



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

Master's Thesis

on the topic

Development and Evaluation of a Robust Portfolio Modeling Approach with Budgeted Robustness

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.

Robust Portfolio Modeling (RPM) is a portfolio selection approach, designed for decision environments with high levels of uncertainty regarding activity outcomes and decision maker preferences. In uncertain environments any optimal portfolio determined for a fixed scenario of outcomes and preferences might prove unsatisfactory for other possible realizations of uncertain parameters. RPM addresses this problem by initially considering all portfolios, feasible in terms of a given set of linear constraints. Inferior solutions are ruled out by dominance relations, valid for all possible preference and outcome scenarios. Decision makers are then provided with a set of non-dominated portfolios to choose from and receive decisional guidance on which activities' uncertainty has the greatest impact on the decision problem. By demanding dominance for all possible scenarios of uncertain parameters decision recommendations provided by RPM are very conservative and therefore impractical for some real-life decision problems.

In order to resolve this issue the concept of "budgeted robustness" by Bertsimas and Sim (2004) has been incorporated in RPM to allow decision makers to adapt the level of conservatism as required.

Based on previous RPM studies this thesis shall develop exact and heuristic algorithms to calculate non-dominated portfolios in this modified RPM framework. In addition different ways to utilize the concept of "conservatism" for decisional guidance shall be discussed. The developed algorithms and decision support approaches are to be evaluated in a case study, based on a real-life portfolio decision problem from the semiconductor industry.

Literature:

- Liesiö, J., P. Mild, A. Salo. 2008. Robust portfolio modeling with incomplete cost information and project interdependencies. *European Journal of Operational Research* 190(3) 679–695.
- Bertsimas, D., M. Sim. 2004. The Price of Robustness. *Operations Research* 52(1) 35–53.

Begin: Immediately

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