

Effective Supplier Selection Using ANP

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Abstract

A supplier provides monetary benefits as well as non-monetary benefits for the organization, especially to maintain company reputation and customer satisfaction. Therefore, an effective supplier network is an important key success factor of the organization. There are many common drawbacks in the existing supplier selection processes which hinder the selection of effective supplier/suppliers. Therefore, the objective of this research is to develop a model and a mechanism to overcome these common drawbacks while predicting the validity of the model across a few industries. With the scope of this paper, supplier selection was considered as a multi-criteria decision making problem (MCDM) because supplier selection is the evaluation of trade-offs between multiple criteria. Analytic Network Process (ANP) which is a technique to solve MCDM problems in which the criteria affect each other and have nonlinear correlation, is used here to prioritize criteria and alternatives. Therefore, this model is flexible for selecting suppliers for any product/service across any organization, sector, and industry. The significance of the proposed model is its Flexibility across any industry with limitations and supports multiple criteria with any number of alternatives.

Keywords: General supplier selection model, Supplier selection process, ANP

1. Introduction

At present, with globalization, intensive competition is developed within the market. If any organization needs to survive in this competitive market, they should possess a competitive advantage over other companies. Effective supplier selection process/ effective suppliers are a major determinant of the degree of competitive advantage within an organization. Because at the basic level, enterprise competitiveness is characterized by the high quality and the low cost of the product/service provided by that organization and it depends on the quality and cost of products/services provided by suppliers. An effective supplier can be stated as an asset for the organization that provides monetary benefits as well as non-monetary benefits for the organization, especially to maintain company reputation and customer satisfaction. Therefore, an effective supplier network is an important key success factor of the organization.

There are several common drawbacks can be identified in the existing supplier selection processes which hinder the selection of effective supplier/suppliers. Not having a well-established systematic procedure for supplier selection process across any industry can be stated as the major drawback of the existing supplier selection process. Therefore, issues like subjective decisions, difficulties in quantifying qualitative criteria, and conflicts in group decision-making can arise. It is also a disadvantage from suppliers' perspective as a supplier cannot systematically align their processes because requirements and expectations differ from organization to organization. Not having a standardized set of criteria and sub-criteria and a systematic way to prioritize them can be stated as another significant drawback of the existing supplier selection processes.

In the past literature, most of the proposed models for supplier selection environmental, social & quality system factors are lesser considered. The scope of the selection criteria is limited to commercial and technical criteria and focuses on a case study of a particular organization and industry. There is no significant general supplier selection model across any organization, industry, or cooperate sector which can be subjected to continuous development with knowledge of industry experts and academia.

With the scope of this paper, supplier selection was considered as a multi-criteria decision-making problem (MCDM) because supplier selection is the evaluation of tradeoffs between inconsistent, contradictory, and competing criteria with each other. Analytic network process (ANP) is a technique to solve MCDM problems in which the criteria affect each other and have a nonlinear correlation. In this study, the goal is to use ANP to rank suppliers because it has the