

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)



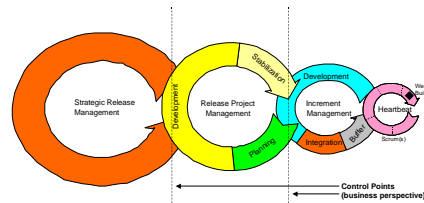
Portfolio management



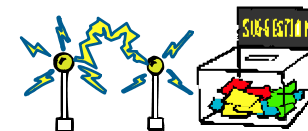
Organisation



Quality strategy



Development model



Product management

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?

8 months

- ❑ 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

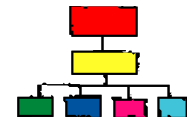
Key Decision Areas in Strategic NPD Mgmt

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



Portfolio management

What, when & why?



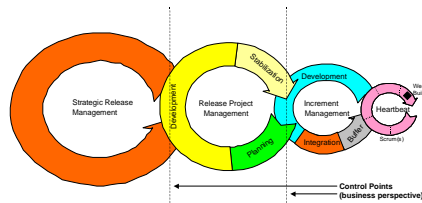
Organisation

By whom
& where?



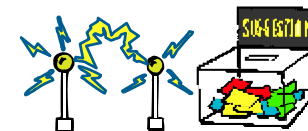
Quality strategy

Deliver
with what
emphasis?



Development model

How to proceed?

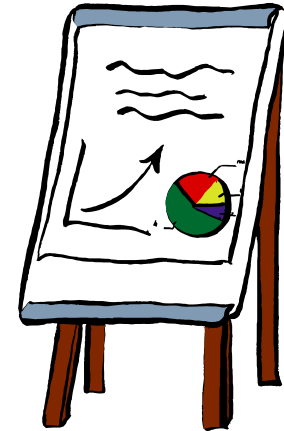


Product management

What, when & why,
more specifically?

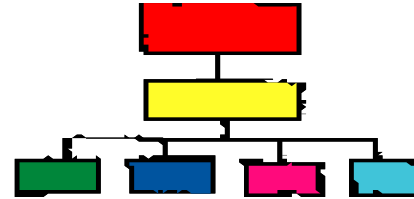
Portfolio Management

- ❑ 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

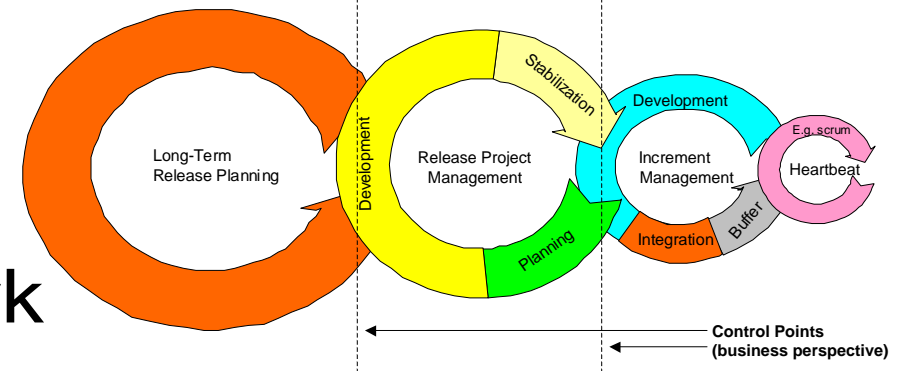
❑ Structuring of the product development work

❖ Development rhythm

- Pacing (length of projects, iterations, etc.)
- Phasing (analysis, design, code, test, etc.)

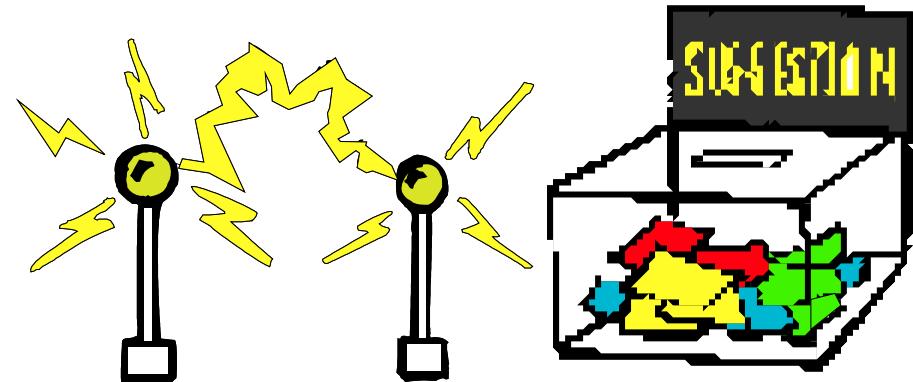
❖ Development control

- Decision points & Communication mechanisms
- Progress tracking
- Relative priority to and interaction with other development models



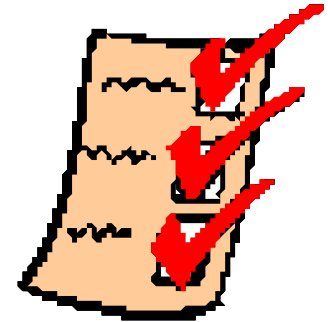
Product Management

- ❑ 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



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

***The framework illustrates the scope
of issues involved in managing NPD
in small software product businesses***

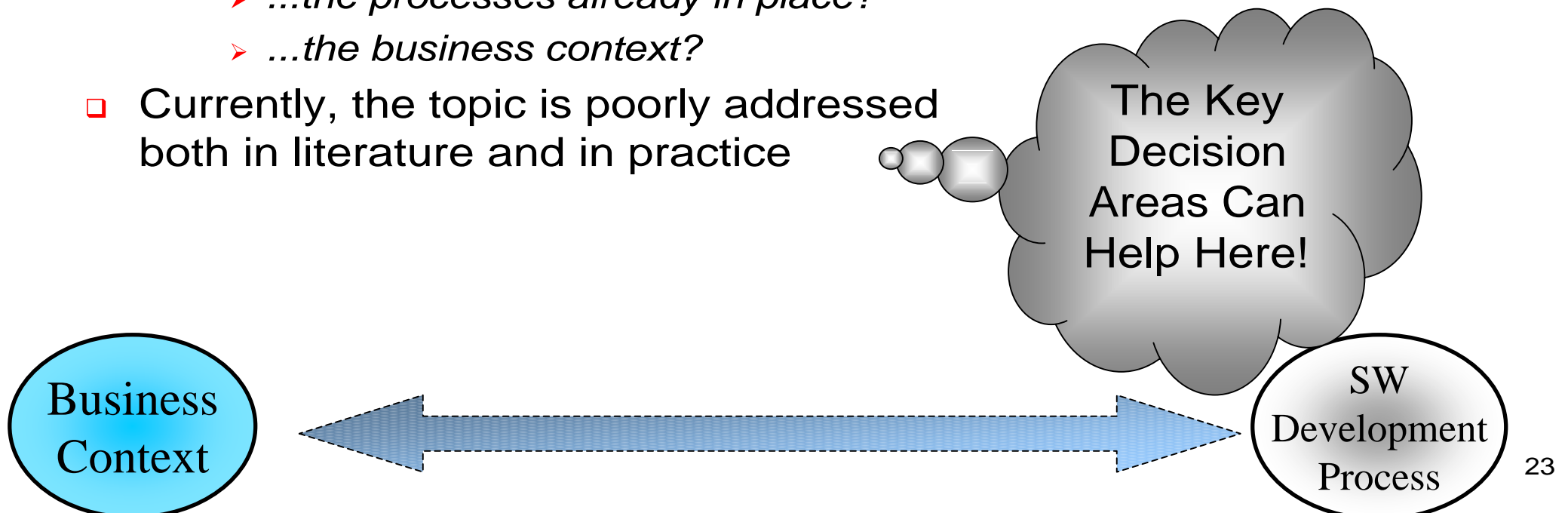


*Complements modern
approaches to SW
development by providing the
'big picture'*

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



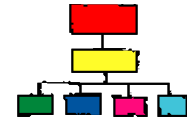
Thank You!

Questions & Discussion



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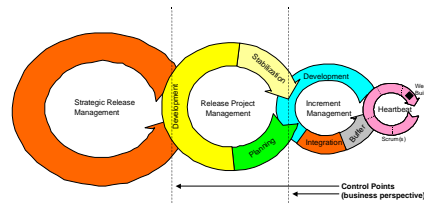
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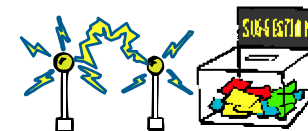
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