

A Multi-attribute NSS for Purchasing Negotiation

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The study aims to implement an integrated multi-attribute negotiation support system (NSS) for purchasing. Through its design process, the system can help firms to make efficient and effective decisions for negotiation.

Purchasing is the largest single dollar control area with which most management firms must deal with, and is a key activity affecting firms' profits. How to handle purchasing effectively has attracted much attention in the past. Many tools and processes have been proposed to improve its efficiency and effectiveness. Here we introduce a multi-attribute NSS to assist negotiations in the purchasing process and to demonstrate how the benefits in time and dollars savings could be obtained.

Following the task of vendor selection, vendors can be ranked by buyers' preferences. Then the negotiation between both parties will be initialized one by one based on the ranking of vendors. Since many considerations are usually conflict, multi-attribute utility functions (MAUFs) come in to incorporate these considerations in term of multiple attributes. In general, price, quantity, due date, delivery or transportation vehicles, and trade credits conditions are the most important attributes in negotiation. The discrete and continuous types of values are combined into the MAUFs for comparison and adjustment, and hopefully able to come to an agreement for the vendor ranking first. If the agreement cannot be reached, the negotiation with the vendor of second rank will continue, and so on. The process will stop

when either an agreement with any listed vendor is reached or no agreement has been reached.

In addition, the attitudes toward risk for vendors and buyers are usually different, i.e., risk averse, risk neutral, and risk seeking, when he/she deals with different money spent or resources consumed. To fit the true preferences of vendors and buyers in a real-world environment, many complex utility functions have been established in the NSS. Thus, the system is able to simulate decision-making under risk and under pressure.

Following the negotiation phases step by step, the system is implemented on Windows-based networked PCs, programmed by ASP.NET and is supported by an SQL database. The system is easily constructed based on a common platform. In addition, the system is classified as a one-to-one negotiation, and is originally designed for buyers.

In the prototype system, both the buyers and vendors are seeking the maximum value on the web. However, they, especially the vendors, are willing to make concessions to win the contract. All representations are shown in values by various MAUFs. Furthermore, to avoid too lengthy a negotiation, an imbedded function for restricting time and the number of offers is also installed. In the final part, as a proof of concept, the system has been implemented by a Taiwanese electronic firm for purchasing activities.

Keywords: Negotiation; Purchasing; Multi-attribute utility function; Negotiation support system, risk.

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