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THE PROCESS CHAIN „FROM MARKET TO PRODUCT“ - A CONCRETE INSTRUMENT FOR PRODUCT INNOVATION

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1 Introduction

The creation of methods for the support of the product development process preoccupies scientists and industrials as well. A great number of development methods is already offered. Although their success potential is undisputedly high German enterprises hardly make use of them. Especially in the early phases of the product development process existing tools are used inadequately [1].

2 Methodology in practice

There are many reasons for the lacking acceptance of supporting methodological tools. Often methodology is still regarded as a well-meant theory from university with apparently insufficient practice aptitude. In addition to the unknown potential of methodology certain prejudices also hinder its application in industry. Increasing costs, a required huge time capacity for its use and a seemingly inadequate adaptability to the enterprise specifications are just examples. On the other hand often there is a lacking consciousness about the already available excellent base for a successful application of methodology inside the enterprises departments. An aim-oriented method-use can mean a decisive projection in the international competition by innovative products. But this potential often just flourishes undetected.

A perhaps decisive contribution to the breaking free from this misery was the forming of the interdisciplinar research project „From Market to Product“. Main aim of this project is to make methodology more accessible to industry and its needs. In future especially small and medium enterprises shall gain by methodological assistance in an intelligible and fast way. A simple to use electronic toolbox (Fig.1) enables different disciplines of enterprises the access to a great number of methods, systematics, workflows and guidelines for the support of the whole product development process.

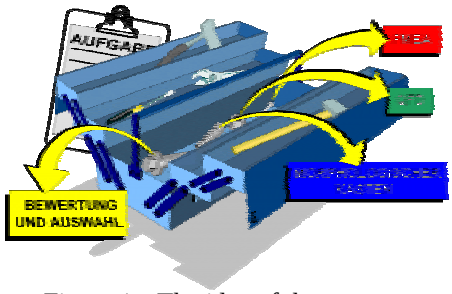

Figure 1. The idea of the methodology-toolbox [2].

The development of the toolbox is shaped by interdisciplinar and practise-oriented viewpoints. It is implemented by the cooperation of different university institutes (mechanical engineering, marketing and psychology) and by integration of an industrial advisory board.

3 The process chain “From Market to Product”

After an extensive analysis of the product development process the branch of industry-neutral definition and interpretation of the process chain "From Market to Product" was elaborated interdisciplinary. It reflexes the base for the use of methods in the product development process. With help of the process chain the user will be able to identify his classification in the total process first. By an emphasized description of their respective potential output in a next step he will make out the benefit of using the tools. The user can then select the methodical support which suites best to his needs.

The recognition, the communication and the standardization of different viewpoints of the involved institutions was a complicated process. Nevertheless it is important to know that the establishment of an intelligible language can be owed significantly to this project phase. On the other hand this is also an important base for the transmission of method knowledge into different disciplines of industrial enterprises. Furthermore it was recognized that the primary area of application of specific methods is also reasonable at other positions of the product development process. The intensive communication with industry soon showed the impossibility of creating an universal process reference. Even on a level of maximum abstraction it is not possible to represent different product development processes in a standardized manner. For example there is an immense difference in process-structures whether an enterprise predominantly operates innovative on reaction of customer demands or takes this initiative of it`s own. Produced numbers of units and manufacturing depths are further exemplary factors which influence the process chain structure. However after the analysis of the procedures of different enterprises the identity of certain basic processes was found. Their order is variable, the compulsion for particular carrying out is individually existent only. The elaborated reference process chain is divided into six basic processes. They are characterized by maximum abstraction degree with individual flexibility in combination and implementation:

1. From market to product idea
2. From product idea to product profile
3. From product profile to product design
4. From product design to prototype
5. From prototype to product
6. From product to market

In three lower levels each process range is divided into several more concrete steps. The lowest level represents the fixing area for the tools. This representation is not to be understood as a process of temporal but of progressing logical steps. Within the framework of a simultaneous engineering it is a matter of course that subprocesses can pass parallel or offset to each other within a given time. It is also natural that the implementation of every process step is no necessary precondition for the successful development of innovative products. The process chain "From Market to Product" is just to be understood as "clothes-line" with a hung up range of potential methods and tools. It is in the user`s own estimation to recognize the individually important processes. Their combination and arrangement in a reasonable order is another individual task. Several workshops in industry revealed a frequently lacking consciousness via the internally available innovation potentials. Process steps with importance for innovative acting are not recognized or not promoted sufficiently. By this the actual process of creating new products is handicapped from the beginning. The reacting-by-order-oriented development engineer is a typical example for this misery. He just very rarely

notices the open space for innovations that even prescribed customer-requirements offer. However the integration of the inventive genius into a standardized job is mostly possible. In many enterprises this possibility of gaining access to new markets became conscious within the framework of this project for the first time. This all indicates the steps which are necessary for an effective method use in industry. In addition to conviction work with regard to the use of methods the consciousness about the individual process handling has to be managed. This sometimes presupposes the optimization or even the reengineering of processes [3].

4 The tools

At this time four disciplines are occupied intensively with relating methodology to the process chain "From Market to Product". The fifth discipline of the project compound is engaged in the transfer of the toolbox-idea into a software-product. The psychological discipline mainly elaborates tools for the measurement of customers contentment on the basis of expert questioning. The economical part optimizes tools for the preparation of outlines for market needs, tools for the determination of the market potential as basis for economical calculations, tools for the determination of benefit expectations of the target customers and tools for the pricing of new products. The production engineering discipline verifies tools for a target-costing-based product and process design. Furthermore it offers instruments for quality control in the processes of product-development and manufacturing. Knowledge about the fundamentals of engineering design and the general problem solving process are typical key-competences of the Institute of Machine Design and Automotive Engineering of the University of Karlsruhe. This includes tools for the processes of productdraft, productdesign and productimplementation. Experiences from workshop-like student tutorials and regularly occurring industry tutorials are only parts of the institute`s wide base in this context [4]. The representation of the tools follows a special design for easy and efficient access and use. It is a main aim to present, introduce and use methodology in enterprises without large expenditure. To avoid incomprehensibility while fitting the tools for interdisciplinarity a project server became arranged for the duration of the project. The communication over this server allows continious criticism and suggestion exchange by the different disciplines. As a long-term aim the Institute of Machine Design and Automotive Engineering elaborates a system which allows a similar communication option in enterprises. In this context the still static toolbox will be transformed into an increasing knowledge management system. In addition to the access onto a basic tool range this system will enable file and play-back of individual industrial experience. This system will equally be usable for the development of macro and micro components. The experiences from the cooperation with 21 industrial enterprises will continuously be integrated into the toolbox until the end of the project in the winter of year 2000. This cooperation regularly comes about in the form of single workshops up to the company of product development processes.

5 The toolbox

The implementation basis of the process chain is the HTML format. Nowadays every PC is equipped with an Internet browser. For the customer the purchase of further software is dropped, the simple networking between process chain and the tools allows a fast navigation. In a very short time the user achieves brief information about the particular tool. This allows the easy decision whether the tool comes into consideration for the enterprise`s needs or not. From there hyperlinks lead to all further necessary information. One option offers the detailed description of the use of the tool, areas of application, advantages and disadvantages as well

as a reference to special literature. On the other hand the user has the option to get material for a lecture about the tool. This can be necessary to achieve agreement among colleagues and supervisors to use particular tools. Another option leads the user to required forms and diagrams [5].

6 Conclusion

With the toolbox „From Market to Product“ the industrial user receives a continual methodical support for the entire product development process. The interdisciplinary development and the adaptation to practical requirements will become profit of all in the product development process involved. A continual case example will reinforce this aspect in addition. In the course of this year the concept of an further training course will be elaborated. This way product development methodology shall be made more accessible to specialist circles as well as to students.

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