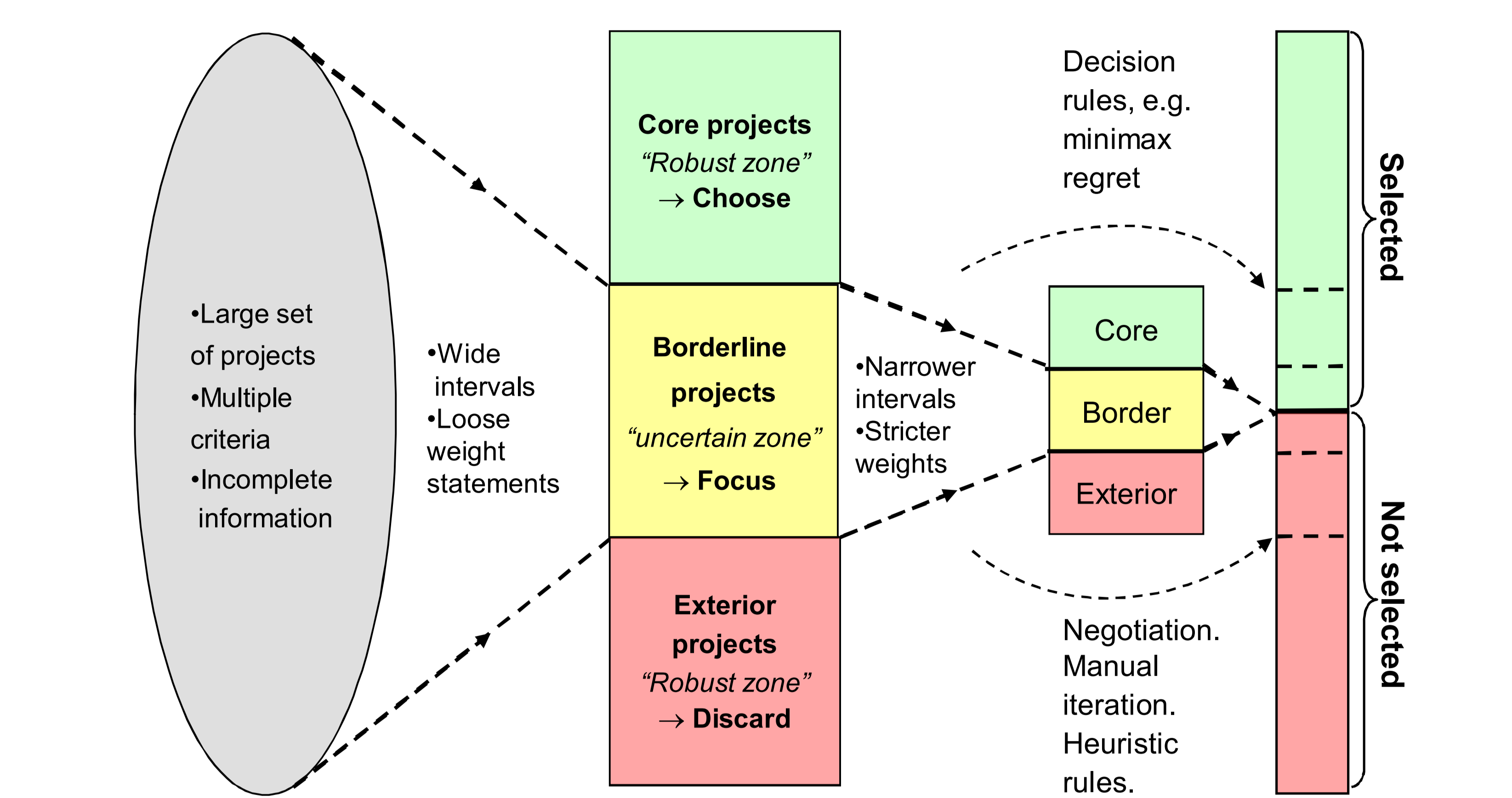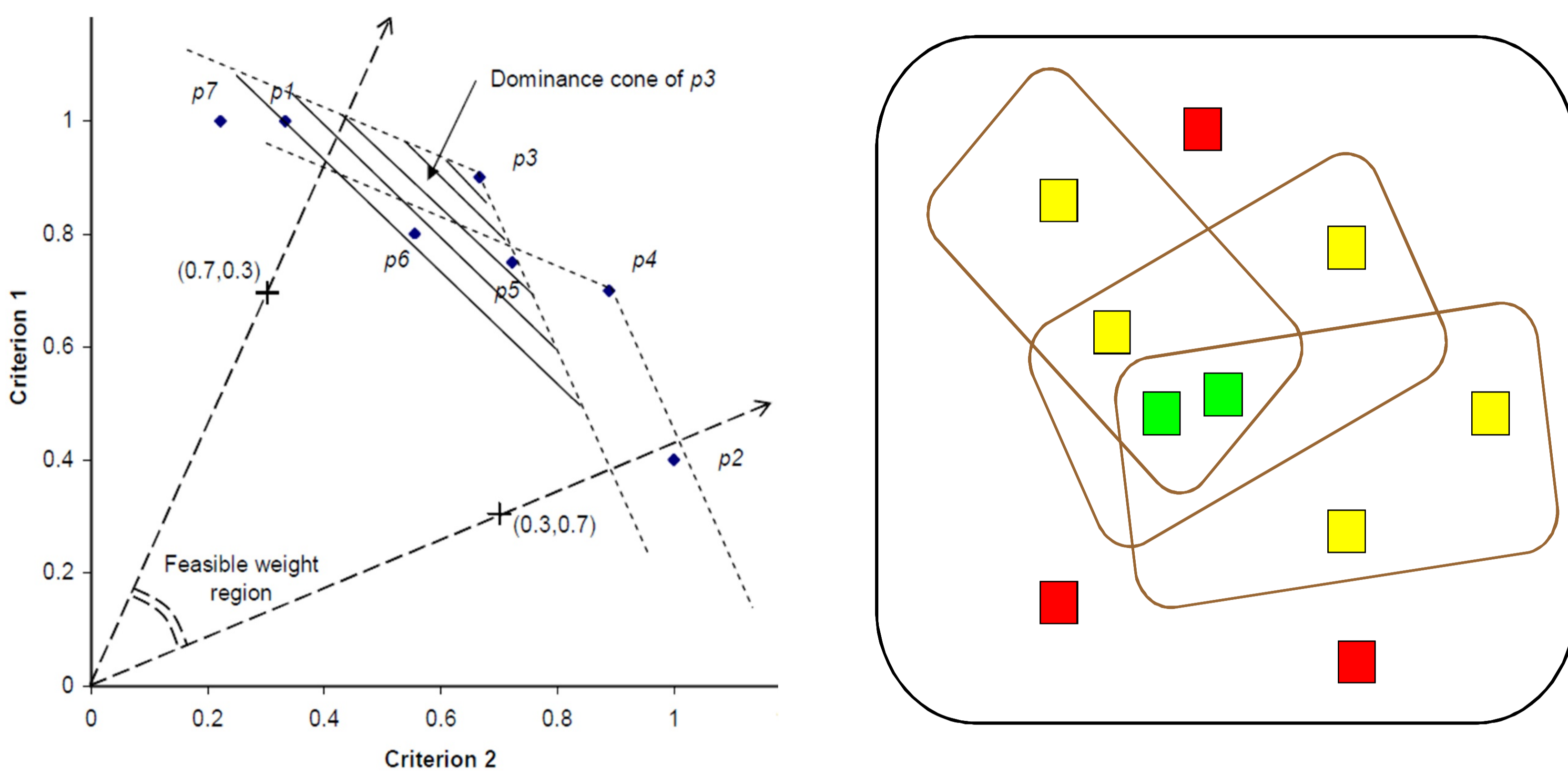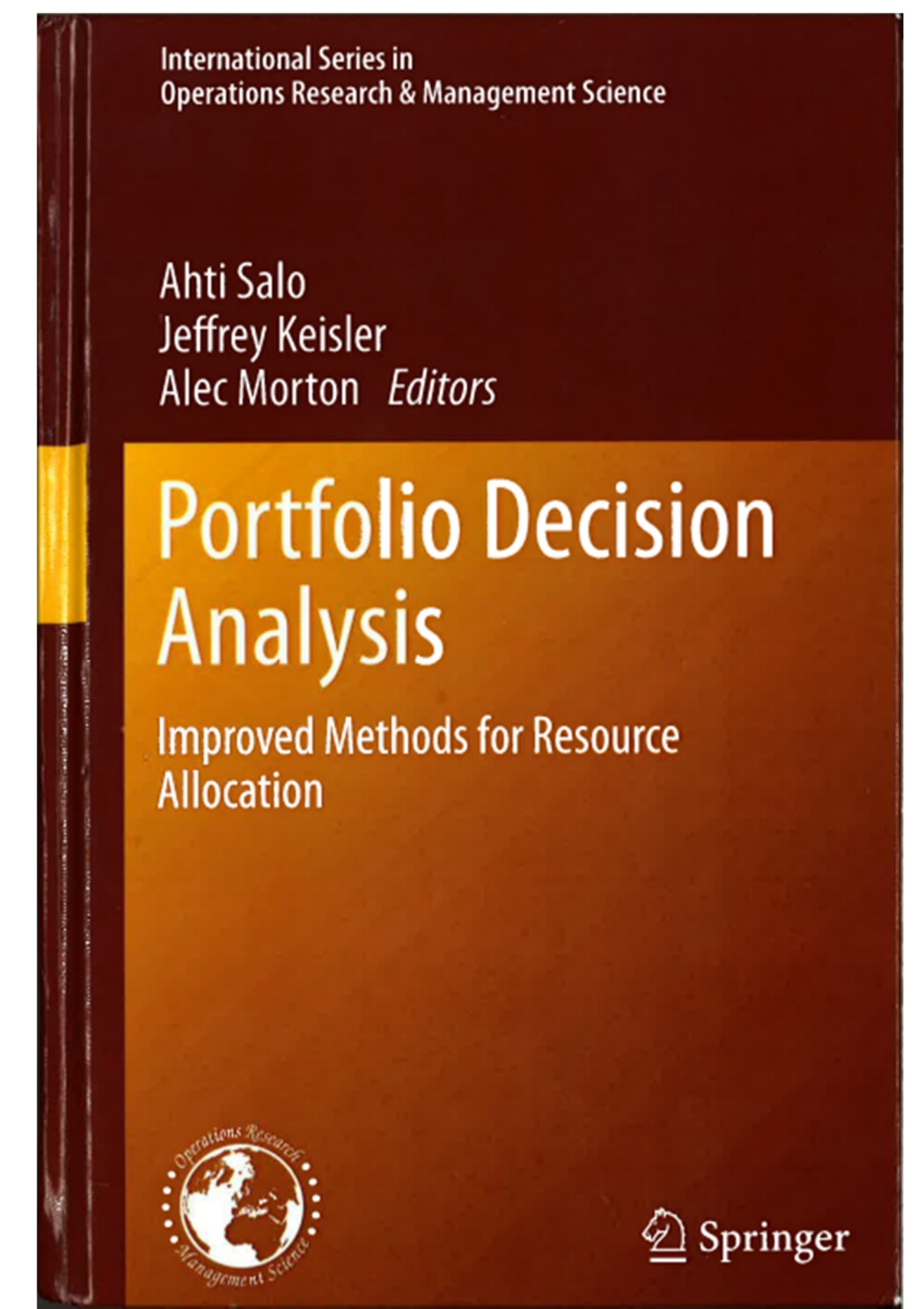# PORTFOLIO DECISION ANALYSIS
## *methods, models and software for resource allocation and portfolio management*
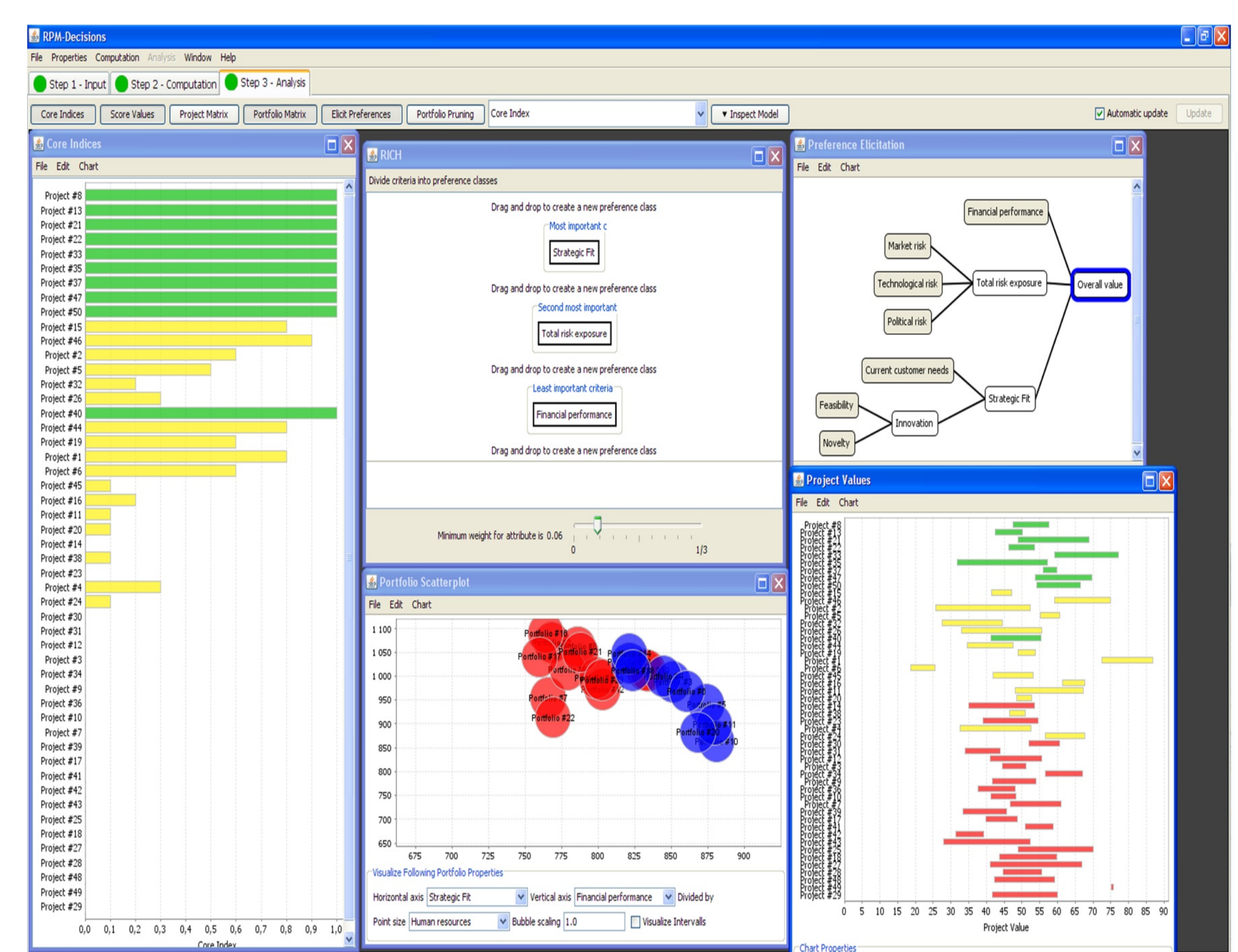
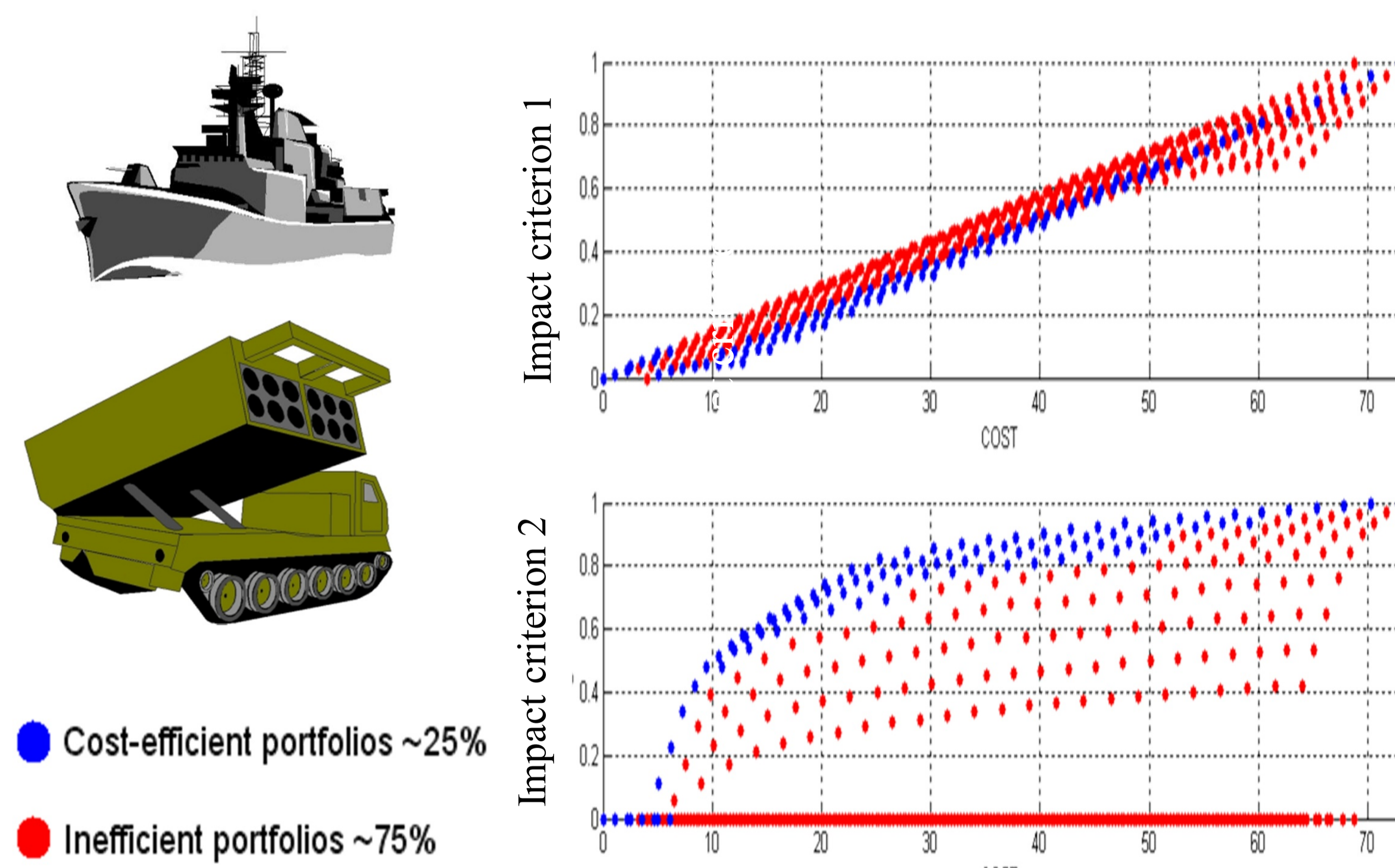## Robust Portfolio Modeling (RPM)



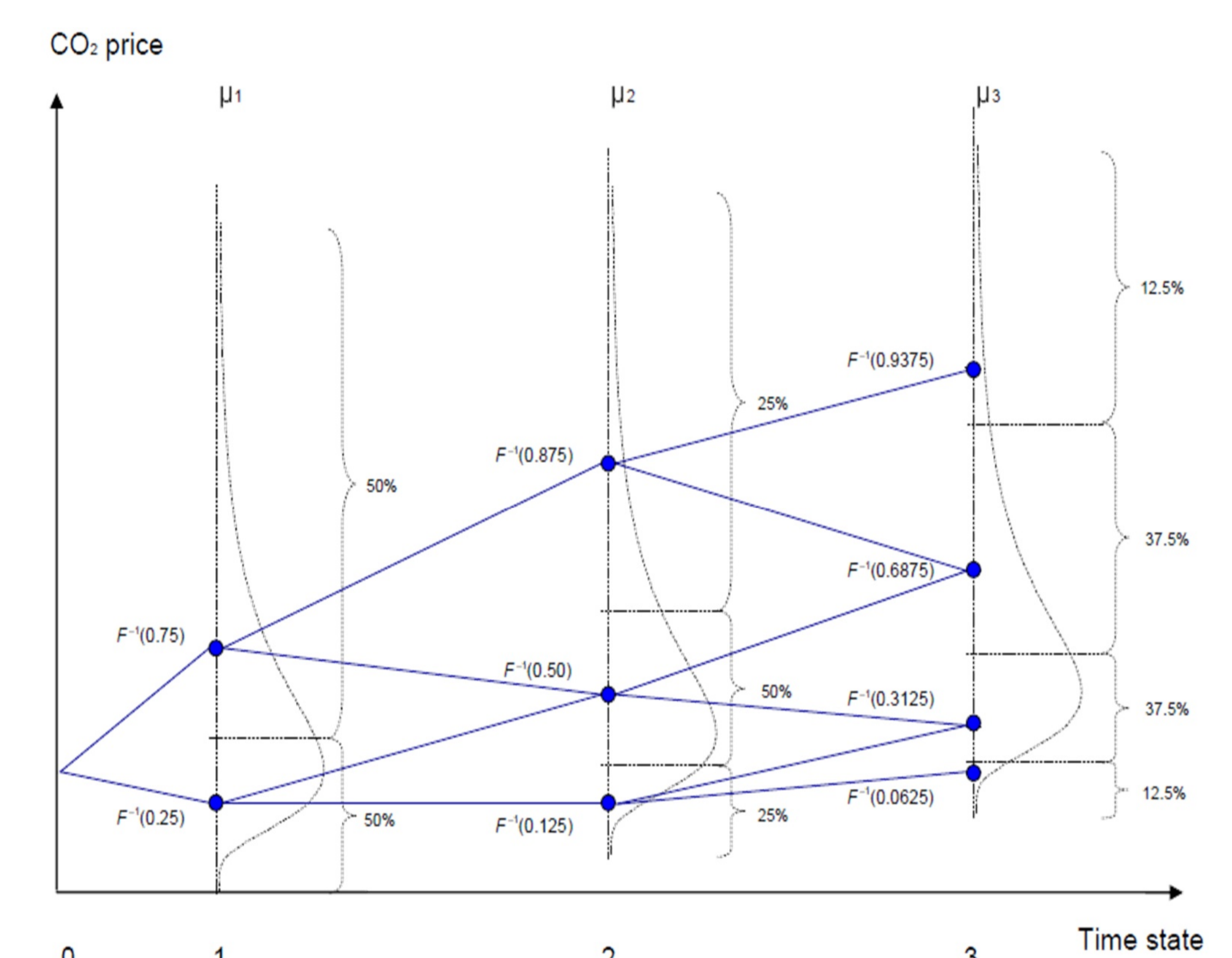*winner of the INFORMS Decision Analysis Publication Award for 2011*

## RPM-Decisions software



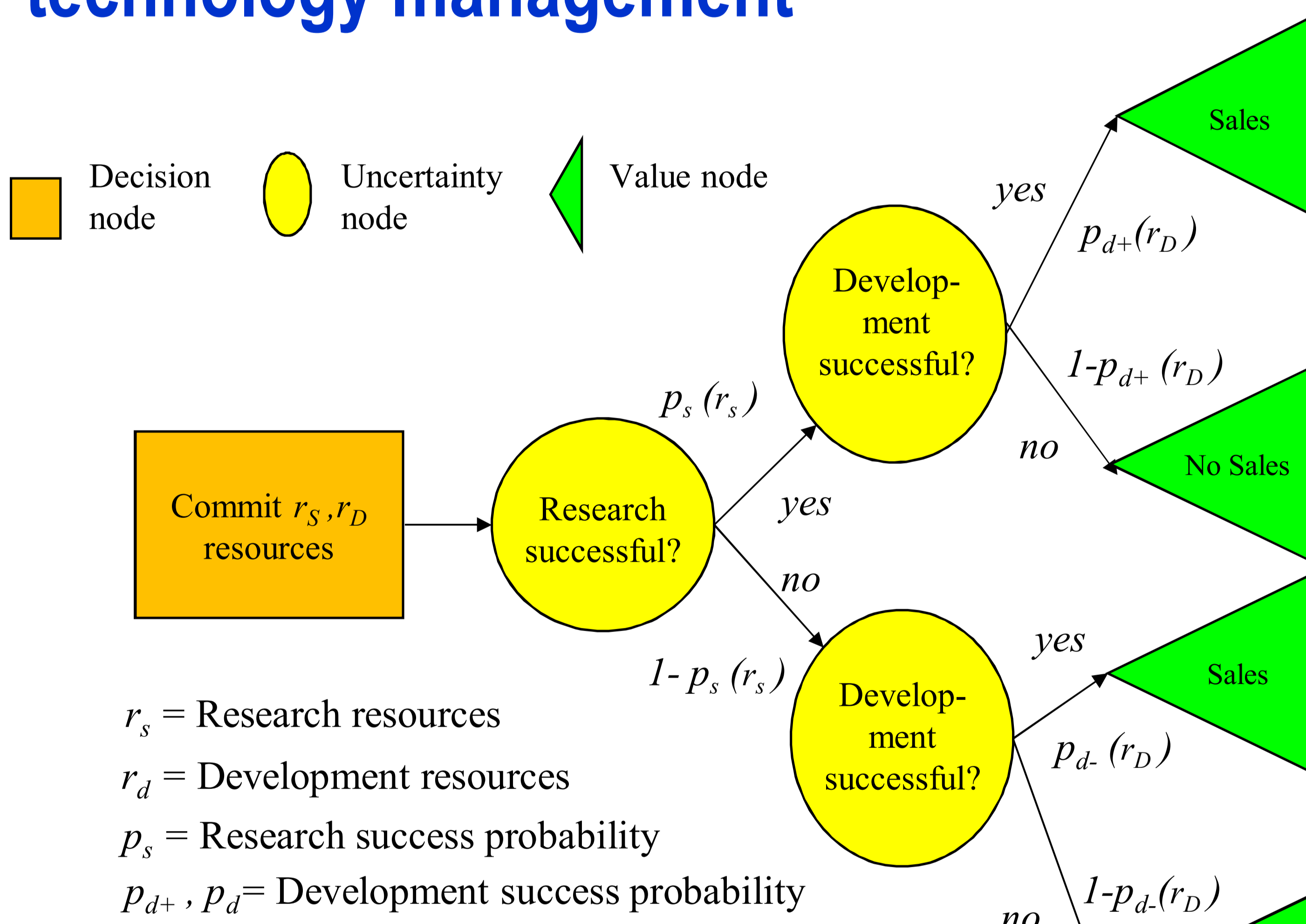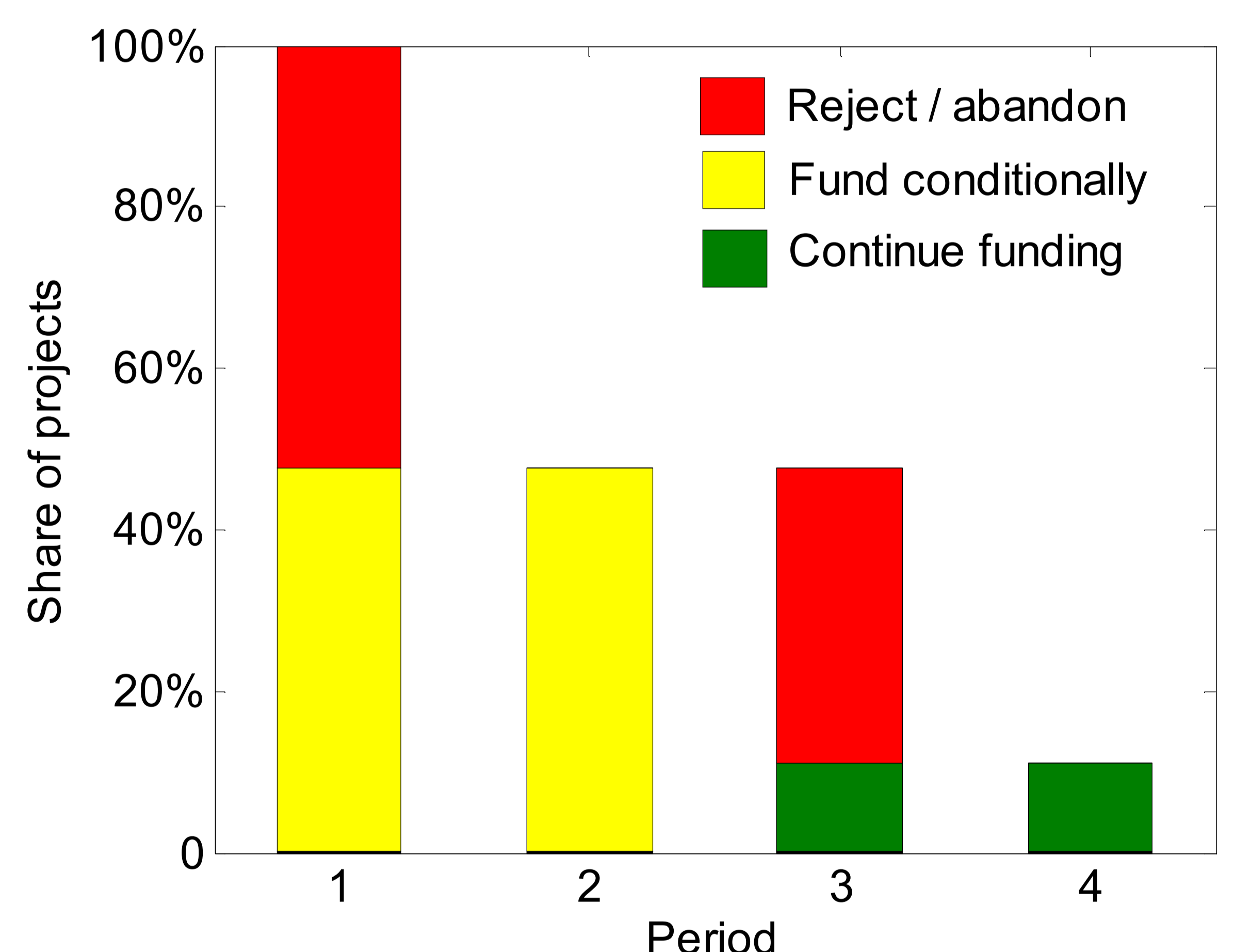## cost-efficiency analysis of weapon systems



- ● Cost-efficient portfolios ~25%
- ● Inefficient portfolios ~75%

## energy and natural resources



## technology management



$r_s$ = Research resources
$r_d$ = Development resources
$p_s$ = Research success probability
$p_{d+}$, $p_{d-}$ = Development success probability

## optimal project funding policies



- Reject / abandon
- Fund conditionally
- Continue funding

## selected publications

**J. Liesiö, A. Punkka:** Baseline value specification and sensitivity analysis in multiattribute project portfolio selection, *European Journal of Operational Research*, 2014

**J. Kangaspunta, A. Salo:** Expert judgments in the cost-effectiveness analysis of resource allocations: A case study in military planning, *OR Spectrum*, 2014

**J. Liesiö:** Measurable multiattribute value functions for portfolio decision analysis, *Decision Analysis*, 2014

**E. Vilkkumaa, J. Liesiö, A. Salo:** Optimal strategies for selecting project portfolios using uncertain value estimates, *European Journal of Operational Research*, 2014

**E. Vilkkumaa, A. Salo, J. Liesiö:** Multicriteria portfolio modeling for the development of shared action agendas, *Group Decision and Negotiation*, 2014

**J. Kangaspunta, J. Liesiö, A. Salo:** Cost-efficiency analysis of weapon system portfolios, *European Journal of Operational Research*, 2012

**J. Liesiö, A. Salo:** Scenario-based portfolio selection of investment projects with incomplete probability and utility information, *European Journal of Operational Research*, 2012

**A. Salo, A. Punkka:** Ranking intervals and cominance relations for ratio-based efficiency analysis, *Management Science*, 2011

**A. Salo, J. Keisler, A. Morton (eds.):** *Portfolio Decision Analysis: Improved Methods for Resource Allocation*, Springer, New York, 2011

**A. Toppila, J. Liesiö, A. Salo:** A Resource allocation model for R&D investments - A case study in telecommunication standardization. In: A. Salo, J. Keisler and A. Morton (eds.), *Portfolio Decision Analysis: Improved Methods for Resource Allocation*, Springer, New York, 2011

**J. Liesiö, P. Mild, A. Salo:** Robust Portfolio Modeling with incomplete cost information and project interdependencies, *European Journal of Operational Research*, 2008

**J. Gustafsson, A. Salo:** Contingent Portfolio Programming for the management of risky projects, *Operations Research*, 2005

**Systems Analysis Laboratory**

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