

Robust Portfolio Modeling

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Abstract

Robust Portfolio Modeling (RPM) provides decision support for selecting a subset of project proposals in problems where (i) projects need to be evaluated in view of multiple criteria, (ii) information about the projects' criterion-specific impacts or the decision maker's preferences may be incomplete, (iii) the projects may exhibit interactions or interdependencies, and (iv) the portfolio must satisfy resource and other possible constraints. In RPM, such problems are analyzed by determining all non-dominated portfolios (i.e., portfolios that cannot be improved upon with regard to all criteria): this makes it possible to determine (i) which *core* projects are included in all non-dominated portfolios, (ii) which *exterior* projects are not included in any non-dominated portfolios, (iii) which *borderline* projects are in some but not all non-dominated portfolios. Based on these analyses at the portfolio level, RPM provides project-level recommendations by advising the decision maker to choose core projects and to reject exterior ones. Also, the total cost of information acquisition may be lower, because the efforts of obtaining information can be organized as a staged process with a focus on borderline projects. Apart from the RPM methodology, we also describe several high-impact case studies in innovation management (cf. <http://www.rpm.tkk.fi>).

Keywords: Multicriteria decision analysis, project portfolio selection, incomplete information, innovation management.

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