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The integration of order picking and delivery operations in a dynamic setting

E-commerce retailing allows customers to place orders from anywhere at any time. Fierce competition is taking place between retailers to deliver the customer orders as fast as possible. Before the delivery takes place, the orders have to be picked in the warehouse. In current operations, the order picking and order delivery processes are often planned individually, with a fixed cutoff time in between. However, optimizing both processes individually may lead to suboptimal solutions for the combined picking and delivery planning problem. By solving an integrated problem, the fixed cutoff time can be removed and better solutions may be obtained.

Results of previous research indicate that integrating decisions on order picking and delivery can indeed improve operational efficiency. Nevertheless, existing studies consider a static setting in which every order is known before the operations are started, while in practice new orders may arrive while order picking and delivery are already being executed.

In this work, we focus on optimizing order picking and order delivery operations in an integrated manner in such a dynamic setting. We propose a metaheuristic algorithm to solve the problem, with the main goal of investigating how decisions can best be integrated and under which circumstances this integration is most beneficial.