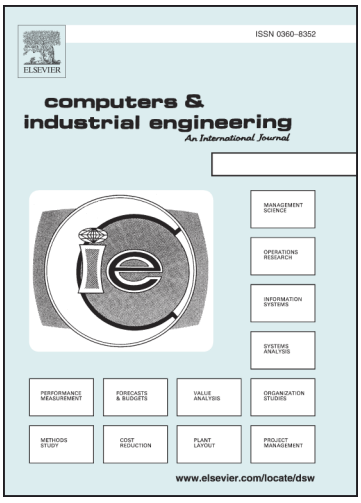

Optimizing the new coordinated replenishment and delivery model considering quantity discount and resource constraints

Rui Liu, Yu-Rong Zeng, Hui Qu, Lin Wang

PII: S0360-8352(17)30580-6
DOI: https://doi.org/10.1016/j.cie.2017.12.014
Reference: CAIE 5018

To appear in: *Computers & Industrial Engineering*

Received Date: 16 July 2015
Revised Date: 14 November 2016
Accepted Date: 11 December 2017

Please cite this article as: Liu, R., Zeng, Y-R., Qu, H., Wang, L., Optimizing the new coordinated replenishment and delivery model considering quantity discount and resource constraints, *Computers & Industrial Engineering* (2017), doi: https://doi.org/10.1016/j.cie.2017.12.014

Optimizing the new coordinated replenishment and delivery model considering quantity discount and resource constraints

Rui Liu [a], Yu-Rong Zeng [b], Hui Qu[c], Lin Wang [a*]

[a] School of Management, Huazhong University of Science and Technology, Wuhan 430074, China;
[b] School of Information Engineering, Hubei University of Economics, Wuhan, 430205, China.
[c]School of Economics and Management, Hubei University of Technology, Wuhan 430068, China

Abstract: Under a global purchasing environment, more and more companies have realized that considerable cost savings can be achieved through a coordinated replenishment and delivery (CRD) strategy. A new and practical CRD model with quantity discount (D-CRD) and its extension with constraints (CD-CRD) are proposed. Several important properties of the proposed D-CRD and CD-CRD policies are presented. A heuristic based on these properties and a hybrid Tabu search algorithm are designed to obtain satisfactory solutions for D-CRD and CD-CRD. Computational results demonstrate the effectiveness and efficiency of the algorithms. Although D-CRD is more efficient than CRD, resource constraints significantly weaken the effects of quantity discount strategy, especially for large-scale problems. Moreover, constraints in the coordinated stage are more sensitive than constraints in the delivery stage.

Keywords: Coordinated replenishment; Delivery; Quantity discount; Resource Restrictions; Heuristic; Tabu search

*Corresponding author.
E-mail addresses: rliuhust316@gmail.com (Rui Liu), zyr@hbue.edu.cn (Yu-Rong Zeng), qhui733@gmail.com (Hui Qu), wanglin982@gmail.com (Lin Wang)