Supplier Selection and Order Allocation

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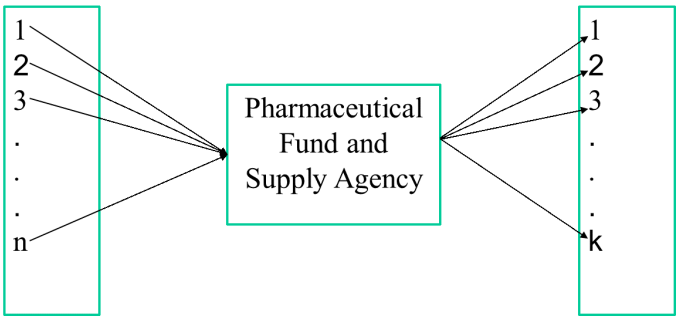
Existing models supporting the supplier selection and order allocation problem generally assume that the weight of criterion used in the multi-criteria decision making model is constant. However, weight of criterion should vary in accordance with the value or importance of the product considered, this is particularly important in the healthcare industry where the criticality of pharmaceuticals should be considered in the supplier selection decision making process.

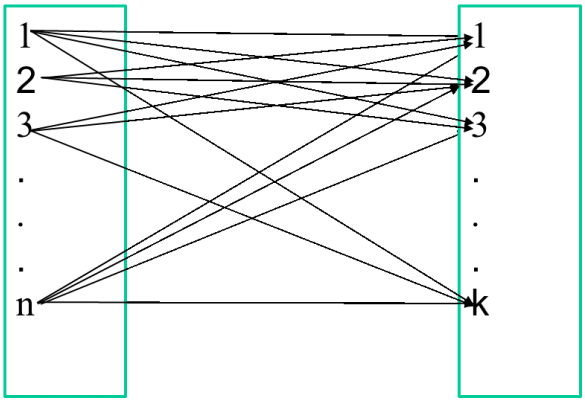
Moreover, there are very few models which consider the integrated problem of supplier selection and order allocation under volume discount and transportation cost with the consideration of variable weight for criterion. Hence, this research aims at developing a mathematical model which can be used as a decision aid by health care supply chain managers in solving the supplier selection and order allocation problem. Multiple suppliers with capacity constraints and business volume discount offers are considered in this supplier selection and order allocation problem.

The objective is to determine the right supplier(s) and the right amount that should be procured from each supplier that minimizes the total cost of the supply chain (ordering, inventory holding, and transportation costs) while meeting the budget, service level, lead time and space constraints.

To this end, first a mathematical model that enables the decision maker to evaluate and rank suppliers based on multiple criteria will be developed. Then a second model that uses the output of the first model as an input will answer the question of how much of each pharmaceutical product should be procured in a given planning horizon, and from which supplier should the health care facility get its products. Once the model is developed, PICO Xpress optimization suit will be used to solve the mathematical problem and analyze scenario analysis. In the scenario analysis, two different purchasing setups which are called centralized and decentralized purchasing systems will be considered to investigate the impact of including transportation cost under both systems in the supplier selection decision.



Decentralized Purchasing System



Centralized Purchasing System

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