Warehouses are an important part of many supply chains. To improve operational performance, optimisation of the order picking operations is considered indispensable. Our research focuses on a manual, picker-to-parts, order picking system. In this setting, the order picking operations can be divided into serveral planning problems, i.e., the order batching, the picker routing and the batch scheduling problem. The order batching problem looks at which orders should be combined in a single pick tour throughout the warehouse. The picker routing problem decides on the most efficient path an order picker should follow to visit the storage locations of all items in his batch. Finally, the batch scheduling problem handles to assignment of batches to pickers, and the sequence in which the batches are picked. In the past years, research efforts shifted from the optimisation of these individual problems towards the optimisation of the integrated order batching, picker routing and batch scheduling problem (IBRSP). Since these planning problems are interrelated, solving the integrated problem leads to better overall results.

So far, studies have focused on a static problem setting, in which all orders are known at the start of the planning horizon. In practice, however, new and possibly urgent orders arrive throughout the day. To offer a good customer service level, these new orders should be included in the picking schedule as soon as possible. Therefore, our study extends the static IBRSP to account for dynamically arriving orders. By re-optimising previous schedules when new orders arrive, urgent orders can be handled very quickly in a cost-effective way.