Chapter 4

Evaluation of Faculties by DEA–ANP Hybrid Algorithm of Chapter: Educational–Research Performance

Elahe Shariatmadari Serkani
Islamic Azad University, Iran

ABSTRACT

One of the fundamental issues facing universities, research centers and institutes of higher education is the absence of an integrated system for performance evaluation. Data Envelopment Analysis (DEA) is a mathematical and management technique for evaluation of Decision Making Units (DMUs) with multiple input and output. The original DEA does not perform full-ranking; instead, it merely provides classification into two groups: efficient and inefficient. Among the available multi-attribute decision-making methods only Analytic Network Process (ANP) can be used to evaluate performance systematically due to the dependencies and feedbacks caused by the mutual effects of the criteria. The DEA-ANP hybrid algorithm, is designed to eliminate the disadvantage of full-ranking in the DEA method, as well as the disadvantage of subjective evaluation in the ANP method. The goal of this chapter is measuring educational and research performance of seventeen faculties, for the academic year 2009-2010, by using the DEA-ANP hybrid algorithm.

DOI: 10.4018/978-1-5225-0596-9.ch004
INTRODUCTION

Evaluating the performance of educational and Research groups is a part of the difficult process of resource allocation at universities. Primary duties and mission of universities is the development and transfer of knowledge that the first one is obtained through research and the second one through education (Kao, Hung, 2008).

The issue of decision making units (DMUs) performance evaluation attracts the manager’s attention initially. Measurement and performance evaluation of the processes helps in achieving the objectives of each process and together determine the organization’s objectives. Hence the more efficient DMUs can help scientific & economic growth in society, bad performance can have big cultural, social and economic crisis.

Efficiency means not wasting resources and measurement of efficiency has been of great attention of researchers because of its importance in evaluating the performance of a company or organization and requires the output & input comparison of a DMU. In the simplest case which there is only one input and one output, efficiency can be achieved by dividing the output into input. The efficiency is often confused with effectiveness and productivity & until the end of the nineteenth century, the words efficiency & effectiveness were almost as synonymous terms.

Effectiveness is indicative of the amount of “doing right things”. Effectiveness refers to the using method of resources to achieve the specified goals. Productivity is a mix of effectiveness and efficiency, because the effectiveness with the performance & efficiency is associated with the use of resources.

DEA method has a public deficit that it is just mathematical & therefore there is no ability to incorporate qualitative, subjective and intuitive indicators in it. Some of the multi criteria Decision-making techniques such as ANP can eliminate this contradiction with its special features. Many decide issues can’t have a hierarchical structure, because of interdependencies or feedback system, preferably ANP method is used. Priorities derived from ANP algorithm based on DEA is two-stage approach. In first stage, paired comparison of DMUs, regardless of other DMUs is done based on data envelopment & paired comparison matrix is formed at this stage. Then in the second stage, the results of the first phase are entered in ANP model to full ranking.

BACKGROUND

The issue of performance evaluation and efficiency assessment of universities that have multiple inputs and outputs, in the past few decades has attracted many
Using Call Detail Records of Mobile Network Operators for Transportation Studies
www.igi-global.com/chapter/using-call-detail-records-of-mobile-network-operators-for-transportation-studies/197145?camid=4v1a

Prediction Length of Stay with Neural Network Trained by Particle Swarm Optimization
www.igi-global.com/article/prediction-length-of-stay-with-neural-network-trained-by-particle-swarm-optimization/204446?camid=4v1a