

## **Study of Vendors Selection Methods for Efficient Supply Chain Management**

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**Abstract :** *The ambition of the customers has raised suddenly, by getting newer variety products regularly, which has changed the market dynamics drastically. Experts, dealing with the related issues are looking for new solutions to new challenges. Incorporating flexibility in Supply Chain Management has become indispensable for any production system today, which has to highly influenced by the suppliers. Obviously, the supplier selection method has to be dynamic, to respond the variation in organization's requirement, supplier's capacity, quality, lead time, unit cost and transportation cost varying with time. Also, the supplier may not be repeated next time, even for the same set of items. Several theories have been proposed for this critical process, which include various quantitative/qualitative methods and models. Several other issues considering, supplier relationship choice, supplier evaluation and selection taking firm's requirements into account, long-term vendor selection, and negotiating and evaluating suppliers etc also has been undertaken. This paper reviews various aspects of these supplier selection methods.*

**Keywords :** Vendor Selection, Quantitative, Qualitative, Mathematical Programming

### I. INTRODUCTION

Optimizing the business operations, can not be a matter of one's choice in today's competitive environment. Moreover, meeting out the increasing and fluctuating customer's demand within due time has also become another challenge in today's continuously changing environment. Out of various factors desired for the steady and smooth business, the role of supply chain is very important, due to which a good chain of supply or supplier needs to be ensured. Hence, the selection of good suppliers becomes a key parameter to ensure success of any business organization which also helps in making the organization competitive. Any organization concerned in this direction would be following the procedure of vendor selection which is actually identifying, evaluating, and contracting with suppliers.

### II. VENDOR SELECTION METHODS

A good number of literature is available on supplier selection problems [1,2,3,4&5]. Most of the methodologies proposed for the supplier selection problem, discusses about the cases of TSSP [Traditional Supplier Selection Problem], in which the suppliers are given certain relative ranking and the supplier with top ranking is supposed to be same throughout the phase unless ranked or assessed again.

Also the problems of supplier selection have been dealt by broadly placing the problems into two categories of Quantitative and Qualitative models.

### III. QUANTITATIVE METHODS

Quantitative methods use several Mathematical programming techniques for the vendor selection as well as order quantity

decisions simultaneously. These mathematical programming models are intended to minimize or maximize some objective function, subject to both vendor and buyer constraints and ultimately selecting several vendors in order.

Various quantitative models used are linear programming (LP), mixed-integer linear program (MILP), mixed-integer non-linear (MINLP), fuzzy goal programming, data envelopment analysis (DEA), dynamic programming and multi-objective programming etc [7]. In some of the work, researches have also applied meta-heuristic such as genetic algorithm (GA) [8-10]. In one another variation the vendor selection problem has been also formulated applying quality, delivery, and capacity constraints involving price-break regimes [11].

### IV. QUALITATIVE MODELS

There are many qualitative models such as AHP [13 14], Fuzzy-AHP and weighted point method, matrix approach, vendor performance matrix approach, vendor profile analysis, Analytical Network Process, TOPSIS and Fuzzy-TOPSIS have been proposed by various researchers in the past to solve TSSP.

One another model was developed for TSSP applying AHP and quality management system principles. For enhancing the performance of the vendor selection in comparison to the traditional approaches one case based reasoning approach has also been applied for the efficient supplier selection. Analytical Hierarchy Process (AHP), is one of the most used qualitative technique for supplier selection. It was developed by Saaty in 1970 for handling with qualitative factors, is used in multi-criteria decision making problem. Based on the

analysis some ranking of the supplier is prepared. By analyzing these ranking the position can be interpreted, in terms of being the most-preferred, least preferred or absolutely preferred suppliers while implementing this flexible supplier selection model. Under the condition of competitive pressures, organizations resorted to restructuring of the operations by focusing more on their core activities which are strategically important and other peripheral operations were outsourced.

According to an estimate made by Accenture, a majority of these companies are spending about half of their total budget on outsourcing. Also, the practice of outsourcing is further expanding and exploring new prospects. As a common perception, conventionally outsourcing used to be involving non-core activities only with the basic purpose of reducing costs and concentrating on their core competency. But as per the emerging trend and practices outsourcing is accessing to almost every domain of business, be it engineering, research & development, product development or even marketing. Making vendor selection considering both tangible and intangible factors has been also devised by integration of qualitative methods and linear programming.

#### V. CONCLUSION

Adopting some scientific practice for proper vendor selection has become an essential condition for ensuring successful supply chain in the organization, which helps the firms in achieving their goal comfortably. Also the supplier selection helps in dealing with market uncertainties, along with reducing the risks associated with the performance. Through various Qualitative as well as Quantitative methods we follow a structured approach in modeling the decision making problem of vendor selection, which simplifies the complexity of the situation and suggests some solution in that situation. The models proposed have been found applicable successfully in various situations, which makes us now capable of dealing with the complex problems of vendor selection based on certain criteria and now decision makers may be facilitated in selecting the best suited supplier among the numerous suppliers.

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