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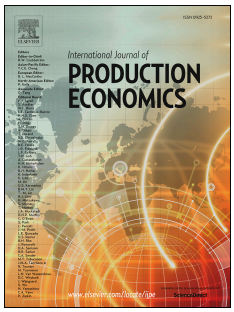

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Maryam Dehghani, Babak Abbasi

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An Age-based Lateral-transshipment Policy for Perishable Items

Maryam Dehghani, Babak Abbasi[1]

School of Business IT and Logistics, RMIT University, Melbourne, VIC 3001, Australia

Abstract

Lateral transshipment is an efficient policy designed to improve the performance of a supply chain. Despite the importance of transshipment for perishable items, few studies consider the issue of perishability. Currently, transshipment in some blood supply chains is based on the age profile of units in hospitals. However, decisions such as the age threshold are made empirically and are fixed for all hospitals. In this paper, we propose a new transshipment policy for perishable items based on the age of the oldest item in the system to improve supply-chain performance. The proposed model has applications for transshipping blood units between hospitals. We develop a heuristic solution using partial differential equations to compute performance measures and cost function. The results demonstrate that our transshipment policy is effective under various circumstances such as lost sale and backordering. We also compare the performance of the suggested transshipment policy to the transshipment policy that is currently practiced in some Australian hospitals (which is an aged based proactive transshipment policy with an empirically set threshold). The results demonstrate that by setting the optimal threshold, hospitals could transfuse units with the same average age of the current policy, while reducing their total inventory cost by approximately 61%.

keyword

Blood Supply Chain; Perishable Inventory; Lateral Transshipment.

[1] Corresponding author: babak.abbasi@rmit.edu.au