An Integrated inventory and routing for the single-period problems with deterministic demand

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Abstract

This paper considers the problem of managing inventory and routing problems in a two-stage supply chain system under a Vendor Managed Inventory (VMI) policy. VMI is an inventory management policy in which the supplier assumes the responsibility of maintaining the inventory at the customers while ensuring that they will not run out of stock. The delivery times to the customers are no longer agreed in response to customers' orders; instead the supplier indicates when each delivery takes place. Under the VMI policy, the planning is proactive as it is based on the available information rather than reactive to retailers' orders. Thus, in this research, we assumed that the demand at each customer is stationary and the warehouse is implementing a VMI. The objective of this research is to minimize the inventory and the transportation costs of the customers for a two-stage supply chain system. The problem is to identify the delivery quantities, delivery times and routes to the customers for the single-period deterministic inventory routing problem (SP-DIRP) system. As a result, a linear mixed-integer program is established for the solutions of the SP-DIRP problem. Some sample tests have indicated that the integrated approach for the SP-DIRP problem provides good result.

Keywords
single-period, deterministic model, inventory routing problem, vendor managed inventory

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Biography

Mohd Kamarul Irwan Abdul Rahim holds a Bachelor degree in Science Remote Sensing and a Master degree in Management (Technology) from Universiti Teknologi Malaysia (UTM), Malaysia, in 2005 and 2007, respectively. Then, he obtained his PhD in Industrial Engineering and Operations Research from Ghent University, Belgium in 2015. His PhD was funded by the Malaysian Ministry of Education (MOE) and Universiti Utara Malaysia (UUM). During PhD, he is doing his research on the inventory routing problems at Department of Industrial Management, Ghent University. His professional expertise covers vendor managed inventory (VMI), supply chain optimization, inventory routing problem (IRP), vehicle routing, mathemathical modelling and programming, heuristics and metaheurisrics, remote sensing, as well as geographic information system (GIS). He is currently working as a Senior Lecturer in Operations Management at School of Technology Management and Logistics (STML), College of Business, Universiti Utara Malaysia (UUM).