



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

Multi-Echelon Spare Parts Inventory Optimization

Inventory management is concerned with reducing inventories while preventing shortages. Unlike single-echelon problems focusing on a single level/stage/location of the supply chain, multi-echelon problems optimize the inventory across multiple locations. For a real-world use case of a Tier-1 automotive supplier, such inventory levels are to be optimized for spare parts whereby its components are produced/stored in multiple European plants. Unlike parts required for active references, spare parts are characterized by variable and fluctuating customer demands. To mitigate shortage risks, often high inventory levels are withheld, affecting a company's result.

In the thesis, based on the assemblies' bill-of-material, similar components must be identified using PLM data. Thereby, some references can be aggregated, and volumes cumulated. Subsequently, purchasing decisions and storage levels per plant should be optimized using mathematical optimization. The input data is available and prepared for analysis.

Key project tasks:

- Literature review on relevant fields of study
- Data analysis and problem modelling
- Implementation and testing of an optimization model
- 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, Julia, C++) is required. Knowledge of mathematical programming and optimization is preferred. The thesis should be written in English.

Earliest begin: as soon as possible

Supervisor: Moritz Rettinger

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