

## Chapter 20

# Ranking Turkish Universities Based on Performance Evaluation via DEMATEL–AHP Approach

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### ABSTRACT

*Universities are indispensable and crucial part of academic life and education system. They grant academic degree in a variety of subjects and provide undergraduate, graduate and postgraduate educations. They carry institutional memory based on experience and knowledge developed by many years. They are the centers of scientific world. In addition, they are one of the important decision point in the human life to shape their future life. In the light of this mission, they are in continuous changing process to provide high level of standards, in science and technology, and better environment for education of students. Therefore ranking of universities have gained a considerable importance among academia, students, parents and industry. There are so many web sites that are publishing the results of their independent evaluations based on different objective and subjective criteria. The aim of this chapter is to provide a background to improve criteria using in ranking methodologies with the help of integrated DEMATEL-AHP methodology by taking into account ranking of Turkish Universities.*

### INTRODUCTION

Universities are not only the crucial part of academic life or education system but also the crucial part of scientific research and innovation. Moreover, selecting the appropriate university is one of the important decisions for students and their parents to shape their future life. They grant undergraduate, graduate and postgraduate degrees in a variety of subjects and provide the appropriate environment to conduct scientific researches. Besides, these indispensable roles, they are in continuous changing process to provide a high level of standards in science and technology. There have been dramatic changes in the nature of higher

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education since 2000. Participation rates are higher than ever and this brings much greater diversity and mobility in the student population and competition between the universities (Biggs & Tang, 2011, p. 3). One of the important reason of this is the globalization and it is the key of the 21<sup>st</sup> century. Globalization can be defined as the reality shaped by an increasingly integrated world economy, new information, transportation and communication technologies, and the emergence of an international knowledge network (Larrinaga & Amurrio, 2015, p. 159). So that universities and governments are implementing the variety of policies and programs to respond to globalization (Altbach, et.al., 2009, p. 4). In the light of increasingly growing interest in diversity and mobility in the student population and competition between universities, university ranking has gained a considerable importance for stakeholders such as academia, students, parents, government, industry, and business (Ismail, 2008, p. 1).

There are so many websites that are publishing the results of their independent evaluations of universities based on different criteria; the learning environment, citation, number of publications, industry income and innovations, research volume and income, reputation, staff, student, and quality and number of academic staff (Times Higher Education, 2015). Generally, institutions and/or universities provide and sign off their institutional data/information for use in these rankings. Different methodologies and statistical techniques are used to conduct these studies. Determining, weighting and updating of criteria are crucial to conducting an objective comparison between universities, depending upon the weighting of the criteria, results can be significantly changed. Based on the results of these studies, universities can determine new goals and even can change their missions to be the best in the innovation race.

Multiple criteria decision analysis (MCDA) approaches are widely used to determine the weights and types of criteria for so many problems such as staff acquisition, project selection, performance evaluation, criteria prioritization etc. DEMATEL (*Decision making trial and evaluation of laboratory*) is one of the important technique that can be used to improve the criteria using for evaluation of the performance of the universities (Aksakal & Dağdeviren, 2010, pp. 905-913). DEMATEL can effectively solve the issues of complexity and dependency among criteria. It has been widely applied in the market strategies, R&D projects, e-learning evaluations, management systems, control systems, and flight safety (Shih, Lin, Wang & Hung, 2013). Graf theory based DEMATEL, by splitting factors depending on the cause and effect into groups, provide us better understanding regarding casual relations between criteria and ease solutions of problems (Li & Tzeng, 2009, pp. 9891-9898).

DEMATEL is the method which is not only searching for direct relationships of criteria but also reveal the indirect relationships between them. Taking into account all direct and indirect relations among criteria, hidden heroes can be determined from the pool of criteria (Atmaca, 2011, pp. 111-120). If the criteria have got intricate relations, especially subjective ones, DEMATEL provides an opportunity to the decision makers to determine main criteria to effect evaluation and to conduct an effective evaluation based on *well*-defined criteria.

In a conventional perspective, DEMATEL methodology consists of five steps and solution can be reached by using graph produced at the end of five steps. The process involves surveys conducted on national, regional or global levels. By using five-level evaluation scale (0-4), relationships among criteria are being asked to experts or survey groups and direct relationship matrix is obtained. Delphi Technique and Brain Storming approaches can be used during the survey process, at the same time AHP (*Analytic Hierarchy Process*) or some other MCDA approaches can be used together with DEMATEL to improve the results of the weighting process.

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