ABSTRACT

The complexity of managing an international operating environment has changed significantly over the last few years. The increasing presence of multinational corporations in emerging markets has not only increased the advantages of developing global economies of scale, but it has also identified a need for the further coordination and assimilation of company activities into the local market of operation. The outsourcing activities have become an important strategic decision because of the globalization and hence, effective vendor selection process has become prime concern and paramount important to the success of any manufacturing organization. Vendor selection is a multi-person and multi-criterion problem which includes both qualitative and quantitative factors (criteria). A trade-off between these tangible and intangible factors is essential in selection the best vendor. A number of models and technique have been developed to deal with the evaluation and selection of vendors.

The research in this thesis is focused on analysis of vendor selection systems using Graph Theoretical Methodology. Matrix and Distance Based Approximation (DBA) methodologies are developed and used for evaluation, selection and ranking of potentially suitable vendors. Eight criteria and fifty six sub-criteria for vendor selection have been identified after extensive study of literature and establishing the relevance of vendor selection in business development. The structural modelling and analysis has been achieved and found useful for visual analysis and structural comparison of the vendor selection systems. Multi-criteria decision models for evaluation, selection and ranking of vendors have been developed using matrix and DBA methodologies. These models were tested for vendor selection in automobile industries in India by collecting data through well designed questionnaires from their employees well conversant with the selection process. The results are consistent and the methodologies are found significantly effective in decision making. The results show that the models are able to assist decision makers to examine the strengths and weaknesses of vendors by comparing them with appropriate criteria and sub-criteria. Furthermore, the systematic effect of this process reduces the time taken to select a vendor. Interactive and user friendly knowledge based software has been developed for implementation of these models. Through an illustration of the proposed model using knowledge based software, it is found that the vendor selection problems can be solved in a structural and timely manner.