How can Open Source Software Development Help Requirements Management Gain the Potential of Open Innovation: An Exploratory Study

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Different facets of agility

Faster development

Faster decisions on WHAT to implement

Growing complexity

SPL and reuse

The problem

- Achieving and sustaining competitive advantage is becoming more and more challenging
- Maximize ROI \(\rightarrow\) identify most profitable functionality
- Traditional requirements identification has focused on internal stakeholder interaction
- Recent changes force companies to “learn how to play poker as well as chess”
Open vs. Closed innovation - definitions

• Closed innovation – focusing on internal stakeholder interaction – analysis, research and development followed

• Open innovation – “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively”, Chesbrough

• Open innovation - “An open innovation approach refers to systematically relying on a firm’s dynamic capabilities of internally and externally carrying out the major technology management tasks, i.e., technology acquisition and technology exploitation, along the innovation process”, Lichtenthaler

• Open innovation is more than using OSS

Why we studied open innovation

• Studied by several researchers from the business management perspective
  • corporate venturing and valuation
  • technology transactions
  • ‘high-technology’ industries
  • large organizations

• No study has attempted to investigate the role of open innovation in requirements management and requirements decision making

• Main research question: “Is the current requirements engineering process designed to facilitate from open innovation?”

Research methodology & Case company

• The company – large, global, undergoing transition from a waterfall-based methodology to an agile methodology
  • Continuous release planning
  • Cross-functional teams
  • Iterative dealing with requirements
  • Integrated requirements management
  • About 10000 features in the database
  • Uses software product lines

Research methodology & Case company

• Semi-structured interviews with 19 participants
  • The results were grouped into 12 clusters, labeled and assigned summary statements
  • 12 clusters were presented to high-level management
  • Next, four respondents agreed or disagreed with identified 12 clusters
Validity

- Description validity – we recorded and transcribed the interviews
- Theoretical validity – reviewed the interview guideline, took precautions that the interviewer expressed neutrality
- Generalizability – strongly limited due to qualitative one company study – we sampled representative individuals

Results – contribution to the OSS community

- Unclear content and contribution strategy (S1) – no clear guidelines from management
- Contribution timeline unclear (S2) – when to contribute back to the open source community
- Minimize modifications to the open source code (S3) – risk of maintenance effort when not contributing back, too many modifications turned out to be a problem
- Unclear relationship between the benefits from contributions in terms of strategy and business goals (S4) – competitors are more successful and contribute less
- Be strategic when adopting innovative features (S5) – sometimes it is better to be ‘the second’ on the market

Results – process and innovation

- Augmenting requirements management process (S6): the process need to be upgraded to fully benefit from open innovation. "you get locked in, with the agreed functionality sometime ahead"
- Manage innovative features in a separate process (S7) – the process is designed for handling mature concepts
- Top-down or bottom-up open innovation (S8) – we should ask the developers “what we can do more with the same code base”. Other respondents suggested top-down approach

Results – release planning and prioritization

- Prioritization process needs modifications (S9) – problems with estimating both cost and market/business value
- Hard acceptance criteria kills innovative features (S10) – innovative features are rejected during the prioritization process due to their immaturity
- Need for special flow for innovative features to evolve to meet acceptance criteria (S11)
- Release planning more challenging (S12) – it may be better to wait for the next release of the OSS than start the implementation earlier
Discussion – areas for further research

- **Requirements management process for open innovation** – support requirements identification, execution and contribution. Understand the balance between limited and generous contribution strategies.

- **Revisit release planning and prioritization models** - how these tasks can be more effectively performed in open innovation contexts