UNIVERSITY OF MANNHEIM
Business School

CHAIR OF SERVICE
OPERATIONS MANAGEMENT
Prof. Dr. Cornelia Schön

Bachelor Thesis FSS 2025

"Current topics in Service Operations Management"

Topic overview

Topic B02: From Surveys to Synthetic Respondents: Can LLMs replace consumer choice data?

Understanding consumer preferences between alternatives is critical for optimizing many business decisions, such as pricing strategies, product assortments, and targeted marketing. Traditionally, discrete choice models, which rely on extensive consumer surveys or historical sales data, underpin such optimization procedures. However, such data collection efforts are often time-consuming, expensive, or historical data is simply not available. With the rapid advancement of large language models (LLMs) such as GPT-3.5 and GPT-4, there is growing interest in using these models as synthetic respondents to simulate consumer choices. Recent research suggests that LLMs can mirror certain aspects of human decision-making, including intertemporal preferences, behavioural biases, and perceptual judgments. This presents a promising opportunity to simulate consumer choice behavior. However, it also raises important questions about the realism, limitations, and potential biases embedded in such AI-generated data.

This thesis aims to evaluate the potential of LLMs to generate synthetic consumer choice data that can be used in optimization procedures and broader market research contexts. The study will begin with a comprehensive review of recent literature on the ability of LLMs to simulate human decision behaviour. This will be followed by an empirical experiment designed to assess how well different LLMs can reproduce realistic consumer choice patterns in specific scenarios. The findings will be critically analysed and implications for businesses and researchers will be discussed. Finally, the thesis will highlight research gaps, and directions for future investigation in this emerging area.

The objectives of the bachelor thesis are to:

- Review of literature on the use of LLMs as substitutes for human respondents in market research and behavioral decision-making studies
- Conduct an empirical study to evaluate the usefulness of generating synthetic choice data using different LLMs for optimizing business decisions
- Critically assess the findings from literature and the empirical study
- Discuss the limitations of using LLMs for consumer choice simulation in optimization contexts
- Identify open research gaps and propose future directions for applying LLMs in this way

Basic Literature:

Chen, Y., Kirshner, S. N., Ovchinnikov, A., Andiappan, M., & Jenkin, T. (2025). A Manager and an AI Walk into a Bar: Does ChatGPT Make Biased Decisions Like We Do? Manufacturing & Service Operations Management, 27(2), 354–368. https://doi.org/10.1287/msom.2023.0279

Goli, A., & Singh, A. (2024). Frontiers: Can Large Language Models Capture Human Preferences? Marketing Science, 43(4), 709–722. https://doi.org/10.1287/mksc.2023.0306

Kök, A. G., Fisher, M. L., & Vaidyanathan, R. (2008). Assortment planning: Review of literature and industry practice. In Retail supply chain management (pp. 99–153). Springer.

Li, P., Castelo, N., Katona, Z., & Sarvary, M. (2024). Frontiers: Determining the Validity of Large Language Models for Automated Perceptual Analysis. Marketing Science, 43(2), 254–266. https://doi.org/10.1287/mksc.2023.0454

Topic B06: Integrating ESG Considerations into Product and Supply Chain Design: Measurement and Impact at the Product Level

Environmental, Social, and Governance (ESG) considerations are becoming increasingly important for businesses as they strive to align with sustainability goals, regulatory requirements, and consumer expectations. While ESG performance is typically measured at the corporate or industry level, there is a growing need to integrate these principles into product and supply chain design. Companies are facing increasing pressure to ensure that their products are not only financially viable but also environmentally responsible throughout their lifecycle. This thesis aims to explore how ESG factors can be incorporated into product and supply chain decisions and how ESG performance can be effectively measured at the product level.

The objectives of the bachelor thesis are to:

- To investigate how ESG considerations influence product and supply chain design
- To identify key ESG metrics from the literature and discuss to what extent they can be applied at the product level and where you see challenges in ESG data collection and measurement at a granular level
- To propose a structured modeling approach for assessing ESG performance in product and supply chain design, including an academic example

Basic Literature:

Dai, T., & Tang, C. (2022). Frontiers in Service Science: Integrating ESG Measures and Supply Chain Management: Research Opportunities in the Postpandemic Era. *Service Science (Hanover, Md.)*, *14*(1), 1–12.

Kaplan, R. S., & Ramanna, K. (2021). Accounting for climate change. Harvard Business Review, 99(6), 120–131.

Andreou, N., & Besharov, M. (2022). Rethinking how we measure companies on social and environmental impact. MIT Sloan Management Review, 64(1), 1–4.

Tundys, B., Kędzia, G., Wiśniewski, T., & Zioło, M. (2024). *Sustainable Supply Chains 2.0 : Towards Environmental, Social, and Economic Resilience*. Cham.

Yen, B., Chow, N., Wang, N. Wong, N.& Choi, B. (2024). Cathay Pacific: Balancing Inherent Risks and ESG Concerns. HKU Business School.

Topic B16: Improving Product Return Programs for Remanufacturing: Strategies for Effective Core Acquisition

As companies increasingly adopt circular economy strategies, remanufacturing has become a crucial approach to reduce waste and reclaim product value. A central challenge in remanufacturing is securing a steady supply of high-quality used products—called "cores." Return programs such as buy-back schemes, take-back incentives, or voluntary collection programs play a key role in this process.

This thesis explores how companies in industries like electronics, automotive, and home appliances design and implement product return programs. It analyzes common challenges such as return quality variability, consumer participation, and reverse logistics complexity. To support the academic foundation, the student will conduct a literature review of operations research models addressing product return and core acquisition. The review will focus on model structures, decision variables (e.g., return volume, inspection strategies), and common assumptions (e.g., predictable behavior, uniform quality), and critically assess their alignment with practical realities.

The objectives of the bachelor thesis are to:

- Investigate industry practices for core acquisition in remanufacturing.
- Identify operational and behavioral challenges in managing return flows.
- Review and analyze OR models on product acquisition and reverse logistics.
- Discuss the gap between theoretical assumptions and real-world implementation.
- Provide recommendations for designing more effective and realistic return programs.

Basic Literature:

Guide, V. D. R., & Van Wassenhove, L. N. (2001). Managing product returns for remanufacturing. Production and Operations Management, 10(2), 142–155.

Daniel, R., Guide, V., & Van Wassenhove, L. (2000). Product acquisition management: Current industry practice and a proposed framework. Production and Operations Management, 9(2), 148–162.

Mutha, A., & Pokharel, S. (2016). Managing demand uncertainty through core acquisition in remanufacturing. International Journal of Production Economics, 175, 35–49.

Bansal, S., Guide, V. D. R., & Naumov, S. (2024). Closed-loop supply chains with product remanufacturing: Challenges and opportunities. Journal of Operations Management, 70(2), 184–189.

Kianpour, K., Jusoh, A., Asghari, M., & Mahdiraji, H. A. (2017). Factors influencing consumers' intention to return end-of-life electronics. Journal of Cleaner Production, 149, 495–505.