General Information:
1. The goal of this seminar is to introduce the participants to the conducting of scientific research. It thereby prepares the students for the writing of their MSc thesis. The seminar is geared towards students intending to write their thesis at the Chair of Logistics.

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 to relate it to the corresponding stream of scientific literature. Each participant presents his/her findings in a written report (about 20 pages) as well as an in-class presentation (20 min + 20 min discussion).

3. Each participant also acts as a discussant for one of the other presentations. The discussant is responsible for critically assessing the presented work and for opening the ensuing discussion.

4. A kick-off meeting for all participants will be held on Monday, 29 May 13:45 in room SO 133. During this meeting, general guidelines for conducting a scientific literature review will be discussed.

5. The written reports have to be submitted electronically and as a hard copy in two-fold by 3 November.

6. The presentations will be held as a blocked session around calendar week +/- 46 (exact times and room to be announced). Attendance of the presentations is obligatory.

7. The final grade for the seminar is composed of the following components: Written report (60%), presentation (30%), contribution to discussion (10%).

8. The report and the presentations can be delivered either in English or in German.

9. There is a joint application process for all seminars offered by the chairs of the Area Operations Management. In the FSS 2017, 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’
Detailed information on the seminar topics is available on the home pages of the respective chairs. In their application, students can indicate up to five preferred topics from all seminars.

10. Students can apply for the seminars by completing the following online form (click here). Applicants for OPM 701 must in addition send a CV + official grades overview by e-mail to logistik@bwl.uni-mannheim.de, mentioning “Seminar Application Documents” in the subject row.

11. Applications will be accepted from 1 May until 14 May. Admission to the seminar is binding and will be confirmed via e-mail by 22 May.

12. For questions concerning the seminar, contact Kilian Seifried at kilian.seifried@bwl.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 as well as to practice.


The bottom-line financial impact of supply chain management has been of continuing interest. Building on the operations strategy literature, Fisher’s (1997) conceptual framework, a survey of 259 U.S. and European manufacturing firms, and secondary financial data, we investigate the relationship between supply chain fit (i.e., strategic consistencies between the products’ supply and demand uncertainty and the underlying supply chain design) and the financial performance of the firm. The findings indicate that the higher the supply chain fit, the higher the Return on Assets (ROA) of the firm, and that firms with a negative misfit show a lower performance than firms with a positive misfit.


This study characterizes the class of Pareto optimal returns policies between a manufacturer and a retailer who receives consumer returns. The manufacturer may take a costly hidden action that reduces the expected number of products returned by consumers, which when realized is hidden information known only to the retailer. When faced with consumer returns, the retailer must decide whether to send the product back to the manufacturer, who harvests a
low salvage value, or to engage in costly refurbishment that permits the returned product to be resold to consumers. We find that the optimal returns policies may be implemented through the payment by the manufacturer of a full refund to the retailer of the wholesale price for any returns as well as a bonus paid to the retailer that is decreasing in the number of returns to the manufacturer.

This paper studies a merger between price-setting newsvendors in an oligopolistic market. It is well known that inventory pooling can greatly reduce inventory costs in a centralized distribution system because it helps reduce aggregate demand uncertainty. Although such statistical economies of scale are important benefits of a retail merger, the extant literature models cost savings from a merger only through reduction in a postmerger firm’s marginal cost. In this paper, we develop a model of a retail merger under uncertain demand that distinguishes between cost savings from conventional economies of scale and those from statistical economies of scale, and we show that these two sources of cost savings have substantially different impacts on firms’ decisions in a postmerger market. Contrary to the existing theory of mergers developed under deterministic demand, we find that although inventory pooling enables the postmerger firm to achieve cost savings, it always induces firms to raise their prices, and we find that marginal cost reduction induces firms to lower their prices only when it is substantial—consequently, larger cost synergies can benefit even nonparticipant firms. Finally, even if a merger induces all firms to raise their prices, it can still improve expected consumer welfare by increasing firms’ service levels under uncertain demand.

We study the strategic problem of a logistics service provider managing a (possibly heterogeneous) fleet of vehicles to serve a city in the presence of access restrictions. We model the problem as an area partitioning problem in which a rectangular service area has to be divided into sectors, each served by a single vehicle. The length of the routes, which depends on the dimension of the sectors and on customer density in the area, is calculated using a continuous approximation. The aim is to partition the area and to determine the type of vehicles to use in order to minimize the sum of ownership or leasing, transportation and labor costs. We formulate the problem as a mixed integer linear problem and as a dynamic program. We develop efficient algorithms to obtain an optimal solution and present some structural properties regarding the optimal partition of the service area and the set of vehicle types to use. We also derive some interesting insights, namely we show that in some cases traffic restrictions may actually increase the number of vehicles on the streets, and we study the benefits of operating a heterogeneous fleet of vehicles.

This study presents a joint three-echelon location inventory model for a donation-demand driven industry in which the main warehouse (MW), distribution centers (DC), retail stores (RS) and donation-only centers (ADCs) exist. This unique inventory-location problem involves demand and supply uncertainties, coverage radius limitations, service level requirements, and multiple products consideration. Each retailer has two classes of products flowing from the assigned DC due to demands minus donations occurring in that retailer. The proposed model simultaneously determines the number of DCs to open, DC locations, and assignments of retailers to the open DCs for particular product types. The objective is to minimize the total annual cost including: facility location costs, transportation costs, inventory costs, and the lost sale costs. Due to the complexity of the problem, the proposed model structure allows for relaxing complicating constraints through recourse to Lagrangian relaxation. The use of robust branch-cut and price heuristics solves the mixed integer nonlinear problem to obtain a lower bound and a distance-based heuristic to get an upper bound. We formulate essential features of this novel problem, solve several numerical example problems and evaluate solution performance. We believe this is a novel problem environment, and that this initial study extends integrated location-inventory modeling to a new context.


This work proposes a two-stage stochastic optimization model to maximize the expected profit and simultaneously minimize carbon emissions of a dual-feedstock lignocellulosic-based bioethanol supply chain (LBSC) under uncertainties in supply, demand and prices. The model decides the optimal first-stage decisions and the expected values of the second-stage decisions. A case study based on a 4-state Midwestern region in the US demonstrates the effectiveness of the proposed stochastic model over a deterministic model under uncertainties. Two regional modes are considered for the geographic scale of the LBSC. Under co-operation mode the 4 states are considered as a combined region while under standalone mode each of the 4 states is considered as an individual region. Each state under co-operation mode gives better financial and environmental outcomes when compared to stand-alone mode. Uncertainty has a significant impact on the biomass processing capacity of biorefineries. While the location and the choice of conversion technology for biorefineries i.e. biochemical vs. thermochemical, are insensitive to the stochastic environment. As variability of the stochastic parameters increases, the financial and environmental performance is degraded. Sensitivity analysis shows that levels of tax credit and carbon price have a major impact on the choice of conversion technology for a selected biorefinery. Biochemical pathway is preferred over the thermochemical as carbon price increases. Thermochemical pathway is preferred over the biochemical as the level of tax credit increases. In addition, bioethanol production in the US is shown to be unviable without adequate governmental subsidy in the form of tax credits.

The available-to-promise (ATP) activity is intended to provide the delivery date promise to customers for their specific orders considering the availability of the ordered product. Although there has been some limited past research attempted to develop delivery date quotation systems, most of them do not consider both customer priority and the variance of penalty costs together. In this paper, we present an ATP model considering two factors: customer priority and variance of penalty costs. Illustrative examples based on a real-world case are presented to show the feasibility of the proposed model.


The inventory control literature generally assumes that the demand distribution and all its parameters are known. In practical applications it is often suggested to estimate the demand variance either directly or based on the one-period ahead forecast errors. The variance of the lead time demand, essential for safety stock calculations, is then obtained by multiplying the estimated per-period demand variance by the length of the lead time. However, this is flawed, since forecast errors for different periods of the lead time are positively correlated, even if the demand process itself does not show (process) auto-correlation. As a result these traditional procedures lead to safety stocks that are too low. This paper presents corrected lead time demand variance expressions and reorder levels for inventory systems with a constant lead time where demand fluctuates around a constant level. Firstly, we derive the exact lead time forecast error of mean demand conditional on the true demand variance. Secondly, we derive for normally distributed demand the correct reorder level under uncertainty of both the demand mean and variance. We show how the results can be implemented in inventory models, and particularly discuss batch ordering policies combined with moving average and exponential smoothing forecasts. We find that traditional approaches can lead to safety stocks that are up to 30 percent too low and service levels that are up to 10 percent below the target.


The goal of this paper is to describe, model, and optimize inventory in a reverse logistics system that supports the warranty returns and replacements for a consumer electronic device. The context and motivation for this work stem from a collaboration with an industrial partner, a Fortune 100 company that sells consumer electronics. The reverse logistics system is a closed-loop supply chain: failed devices are returned for repair and refurbishing; this inventory is then used to serve warranty claims or sold through a side sales channel. Managing inventory in this system is challenging because of the short life cycle of these devices and the rapidly declining value for the inventory. We examine an inventory model that captures these dynamics. We characterize the structure of the optimal policy for this problem for stochastic demand and introduce an algorithm to calculate optimal sell-down levels. We also provide a closed-form policy for the deterministic version of the problem, and we use this policy as a certainty-
equivalent approximation to the stochastic optimal policy. Finally, using numerical experiments, we analyze the sensitivity of this system to changes in various parameters, and we also evaluate the performance of the certainty-equivalent approximation using data from our industrial partner.


Operations Researchers support Supply Chain Management and Supply Chain Planning by developing adequate mathematical optimization models and providing suitable solution procedures. In this paper we discuss what adequate could mean. Therefore, we may ask several questions concerning “optimality” in Supply Chain Planning under causal and temporal uncertainty: What is an optimal solution? When is it optimal? For how long is it optimal? How should the design of a supply chain be changed when conditions and requirements ask for new structures? In particular, we discuss new approaches to Supply Chain Planning in order to give an optimal transformation from an initial solution over multiple periods to a desired one rather than just specifying an optimal snapshot solution. Time and uncertainty are the factors triggering the whole discussion. In particular, several flaws often found when dealing with these factors result in so-called “time traps”. We look at the impact of recent technological developments like the Internet of Things or Industry 4.0 on operational supply chain planning and control, and we show how online optimization can help to cope with real-time challenges. Moreover, we re-coin the concept of risk in the realm of Supply Chain Planning. Here the question is how to measure supply chain specific risks and how to incorporate them “adequately” into mathematical models.


A new class of online services allows Internet media sites to direct users from articles they are currently reading to other content they may be interested in. This process creates a “browsing path” along which there is potential for repeated interaction between the user and the provider, giving rise to a dynamic optimization problem. A key metric that often underlies this recommendation process is the click-through rate (CTR) of candidate articles. Whereas CTR is a measure of instantaneous click likelihood, we analyze the performance improvement that one may achieve by some lookahead that accounts for the potential future path of users. To that end, by using some data of user path history at major media sites, we introduce and derive a representation of content along two key dimensions: clickability, the likelihood to click to an article when it is recommended; and engageability, the likelihood to click from an article when it hosts a recommendation. We then propose a class of heuristics that leverage both clickability and engageability, and provide theoretical support for favoring such path-focused heuristics over myopic heuristics that focus only on clickability (no lookahead). We conduct a live pilot experiment that measures the performance of a practical proxy of our proposed class, when integrated into the operating system of a worldwide leading provider of content recommendations, allowing us to estimate the aggregate improvement in clicks per visit
relative to the CTR-driven current practice. The documented improvement highlights the importance and the practicality of efficiently incorporating the future path of users in real time.


While the value of using social media information has been established in multiple business contexts, the field of operations and supply chain management have not yet explored the possibilities it offers in improving firms’ operational decisions. This study attempts to do that by empirically studying whether using publicly available social media information can improve the accuracy of daily sales forecasts. We collaborated with an online apparel retailer to assemble a dataset that combines (1) detailed internal operational information, including data on sales, advertising, and promotions, as well as (2) publicly available social media information obtained from Facebook. We implement a variety of machine learning methods to forecast daily sales. We find that using social media information results in statistically significant improvements in the out-of-sample accuracy of the forecasts, with relative improvements ranging from 12.85% to 23.23% over different forecast horizons. We also demonstrate that nonlinear boosting models with feature selection, such as random forests, perform significantly better than traditional linear models. The best-performing method (random forest) yields an out-of-sample MAPE of 7.21% when not using social media information and 5.73% when using social media information is used. In both cases, this significantly improves the accuracy of the company’s internal forecasts (a MAPE of 11.97%). Combining these empirical results, we provide recommendations for forecasting sales in general as well as with social media information.