

Master Thesis Proposal

Optimizing Omnichannel Retail Operations

Omnichannel retail seamlessly integrates a retailer's physical stores, online shops, mobile apps, social media platforms, and other sales and marketing channels into a unified customer experience. It enables customers to move smoothly between channels — for example, by researching a product online, purchasing it in-store, and later receiving customer support via a mobile app. Prominent example of companies successfully implementing omnichannel strategies include Apple, IKEA, and Zara. While omnichannel retail offers significant opportunities — such as richer customer data that can inform optimization models to reduce costs, increase revenues, and improve service quality — it also presents substantial challenges for operations management. Key issues include managing complex inventory systems across multiple channels, handling increased logistical demands for order fulfillment, and meeting heightened customer expectations regarding speed, flexibility, and service consistency.

This thesis aims to explore how optimization problems can be adapted and extended to address the challenges posed by omnichannel retail operations. It will clearly distinguish the concepts of single-, multi-, and omnichannel retail and provide a brief introduction to key optimization problems relevant to these environments. Following this, a comprehensive literature review will classify and critically assess existing research that incorporates multi- and omnichannel considerations into optimization models. This review will highlight both the progress made in this area and the gaps that remain. A well-suited optimization model will then be selected from the literature and explained in detail. Subsequently, an extension of the model will be developed and implemented using a publicly available or synthetic dataset to demonstrate its practical value. The thesis will conclude by outlining future research directions.

The objectives of the thesis are to:

- Introduce and clearly distinguish the concepts of multichannel and omnichannel retail.
- Provide an overview of the most relevant optimization problems in single, multi- and omnichannel retail.
- Review and classify existing literature that incorporates multichannel and omnichannel considerations into optimization models for retail decision-making.
- Discuss findings from the literature review.
- Explain one well suited optimization model of your choosing in detail.
- Propose an extension to the model.
- Implement the chosen optimization model using publicly available real-world or synthetic data, demonstrating its value in practice.
- Outline future trends with respect to optimization of multi- and omnichannel retail operations.

Requirements

- OPM 781
- Profound knowledge in Operations Research
- Excellent analytical skills and an ability to transform real-world business problems into Operations Research models

Administrative information for writing a master thesis at the Chair of Service Operations Management can be found [here](#).

Selected Literature Recommendations

Bell, D. R., Gallino, S., & Moreno, A. (2018). Offline Showrooms in Omnichannel Retail: Demand and Operational Benefits. *Management Science*, 64(4), 1629–1651.

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Hense, J., & Hübner, A. (2022). Assortment optimization in omni-channel retailing. *European Journal of Operational Research*, 301(1), 124–140.

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Rooderkerk, R. P., & Kök, A. G. (2019). Omnichannel Assortment Planning. In S. Gallino & A. Moreno (Eds.), *Operations in an Omnichannel World* (pp. 51–86). Springer International Publishing.

Sapra, A., & Kumar, S. (2024). Optimal Joint Assortment for an Omni-Channel Retailer. *Information Systems Research*, 35(3), 1154–1174.

Srivastava, P. R., Zhang ,Justin Zuopeng, Eachempati ,Prajwal, Sharma ,Satyendra Kumar, & and Liu, Y. (2025). An Intelligent omnichannel assortment model to manage webrooming: An optimization approach. *Journal of Strategic Marketing*, 33(3), 441–465.