The **Chair of Operations Management** of **TUM School of Management** is looking for an interested and qualified student to conduct his/her

Bachelor's Thesis

on the topic

Review of Mathematical Modeling Approaches

for Portfolio Decision Analysis under Uncertainty

Description:

Practically all organizations achieve their objectives by building a portfolio of activities subject to budgetary restrictions and other constraints. Such decision problems involve decision makers facing alternative courses of action, which, if selected, consume resources and lead to multi-dimensional consequences. Research in the area of "Portfolio Decision Analysis (PDA)" strives to bring greater rationality and transparency to such resource allocation decisions.

In the past thirty years a vast number of publications have proposed different mathematical programming models for PDA problems, considering specific (real-life) decision environments. In order to support organizations in selecting suitable PDA methodologies, the Chair of Operations Management is developing a categorization framework for PDA decision problems and their mathematical formulations.

This thesis shall summarize and categorize mathematical modeling approaches for PDA problems with focus on the consideration of information reliability, i.e. the level of uncertainty of problem parameters as budgetary constraints, benefits or cost. Based on a literature survey on mathematical modeling of PDA problems, relevant modeling approaches for uncertainty and typically considered side constraints of portfolio problems shall be identified, formally defined and structured. This problem formulation framework shall be applied to a database of PDA literature, provided by the chair, in order to investigate the suitability of PDA methodologies for different uncertainty environments.

Literature:

- Ghasemzadeh, F., N. Archer, P. Iyogun. 1999. A zero-one model for project portfolio selection and scheduling. *Journal of the Operational Research Society* **50**(7) 745–755.
- Heidenberger, K., C. Stummer. 1999. Research and Development Project Selection and Resource Allocation: A Review of Quantitative Modelling Approaches. *International Journal of Management Reviews* **1**(2) 197-224.

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Any interested student, please send by email your application together with your curriculum vitae and transcripts of records.