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Lehrstuhl BWL, insb. Operations Management

LEHRSTUHL BWL, INSB. OPERATIONS MANAGEMENT

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1. LEITUNG

Prof. Dr. Sven Müller

2. HOCHSCHULLEHRER/INNEN

Prof. Dr. Sven Müller

3. FORSCHUNGSPROFIL

Data-Driven Operations Management:

- Applied Optimization & Modeling
- Predictive Analytics & Modeling
- Assortment, Revenue, and Pricing
- Transport, Logistics, and Crowds
- Marketing, Health, and Energy

4. KOOPERATIONEN

- LEWAK greenprojects

5. FORSCHUNGSPROJEKTE

Projektleitung: Lucas Weber, Prof. Dr. Sven Müller
Förderer: Haushalt - 01.02.2021 - 31.01.2024

Sales Operations Management

This project considers an implementation of the sales force deployment problem with explicit contiguity constraints. The task is to improve the existing approaches in terms of fairness: assign sales territories to the sales representatives such that the profit contribution among sales locations becomes more equal. The aim is to find and implement constraints to avoid that and to design and assign sales territories in a "fairer" way. Moreover, the consideration of locational capacities and schedules is intended. The project should deliver heuristic and exact solution algorithms to the sales force deployment problem.

Projektleitung: Lucas Weber, Prof. Dr. Sven Müller
Förderer: Haushalt - 01.02.2021 - 31.01.2024

Crowd Operations Management

We are interested to determine the relationship between commuter satisfaction of transit services and waiting time. Satisfaction is a crucial KPI for many transit operators and waiting time is mainly influenced by the design of public transport services (timetable, scheduling). Moreover, we develop models and algorithms to manage passenger boarding operations in urban transit systems such that dwell times are minimized. We account for variable passenger demand (routes and travel times) as well as transit timetables and capacities. In particular, the impact of (monetary) incentives to control passenger flows while embarking and debarking will be analyzed. This project joins insights from pedestrian simulation, microeconomics (discrete choice), and operations research.

Projektleitung: Annegret Lewak, Prof. Dr. Sven Müller
Förderer: Stiftungen - Sonstige - 01.03.2021 - 29.02.2024

Open the window of opportunity - renewable energies as a facilitator for maximization of the common good

Our research is set to get a better understanding about whether the common good can be improved by specific project designs. The projects in our study are investment projects in the area of renewable energies. They are defined by attributes like "amortization timeline", "investment volume" and "expected return". The specific set of characteristics define a type of project, which is considered a product. Choice makers decide which projects provide individual maximum utility. We conduct an empirical experiment to analyze the trade-offs between the attributes.

We assume that the return of each project can be split into two types: a) the classic monetary benefit (tangible return) and b) increasing common good (intangible return). B can be maximized by deciding that a or parts of a can be allocated to a common fund instead of cashing in. Participants with low income get access to the fund and therefore can increase their personal profit on their invest in a disproportional way. We consider this re-allocation of income within the group as an indicator for increase of the common good. Our problem is to select a sub-set of the overall pool of projects and present them to the choice makers in order to maximize the common good.

Projektleitung: M.Sc. Julia Zimmermann, Prof. Dr. Sven Müller
Förderer: Haushalt - 01.10.2016 - 30.09.2021

Simultane Planung von Puffern in Produktionssystemen und Ersatzteilbeständen

The design of a manufacturing system is essential for its performance. Even a few design improvements can increase production output or maintain throughput at a lower cost, consequently increasing the revenue of a company. In a discrete part production line throughput is influenced by variable processing times or unexpected machine failures, amongst other reasons. One possible way of mitigating the effects of these uncertainties is by installing buffers between the machines such that the machines are decoupled, meaning they are less affected by each other and can continue producing while another machine is under repair or when processing is slow. In this research project it is investigated how the throughput of a manufacturing system can be increased by smart spare parts planning.

Projektleitung: M.Sc. Christoph Rippe, Prof. Dr. Sven Müller
Förderer: Haushalt - 01.09.2016 - 31.08.2022

Das Repair-Kit Problem bei Kundendifferenzierung

In bisherigen Publikationen zum Repair-Kit Problem wird für alle Kunden von identischen Ersatzteilbedarfs-wahrscheinlichkeiten ausgegangen. Setzt man stattdessen verschiedene Kundengruppen voraus und geht davon aus, dass Ersatzteile nur bei einer vollständigen Reparatur beim Kunden verbleiben, ist die Job-Fill-Rate eines Service-Technikers nicht mehr nur von der Zusammensetzung seines Repair-Kits sondern auch von seiner Tourenplanung abhängig. Ziel dieses Projektes soll es sein, zugleich die Zusammenstellung des Repair-Kits und die Tourenplanung des Service-Technikers zu optimieren.

Projektleitung: Annegret Lewak, Prof. Dr. Sven Müller
Kooperationen: LEWAK greenprojects
Förderer: Sonstige - 01.10.2020 - 31.12.2025

Einfluss von Gemeinwohl - Rendite auf die Anwendung der Portfolio - Theorie nach Markowitz

Im Rahmen des Projekts soll die Bereitschaft zu Verhaltensänderung im Investitionsverhalten aufgrund von Bewertungsanpassungen untersucht werden. Unter Bezugnahme auf aktuelle Befunde im Kapitalmarkt hinsichtlich des Parameters "Klimafreundlichkeit" wird insbesondere der Frage nachgegangen ob ähnliche Tendenzen auch im Bereich "sozioökonomischer Mehrwert" gefunden werden können. Ausgehend von der Portfolio - Theorie wird untersucht, inwiefern sich die Ausgestaltung von rational choice durch konkrete Anwendung von Prinzipien der Akzeptanzmodelle aus der Verhaltenstheorie um Parameter der Gemeinwohltheorie erweitern lässt. An der Forschungsschnittstelle von Ökonomie, Ökologie und Soziologie entstehen hierdurch konkrete Handlungsvorschläge für Politik und Unternehmen.

Projektleitung: Dr. Lorena Silvana Reyes-Rubiano
Kooperationen: Universität für Bodenkultur Wien, Wien, Prof. Patrick Hirsch
Förderer: Haushalt - 01.01.2021 - 01.05.2023

Integrated mobility concept for healthcare workers and ambulant patients

Hospital treatment and home care face rising demand in Europe. The rise is caused by increased life expectancy and the growing trend of old people living alone. Thus, the demand for transport of home care workers and vulnerable people is increasing. Today, the transport of home care workers and vulnerable people is performed independent of each other which also leads to congestion of urban areas. We propose an integrated mobility concept to deal with the transport of home care workers and non-time-critical patients. The integrated mobility concept involves a trip sharing system combined with the additional option of walking for home care workers. The home care service provision is related to the drop-off and pick-up of home care workers at the home of patients. Vulnerable people are transported from their homes to hospitals or other medical facilities and then they are picked up after the end of their hospital treatment. We consider that each home care worker and home care job have an associated qualification level. This work addresses the transport of non-time-critical patients and home care workers. Different qualification levels, service time windows, maximum ride times and maximum working hours have to be considered. We implement a matheuristic algorithm to determine this integrated transport. A series of computational experiments allow us to evaluate the impact on the waiting and driving times of the home care workers and non-critical patients. Afterwards, we compare the waiting time and driving time of individual trips versus shared trips. This evaluation sheds light on standards for waiting and ride times.

Projektleitung: Dr. Lorena Silvana Reyes-Rubiano
Förderer: Haushalt - 01.01.2021 - 01.05.2023

Revenue Maximizing Tariff Zone Planning for Public Transport Companies

This project presents two approaches to design a counting zones tariff system applicable for urban public transport service providers. The proposed approaches are oriented to a counting zones tariff system that maximizes the expected revenue for a given price system. It is assumed that the price per zone takes a discrete set of values, the number of public transport trips depends on the price system, public transport passengers always choose the time-shortest path. The exact method aims to partition the transport network into zones and find a price per zone such the total expected revenue is maximized. The heuristic approach reduces the problem size; it only considers transport network connections with the most significant revenue. In extensive numerical studies with artificial test instances, it is evaluated for different network structures and public transportation demand which of the proposed approaches perform best. This project sheds light for service providers on how the service area can be zoned to maximize expected revenue through a counting zones tariff system.

6. VERÖFFENTLICHUNGEN

BEGUTACHTETE ZEITSCHRIFTENAUFsätze

Koch, Matthes; Müller, Sven; Haase, Knut

Mit mathematischer Planung zu mehr Sicherheit in Großveranstaltungen
Mitteilungen der Deutschen Mathematiker-Vereinigung/ Deutsche Mathematiker-Vereinigung - Berlin: DMV,
Bd. 29 (2021), 3, S. 129-131;

Muñoz-Villamizar, Andrés; Solano-Charris, Elyn L.; Reyes-Rubiano, Lorena; Faulin, Javier

Measuring disruptions in last-mile delivery operations
Logistics - Basel: MDPI AG, Bd. 5 (2021), 1, insges. 9 S.;

Reyes-Rubiano, Lorena Silvana; Solano-Charris, Elyn L.; Caneva, Yira; Müller, Marcel; Reggelin, Tobias

An optimization model for urban transport distribution with time windows - a case study of invoice delivery in a law firm
IFAC-PapersOnLine/ Internationale Förderung für Automatische Lenkung - Frankfurt: Elsevier, Bd. 54 (2021),
1, S. 236-242;

Tscharaktschiew, Stefan; Müller, Sven

Ride to the hills, ride to your school - physical effort and mode choice
Transportation research / D: an international journal - Amsterdam [u.a.]: Elsevier Science, Bd. 98 (2021);
[Imp.fact.: 5.495]