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An enhanced reverse auction framework for relief procurement management

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Abstract

An enhanced reverse auction framework is developed for procuring excess required relief items for humanitarian organizations at post-disaster. Given the input data tainted with epistemic uncertainty, two novel possibilistic models are developed to support the bidders and the auctioneer who is a coordinating platform (CP), regarding the bid construction and bid evaluation, respectively. First, using the bid construction model, competing suppliers determine their suggestions regarding the unit prices, quantities, and delivery times of relief items as well as the most appropriate transportation modes. Afterwards, the CP runs the bid evaluation model to assess the submitted bids by which the best portfolio of suppliers and their allocated orders are determined. An illustrative numerical example inspired by a real practice is provided to demonstrate the applicability of the proposed decision models. Several sensitivity analyses are also conducted on key parameters from which useful managerial insights are drawn.

Keywords: Humanitarian logistics, Post-disaster procurement, Reverse auction, Possibilistic programming.

1. Introduction

In recent years, the humanitarian logistics has attracted the attention of many researchers and practitioners because of the necessity for delivering effective and efficient disaster relief operations.

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