

Commonalities in the Development Process Part 1: The Idea of Platforms Reaches Further than Thought

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Abstract:

Physical product platforms achieve efficiency and cost advantages through scale effects for the order management process. Other forms of communalities can also be realized throughout the product development process. This, however, is only considered in few companies.

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Commonalities in the Development Process

Part 1: The Idea of Platforms Reaches Further than Thought

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The utilization of product platforms and the associated increase in common parts for product families is already common procedure in many manufacturing companies. Planned common value-adding parts of different product variants are referred to as commonalities. The systematic establishment of such commonalities does not only allow for the realization of savings in the manufacturing process. Advantages through commonalities are also achievable in the product development process. An increase in efficiency and effectiveness of the development phase has become an additional success factor against the competition due to the increasing complexity of many products. This increasing complexity is on the one hand caused by a stronger integration of different technologies, while it is on the other hand driven by individualization and its resulting increase of product variance.

Tasks within the Product Development Process

Core to the product development process is the generation of new knowledge, which results in the availability of a distinct range of products and services. Usually such processes follow a defined pattern. The possibilities to re-use this knowledge are specific to the stages of this type of knowledge generation. The various activities of project developers can be bundled into five basic categories: planning, structuring, search for solutions, categorization of components as well as designing the manufacturing process (Figure 1).

Planning. Since the development of each product typically represents an individual project, an intensive planning period is necessary. Planning activities emphasize goal setting and task specification at the beginning of the product development process.

Structuring. The early phases of the development process are in particular shaped by the structuring and prioritization of tasks. After the identification of the product requirements, they have to be bundled and organized into a hierarchy. This step is mandatory, since the list of the requirements is most often applicable to several market segments and thus covers many product variants. In addition, the needs of several stakeholder groups have to be covered, which are found both in the company external environment (direct

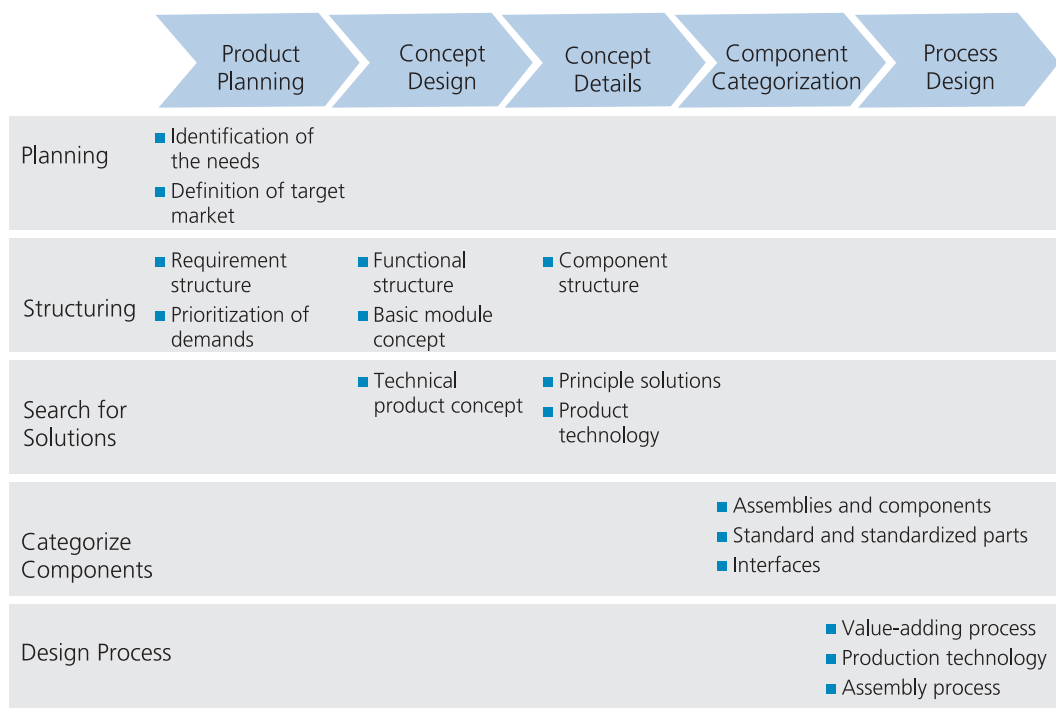


Figure 1: CaregORIZATION of Task during the Development Process

customers, but also subsequent users of the product further along the value chain) and in the company internal environment (e.g. in the production, logistics and procurement departments).

Search for Solutions. The search for new solutions is an additional central aspect of product development. In almost any development project problems arise, which are either completely new or at least so different to already well-known development tasks that the existing solutions are no longer sufficient. The claim in terms of the constant improvement of products regarding quality, costs and functional efficiency requires the critical verification of existing solutions, particularly with technically high-quality products. The possibilities of new product and process technologies therefore needs to be verified with each new product generation with regards to their suitability for each respective application or the entire enterprise.

Categorization of Components. The engineering design of physical components corresponds with the common understanding of the technical product development. Here the components are defined regarding form, dimension, and surface finish, as well as choice of material, and the appropriate documents are developed.

Designing the process. The cost-effective allocation of products also contains the definition and organization of the entire value creation process. The intensive examinations of the possible way to manufacture the necessary components and the resulting challenge of choosing the correct production technologies or methods, is therefore a prerequisite for a competitive cost position. The importance of mastering the process is for some products so large that the company-specific expertise and uniqueness rest largely with the intelligent and rational production than in the design of the product itself. This is in particular the case for variant-rich product families.

The Importance of the Product Architecture

The multilayered process of the development of a complex product – starting with the identification of the market potential as far as the implementation of the necessary manufacturing process – offers, despite the degree of novelty of each development project, a multitude of possibilities to use commonalities. The design of product architecture plays an important role during the definition and design of product families. This influences both the possibilities to manufacture market-specific optimized variants and the cost/use relationship regarding the fulfillment of demanded functionality and costs of this variance.

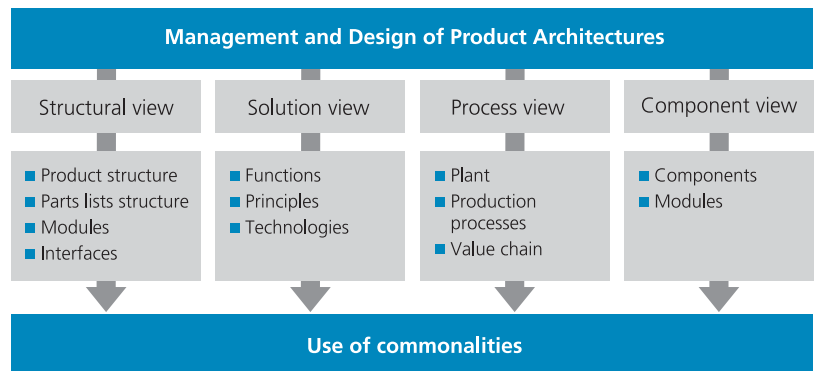


Figure 2: Product Architecture Management as a Basis for the Utilization of Commonalities

Types of Commonalities in the Development Process

The use of commonalities during a process is based on the identification of repeatedly used process steps. With reference to the design of product families, this means a combined execution of development steps for several variants. Yet only four of the five above-mentioned activity categories of the development process are suitable for the creation of commonalities. The activities during planning stage can hardly be optimized due to the individual project character vis-à-vis the re-use of sub-steps. Otherwise the risk exists that the individual goals of a single product development project receives too little attention.

Hence four forms of commonalities can be realized in the development process (Figure 2):

- Structure commonality
- Solution commonality
- Component commonality
- Process commonality

In order to use one or more of these commonalities, they already have to be considered during the interpretation of the product architecture.

In the two upcoming issues these forms of the commonalities and their effects will be described in more detail.

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