

OPM 751 – Research Seminar Operations Management
HWS 2021

General Information:

1. The goal of this seminar is to introduce the participants to conducting scientific research. Thereby, it prepares the students for writing their Master thesis. The seminar is geared towards students intending to write their thesis at the Assistant Professorship of Operations Management.
2. Each participant will explore one of the research papers listed below. The task is to review and critically assess the assigned research paper and relate it to the corresponding stream of scientific literature. Each participant presents his/her findings in a written report (about 20 pages) and a presentation (20 min + 20 min discussion).
3. A **kick-off meeting** for all participants will be held on **Tuesday 8 June, 13:45 CEST** in **BWL-ZOOM-XX (announced later)**. During this meeting, general guidelines for conducting a scientific literature review will be discussed, and the deliverables of the seminar will be explained in detail.
4. The written reports have to be **submitted** electronically and as a hard copy by **Monday, 8 November**.
5. The **presentations** will be held as a blocked session, most probably on **18 and 19 November** (exact times and room to be announced, might still be subject to change!).
6. The final grade for the seminar is composed of the following components: Written report (60%), presentation (30%), contribution to the discussion (10%).
7. As a class of international students usually attends the seminar, the report and the presentations should be delivered in English.
8. There is a joint application process for all seminars offered by the chairs of the Area Operations Management. In the HWS 2021, this includes the following seminars:
 - OPM 701: Research Seminar Supply Chain Management (Chair of Logistics and Supply Chain Management), **topics labeled with 'L'**
 - OPM 761: Research Seminar Production Management (Chair of Production Management), **topics labeled with 'P'**
 - OPM 781: Research Seminar Service Operations (Chair of Service Operations Management), **topics labeled with 'S'**
 - OPM 791: Research Seminar Procurement (Chair of Procurement), **topics labeled with 'B'**
 - OPM 751: Research Seminar Operations Management (Assistant Professorship of Operations Management), **topics labeled with 'O'**

Detailed information on the seminar topics is available on the home pages of the respective chairs. In their application, students can indicate three to five preferred topics from all seminars.

9. Applications are open within the period **3 – 16 May**. Students have to join the ILIAS group **Seminar Application Area Operations** ([link](#)) and complete the **application form** there.
10. Additionally, students applying for a topic of OPM 7X1 must send an e-mail to dsonntag@mail.uni-mannheim.de, titled "Seminar Application Documents", including a current **CV** and a **grades overview** (the one you can print yourself is enough). If you are applying for topics of the other chairs, please check if you have to send documents to them as well.
11. For any questions concerning the seminar, feel free to contact Prof. Dr. Danja R. Sonntag at dsonntag@mail.uni-mannheim.de.

Seminar topics:

Each participant will be assigned one of the topics listed below. The task then is to identify the main issues addressed by the paper, explain its methodology, including potential quantitative models, position it in the corresponding stream of scientific literature, and critically assess the paper's contribution to the literature and practice.

Topic O1: Belavina, E. (2021). Grocery Store Density and Food Waste. *Manufacturing & Service Operations Management* 23(1), 1-18.

We study the impact of grocery-store density on the food waste generated at stores and by households. Food waste is a major contributor to carbon emissions (as big as road transport). Identifying and influencing market conditions that can decrease food waste is thus important to combat global warming. We build and calibrate a stylized two-echelon perishable-inventory model to capture grocery purchases and expiration at competing stores and households in a market. We examine how the equilibrium waste in this model changes with store density. An increase in store density decreases consumer waste due to improved access to groceries, whereas increasing retail waste due to decentralization of inventory increased variability propagation in the supply chain (cycle truncation) and diminished demand by customers. Higher density also induces more competition which further increases (decreases) waste when stores compete on prices (service levels). Overall, consumer waste reductions compete with store waste increases and the effects of increased competition. Our analysis shows that higher density reduces food waste up to a threshold density; it leads to higher food waste beyond this threshold. Put differently, in so far as food waste is concerned, there exists an optimal store density. Calibration using grocery industry, economic, and demographic data reveals that actual store density in most American cities is well below this threshold/optimal level, and modest increases in store density substantially reduce waste; for example, in Chicago, just 3–4 more stores (per 10 sq km) can lead to a 6%–9% waste reduction, and a 1%–4% decrease in grocery expenses. These results arise from the principal role of consumer waste, suggesting that activists and policy makers' focus on retail waste may be misguided. Store operators, urban planners, and decision makers should aim to increase store densities to make grocery shopping more affordable and sustainable.

Topic O2: Holzapfel, A., Hübner, A., Kuhn, H., Sternbeck, M.G. (2016). Delivery pattern and transportation planning in grocery retailing. *European Journal of Operational Research* 252, 54-68.

This paper develops a planning concept for defining repetitive delivery patterns according to which stores of a grocery retailer are supplied from a distribution center. Applying repetitive delivery patterns offers major advantages when scheduling the workforce for shelf replenishment, defining cyclic transportation routes and managing warehouse capacities. In doing so, all logistics subsystems of a retail chain, i.e., warehousing, transportation and instore logistics, are jointly scheduled. We propose a novel model to minimize total costs in all associated subsystems of a retail distribution chain. A solution approach is developed for clustering stores and selecting delivery patterns that reflects practical requirements. A broad numerical analysis demonstrates cost savings of 2.5 percent on average compared to a state-of-the-art approach (see Sternbeck & Kuhn, 2014). This considerable cost reduction potential is confirmed by applying the suggested approach to a real case of a major European grocery retailer.

Topic O3: Ketzenberg, M.E., Geismar, N., Metters, R. (2013). The Value of Information for Managing Retail Inventory Remotely. *Production and Operations Management* 22(4), 811-825.

An important difference between both manufacturing and wholesaling vs. retail is the information available concerning inventory. Typically, far less information characterizes retail. Here, an extreme environment of information shortfall is examined. The environment is technically termed “unattended points of sale,” but colloquially called vending machines. Once inventory is loaded into a machine, information on demand and inventory level is not observed until the scheduled reloading date. Technological advances and business process changes have

drawn attention to the value of information (VOI) in retail inventory in many venues. Moreover, technology is now available that allows unattended points of sale to report inventory information. Capturing the value of this information requires changes in current business practice. We demonstrate the value of capturing information analytically in an environment with restrictive demand assumptions. Experiments in an environment with realistic demand assumptions and parameter values show that the VOI depends greatly on operating characteristics and can range from negligible effects to increasing profitability 30% or more in actual practice.

Topic O4: Gaukler, G.M., Seifert, R.W., Hausman, W.H. (2007). Item-Level RFID in the Retail Supply Chain. *Production and Operations Management* 16(1), 65-76.

Analyzing the proliferation of item-level RFID, recent studies have identified the cost sharing of the technology as a gating issue. Various qualitative studies have predicted that conflict will arise, in particular in decentralized supply chains, from the fact that the benefits and the costs resulting from item-level RFID are not symmetrically distributed among supply chain partners. To contribute to a better understanding of this situation, we consider a supply chain with one manufacturer and one retailer. Within the context of this retail supply chain, we present analytic models of the benefits of item-level RFID to both supply chain partners. We examine both the case of a dominant manufacturer as well as the case of a dominant retailer, and we analyze the results of an introduction of item-level RFID to such a supply chain depending on these market power characteristics. Under each scenario, we show how the cost of item-level RFID should be allocated among supply chain partners such that supply chain profit is optimized.