

At the Chair of **Logistics and Supply Chain Management** of TUM School of Management, we are looking for an interested and qualified student to conduct his/her.

Master thesis

on the topic

Multistage stochastic optimization for disruption recovery in liner shipping

Liner shipping, a major maritime transportation mode, operates on the foundation of a vessel owner adhering to a prearranged schedule for visiting a set of ports. However, from port congestion to unforeseen geopolitical events, disruptions to liner shipping can have widespread impacts on global supply chains. These unpredictable and often disruptive forces may interfere with vessels and cause significant delays from the planned schedule. To mitigate such issues, a liner company needs to adjust its shipping operations by changing speeds, rerouting, or repositioning its ships to respond to disruptive events. This thesis aims to develop a multistage stochastic optimization model to create robust recovery strategies for possible disruptions in liner shipping. Mathematical programming models or MDP models can be derived to address this challenge. These models should be implemented to evaluate their performance under various disruption scenarios systematically. Lastly, an in-depth analysis of the results and implications should be taken, providing insights into the effectiveness of the proposed recovery strategies and their possible extensions for the liner shipping industry and beyond.

Key project tasks:

- Literature review on relevant fields of study.
- Mathematical modeling addressing the research question.
- Implementation of the model and systematic analysis of the model performance.
- Analysis of results and implications.

Requirements:

The thesis is suitable for Master in Management and Technology students with a major in operations and supply chain management. The ability to work independently, as well as analytical skills, are required. Knowledge of one general-purpose programming language (e.g., Python, C++, or others) is required. Knowledge of mathematical programming and optimization is preferred. The thesis should be written in English.

Earliest begin: September 2023

Supervisor: Kai Zhu

Application: Email with curriculum vitae and transcript of records to logtheses.log@mgt.tum.de