Business-Driven New Product Development Process Improvement in Small Software Product Businesses – Theory and a Research Approach

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1. Introduction

A business model is a manifestation of business strategy designed for a particular product/market situation, and in the software business, its four elements are revenue logic, marketing & sales, delivery and product strategy [4,6]. While it is generally agreed that a company's product development process(es) should support its business models, explaining this relationship has received very little attention. Also, little guidance exists for helping small companies (under 50 people, in compliance with the European Union standard) to link business strategy with product development processes [6].

While deploying an appropriate software development process can improve development effectiveness and efficiency as well as the quality of the software itself [5], small companies find it hard to tailor existing process models to their needs and motivate their personnel to use them [2] for a number of reasons (see [5,6]). Literature on managing new product development features a large number of techniques, tools and methods for aligning new product development efforts and processes with strategy [3]. However, these have been designed from the perspective of large companies with multiple business units, each with possibly several product lines, and literature does not provide insight into the applicability of these models in small companies [1].

In [6], the author examined the scope of issues involved in reconciling business strategy and product development, and proposed that business models should be reflected in product development processes through the *portfolio management process*, with the key elements involved being the *characteristics of the offering* in question and its *release strategy*. Also, the constraints and requirements set by the business models and development capability on each other should be reconciliated in release strategy. This paper presents our plans for further examining the outlined connection in order to help focus and direct process improvement efforts in a business-driven manner in small software product businesses (section 2), as well as an approach to carry out the research (section 3).

2. Research problem

The hypothesis of the author is that in wellorganised software companies, the design of product development processes can be traced to the business models, and subsequently, to business strategy and business environment. Understanding the key mechanisms and factors involved would help software process improvement focus on the essentials, increasing the value of such work especially in those small companies having a clear business proposition but relatively ad hoc product development practices to start with. The research problem of this study is thus *how to take advantage of the key mechanisms connecting business model(s) and product development process(es) to facilitate business-driven process improvement in small software product businesses?*

Answering the research problem involves investigating business models and product development processes within their real-world context, with an unclear boundary between these concepts and the context itself. Based on these characteristics, a suitable approach is action research and qualitative case study [7]. We have broken the research problem into the following research questions about a sample of case companies:

- 1.1 What products and services does the company offer and what business models does it employ in terms of the software business model framework [4]?
- 1.2 For each business model, what is the respective product development process like in terms of development model, technical product management process and quality strategy (see [6] for details on these concepts)?
- 1.3 How does the company conduct portfolio management and what issues does the process deal with?
- 1.4 What is the organisation of the company like?
- 1.5 Do the answers to research questions 1.2-1.4 form patterns that can be traced back to the business models, and if so / not, what are these patterns like / why are they missing?
- 1.6 Based on possibly found patterns, what are the key factors that affect the mutual appropriateness of business models and development processes, and what are the key

mechanisms that can be used to reconciliate the demands and constraints set by these factors on business models and product development processes?

3. Methodology

The case companies are industrial partners of the SEMS research project at the Software Business and Engineering Institute at Helsinki University of Technology. Our partnerships are typically 1-2 years in length, and the case work involves defining and improving different aspects of the product development process. The following approaches have been planned to account for the perspective of this study in the SEMS research project:

3.1. Data collection

3.1.1. Identifying development processes and business models used. The key decision areas framework [6] is used as the basis for semi-structured interviews aiming to understand how the case companies manage their new product development, and what their current process improvement priorities are.

In order to understand the business models the companies employ, questions about marketing and sales, revenue logic and delivery models are included to the *portfolio management* section of the interviews. In practice, the case companies may not have defined development processes or employ clear business models. In such cases, it may be necessary to include a brief examination of all of the factors affecting business models, for example, the competing environment (see [4]).

3.1.2. Observation of portfolio management. Because portfolio management is the key mechanism in connecting a business model and the product development process, we plan to track how the long term product development plans (for example, a "product roadmap") of the company change over time, the design decisions involved and their justification, as well as the process used for managing this. Short (15-30min) bi-weekly interviews are used to record these.

3.2. Analysis

The planned approach for answering the research problem based on the data is summarised below. In practice, the steps described are likely to be iterative in nature.

First, a suitable level of abstraction for representing the key concepts, as identified by the research questions 1.1-1.4, is identified. Then, taxonomies regarding each concept are set up based on literature and case data. Here,

a taxonomy means creating a model to represent the possible (known) values for a concept. The data is then examined in the light of these taxonomies to find patterns within case companies and across cases. A pattern refers to an intentional or non-intentional combination of values clearly beneficial or harmful from the perspective of realising corporate and business strategies. The existance, as well as the degree of intentionality of such patterns are validated by discussing them with case company personnel. Based on patterns found, key factors that affect the mutual fit-for-context of business models and development processes are identified, and mechanisms for reconciling the demands and constraints set by these factors are identified. The theory of key factors and mechanisms is refined and validated by examining the intuitiveness and correctness of the guidelines it sets for business-driven process improvement in the case companies in comparison with process improvement priorities as perceived by the case company personnel and other process improvement frameworks.

4. References

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