Key Decisions in Strategic New Product Development for Small Software Product Businesses

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Software Process and Product Improvement Track

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Presentation Outline

- Background & motivation
- Methodology
- Results
  - The framework of key decision areas
  - Application experiences
- Contribution
- Directions for further research

For more details, come see the Work-in-Progress session on Sat 6.9. 9-11:10 and/or ask for the material!
Definitions

- **A Small Company**
  - Under 50 employees (EU standard)

- **Software Product Business**
  - The amount of customer-specific development effort is (or is intended to be) relatively small (Hoch et al. 1998)

- **Strategic New Product Development**
  - A deliberate and systematic approach to managing the development of products & complementary services on the long term (Rosenau 1996)
Non-Strategic New Product Development as the State-of-Practice

- Tempted to respond to time-to-market pressures by omitting the planning stages entirely (Mello 2002)
  - Lack of long-range planning leads to unclear priorities
    - Overbooking of resources
    - Some important activities may not receive enough attention
- Important product development decisions are often made based on the opinions of the key personnel (Brouthers 1998, Smith 1998)
  - Rationale implicit and/or not discussed
  - Being “market-driven” on the short term may cause problems
- Deliberate vs. accidental decision-making?
  - We have observed a tendency for the personnel to lose sight of the ‘big picture’ in the everyday bustle of multiple (and sometimes even contradictory) roles and responsibilities
Existing Work?

- Literature review in the fields of *management of new product development* (NPD), *strategic management* and *software engineering*
  - No direct support for strategic NPD found

- Our conclusion:
  - Begin with promoting **awareness** of the underlying issues; in other words,

  The *key decisions* in managing SW product development that literature and our experiences from small software product businesses deem important
Key Decision Areas in NPD Management

(Vähäniitty 2003; starting point: Krishnan & Ulrich 2001)
Literature Review – Details

- Most of current management theory cannot be applied directly in smaller companies because it is founded upon a large company context [20,40].
  - Still, even at the beginning of the life-cycle of a company, planning should incorporate analytical elements and become more formal and sophisticated as the company grows and matures [4].

- A large number of techniques, tools and methods for aligning new product development efforts with strategy exist [11].
  - However, these have been designed from the perspective of large companies with multiple business units, each with possibly several product lines.
    - Literature does not provide insight into their applicability in small companies [2].

- Much of the literature on software engineering is written from the viewpoint of large organisations and companies doing individual projects for specific customers [5,8,15,23,27].
  - Also, software engineering literature prefers the engineering point of view and generally leaves the link to business management for others to handle [37].
Methodology
How Were the Areas 1) Identified 2) Tested?

- 1st version from literature:
  - A generic list of "new product development decisions" (Krishnan & Ulrich 2001) …
  - … which we tailored according to characteristics attributed to small product-based SW companies (Condon 2002, Fayad 2000, Regnell 2000, Ward 2000, …)

- Interviews for assessing NPD strengths, weaknesses, problems and challenges at three companies based on the 1st version
  - Opportunistic case selection: industrial partners in our research project
  - Slipstream (20 developers / 40 total), Cielago (10/20) & Cheops (30/100)

- After 1 month
  - Dissemination of general findings in a joint session (3h)
  - Separate sessions for company-specific observations and improvement suggestions (3h each)

- Follow-up after 6 months
  - 2nd round of interviews to observe changes and get feedback

Final structuring and naming + one fourth of total framework content from the empirical work
Results: The Key Decision Areas Framework
Key Decision Areas in Strategic NPD Mgmt

(Vähäniitty 2003; starting point: Krishnan & Ulrich 2001)

- Portfolio management
  What, when & why?

- Organisation
  By whom & where?

- Development model
  How to proceed?

- Quality strategy
  Deliver with what emphasis?

- Product management
  What, when & why, more specifically?
Portfolio Management

- Deciding about
  - Characteristics of the offering
  - Release strategies; i.e. release...
    - Roles
    - Contents
    - Types
    - Timing

- ...across the set of products & services offered by the company
Organisation

- Organisational structure
- Roles and responsibilities
- Mechanisms for team staffing
- Team physical arrangement and location
- Competences and collaboration support
- Technical infrastructure
- Use of outsourcing
Development Model

- Structuring of the product development work
  - Development rhythm
    - Pacing (length of projects, iterations, etc.)
    - Phasing (analysis, design, code, test, etc.)
  - Development control
    - Decision points & Communication mechanisms
    - Progress tracking
    - Relative priority to and interaction with other development models
Product Management

- Technology selection
  - Product architecture
  - Employed technologies

- Requirements engineering
  - Elicitation
  - Specification
  - Release planning
  - Change management

- Release and (outbound) configuration management
Quality Strategy

- Defining "good-enough" quality

- Risk management
  - Release criteria
  - Release success evaluation

- Test planning
  - Test types
  - Timing
  - Documentation
  - Quality metrics
Results: Application Experiences
Major Changes at Follow-Up

- **Slipstream (~20 developers)**
  - Requirements process and release planning made more systematic
  - Project progress tracking strengthened

- **Cielago (~10 developers)**
  - Roles and responsibilities of some of the key personnel altered to stimulate R&D-sales-customers interaction
  - Phases introduced to the product development process and
  - Requirements for new products specified and analysed more rigorously

- **Cheops (~40 developers)**
  - Improvements to requirements prioritisation
  - Organising quality assurance
  - New practices in project planning
  - Part of the development work was outsourced
Benefits as Perceived by the Case Companies

- Slipstream
  - Improvement suggestions were acted on
  - Cause-and-effect unclear because of personnel changes

- Cielago
  - The management considered the interviews (i.e. going through the key decision areas) "very useful for spotting weaknesses and targets for improvement"
  - The most significant problems and challenges identified together successfully acted on

- Cheops
  - The interviewed R&D manager was "both surprised and delighted" of the amount of improvements traceable back to the interviews and suggestions presented

The intention of increasing awareness works and the content of the framework is perceived relevant
Contribution
The framework illustrates the scope of issues involved in managing NPD in small software product businesses.

Useable as a checklist for managing, evaluating and improving management of software product development.

Complements modern approaches to SW development by providing the ‘big picture’.
Future work
A Business-Driven Approach to Process Improvement?

- We propose that instead of following a prescriptive model, process improvement efforts should be focused on where the most business value lies
  - What are the first things a small company should look at, *how does this depend on...*
    - *...the processes already in place?*
    - *...the business context?*

- Currently, the topic is poorly addressed both in literature and in practice
Thank You!

Questions & Discussion

- Portfolio management
  - What, when & why?

- Organisation
  - By whom & where?

- Quality strategy
  - Deliver with what emphasis?

- Development model
  - How to proceed?

- Product management
  - What, when & why, more specifically?