Requirements Elicitation and Selection

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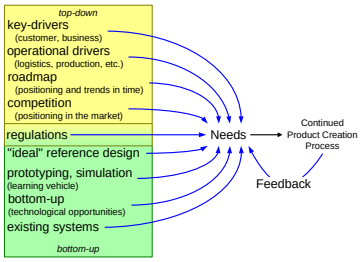

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Abstract

An elicitation method for needs is described using many different viewpoints. A selection process with a coarse and a fine selection is described to reduce the specification to an acceptable and feasible subset.

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1 Introduction

The quality of the system under development depends strongly on the quality of the elicitation process. We can only make a fitting system when we understand the needs of our customer. The outcome of an elicitation process is often an overload of needs. We need a selection process to balance what is needed with all kinds of constraints, such as cost, effort, and time.

2 Viewpoints on Needs

Needs for a new product can be found in a wide variety of sources. The challenge in identifying needs is, in general, to distinguish a solution for a need from the need itself. Stakeholders, when asked for needs, nearly always answer in terms of a solution. For example, consumers might ask for a *flash based video recorder*, where the underlying need might be a light-weight, small, portable video recorder. It is the architect's job, together with marketing and product managers, to reconstruct the actual needs from the answers that stakeholders give.

Many complementary viewpoints provide a good collection of needs. Figure 1 shows a useful number of viewpoints when collecting needs.

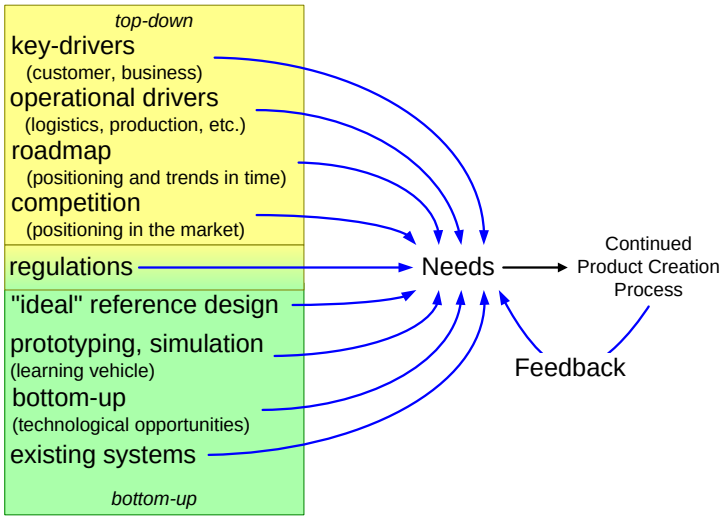

Figure 1: Complementary viewpoints to collect needs

The **key-driver** viewpoint and the **operational** viewpoint are the viewpoints of the stakeholders who are "consuming" or "using" the output of the Product Creation Process. These viewpoints represent the "demand side".

The **roadmap** and the **competition** viewpoints are viewpoints to position the products in time and in the market. These viewpoints are important because they

emphasize the fact that a product is being created in a dynamic and evolving world. The product context is not static and isolated.

Regulations result in requirements both top-down, as well as bottom-up. A top down example are labor regulations that can have impact on product functionality and performance. A bottom up example are materials regulations, for instance do not use lead, that may strongly influence design options.

The **"ideal" reference design** is the challenge for the architect. What is in the architect's vision the perfect solution? From this perfect solution the implicit needs can be reconstructed and added to the collection of needs.

Prototyping or simulations are an important means in communication with customers. This "pro-active feedback" is a very effective filter for nice but impractical features at the one hand and it often uncovers many new requirements. An approach using only concepts easily misses practical constraints and opportunities.

The **bottom up** viewpoint is the viewpoint where the technology is taken as the starting point. This viewpoint sometimes triggers new opportunities that have been overlooked by the other viewpoints due to an implicit bias towards today's technology.

The **existing system** is one of the most important sources of needs. In fact it contains the accumulated wisdom of years of practical application. Especially a large amount of small, but practical, needs can be extracted from existing systems.

The product specification is a dynamic entity, because the world is dynamic: the users change, the competition changes, the technology changes, the company itself changes. For that reason the **Continuation of the Product Creation Process** will generate input for the specification as well. In fact nearly all viewpoints are present and relevant during the entire Product Creation Process.

3 Requirements Value and Selection

The collection of customer and operational needs is often larger than can be realized in the first release of a product. A selection step is required to generate a product specification with the customer and operational needs as input. Figure 2 shows the selection process as black box with its inputs and outputs.

The selection process is primarily controlled by the strategy of the company. The strategy determines market, geography, timing and investments. The roadmap, based on the strategy, is giving context to the selection process for a individual products. The reality of the competitive market is the last influencing factor on the selection.

The selection will often be constrained by technology, people, and process. The decisions in the selection require facts or estimates of these constraints.

During the selection a lot of insight is obtained in needs, the value of needs, and the urgency. We recommend to consolidate these insights, for example by

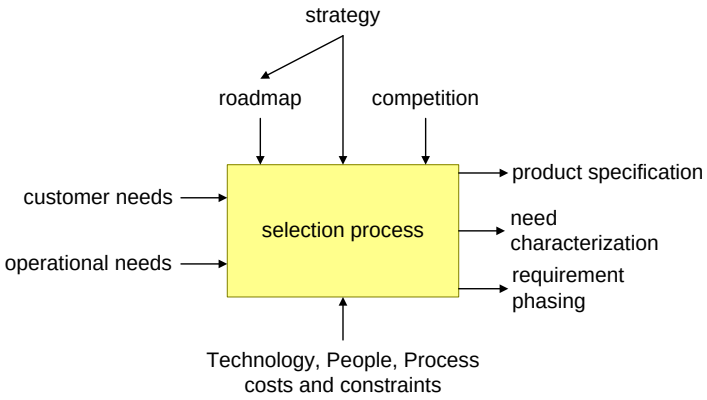

Figure 2: The selection process produces a product specification and a phasing and characterization of requirements to prevent repetition of discussion

documenting the characterization of needs. The timing insights can be documented in a phased plan for requirements.

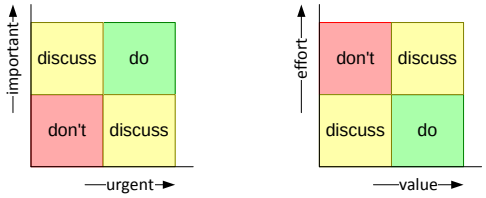

Figure 3: Simple methods for a first selection

The amount of needs can be so large that it is beneficial to quickly filter out the“obvious” requirements. For some needs it is immediately obvious that they have to be fulfilled anyway, while other needs can be delayed without any problem. Figure 3 shows a number of qualitative characterizations of needs, visualized in a two-dimensional matrix. For every quadrant in the matrix a conclusion is given, a need must be included in the specification, a need has to be discarded or the need must be discussed further.

This simple qualitative approach can, for instance, be done with the following criteria:

- importance versus urgency
- customer value versus effort

In the final selection step a more detailed analysis step is preferable, because

this improves the understanding of the needs and results in a less changes during the development.

A possible way to do this more detailed analysis is to "quantify" the characteristics for every requirement for the most business relevant aspects, see for examples Figure 4.

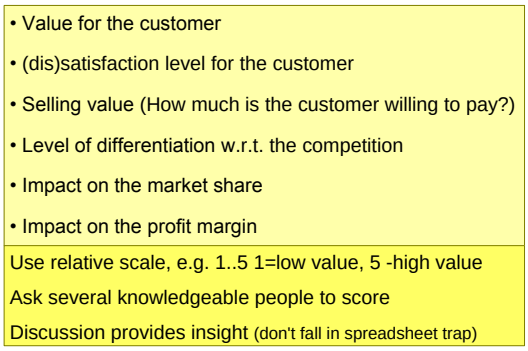

Figure 4: Quantifiable Aspects for Requirements Selection

These quantifications can be given for the immediate future, but also for the somewhat remote future. In that way insight is obtained in the trend, while this information is also very useful for a discussion on the timing of the different requirements. In [1] a much more elaborated method for requirement evaluation and selection is described.

The output of the requirement characterization and the proposed phasing can be used as input for the next update cycle of the roadmap.

References

[1] Jean-Marc DeBaud and Klaus Schmid. A systematic approach to derive the scope of software product lines. In *21st international Conference on Software Engineering: Preparing for the Software Century*, pages 34–47. ICSE, 1999.

[2] Gerrit Muller. The system architecture homepage. `http://www.gaudisite.nl/index.html`, 1999.

History

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- created by refactoring Requirements