Simulating the Supply Chain with Various Alliances by Two-Step Fuzzy Game

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ABSTRACT

Many models of supply chain management (SCM) are popularly developing in recent years. However, this study focuses on the supply chain (SC) performance with respect to various alliances among partners instead of model development. First, this study explores the game theory for formulating the SCM problem as a multi-objective programming problem. Second, various alliances among partners will be considered in such a problem so as to simulate the SC performance. Third, a numerical example will be illustrated. Including two different material supplier partners, three different manufacturing partners, two different logistics partners and three different vendors. Each partner in the SC has its own objective functions and constraints. This SC problem is resolved across six different time periods. Study results show that the fuzzy multi-objective approach can easily provide a satisfied solution at an acceptable achievement level of desired goals. Therefore, this study is valuable when designing a large-scale SC for practical use. Thus, this study provides the theoretical validation.

Keywords : supply chain (SC), fuzzy theory, multi-objective, and game theory

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