

Reverse Logistics Network Design for an E-Commerce Firm

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Abstract

The present work is an attempt to design a reverse logistics (RL) network for an e-commerce firm based on one of the most frequently returned items namely fashion goods. The problem essentially revolves around the trade-off between cost and responsiveness in designing an RL network for an e-commerce firm. If returns are sent back to the vendors through faster mode of communication in frequent interval for improving responsiveness, the cost of transportation becomes prohibitively high although inventory carrying cost diminishes. On the contrary, if the returns are sent to the vendors in batch mode, cost of transportation would decrease due to economies of scale achieved in transportation. However, this would result in higher inventory carrying cost. We have considered several big residential complexes within a large metropolitan city in India and treated the same as customer indexes from which the returns originate. Several candidate nodes have been identified as initial collection centres (ICCs) in which the returns from the customer indexes are initially collected and stored for some time before being sent to the final warehouses. There are three warehouses in three different cities. We have ensured that one customer index would be assigned to only one ICC. The decision variables of the above problem include the selection of ICCs, the assignment of the customer indexes to the ICCs and finally the volume of returns to be shipped from the ICCs to all three warehouses. We have formulated the above problem as a mixed integer linear programming (MILP) problem with a view to minimizing the total cost of the network. We have carried out sensitivity analyses on the relevant parameters and provided rich managerial insights.

Keywords: Reverse Logistics, E-Commerce firm, Cost-Responsiveness trade-off, Mixed Integer Linear Programming.

Biographies

Debadyuti Das is a Professor at Faculty of Management Studies, University of Delhi. He holds a Ph.D. in Industrial Management from IIT BHU, Masters in Industrial Engineering & Management from ISM, Dhanbad and Bachelors in Textile Technology from Calcutta University. His areas of specialization include Production & Operations

Management, Supply Chain Management etc. His research papers have appeared in various journals of repute including International Journal of Production Research, International Journal of Project Management, Journal of Cleaner Production, International Journal of Services & Operations Management, International Journal of Logistics Systems & Management, International Journal of Tourism Policy, IIMB Management Review, Journal of Services Research etc. His current research interests include sustainable supply chain management, issues in reverse logistics in both traditional and e-commerce firms, carbon footprints in supply chain, environmental and supply chain issues in development projects, optimization of power procurement etc. He is a member of POMS, USA and SOM, India.

Manish Kumar Rajak, an MBA from Faculty of Management Studies, University of Delhi, is currently working as Manager at ShopClues, Gurugram, India. ShopClues is an online marketplace owned by Clues Network Pvt. Ltd. Mr. Manish is leading and managing a large team of professionals for improving merchant experience in ShopClues. He is responsible for maximizing merchant operational performance by providing technical advice and resolving problems within SLA. He is also responsible for improving merchant service quality results by studying, evaluating and re-designing processes; establishing service metrics; monitoring and analyzing results and finally implementing changes.

Rahul Kumar is currently pursuing his Ph.D. from Faculty of Management Studies, University of Delhi. Earlier he completed his M.Sc. and M. Phil in Operational Research from the Department of Operational Research, Faculty of Mathematical Sciences, University of Delhi. He has published research papers in several journals of repute. He has also presented papers in a number of conferences including the annual international conference of the Society of Operations Management (SOM), India.