Chapter 8
Performance Evaluation of Suppliers with Undesirable Outputs Using DEA

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ABSTRACT

Performance evaluation and selection and ranking of suppliers is very important due to the competitiveness of companies in the present age. The nature of this kind of decision is usually complex and lacks clear structure and many qualitative and quantitative performance criteria such as quality, price, flexibility, and delivery times must be considered to determine the most suitable supplier. Given that in the supplier evaluation may offer undesirable outputs and random limitations, providing a model for evaluating the performance of suppliers is of utmost importance. With regard to the issue of multi-criteria selection of suppliers, one of the most efficient models to choose suppliers is DEA. In this paper to measure the strong performance and development of undesirable output and random limitations concept the SBM model is used.

DOI: 10.4018/978-1-5225-0596-9.ch008


INTRODUCTION

Today, the performance measurement of organizational units and Evaluate the effectiveness has particular importance as an important part of the organizational process. The importance of this as far as many large organizations planning their own activities on this basis. Supply chain management evaluated supplier performance potential by multiple criteria instead of cost factors. In this context, methods and models been suggested to choose and evaluate. DEA traditional models such as: CCR and BCC measure the only weak radial performance and are not able to measure strong performance. To resolve this deficiency and strong performance measurements SBM model was used in this article. Also in this article with concept of random limitations SBM model developed for the consideration of undesirable outputs. This method (DEA) which use multiple input and output to select the best single decision, first time was used In 1976, Carnegie university and in 1978 in an article entitled “Measuring the efficiency of decision making units” were presented.

The Concept of DEA

Data envelopment analysis shows a concept of calculating the levels of efficiency within an organization that the performance of each unit is calculated in comparison with the highest performance. Data envelopment analysis is a mathematical model to the observed data that provide the new method for estimating the efficiency frontier Such as the production function that is basis of modern economic (Charnes, 1978).

DEA is a mathematical programming method to evaluate the decision making units. The purpose of the DMU is an organizational unit or a separate organization that managed by a person called director or chief on the condition that the organization or organizational unit has a systematic process. The system consists of production systems and services or the profit and nonprofit or governmental and non-governmental (Cooper, 2004).

SBM Model

Since the introduction of the DEA in 1978 by Charnes and others, application and study about it quickly spread and by 1996 more than 1000 article about it was published. CCR model uses fractional Planning model that are multiple input and output ratio in others DMUs in order to calculate the relative efficiency of decision making units. A decision-making unit in CCR model is effective when the optimum value of the objective function has value one. In 2001 Tone, in order to solve the problems of the CCR, and robust performance measurement, SBM model to be introduced below.
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