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ACTIVE CUSTOMER INTEGRATION TO INNOVATION NETWORKS: A PROJECT OUTLOOK

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1. Introduction

Being innovative is a critical success factor for most of the European industry facing a global competition. Especially the small and medium-sized enterprises (SME) have to be innovative if they can't or won't participate in the globalization of production locations to gain cost advantages. Top management is aware of the strategic importance of innovation and gives top priority to it. [Booz 2005][Little 2005]. Considering product innovation, the main objective is to create new products with new or improved features that offer a surplus value for the customer in order to compensate higher pricings in comparison to competing products. To accomplish this objective the design engineers must have an excellent understanding of the customer's needs and wishes, and even better unarticulated and latent needs. It has to be considered that the adaptation of already existing products as well as the development of new products completely from scratch require to fulfill both recent customers' needs and needs which will arise and dominate the market when the development stage is accomplished. Therefore the customer has to become "an integrated part of the entire process: scoping, product definition, development, validation, and beyond" [Cooper 2006]

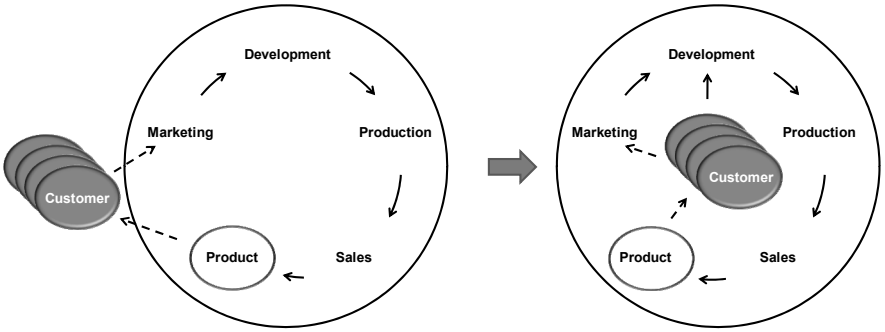

Figure 1. Approach of customer integration

In the last decades the early stages of the new product development process and the possible involvement of customers and users has been a growing field of research. Promising methods and techniques like von Hippel's Lead-user method [Hippel 1988], Toolkits for User Innovation and Co-Design [Hippel 2001], Leonard's and Rayport's customer-centric empathic design approach [Leonard

1997], Gerybadze's innovation communities [Gerybadze 2003] or Walcher's competition of innovations [Walcher 2007] have been introduced. Even the possible benefits of customer integration have been verified. For instance, Homburg and Gruner could demonstrate that customer integration in the new product development (NPD) process can have significant positive influences on the product success in specific situations.
Nevertheless, the actual application of customer knowledge in NPD processes is underdeveloped, especially in the environment of SME. The AKINET project, funded by the Federal Ministry of Education and Research and headed by the Institute of Product Development of the TU München, aims to develop a new approach for the active integration of customers in the NPD process. The project has different cooperation partners within the TU München (the Chair of Sociology and the Chair of Business Informatics) and cooperating business partners for the implementation and verification (companies of market research, of informatics and a number of medium-sized companies of supplier industry and OEM's)

2. Background / State of the art

Consideration of customers' needs within the product development process is widely accepted and considered the basis of business success facing market demand [Booz 2005][Little 2005]. Lindemann describes a methodology (the Munich Procedural Model) to structure the product development process in several steps in order to proceed wittingly [Lindemann 2005]. Additional iterative characteristics allow reactions to changes, such as arising new information or demands, in a proactive manner. Gathering information, defining demands and thus detailing the product definition requires clarifying the mission comprehensively. Based on this information, alternative solutions may be generated and evaluated. When the decision for one particular solution is taken, it needs to be secured, risks need to be identified and minimized. Innovative products are characterized by a high degree of novelty due to inventive concepts and market success as measured by the customers' acceptance [Reichwald 2004]. A methodology for anticipating customers' needs that may arise along with generating new markets and fulfilling them by appropriate products is the "Lead user" approach [Hippel 1988]. Lead users can be characterized by facing needs that will widely occur, and they will benefit enormously by providing a solution to those needs. Von Hippel describes this approach of questioning users' needs based on several studies referring to capital equipment. In this case the customer is willing to cooperate with the company in order to achieve products that fit his needs perfectly. When utilizing a machine for production customization plays a major role for minimizing operating costs. Based on these considerations Lüthje widens the scope of application of the lead user methodology to enclose even consumer goods [Lüthje 2000]. One major difference between these trades is the degree of anonymity of the customer spoken to. Whereas in the former case the customer may be well known, the latter one embraces a huge number of various customers without having direct contact to the company. The customer is interested in utilizing the product and not in supporting a dedicated company. Involving however defined important customers to the process of product development may lead to superior products. A company-customer-relationship may be the result and lead to additional success in market due to standing out from competitors.
Von Hippel also determines the initial party of starting integration of customers [Hippel 1988]. The process of selection and activation of lead users may be started by the company or by active users themselves. The intent of companies for involving customers has already been described above. Additionally customers may try to implement their ideas of requirements or functionalities of new products in order to get products which fulfill their needs. Toolkits for User innovation and Co-Design as described in [Hippel 2001] enable the company to transfer design tasks from the manufacturer to the customer. The customers may apply their need-based knowledge directly without the necessity of costly transfers a priori to the manufacturer.
Gassmann et al. identify activities taken recently by major companies in order to integrate customers in the NPD-process [Gassmann 2005]. The earliest step of integrating customers in an active manner is considered the definition of innovation scopes. Therefore even particular business units have been established:

- In order to further innovative projects carried out with customers a Creative Center at Bayer Material Sciences was established.
- Siemens identifies customers as executive units within the department of Corporate Technology.
- Infoterra, an affiliated company of EADS busy in the geographical information branch, even integrates customers in the stage of developing a business plan.

Von Hippel, Thomke and Sonnack describe their positive experiences in using the lead-user approach at 3M to generate 'breakthroughs' [Hippel 1999]. Although the relevance of customer integration is obvious to science and to industry, there is still a gap between theory and implementation of these methods in a systematic and embracing manner. A handbook with detailed guidelines and step-by-step suggestion making when to use which methodology, which departments to involve and what the tradeoff between possible benefits and cost is, could help to increase the implementation rate. Especially small and medium sized companies which need to focus on daily business without having enough resources for introducing new processes of customer integration on their own may benefit from this kind of guideline. User integration in early stages of product development may be driven forward which in turn may strengthen the company-customer relationship due to "fitting products" as well as the those companies' standing in global competition as mentioned above. Applying this kind of methodology may help to enclose new regional markets by means of adaptation of products in early design stages and thus in a cost efficient manner.

3. Objective of the research project AKINET

A systematic and early integration of customers as active participants in innovation processes is rarely implemented, even though it can support notably the innovativeness of the company. The creative potential of the customer, his ideas and concepts, are so far substantially unexploited in the new product development (NPD).
Therefore, the objective of the presented research project AKINET (Aktive Kundeneinbindung in InnovationsNETzwerke – active customer integration in innovation networks) is the development of new methods and approaches for innovation processes which enable systematic and early active customer integration in the phase of generating ideas, concepts and even prototypes in order to exploit the existing potential. The innovative methods have to be suitable and convincing especially for small and medium enterprises (SME), where the use of customer knowledge is currently remarkably low. Thus, a subsequent objective is the early integration of industry experts into the development of methods and approaches, as they will be the future customers of the research results.
Process innovations of this type are substantially more difficult to copy as for example product innovations. Therefore, the research results not only promise the generation of higher quality ideas but also an elevated competitiveness of German engineering industry.

4. Method

In order to improve the integration of customer knowledge, experience and capabilities into the NPD-process, the following steps are subject of the research project:

- Quantitative and qualitative analysis of communication patterns between product developing staff, customers and other internal and external entities. This analysis will be based on structured interviews and process documentations; it will be assisted by the LOOMEO tool of the Institute of Product Development [Maurer 2005].
- Identification of points within the NPD-process where active customer integration is reasonable and preparation of a proposal how this integration should be realized. This includes the identification of demands that have to be met by innovation promoting processes and methods.
- Systematic development of innovation promoting processes and methods for active customer integration. These processes and methods are planned to be compiled into a generic guideline

that assists the selection and adaptation of new processes and methods according to the specific requirements in the NPD-process and the situation of the particular company.

- Evaluation of the benefit of applied methods and processes for customer integration. This step includes the identification of appropriate criteria and leads to recommendations for the innovation management of the company.

5. Results

The main objective is the development of generic guidelines which assist the small and medium-sized enterprises to select appropriate methods of customer integration reflecting the specific goals and situation of the particular company. Interlinking these guidelines to a methodology enables the company to both apply proper means and collect feedback and experiences in order to document results, and to enrich a company specific database. The methodology comprises five interlinking stages: Describe the situation, choose a method, identify customers and / or users, involve internal / external protagonists and carry out an evaluation. The following figure shows these steps with their respective links to the tool based guideline.

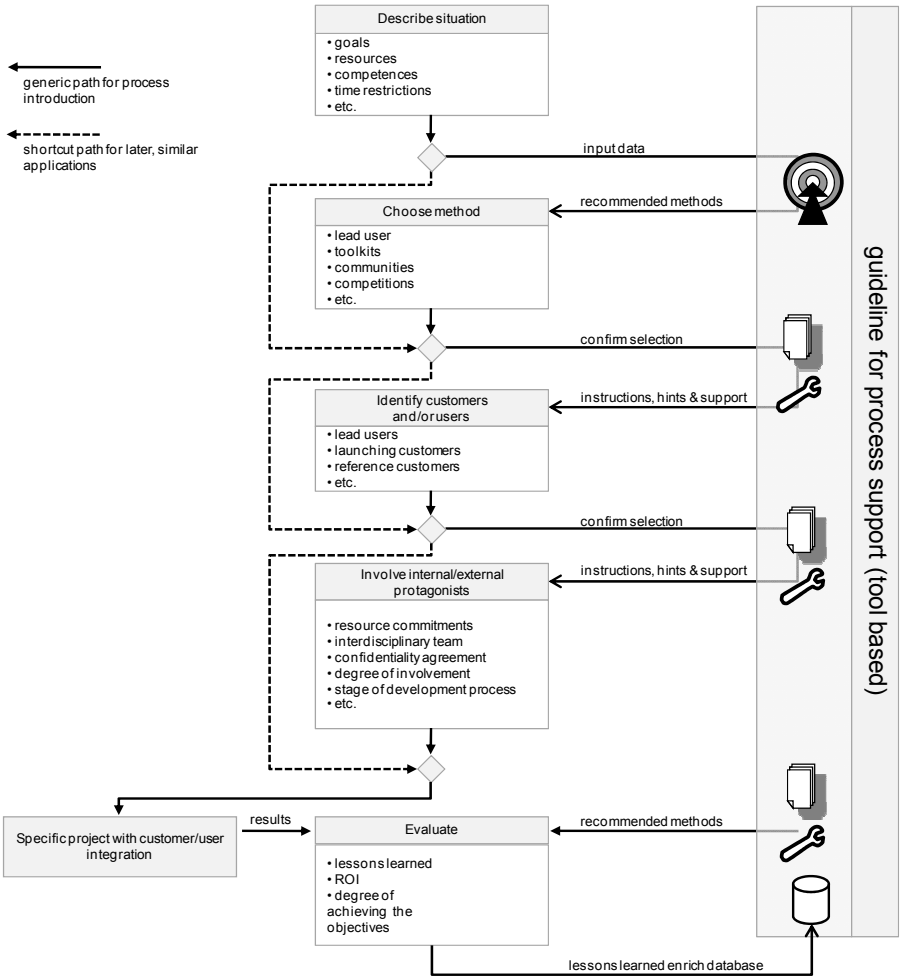

Figure 2. Guideline to support customer integration in the NPD-process

The first step is an explicit characterization of the design situation and process. Especially company and market specific context of customer integration like desired level of innovativeness, resource restrictions or the available time-to-market and the kind of relationship towards customers is of great importance in this stage considering the cost benefit ratio.
Depending on the specific situation a recommendation for the design engineers has to be made. One method or a set of appropriate methods and techniques are proposed from a database. If possible benefit of customer integration is strictly limited by the specific situation, the responsible managers should be made aware of that. By selecting the most promising method or a set of different methods addressed to specific stages in the design process, tailored instructions for the identification of relevant methodologies of integrating customers and/ or users are suggested. The experience from best-practices and case studies of finding the desired users or customers will be provided in an edited format for the attendee to support the next steps. For example the networking approach to find lead-users [Hippel 1999] differs significantly from the standard process of finding representative customers for product clinics.
Additionally internal as well as external protagonists need to be involved in order to embed the methodology of customer integration not only to the department of product development but to the company. Therefore the company should be aware of its explicit and implicit interrelations between departments and time dependant interdependencies which influence, attend and trigger the customer integrated driven development of products. Which input data needs to be retrieved from which department, which commitments concerning available competences should be made before starting the integration?
To justify the additional costs and efforts, there has to be clear evidence for outbalanced benefit of costumer integration. Therefore within the AKINET project, the Chair for Business Informatics at the Technische Universität München will develop models to calculate the extended profitability of innovation projects. The evaluation is an important precondition to make customer integration a regular component even in the early stages of product design. It is vital to gain the faith of the top management and therefore important to assure further resource commitments.
The suggested methodology needs to be strengthened and further detailed by applying input data as well as determination of characteristics concerning each step when proceeding in the research project.
The involvement of customers is limited when the product to be developed passes a certain level of complexity. Most of the known methods have been validated on relatively simple products [Herstatt 1992]. Thus, the question emerges whether the correlation between the complexity of the product and the possible integration of the customer into the NPD-process is quantifiable. Furthermore, the product portfolio itself may require or even exclude the active integration of users to gain additional market potential. It also needs to be discussed whether the users need to understand the product completely in order to participate in the NPD process as a vital partner. In general, parameters and characteristics (product, company, and market) need to be determined and classified that may limit the range of active user integration in the NPD-process. These results will lead to decision rules in the generic guideline that allow the selection of appropriate methods for specific cases.

6. Conclusion

The research project AKINET as described above aims to provide guidelines for SME in order to structure and focus the active integration of customers within the NPD-process. These guidelines contain the collection of recent methods for customer integration such as lead user approach [Hippel 1988], Toolkits for User Innovation and Co-Design [Hippel 2001] Leonard's and Rayport's customer-centric empathic design approach [Leonard 1997], Gerybadze's innovation communities [Gerybadze 2003] or Walcher's competition of innovations [Walcher 2007]. These already existing methods will be arranged and sorted in a methodology following the structure of the Munich Procedural Model [Lindemann 2005] in order to assist the selection of appropriate measures in specific development situations. Moreover, the context of these methods will be illustrated, broadened, and processes will be defined which support the active integration of customers within the NPD-process for innovative products focused on SME.

This approach furthers the integration and cooperation of NPD participants, such as departments and functional branches within the SME and networks of SME. External innovative potential can be explored not only due to awareness of customers' needs but due to the active integration of customers already in early stages of the NPD-process. Thus innovative products can be provided to the market which "fit customers' needs" and enable the SME to gain advantages in market competition. The generation and application of knowledge within methodologies and processes provides a long term surplus which is not directly detectable in the product itself, thus is considered a lever to prohibit simply imitation by competitors.
Problems may occur due to the huge research area that is covered by AKINET. Focused on the generation of guidelines for active customer integration supporting SME, some restrictions need to be taken in order to reach the research objective.
Sketching the next steps the state of the art of participating SME will be identified exemplarily together with academic and industrial research partners. Additionally characteristics of already existing methods for customer integration will be determined in order to structure these approaches according to the suggested model. This methodology needs to be strengthened and further detailed by applying input data as well as determination of characteristics concerning each step when proceeding in the research project.

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