The Influence of Situational Factors in Software Product Management: An Empirical Study

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Overview

- Introduction
  - Research trigger
  - Research aim
  - Research question
  - Previous work
  - Case study company
- Results
  - List situational factors
  - Influence study
  - Constraints study
- Summary / Conclusion
- Questions / suggestions
Product managers play a crucial role in the success of product software companies (Condon, 2002)

Best known SPI methods:
- CMM (Paulk, Curtis, Chrissis, & Weber, 1993)
- CMMI (CMMI Product Team, 2002)
- SPICE (ISO/IEC-15504, 1998)

Why not?
- Found too heavy to use by organizations (Cusamo, 2004)
- Too large to implement, or even comprehend (Kuilboer & Ashrafi, 2000) (Reifer, 2000)
- Too expensive for many small and medium sized companies (Brodman & Johnson, 1994)
Aim research

To expand the research in the field of software product management (SPM), by finding out which situational factors influence the selection process of method fragments. Thus allowing software process improvement to be enhanced by tuning the selection of method fragments to the companies environment.
“What are the most important situational factors influencing the selection of method fragments for software product management processes?”
Previous work

The case company

- IT company which manages the IT needs of numerous customers on a daily basis
- Implement large-scale projects in a wide variety of markets including local government, financial services, housing associations and wholesale
- Offices in The Netherlands, Belgium, Germany and Norway, and more...
- Various areas of expertise; consultancy, IT solutions, software engineering, e-business, systems integration, managed ICT services and training.
- More than 50 takeovers since the year 2000
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  o List situational factors
  o Influence study
  o Constraints study

• Conclusion

• Questions / suggestions
List of situational factors

- Developed based on:
  - Literature research
  - Interviews with experts from practice
  - Interviews with experts from scientific community
- 31 situational factors
- Five categories
- Named, described, specified unit
List of situational factors examples

- **Customer characteristics**
  - Number of customers
  - Type of customers
**List of situational factors examples**

- **Market characteristics**
  - Market size
  - Release frequency
List of situational factors examples

- **Product characteristics**
  - Product age
  - Product lifetime
Influence study

- All 14 interviewees are experienced product managers
- Influence indicated on 7 points Likert scale for the domains of the framework for SPM
  - Portfolio management
  - Product roadmapping
  - Release planning
  - Requirements management
- All experts used the same SF definitions
  - Varying opinions cause deviations in influence
- Removed unreliable results
- Strongly correlated SFs are aggregated
## Results: Business unit char. influence

- **Main influence on release planning & requirements management, limited overall importance**
- **Size business unit team & Size development team merged**

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<thead>
<tr>
<th></th>
<th>Portfolio management</th>
<th>Product roadmapping</th>
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<td>1,748</td>
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Results: Customer char. influence

- Most important group
- Number of customers & number of end-users merged

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<td>1.794</td>
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</table>
Overall, relative little importance

Some star SFs:
- Sector, Variability among feature requests
- Release frequency factor removed

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<td>Variability of feature requests</td>
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<td>1.779</td>
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<td>1.973</td>
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## Results: Product char. influence

**Important**

**Defects per year: total & serious merged**

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<tr>
<td>Defects per year: serious &amp; Defects per year: total</td>
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<td>p</td>
<td>r</td>
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<tr>
<td>0,881</td>
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</table>
Results: Stakeholder involvement influence

- Most important group after ‘Customer characteristics’
- Number of customers & number of end-users merged

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<td>Partner involvement</td>
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SF based method constraints

- Based on same list of SFs as influence study
- Evaluated 26 different SPM method fragments
- SFs used most as constraint:
  - Customer involvement (46% of methods researched)
  - Development philosophy (35% of methods researched)
  - New requirements rate (27% of methods researched)
  - Release frequency (27% of methods researched)
Conclusion

- SFs influence method fragment choice
- SFs are useful as an indication of the restrictive environmental properties of method fragments
- Restrictive SFs differ from influential SFs
- SFs can be instrumental in:
  - SPM process maintenance – Does the SPM method need to be changed due to a change in environment?
  - Fragment choice – What method fragments can be applied given the business units SF values?
Future research

- More focus on higher levels of framework for SPM
- Validation of reference framework for SPM
- More case studies
- More detailed influences
- PSKI
  - A tool which takes a company’s current SPM processes and incrementally improves them by looking at the SFs
Questions

- Questions
- Suggestions

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Research approach

(Vaishnavi & Kuechler, 2007)
Research methods

- Literature study
- Explorative semi-structured interviews
- Document study, e.g.
  - Product folders
  - Requirements template
  - Release documents
- Meta modeling
  - Process deliverable diagram (Weerd & Brinkkemper, in press).
Validity

- **Yin (2003) Guidelines**
  - For situational factors: Guided by list of factors from literature
  - For processes: Guided by structure reference framework

- **Multiple triangulation**
  - Multiple observers
  - Documents

- **Chain of evidence**