

Collaborative Model for Inventory Routing in City Logistics

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The Inventory Routing Problem (IRP) provides integrated logistics solutions by optimizing inventory management and vehicle routing decisions simultaneously. Currently, only a few studies consider the integration of inventory and routing decisions along with collaboration aspects in a city logistics context. Therefore, we investigate the impact of integrated inventory routing decisions and collaborative mechanisms in a city logistics context. We consider three scenarios with increasing level of collaboration. For each scenario, a mathematical model is presented, together with first experimental results. The first scenario is a basic IRP model with multiple suppliers. In this scenario, each customer defines its replenishment policy and each supplier determines its optimal delivery plan independently. In the second scenario, customers determine their amount of orders and suppliers send their products to the customers via a city-hub. The city-hub determines the optimal delivery routes for the customers with a heterogeneous vehicle fleet making multiple trips. In the third scenario, the city-hub receives the products from the suppliers, defines the optimal delivery routes and decides on the quantity delivered to each customer at each period.