Abstract

In the recent years, many buying firms have reduced their supply base or have chosen single sourcing due to the pressure of cost reduction and development of various management theories such as JIT, lean, etc. However, this has exposed them to supply disruption risks. Several strategies have been discussed in the literature to mitigate supply disruption risks and among them; multiple sourcing has been suggested as one of the efficient strategies for evading the risks of supply disruption. But, it increases management cost which includes cost of negotiation, managing a supplier contract, and monitoring the quality etc. Therefore, the task before a buying firm is to determine the optimal number of suppliers by making a tradeoff between supplier management cost and cost due to the supply disruption. After determining the optimal number of suppliers, the next issue is the optimal demand allocation among the selected suppliers. The motivation of the current research emanates from these issues. In this thesis, various analytical models are developed to study sourcing decisions problem under supply disruption risks in depth.

Apart from the development of above analytical models, this thesis also addresses another important issue, the measurement of supplier satisfaction in buyer-suppliers relationships. In today's competitive business environment, it is equally important for the buying firms to retain the selected suppliers in their supply base. To maintain a long-lasting business relationship, both parties should be equally satisfied with each other's performance. Therefore, supplier performance evaluation alone is not sufficient and the buyer has also to satisfy the needs of the supplier. Very few studies are available on supplier satisfaction measurement. This has motivated us to take up this important issue also as a part of this research work. In this thesis, a scale and method are developed to supplier satisfaction and to delve the relationships of various factors with supplier satisfaction.

To solve the analytical models, different heuristics have been proposed and further different tools/techniques are used including genetic algorithm (GA) for specific problem.

For supplier satisfaction work, analytical hierarchy process (AHP), partial least square (PLS) and structural equation modeling (SEM) techniques are employed.

Keywords: Supply chain, sourcing decisions, supply disruption risks, supplier selection, demand allocation, quantity discount, supplier satisfaction, heuristic, genetic algorithm, analytical hierarchy process, partial least square, structural equation modeling.