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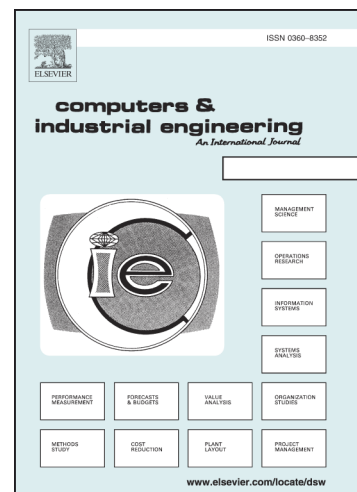
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A decision support system to investigate food losses in e-grocery deliveries

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Abstract

Delays and inefficiencies in last-mile distribution of e-groceries result in high costs and further contribute to food waste. This work focuses on optimizing inventory and delivery strategies. While in traditional brick-and-mortar operations customers select products based on quality and expiration date, in e-groceries, primarily the provider performs this selection, impacting both food waste and customer satisfaction. Shipping goods close to expiration reduces spoilage, however, customers mainly prefer products with a long-lasting shelf life. To support sustainable provision of food, this work develops a decision support system incorporating an agent-based simulation and dynamic routing procedures to investigate e-grocery inventory and delivery operations. Food quality functions for 48 produces are incorporated to model food decay. Based on test scenarios motivated by an e-grocery provider operating in Vienna, Austria, managerial implications are provided and discussed. Results highlight major trade-offs between minimizing travel distances and food waste as well as the high importance of the selected inventory strategy. Furthermore, insights on the impact of the number of operated stores and individual store utilization are given.

Keywords: Decision Support, Food Logistics, Simulation Optimization, Fresh Fruit Supply Chain, E-Grocery, Vehicle Routing

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