



Last-minute coordination: Adapting to demand to support last-mile operations

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Abstract

In the highly competitive e-commerce industry, customer-facing warehouses are crucial as the “order penetration points” for e-commerce last-mile operations. This research examines how warehouses use last-minute coordination, an unstructured mechanism, to ensure sufficient inventory at the order penetration points. Previous research has focused on structured mechanisms like contracts and inventory management systems to enhance warehouse performance. However, these mechanisms can be ineffective when faced with unforeseen local contingencies. To adjust inventory and adapt to changes in supply and/or demand, warehouses need to engage in unstructured, last-minute coordination with other warehouses. Using coordination and loose coupling theories, we find that coordinating with many warehouses (i.e., large coordination scope) reduces the operational efficiency of individual warehouses. At the network level, we find that a centralized coordination structure improves the operational efficiency of the entire network. We also show that demand uncertainty reinforces the existing last-minute coordination patterns, using the Separable Temporal Exponential Random Graph Model (ST-ERGM). This research highlights the importance of last-minute coordination and reveals its effects on both individual warehouses and the overall network.