A QUANTITATIVE ASSESSMENT METHOD RECOMMENDED FOR THE STATE UNIVERSITIES IN TURKEY

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Abstract
The university ranking systems have been utilized for academic performance of higher education system in the World since beginning of 2000's years. These systems, which considered the common parameters, have quickly followed with their own hierarchical measures by higher education organizations. However, these ranking systems never consider country's special conditions. This paper mentions the main principles of a new system for state universities performance in Turkey. The quantitative assessment method depends to six separate parameters such as number of publications and projects, teaching quality, teaching income, teaching structure, the index for entrepreneurial and innovative university and student satisfaction. The technique provides data for well-balanced and justice decision for the national state universitiesthroughout the country. Summation of all numerical values resulted from six parameters represents total score for the related university. The total score obtained for an university also gives its place in the ranking system of higher education in the country. It is possible the central budget to be shared to all state universities in Turkey by means of this method.
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Introduction

According to the report of OECD (2013), universities in developed countries, rather than the institutions that carry out classical education and training services, mostly transform to the research organizations integrated with the industry and producing information. Universities in relevant countries are supported by the governments in order to transform and accelerate transformation, which is considered as a strategic change. It should be noted that state support for North American universities is largely towards to research and development projects (Meyerson, 1988). Turkey is one of the countries where education sector is very large in the world. With end of 2018, the number of faculty (academic staff) is 158 098 in Turkish Universities. The full professors and associate professors are about 33 and 39 percent of total members of faculty, respectively. In Turkish Universities more than 7.5 million students are studying at different levels as end of year 2019. The number of students studying in two-years programs is 2 768 757 while it rises up to 4 241 841 for four-years programs. The number of students in graduate study is 549 773. The seventeen percent of graduate students is studying in doctoral degree program. The graduate study is only about seven percent of total system in Turkey.
In the context of this study, an assessment technique, which depends to six separate parameters, was recommended. The parameters of this specific assessment technique are teaching income, teaching structure, teaching quality, number of publications and projects, the index for entrepreneurial and innovative university, and student satisfaction. The suggested technique provides data for well-balanced and justice decision in sharing the financial resources allocated by the central government in Turkey. Summation of scores belonging to each parameter gives total score for the related university to obtain its place in the ranking system of higher education system in Turkey. In addition to this, the technique also provides a ranking for each parameter (Tosun, 2015). It has been developed for only state universities in Turkey.

Literature survey for Performance Assessment and Metodology

In general, performance appraisal can be classified into two groups as traditional and modern methods (Tosun, 2019). Traditional methods are older methods for performance appraisal which concentrated only on the past performance. There are the topical traditional methods used in the past: (1) ranking method; (2) graphical rating scales; (3) critical incident method; and (4) narrative essay method. Modern methods were introduced to improve the conventional methods. They consider the shortcomings of the old methods, such as biasness and subjectivity. The typical modern methods are generally categorized into six groups: (1) management by objectives (MBO); (2) behaviorally anchored rating scales (BARS); (3) humans resource accounting (HRA); (4) assessment center; (5) 360 degree; and (6) 720 degree. In MBO, which includes three main processes: object formulation, execution process, and performance feedback, the performance is graded against the achievement of the objectives specified by the management. It generally consists of several components (Tosun, 2019).
In addition to traditional and modern methods mentioned above, there are some various fuzzy hybrid techniques to execute performance appraisal for individuals or organizations. The author has studied on the performance of higher education institutes and suggested a financial model for sharing the central budget allocated by the Government and has so many national publications on this issue (Tosun, 2004; 2006; 2015; 2016 and 2019). This paper summarizes the main principles of the specific method introduced for evaluating the universities in Turkey and introduces the result of studies, which was executed on performance of universities established at the different

periods. The model is based on methods of ranking and graphical rating scales. It includes the studies, which were done along 12 years.
Currently, there are some ranking systems for the world universities based on academic performances, which determined by quality and quantity of scholarly publications. These methods, which have been implemented since the first half of 2000's years, adapted to an important criterion for questioning position of universities with time. Times and QS in United Kingdom, ARWU-Jiao Tong in China, Leiden in Nederland, and SCImago in Spain are some of the evaluation systems that are internationally renowned. These systems are based on reliable sources, such as Scopus, Web of Science, and Google Scholar. In Turkey, University Ranking by Academic Performance (URAP) ranking system developed by Middle East Technical University globally measures universities according to academic performance. In the context of this study, an assessment technique, which depends to six separate parameters, was recommended.

The model Recommend for Performance Assesement of State Universities
In the model, twenty-seven parameters in six areas were taken into account for performance assessment of the state universities in Turkey. These parameters are given in Table 1. The parameters of this specific assessment technique are explained below:

Teaching Income- The state universities in Turkey provide a significant portion of their income from the central government budget. The university budget on the basis of economic classification in the chart is categorized into five main titles as personnel expenses, social security state premiums, goods and service purchasing expenses, current transfers, and capital expenditures. Total of these five items constitute the university's portion from the central government budget for one year. Teaching income is considered as a separate parameter in the model and the Teaching Income Score (TIS) is calculated.

Teaching Structure- The teaching structure in the modern university system is categorized into undergraduate and graduate levels. Undergraduate level includes two-year and four-year programs. This parameter means at which university intensifies degree of level or levels. For this purpose, four different evaluation criteria are defined and the Teaching Structure Score (TSS) is calculated taking into account the influence factor values of each evaluation criteria (Tosun, 2015). The great value of Teaching Structure Score means the university in where graduate education is major. Otherwise, undergraduate level including two-year programs is predominant.

Teaching Quality-The teaching quality in higher education institutions in developed countries is generally assessed by the number of students per faculty member and per research assistant. In this study, six different criteria are defined in order to determine the quality of teaching of universities and the Academic Quality Score (AQS) is calculated for each university based on the relevant criteria and taking into consideration the influence factors (Tosun, 2004; 2015). Table 1 introduces the criteria considered for teaching quality with others.

Publication Efficiency- Publication data used in this study were collected on the basis of the whole document using "Thomson Reuters—Web of Science Database".]For this study, scientific efficiency was taken into account as a basic parameter, which mainly depends to unit number of publication and citation, which are scanned by international indexes (Sciences Citation Index-SCI, Social Sciences Citation Index –SSCI and Arts & Humanities Citation Index-AHCI) and then the Publication Efficiency Score (PES) is determined (Tosun, 2004; 2015).

Project Yield- Universities in developed countries produce projects in different scopes and seek support for these projects to use facilities central and local governments, public and private sector institutions and gain the culture on research and development, innovation and entrepreneurship. Within the scope of this study, project numbers and budgets supported by the Scientific and Technological Research Council of Turkey (TUBITAK) and the General Directorate of Science and Technology of the Ministry of Science, Industry and Technology (SAN-TEZ) with serious evaluation criteria were evaluated and then calculated the Project Yield Score (PYS) based on the impact factor value of each evaluation criteria in the field of project yield (Table 1).

Table 1. The parameters considered in the performance assessment method for state universities in Turkey

#	Area	Ratio to total score (%)	Area Score	Parameters	Impact factor of parameter
1	**Teaching Income**	10	100	Ratio b/t personnel expenses and total number of students Ratio b/t total budget and total number of students Ratio between capital expenditures and total budget Ratio between self-income and total number of students	0,1 0,6 0,1 0,2
2	**Teaching Structure**	10	100	Ratio b/t numbers of students on PhD and MS Degree Ratio b/t numbers of graduate and undergraduate students Ratio b/t numbers of pre-undergraduate and undergraduate students Ratio b/t undergraduate and total (excluding graduate) students	0,3 0,3 0,1 0,3
3	**Teaching Quality**	20	200	Ratio b/t numbers of total student and faculty * Ratio b/t numbers of total students and assistant faculty Ratio b/t research area and number of faculty Ratio b/t education area and total number of students Ratio b/t total area and total numbers of faculty and staff Ratio b/t social activity area and total students	0,4 0,4 0,05 0,05 0,05 0,05
4	**Publication Efficiency**	25	250	Ratio b/t total number of publications and faculty Ratio b/t total number of citiations and faculty Ratio b/t number of citiations and publicaitons Ratio b/t total number of publications and age of university Ratio b/t total number of citiations and age of university	0,2 0,2 0,2 0,2 0,2
5	**Project Yield**	25	250	Ratio b/t total number of TUBITAK projects and faculty* Ratio b/t total number of SAN-TEZ projects and faculty* Ratio b/t total amount of projects and total number of projects Ratio b/t total number of patent and faculty Ratio b/t total number of utility models and and faculty	0,25 0,25 0,1 0,2 0,2
6	**Entrepreneur-Innovation and Student Satisfaction**	10	100	Entrepreneur-Innovation and Preference Score Free quata for two-years programs Free quata for two-years program	0,6 0,2 0,2
Total		100	1000	Totally 27 parameters	1.0 for each area

(*) including only full professors, associate professors and assistant professors

Entrepreneur-Innovation and Student Satisfaction- An index on entrepreneur and innovative university has been started in 2011, considering 23 indicators in the leadership of TUBITAK. This index which was depended on the basis of universities' scientific and technological research competence, intellectual property activity, cooperation and interaction activity, economic contribution, and commercialization potential is calculated for each university and the scores of the universities in the first 50 are announced. For this study, a new parameter is defined as based on the above-mentioned index and student satisfaction, and then the score of parameter on Entrepreneur-Innovation and Preference Score (EIPS) is calculated.
Summation of scores belonging to each parameter gives total score for the related university to obtain its place in the ranking system of higher education system in Turkey (Equation 1). The evaluation was based on a total score of 1,000 and the score for each parameter is given below.

$$TPS = TIS + TSS + AQS + PES + PYS + EIPS \quad (1)$$

in which
TPS = Total Performance Score (1,000 points)
TIS = Teaching Income Score (100 points)
TSS = Teaching Structure Score (100 points)
AQS = Academic Quality Score (200 points)
PES = Publication Efficiency Score (250 points)
PYS = Project Yield Score (250 points)
EIPS = Entrepreneur-Innovation and Preference Score (100 points)

In addition to this, the technique also ranks state universities for each parameter (Tosun, 2015). The technique provides data for well-balanced and justice decision for universities in Turkey. It has been developed for only the state universities throughout country.

Discussions
The expansion of the higher education in Turkey has been remarkable between 2002 and 2018. As of the end of 2019, there are 209 universities in the country in total. There are 131 state universities (including 11 technical universities, 2 universities of Fine Arts and 1 Institute of high technology, as well as the Police Academy and the University of National Defense) and 78 foundation universities. Apart from universities, there are 5 vocational schools. Rapid development in this direction has led to problems in the higher education system in terms of qualifications. All universities across the country (including the foundation) must undergo a serious performance assessment every year, universities must be ranked and declared. This, in turn, will only be possible with a software suitable for the country. Because Turkey has its own conditions. A significant part of the budgets of public universities come from the Central Government Budget, it is not clear what the foundation universities spend for academic activities and researches directly and indirectly, and the reliability of known data is also questioned. All information in the higher education system must be safe and reliable. These principles should be contained in the reformed form of higher education legislation.
Currently, the number of students in the higher education system in thecountry has reached 8.0 million. In fact, this definition is incomplete. the number of students in the university system will decrease a lot, when 2-yearsprograms of vocational high schools are excluded from the system, and the system will relax and the possibility of evaluation on a more realistic basis will arise. A university with a school in each district in the province, in which it is located, cannot compete in a competitive environment with a university that does not have a 2-year program located in metropolitan areas. Therefore, the software utilized for performance evaluation should have the capability to respond to such changes in the system.
Today, there are no incentive measures for universities to provide high performance. The software that measures performance of higher education system throughout the country should provide significant clues in determining the state budget of the universities and provide a financial model with the country's higher education system. Of course, legal regulations are necessary to realize these items for higher education system in Turkey.
Restrictions should be placed on the transfer of public property to foundation universities. We have to be fair in creating a competitive approach. Otherwise, the deficiencies that still exist in the system increase and a skewed development is achieved. The situation of Istanbul şehir University, which is being discussed today, is a very good example to explain this flaw. The software must have the ability to estimate university properties at current value and their value added.

Conclusions
Currently the higher education institutes in Turkey are far from being homogeneous and productive. Most of them only have a functionality on education of young people, not on scientific research. Universities should have an institutional characteristic that illuminates the environment and influences social life rather than being classical

institutions that provide normal education and carry out public affairs. Therefore, the performance of all higher education institutions in Turkey should be measured, their allowances should be given depending on their performance, and they should be transformed into institutions that are more effective in the production and transfer of information. For this, the method suggested above can be used effectively.

In Turkey, there is a board that evaluates the performance of universities within the higher education system. This board tries to do its duty in good faith by staying within the existing system. However, radical transformation should be achieved in the higher education system. The performance of universities should be determined every year using the method suggested above and state appropriations should be allocated according to the performance of universities. For example, universities should receive one-third of their total budget from local authorities. Universities should receive these fees each year in return for projects to be prepared in specific subjects, such as earthquake, flood, urbanization, social tissue treatment, mental health rehabilitation, water, land and mines, as well as for the effective use of local natural resources. It is clear that the issues mentioned above can be checked by a well-defined system on performance evaluation for the higher education system.

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