With the rising importance of e-commerce, companies try to compete by delivering as quickly as possible at the customer's home. After a customer places an order, the requested items first need to be picked in the warehouse. Once the order picking operations are finished, the goods need to be shipped to the customer's location. Nowadays, companies are often scheduling the order picking and delivery operations separately, leading to a fixed cut-off time between both scheduling problems. To shorten the delivery time, this cut-off time may be removed by integrating the problems of order picking and order delivery.

Previous research showed that solving the integrated planning problem can significantly improve operational efficiency. Only few studies exist on this topic, however, and in all of them a static problem setting is considered. Nevertheless, quickly responding to dynamic order arrivals is important to reduce the delivery time even more. While dynamic problems exist for both the order picking and vehicle routing problem separately, such a setting has not yet been considered for the integrated problem.

We propose a new metaheuristic algorithm, to solve the integrated order picking and vehicle routing problem in a dynamic context. This way, new orders are handled with minimal delay, while the operational performance is optimised.