

---

# The Benefits of Flexible Fulfillment Center Assignments in Attended Home Delivery

Kilian Seifried\*<sup>†1</sup>, Niels Agatz<sup>2</sup>, and Moritz Fleischmann<sup>1</sup>

<sup>1</sup>Business School, University of Mannheim – PO Box 103462 68131 Mannheim, Germany

<sup>2</sup>Rotterdam School of Management, Erasmus University Rotterdam (RSM) – Netherlands

## Abstract

Attended home delivery in narrow time windows is the prevailing service model in internet grocery retailing. E-grocers typically serve their customers from one or more dedicated e-fulfillment centers. To simplify planning, each fulfillment center is often responsible for a fixed delivery region. In this contribution, we investigate the benefits of allowing flexibility in the assignment customers to fulfillment centers from a routing perspective. The underlying routing problem can be characterized by a multi-depot vehicle routing problem with time windows. We analyze the advantages of a flexible assignment as compared to a decomposed planning per fulfillment center by using a new exact mixed-integer programming model and a state-of-the-art heuristic. In addition, we investigate the impact of different factors on this benefit and the associated solutions.

---

\*Speaker

<sup>†</sup>Corresponding author: [kilian.seifried@bwl.uni-mannheim.de](mailto:kilian.seifried@bwl.uni-mannheim.de)