Also, in other cases the semi-structured interviews were conducted with some students to obtain general information about the universities and the necessary information that should be obtained from the universities' records. This is in addition to difficulty of clarifying points or terminology about answering questionnaire questions such as 'benchmarking', 'league tables', 'rankings' etc. to prevent misunderstanding and a possible distortion of results. Moreover, the questionnaire was distributed in the four UAE-Us during the period of October 2009 till May 2011 to identify priorities and apply weights for

multiple criteria decision-making in the context of choosing a university. Twenty usable questionnaires were elected from each university. The choices of the twenty considered questionnaires within each university were based on the fully completed questionnaires by students who belong to different colleges/departments in the four universities.

Pairwise comparisons were made by students within the four UAE-Us (University of Sharjah, United Arad Emirates University, American University, and Ajman University of Science and Technology). Questions were designed to elicit judgements about the relative importance of each of the selected criteria.

This study used the standard measurement scale developed by Saaty (1980) to determine priorities' weights across all elements for the purpose of benchmarking implementation. The scale ranges from equal to extreme, where one represents equal importance and nine indicates absolute importance. The scale is 1, 3, 5, 7, and 9 with 2, 4, 6, and 8 as intermediate values. Figure-2 shows Saaty's standard scale which respondents use in AHP.

(Figure-2)

Election technique response scales which can be used by respondents in AHP

Intensity of Importance	***Definition***	***Explanation***
1	Equal importance	Two activities or items contribute equally to the objective.
3	Weak importance of one over another	Experience and judgement slightly favour one activity or item over another
5	Essential or strong importance	Experience and judgement strongly favour one activity over another.

7	Demonstrated importance	An activity or item is strongly favoured and its dominance is demonstrated in practice.
9	Absolute importance	The evidence favouring one item over another is of the highest possible order of affirmation.
2, 4, 6, 8	Intermediate values between the two adjacent judgements	When compromise is needed.

Source: Saaty (1980 1990, 1995); Saaty and Vargas (1982)

5. Results of AHP application and discussion

AHP was used in this study as a structured way of building prioritised criteria across three main criteria. As shown in Figure-1, the top level of the hierarchy represents the ultimate goal of determining "the best benchmarking" dimensions. The second level reflects the three main criteria considered important in measuring the well-being of the university. At the third level, these criteria are decomposed into nine sub-criteria. These are further classified into eighteen specific sub-criteria. This section presents a discussion of students' responses to questions developed to investigate the evaluation of benchmarking criteria, sub-criteria and specific sub-criteria for the university.

Students were required to work through twenty one paired comparisons of the main criteria. Majority of the students believed that university reputation and university campus were the most important criteria followed by research evaluation performance when all criteria, sub-criteria and specific sub-criteria were jointly and simultaneously evaluated.

5.1 Criteria level analysis

The decision hierarchy depicts the three distinct main criteria of the

well-being of the university in the context of UAE-Us. However, the students within the four UAE-Us were required to work through three paired comparisons of the three benchmarking criteria conditional on the assumption that they were concerned with determining the well-being of the university. Consequently, these three criteria were integrated into one set of priorities by considering the relative strength of the well-being of the university dimensions, as discussed below.

5.1.1 Priorities of benchmarking criteria within the four universities

From the AHP analysis of students' views about the relative priorities of each criterion to be benchmarked, the evaluation of benchmarking university campus, university reputation and research evaluation performance across students within each of University W, X, Y, and Z are given below.

University W's results show that the rating of university campus, research evaluation performance were second and third respectively. These two criteria appeared to be less important in determining the well-being of the university. The overall conclusion for University W is that there was a general consensus across students' responses that university reputation mean ranks is more important than university campus and research evaluation performance in benchmarking (Table-1).

(Table-1)

Ranks given by respondents to criteria tested to determination of best benchmarking*

Explanation	Universities			
	W	X	Y	Z
University campus	2.20	2.00	1.60	2.10
University reputation	1.50	1.70	1.40	1.90
Research evaluation performance	2.70	2.00	1.80	2.00

*This table shows the average of the main ranking for the participants' responses within each university.

Across respondents of University X, there was general agreement that university reputation is the most important criterion in determining benchmarking. The importance of university campus and university research evaluation performance is unclear, but it was generally accepted by participants that these two criteria are the second and third most important criteria respectively in determining the well-being of the university. This was confirmed by the mean ranks for each criterion mentioned, as shown in Table-1 for University X.

Finally, it appears that university campus and university research evaluation performance are generally regarded as being less important in determining benchmarking than the university reputation. The mean ranks confirm that university reputation was clearly considered as the most important criterion as shown in Table-1 for University Y and Z.

5.1.2 Consistency analysis for criteria level

The consistency of responses across students was examined within each of the four universities with respect to the benchmarking criteria. It is found that the principal eigenvalue (l_{max}) is very close to n (number of elements in the matrix). This is consistent with the Saaty's suggestion (1980, 1995) that the closer the value of computed l_{max} to n, the more consistent in performing pairwise comparisons of elements. In fact, l_{max} is equal to 3.05, 3.03, 3.02 and 3.01 within each of the University W, X, Y and Z respectively (Table-6). This consistency is considered satisfactory because the value of the CI and CR was less than 0.10 within each of four universities. This confirms studies by Lee et al. (2002), and Saaty (1980, 1995) who have indicated that the value of CR is acceptable if it less than 0.10.

5.2 Sub-criteria level analysis

This section describes the derivation of priorities associated with determination of benchmarking sub-criteria. In this sense, there are three sets of sub-criteria with respect to their relation to the main criteria used in this study as shown in Figure-1. Following this, students were asked to indicate their priorities through three paired comparisons of university campus, university reputation, and research evaluation performance sub-criteria dependent on the assumption that they were concerned with determining the best benchmarking practice. A detailed discussion of students' comparisons for the three sub-criteria within four universities is presented below.

5.2.1 Priorities of university campus sub-criteria within four universities

Across respondents of University W, geographical locations appear to be the third most important sub-criterion. The mean ranks indicate that facilities, campus atmosphere and geographical location were believed to be the most, second and third most important sub-criteria respectively in benchmarking university campus (Table-2 for University W).

(Table-2)

Ranks given by respondents to sub-criteria tested to determination of university campus*

Explanation	Universities			
	W	X	Y	Z
Campus atmosphere	1.70	1.80	1.60	1.50
Facilities	1.50	1.70	1.00	1.00
Geographical locations	2.30	2.30	2.00	1.90

*This table shows the average of the main ranking for the participants' responses within each university.

Concerning University X, it appears that there was general consensus over the importance of the facilities when benchmarking university campus. Overall, the mean ranks confirm that facilities were clearly regarded as the most important sub-criterion compared with campus atmosphere and geographical locations, as shown in Table-2 for University X. This section also analysed the respondents' responses in determining university campus sub-criteria in University Y and Z. There appears to be general consensus across respondents regarding the importance of facilities, campus atmosphere and geographical locations with respect to the determination of university campus in the University Y and Z.

5.2.2 Priorities of university reputation sub-criteria within the four universities

The overall results of University W suggest that, in determining university reputation, the students believe that learning environment is considerably more important than university age and quality in benchmarking university reputation. This was confirmed by the mean ranks as shown in the Table-3.

(Tabl-3)

Ranks given by respondents to sub-criteria tested to determination of university reputation*

Explanation	Universities			
	W	X	Y	Z
Learning environment	1.50	2.20	1.90	1.90
Quality of programs	2.30	1.60	1.50	1.70
University age	1.80	2.10	2.20	2.10

*This table shows the average of the main ranking for the participants' responses within each university.

Table-3 also summarises the priority weights produced by the twenty respondents in University X. These results show that there was general agreement among students that quality of programs was the most important sub-criterion when benchmarking university reputation. Across respondents, the mean ranks suggest that quality of programs was clearly regarded as the most important. Overall, a minority of the respondents believed that learning environment and university age were considered as second and third sub-criteria respectively, while a majority of respondents for University Y and Z rated quality programs as the most important sub-criterion. This was confirmed by mean ranks for quality programs as shown in Table-3.

5.2.3 Consistency analysis for sub-criteria level

The findings were examined through three consistency measurements to provide the level of consistency across students' responses with respect to determine benchmarking sub-criteria of geographical location, campus atmosphere and facilities. Concerning this, the findings shown in Table-6 for consistency regarding l_{max}, CI and CR indicate satisfactory consistency across students' responses in determining university campus sub-criteria within each of the four universities. Specifically, the value of l_{max} (e. g., 3.02, 3.03, 3.01, and 3.01 for Universities W, X, Y, and Z respectively) is very close to n. Also, the value of CI and CR is less than 0.10 as shown in Table-5.

5.3 Specific sub-criteria level analysis

At the sub-criteria level, students are required to make paired comparisons between the two specific sub-criteria with respect to their relation to sub-criteria at the level above. Respondents are asked to work through nine paired comparisons for all sub-criteria. Priorities were then derived from the point of view of determining the best practice benchmarking of specific sub-criteria.

The study analysed the results of nine paired comparisons across the eighteen specific sub-criteria within each of the four universities under

the determination of sub-criteria (e.g., campus atmosphere, geographical location and facilities). The result of all the paired comparisons of specific sub-criteria made by eighty students across University W, X, Y, and Z is presented, along with brief discussion of paired comparisons for teaching quality and reasonable tuition fees with respect to learning environment.

5.3.1 Priorities of learning environment specific sub-criteria (teaching quality and reasonable tuition fees) within the four universities

The judgement over learning environment in University W is presented in Table-4. With respect to teaching quality there was general agreement among respondents that this element is much more important than reasonable tuition fees. Overall, the mean ranks confirm that teaching quality was regarded as the most important specific sub-criterion.

(Table-4)

Ranks given by respondents to specific sub-criteria tested to determination of sub-criteria (learning environment, quality of programs and university age)*

Explanation	Universities			
	W	X	Y	Z
Teaching quality	1.30	1.20	1.10	1.20
Reasonable tuition	1.40	1.30	1.20	1.30
Courses studied	1.30	1.60	1.10	1.40
Content of specific courses	1.60	1.30	1.60	1.60
New university (less than 10 years)	1.40	1.70	1.30	1.30
Old university	1.50	1.40	1.20	1.20

*This table shows the average of the main ranking for the participants' responses within each university.

Table-4 summarises the results of the priority weights for each of the

twenty respondents for teaching quality and reasonable tuition fees in the determination of learning environment in University X. The results show that there is a general agreement among respondents regarding the importance of the teaching quality and reasonable tuition fees specific sub-criteria. This was confirmed by mean ranks for reasonable tuition fees as shown in Table-4. In determining learning environment specific sub-criteria, a high degree of consensus emerges across respondents regarding these two specific sub-criteria. In this respect, all respondents agreed that teaching quality was one of the most important specific sub-criteria. There was also general consensus over the relative importance of reasonable tuition fees. Overall, mean ranks give more priority to teaching quality than reasonable tuition as exhibited in Table-4 for University Y and Z.

5.3.2 Consistency analysis for specific sub-criteria

From the above discussion about priorities of benchmarking specific sub-criteria to determine benchmarking sub-criteria, and from the results of consistent matrices shown in Table-5, it appears that there is almost high consistency across students' responses within each of the four universities. Specifically, the value of l_{max} is equal to 2 which is exactly the same number of elements (n) in each specific sub-criteria matrix across all four universities. The overall consistency of judgements across students concerning CI and CR is generally considered satisfactory in determining benchmarking specific sub-criteria with respect to sub-criteria of university campus, university reputation, and research evaluation performances. In fact, the values of CI and CR equal to zero for each specific sub-criterion across the four universities.

(Table-5 for consistency): The results of three consistency measurements (l_{max}, C.I and C.R) for priorities of (criteria, sub-criteria and specific sub-criteria) in determining the well-being of the university

Explanation	Universities											
	W			X			Y			Z		
	λ_{max}	C.I	C.R	λ_{max}	C.I	C.R	λ_{max}	C.I	C.R	λ_{max}	C.I	C.R
All main criteria	3.05	.02	.03	3.03	.01	.01	3.02	.01	.01	3.01	.01	.01
All sub-criteria of university campus	3.02	.02	.03	3.03	.02	.04	3.01	.01	.01	3.01	.02	.02
All sub-criteria of university reputation	3.01	.01	.02	3.04	.03	0.4	3.01	.01	.01	3.02	.01	0.2
All sub-criteria of research evaluation performance	3.05	.03	.04	3.04	.01	0.03	3.03	.02	.03	3.03	.02	.01
All specific sub-criteria of university campus	2.00	.00	.00	2.00	.00	.00	2.00	.00	.00	2.00	.00	.00
All specific sub-criteria of university reputation	2.00	.00	.00	2.00	.00	.00	2.00	.00	.00	2.00	.00	.00
All specific sub-criteria of research evaluation performance	2.00	.00	.00	.2.00	.00	.00	2.00	.00	.00	2.00	.00	.00

l_{max} (Lamda) = principle eigenvalue, C.I = consistency index, C.R = consistency ratio.

6. Conclusions

This study used Saaty's Analytic Hierarchy Process as a procedure for modelling individuals' importance ratings for four main criteria and their sub-criteria and specific sub-criteria as a function of various multiple attributes. The results provided in this paper are specific to the students under study; and, while they could not be considered as representative of larger groups of students, important insights into respondents' judgements over the relative importance of various elements have been identified

for the four UAE-Us. It is difficult to generalise from the results, when these results follow from the fact that students in these universities may concentrate on their own judgment performance measures over the three criteria and their sub-criteria and specific sub-criteria in determining benchmarking. However, it has been possible to highlight some areas where students seemed to hold the same beliefs across the four UAE-Us. The findings in University W and X indicated that a majority of the respondents in these two universities had launched a more structured procedure to university reputation. Meanwhile, university campus was seen as the most important criterion to be benchmarked in University Y. This is related to the geographical locations and campus atmosphere that may direct some UAE-Us in general and University Y and Z in particular with respect to research environment, and library facilities and funds available, which minimised the success of various activities of these universities.

Across students' responses, therefore, a general conclusion can be drawn. A majority of the students indicated that the unavailability of enough research environment and policies to encourage research caused these universities to be more concerned with some benchmarking criteria and less concerned with others. Obviously, the judgements of students over the relative importance of university reputation, university campus and research evaluation performance with respect to determination of benchmarking criteria, sub-criteria and specific sub-criteria indicated valuable findings across the four universities. These findings suggest that university reputation and university campus are the dominant criteria, while research evaluation performance seems less important.

The implications of this study lie in the potential effect of its research findings. The study highlighted the difficulty experienced by the researcher in obtaining access to students and in collecting data from the four universities because of the attitudes of students toward interviews in particular and research in general. Despite this, the study carried out a questionnaire survey and semi-structured interviews with students in order to gain a wider understanding of benchmarking analysis of university league tables based on students' priorities and rankings for choosing a university. The study demonstrates that AHP is a procedure for modelling

preferences and relations between benchmarking criteria sub-criteria and specific sub-criteria in universities. In particular, this study has highlighted useful insights into the relationships among students' priorities, selection criteria in processing benchmarking in the context of choosing a university. Further, this study uses the AHP technique to evaluate students' views about the selection process of benchmarking criteria in UAE-Us in an effective way.

Based on the previous conclusion, this study contributes to the knowledge and understanding of the nature of benchmarking implementation in UAE-Us. It also contributes to the notion that a decision support system such as AHP can be a viable approach to determining benchmarking criteria as well as improving the quality of UAE-Us decisions toward benchmarking implementation. This study indicates that AHP and its framework of testing benchmarking implementation are transferable into UAE-Us where decisions maybe made in an undisciplined way. Beyond this, the study demonstrated that the AHP model can create opportunities for universities in UAE to interact, to justify and modify their personal judgments in carrying out benchmarking practice.

Biographical notes about the author

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APPENDIX 1

Questionnaire: (the pairwise comparison criteria)

Please read the instructions below carefully to help you complete this section.

Instructions

For each criterion, sub-criterion, and specific sub-criterion given below, rate how important each one is, when compared to the other criteria. For example when you are asked; in determining the good being of your university (benchmarking best practice) to what extent is UNIVERSITY REPUTATION more or less important than UNIVERSITY CAMPUS, the question will appear as:

Comparison of the importance of characteristics with respect to determination of THE WELL BEING OF YOUR UNIVERSITY (BENCHMARKING BEST PRACTICE).

_____ University Campus: University Reputation _____

In responding to the question you should use the following scale:

Intensity of Importance	Definition	Explanation
1	Equal importance	Two activities or items contribute equally to the objective.
3	Weak importance of one over another	Experience and judgement slightly favour one activity or item over another
5	Essential or strong importance	Experience and judgement strongly favour one activity over another.
7	Demonstrated importance	An activity or item is strongly favoured and its dominance is demonstrated in practice.

9	Absolute importance	The evidence favouring one item over another is of the highest possible order of affirmation.
2, 4, 6, 8	Intermediate values between the two adjacent judgements	When compromise is needed.

For example, if, in responding to the sample question, you believe that UNIVERSITY REPUTATION has 'demonstrated importance' over UNIVERSITY CAMPUS, then you should complete the questionnaire as follows:

Comparison of the importance of characteristics with respect to determination of THE WELL BEING OF YOUR UNIVERSITY (BENCHMARKING BEST PRACTICE).

___7_____ University Campus: University Reputation _____

Alternatively, if you believe that, in determining the good being of your organisation, UNIVERSITY CAMPUS is of 'essential or strong importance' over UNIVERSITY REPUTATION then the questionnaire should be completed as follows:

Comparison of the importance of characteristics with respect to determination of THE WELL BEING OF YOUR UNIVERSITY (BENCHMARKING BEST PRACTICE).

_____ University Campus: University Reputation ____5____

Questions

1- Comparison of the importance of characteristics with respect to determination of THE WELL BEING OF YOUR UNIVERSITY (BENCHMARKING BEST PRACTICE).

_____ University Campus: University Reputation _____

_____ University Campus: Research Evaluation Performances _____

_____ University Reputation: Research Evaluation Performance _____

2- Comparison of the importance of characteristics with respect to determination of UNIVERSITY CAMPUS.

_____ Geographical Location: Campus Atmosphere _____

_____ Geographical Location: Facilities _____

_____ Campus Atmosphere: Facilities _____

3- Comparison of the importance of characteristics with respect to determination of UNIVERSITY'S REPUTATION.

_____ Learning environment: Quality of Programs _____

_____ Learning Environment: University Age _____

_____ Quality of Programs: University Age _____

4- Comparison of the importance of characteristics with respect to determination of RESEARCH EVALUATION PERFORMANCES.

_____ Research Environment: Quantity of Research Inputs _____

_____ Research Environment: Quality of Research Outputs _____

_____ Quantity of Research Inputs: Quality of Research Outputs _____

5- Comparison of the importance of characteristics with respect to determination of GOEGRAPHICAL LOCATION.

_____ Suitable Weather: Shopping in the Area _____

6- Comparison of the importance of characteristics with respect to determination of CAMPUS ATOMSPHER.

_____ On Campus Safety: Good Social Life _____

8- Comparison of the importance of characteristics with respect to determination of FACILITIES.

_____ Transportation and Parking: Suitable Cost of Living _____

9- Comparison of the importance of characteristics with respect to determination of LEARNING ENVIRONMENT.

_____ Teaching Quality: Reasonable Tuition Fees _____

10- Comparison of the importance of characteristics with respect to determination of QUALITY OF THE PROGRAMS.

_____ Courses Studies: Content of Specific Courses _____

11- Comparison of the importance of characteristics with respect to determination of UNIVERSITY AGE.

_____ New University: Old University _____

12- Comparison of the importance of characteristics with respect to determination of RESEARCH ENVIRONMENT.

_____ Policies to Encourage Research: Collegial Cooperation _____

13- Comparison of the importance of characteristics with respect to determination of QUANTITY OF RESEARCH INPUTS.

_____ Library and Facilities Available: Funds Available _____

14- Comparison of the importance of characteristics with respect to determination of QUALITY OF RESEARCH OUTPUTS.

____ Excellent Researchers: Publication Outlets (Journal Ranking) _____

التحليل القياسي لجداول الجامعات باستخدام نموذج التحليل الهرمي

محمد ســـــالم

كلية إدارة الأعمال - جامعة الشارقة

الشارقة - الإمارات العربية المتحدة

ملخص الدراسة

يعدّ القياس من أبرز الوسائل المهمّة التي تعتمد عليها الجامعات لتحقيق التميّز في أداء برامجها ومخرجاتها، وقد سعى هذا البحث إلى تحديد ضوابط للقياس الذي تسعى الجامعة إلى تطبيقه؛ وذلك من خلال إجراء دراسة تطبيقية على عينة من الطلاب أبدوا وجهة نظرهم بشأن عمليات القياس في أربع جامعات بدولة الإمارات العربية المتحدة، في الفترة الزمنية من (أكتوبر 2009م وإلى مايو 2011م). وقد كان الهدف من ذلك اختيار معايير أفضل جامعة باعتماد الضوابط والمرجّحات الموضوعية. وقد استند الطلاب في اختياراتهم إلى مبدأ التحليل الهرمي، وهو طريقة فعّالة، وأكثر سهولة في الإجراءات التطبيقية، وقد تمّ استخدامها لحساب القيم النسبية لكلّ الضوابط الرئيسية والفرعية، من أجل اختيار أهمّها في العينة المختارة. وقد أظهرت النتائج الأولية أنّ سمعة الجامعة والحرم الجامعي هما من أكثر الضوابط تفضيلا لدى الطلاب، في حين حظي البحث وتقييم الأداء بأهمية أقلّ من الضوابط السابقة في هذه العينة المختارة.