

# **DESIGN SUPPORT BY IMPROVING METHOD TRANSFER – A PROCEDURAL MODEL AND GUIDELINES FOR STRATEGIC PRODUCT PLANNING IN SMALL AND MEDIUM-SIZED ENTERPRISES**

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## **1. Introduction and motivation**

Efficient and effective strategic product planning gets more and more important for small and medium-sized enterprises (SMEs) to ensure sustainable success in business. Although numerous methods in the field of strategic product planning exist, especially in small and medium-sized enterprises the use of these methods isn't very established up to now [Gausemeier et al. 2000]. Usually strategic planning is not institutionalized in SMEs and resources for strategic planning are limited. Furthermore, a lack of experience in method application is observable. SMEs often are not able to select and apply adequate methods for product planning on the one hand. On the other hand, existing method approaches are adjusted to major enterprises, which can afford to have own departments and experts in the field of strategic product planning. In addition negative experiences, where inadequate methods failed, lead to prejudices against method application in common.

To enhance strategic product planning in SMEs, existing methods for product planning have to be selected, adapted and combined in a user- and situation specific way for efficient and effective application. Based on existing approaches concerning integrated and systematic product planning [e.g. Ehrlenspiel 2003, VDI 1983], it is the objective to develop and provide instruments that especially fit to the needs of SMEs supporting them to process a company- and situation-specific strategic product planning.

## **2. Procedural model and guidelines for strategic product planning in SMEs**

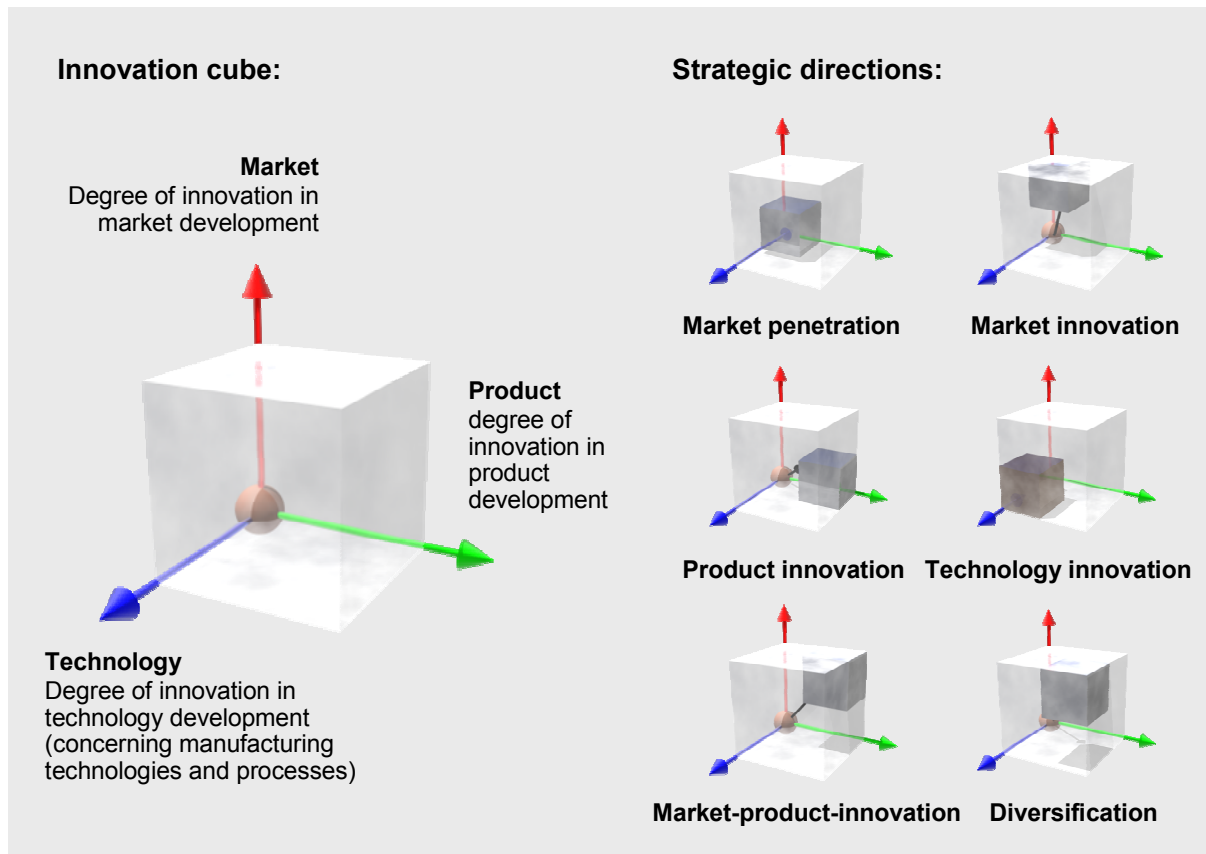
The multitude of small and medium-sized enterprises is characterized as very heterogeneous. But as one might think, company-differentiating aspects like manufacturing type, depth of production, etc. are not significant for the tasks, which have to be worked out concerning strategic product planning. In fact, we could ascertain that task and situation-specific conditions in certain business areas are by far more important to find the right way to deal with strategic product planning.

### **2.1 Innovation Cube and strategic directions**

As a result of the analysis of these different requirements and experiences in pilot projects with small and medium-sized enterprises, we formulated typical strategic directions as starting points for strategic planning in certain business areas. Trying to classify these different strategic directions, we identified three fields as significant: market, product and technology (technology here focuses on manufacturing

technologies and processes). We came up with a three-dimensional model called innovation cube (figure 1), which enables to arrange the strategic directions concerning the degree of innovation in the above mentioned fields.

An increasing distance from the origin of the cube characterises a higher degree of innovation in the considered dimension. The combination of values of degrees of innovation in all three fields is significant for a certain strategic direction.



**Figure 1. Innovation cube and strategic directions**

Six strategic directions emerged as relevant:

**Market penetration** is based on the intention to tap the full potential of present markets with existing products. For this reason, market penetration is the most-favoured strategic direction as starting point for strategic product planning of SMEs.

**Market innovation** describes how to capture new markets with existing products and technologies. Therefore existing product competences have to be transferred to new markets and applications.

The objective of the strategic direction **product innovation** is to develop new products or product technologies for the elaboration of already existing markets. This also includes the adaptation of present products.

**Technology innovation** focuses on the further development of manufacturing technologies and processes. Company-specific competences or unique selling propositions particularly concerning manufacturing processes are initial starting points.

**Market-product innovation** is based on the further development of existing competences and abilities of the considered business area. Based on the analysis of core competences [Prahalad et al. 1990] market and/or product potentials get identified and worked out.

**Diversification** focuses on innovation in all fields of the innovation cube. It is the objective to realize new products in new market areas if necessary by applying new manufacturing technologies and processes.

## 2.2 Procedural model

To support the implementation of strategic directions a procedural model was developed which consists of the following three crucial steps:

1. First, by carrying out a short strategic analysis the adequate strategic direction has to be identified.
2. In the second step a generic guideline consisting of process-steps is assigned to the selected strategic direction. Different method alternatives are assigned to each process step.
3. Finally, the suggested generic guideline has to be adapted to the prevalent user- and situation-specific requirements. This third step is supported by means of method selection and adaptation.

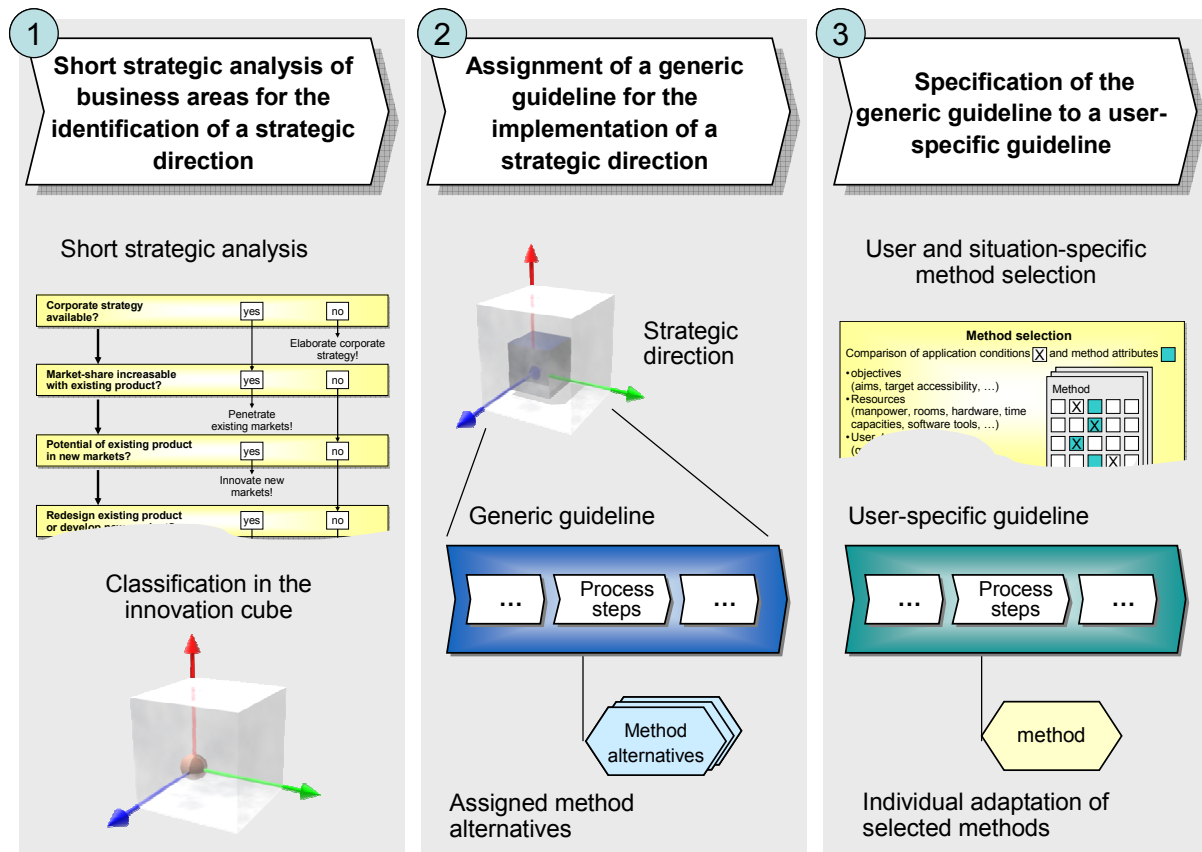


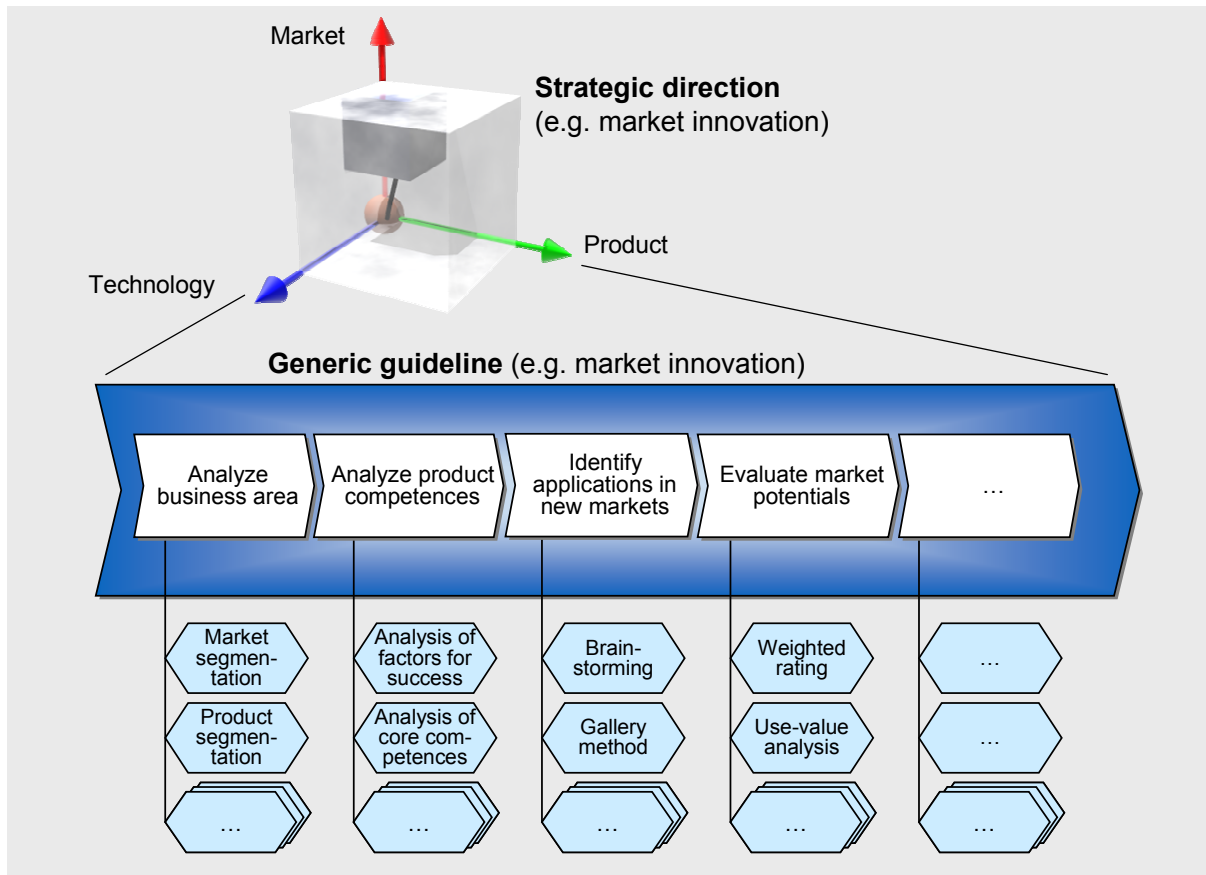
Figure 2. Procedural model for strategic product planning in SMEs

### 2.2.1 Short strategic analysis

A detailed strategic analysis is an indispensable precondition for future-adequate decision making [Aeberhard 1996]. Following the above described requirements of small and medium-sized enterprises, it is necessary to identify a strategic direction in a pragmatic way. Firstly information in the fields of market, product and technology concerning a certain business area has to be gathered and analyzed. The identified criteria can be opposed to those parameters, which are specific for different strategic directions. That strategic direction will be selected, where best possible consistence is ascertained. Secondly conformance to the superior corporate strategy has to be checked. The short strategic analysis is guided by a checklist as indicated in figure 2.

### 2.2.2 Assignment of a generic guideline

After having identified a strategic direction for a business area, a generic guideline is assigned to work out the task. As experiences in industry projects show, for the realization of each strategic direction different processes are necessary. For the elaboration of a process-step various methodical devices can be implemented according to present requirements. Due to this fact, a specific guideline is available for each strategic direction in the procedural model. The suggested guidelines consist of several process steps in a predefined order. Requested information to work out the selected strategic direction is included in the guideline in terms of guideline descriptions and process descriptions.

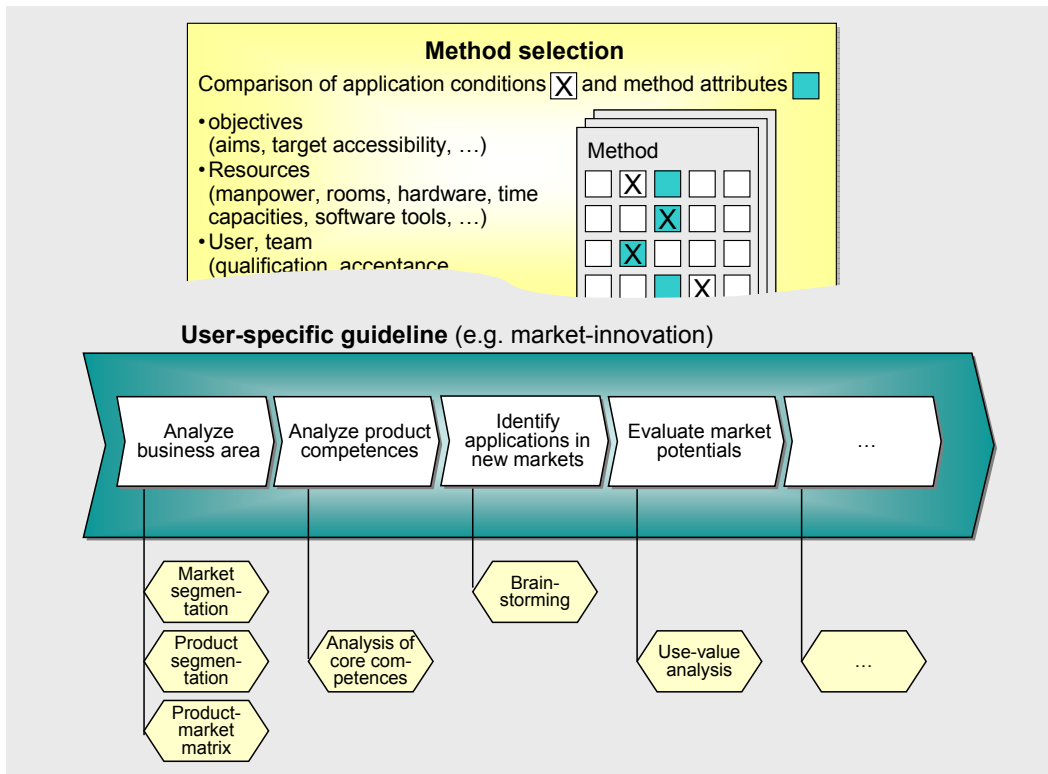


**Figure 3. Generic guideline for the implementation of a strategic direction (e.g. „market innovation“)**

As illustrated in figure 3, method alternatives are assigned to process steps. To every process step one method or a combination of methods is recommended in particular. The suggestion of this method or method-set is based on experiences in industry projects concerning the fulfilment of average SME requirements. Guidelines are characterized as generic at that time. Relating to method application, user- and situation-specific conditions are not taken into consideration up to now.

### 2.2.3 User-specific guidelines

By selecting and adapting adequate methods from the pool of given method alternatives the generic guideline becomes user- and situation-specific (figure 4). Those users who do not adopt a recommended method are supported in further method selection by a set of selection criteria. The principle is to oppose the underlying application conditions to the opposing attributes of eligible methods [Braun et al. 2003]. Best possible consistence is the decisive factor for selection. Those attributes where major variations are identified highlight the starting points for the adaptation of a selected method.



**Figure 4. User-specific guideline (e.g. market innovation)**

Experiences in pilot projects show, that small and medium-sized enterprises often refuse to deal with detailed classifications of method attributes or boundary conditions – pragmatic solutions are requested. For this reason we abandoned insisting on a detailed comparison of application conditions and method attributes and integrated selection and adaptation criteria into process steps descriptions. Formulated as “selection and adaptation hints”, by going through these hints (which are nevertheless structured by applying the given criteria) the user intuitively reaches a decision about which method to select, to be supported to work out a considered task in a best possible manner.

### 2.3 Implementation of the procedural model in a knowledge base

To reach applicability of the described approach in practice and to support method application the procedural model for strategic product planning and its guidelines for the elaboration of strategic directions are implemented in a web-based knowledge database. The knowledge database claims to meet the requirements of small and medium-sized enterprises in regard to method transfer. Detailed descriptions of strategic directions, guidelines, process steps and methods are given in the knowledge base. In particular method knowledge is provided in terms of implementation descriptions, presentations, software templates, literature, expert links and further application tools. The provided method knowledge builds the starting point for flexible adaptation of methods and the instrument in common. Besides navigation through the procedural model, the knowledge database provides further access possibilities. Advanced users are supported by direct access to process-steps and methods, which also allows dealing with further tasks.

Method application in many places demands input of information. Especially methods for product planning are considered as very “inquiring”. For this reason, it is another aim of the database to provide required information or at least highlights how to get it.

## 3. Results and key conclusions

To ensure sustainable business success, SMEs have to improve their strategic competence. We think that this is actually achievable without excessive efforts. It is not necessarily required to increase staff capacities but rather integrate strategic product planning into the corporate management. Therefore it

is necessary to systematically process strategic product planning. This can be supported by the procedural model which has been elaborated in tight cooperation with “typical” SMEs, and which is described in this approach. Thereby it was the focus to especially adjust the instrument to the specific needs of small and medium-sized enterprises.

The guided selection of an adequate strategic direction leads to an adequate generic guideline. For the assignment and visualisation of strategic directions, a three-dimensional model, called innovation cube, was elaborated. Guidelines, which serve to work out a selected strategic direction, consist of combinations of process-steps. Different method alternatives are assigned to process-steps. The suggested generic guideline gets adapted to the prevalent user- and situation-specific requirements. This step is supported by means of method selection and adaptation. Methods have to be selected situation- and user-specific and adapted in a flexible way [Lindemann 2002].

To support the implementation of the procedural model, a knowledge database was developed. Besides navigation through the procedural model, the database also provides possibilities to obtain required information, which is an indispensable prerequisite for a successful application of product planning methods.

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