At the **Chair of Operations Management** at **TUM School of Management**, we are looking for interested and qualified students to conduct their

Master's Thesis

on the following topic:

A Fix&Optimize-Heuristic for the Integrated Procurement and Reprocessing Planning Problem for Reusable Medical Devices

Hospitals are under significant cost pressure which requires them to manage costs effectively. Rationalization efforts often focus on the surgical area, which is both a major revenue source and a significant cost center, yet the supply of sterile goods, although crucial, has received less attention. The sterile service department (SSD) must ensure timely and adequate supply of sterile medical devices to avoid disruptions in surgeries. Reusable medical devices, while more complex to manage due to reprocessing requirements, are economically and ecologically preferable. Rickers and Sahling (2024) develop an optimization model and solution approach to minimize total costs while ensuring timely provision of reusable medical devices.

Your tasks:

- Perform a literature review on related literature
- Model the integrated procurement and reprocessing planning problem (PRPP) for reusable medical devices with a limited shelf life
- Implement the model with a commercial solver and conduct a computational study in which you solve different test instances of the MILP
- Develop a Fix&Optimize-heuristic for the problem and evaluate the results by comparing them to the MILP results

Requirements:

- Profound knowledge in mathematical optimization
- Familiarity with commercial solvers (Gurobi, CPLEX, or similar)
- Programming experience (preferably Python)

Beginning: as soon as possible

Main supervisor: Linda Bentzen (linda.bentzen@tum.de)

Sources:

Rickers, S. and Sahling, F. (2024): Integrated procurement and reprocessing planning for reusable medical devices with a limited shelf life. In: Health Care Management Science.