Project Interactions in value based IT Project Portfolio Management

Christian Meier, Dennis Kundisch

40. Jahrestagung der Gesellschaft für Informatik e.V.

Workshop: Wirtschaftlichkeit und Wertbeitrag von Informationssystemen

30.09.2010
Interactions in IT Project Portfolio Management - A practical view

- More than 50% of corporate investments are investments in IT (Laudon et al. 2010)

- 32% of IT Investments fail and more than 44% substantially exceed their planned costs (Standish Group, 2009)

- One of the main reasons for this is the inadequate treatment of project interactions (CA Research, 2007)

**Interaction:**

*Resources consumed or outputs generated by a project influence the use of resources or outputs generated by one or several other projects.*

→ Adequate consideration of interactions is a prerequisite for value based IT Project Portfolio Management (IT PPM)
## Interactions in PPM in the literature

<table>
<thead>
<tr>
<th>Article</th>
<th>Journal</th>
<th>Year</th>
<th>Interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weingartner</td>
<td>MS</td>
<td>1966</td>
<td>Mutual exclusive projects, Compound projects</td>
</tr>
<tr>
<td>Fox et al.</td>
<td>MS</td>
<td>1984</td>
<td>Cost utilization interactions, Outcome, technical or probability interactions, Benefit, payoff or effect interactions</td>
</tr>
<tr>
<td>Nelson</td>
<td>EJOR</td>
<td>1986</td>
<td>Overlap interdependencies, Technical interdependencies, Effect interdependencies</td>
</tr>
<tr>
<td>De Maio et al.</td>
<td>EJOR</td>
<td>1994</td>
<td>Resource interdependencies, Commonality interdependencies, System integration interdependencies, Technological prerequisites, Market interactions</td>
</tr>
<tr>
<td>Santhanam et al.</td>
<td>EJOR</td>
<td>1996</td>
<td>Resource interdependencies, Benefit interactions, Technical interactions</td>
</tr>
<tr>
<td>Bardhan et al.</td>
<td>JOM</td>
<td>2004</td>
<td>Soft dependencies, Hard dependencies, Interdependencies</td>
</tr>
<tr>
<td>Liesiö et al.</td>
<td>EJOR</td>
<td>2008</td>
<td>Mutual exclusivity, Synergetic-/cannibalization effects, Follow-up projects</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

Project Interactions in value based IT Project Portfolio Management - Meier, Kundisch
Findings in the literature

1. Identification of modeling dimensions
2. Development of a unified terminology and framework
3. Formulation of a mathematical Model that accounts for the identified interactions
4. Simulation/Optimization
5. Extension of the model
   - Consider scheduling
   - consider uncertainty
   - consider different modeling dimensions

- Consensus that interactions are an important issue in PPM
- No unified structure or terminology
- Inconsistent or conflicting understanding of interactions
- Interactions considered only partially resulting from special fields of application
- No holistic model with solution method
Dimensions of interactions in IT PPM

1. Certain
   Intratemporal
   Portfolio

2. Certain
   Intertemporal
   Portfolio

3. Uncertain
   Intratemporal
   Portfolio

4. Uncertain
   Intertemporal
   Portfolio
Deterministic intratemporal interactions

Transformation level

Resources

Outputs

Economic effect level

Costs

Benefits
Deterministic intratemporal interactions

Resources

P₁
R₁
R₂
R₃

P₂
R₃
R₄

P₃
R₅
O₂

Outputs

P₃
O₃

P₁
O₁

P₂
O₂

Pᵢ: Project i
Rⱼ: Resource j
Oᵢ: Output of project i

Transformation level

Economic effect level

Costs

Benefits
Deterministic intratemporal interactions

Resources

Outputs

Resource-Resource interactions:
- Competitive resource utilization
- Complementary resource utilization

Transformation level

P1: Project i
Rj: Resource j
Oj: Output of project i

Economic effect level

+ - Costs

Benefits
Deterministic intratemporal interactions

Transformation level

Output-Output interactions:
- Competitive output interactions
- Complementary output interaction

Economic effect level

Costs

Benefits

Outputs

Project Interactions in value based IT Project Portfolio Management - Meier, Kundisch
Deterministic intratemporal interactions

Output-Resource interactions:
- Binary contingency (→ Constraint effect)
- Continuous competitive contingency interactions
- Continuous complementary contingency interaction

Transformation level

Economic effect level

Costs

Benefits
Next steps

1. Identification of modeling dimensions

2. Development of a unified terminology and framework

3. Formulation of a mathematical Model that accounts for the identified interactions

4. Simulation/Optimization

5. Extension of the model
   - Consider scheduling
   - Consider uncertainty
   - Consider different modeling dimensions
Project Interactions in value based IT Project Portfolio Management

Thank you very much for your attention!

Discussion

For further information please visit:
www.uni-paderborn.de/winfo2