

REACHING THE COST TARGET – CURRENT STATUS IN SMEs

A. Nissl and U. Lindemann

Keywords: integrated product development, EDM, knowledge systematization tools and techniques and empirical studies of design support

1. Introduction

Progressive globalization combined with stronger competition, has lead to an increased need for products with an optimal cost-performance ratio. Target Costing is the most established method to support the development of competitive products in relation to the market price. With this method, a cost target is defined in the beginning of the development of a new product. Further, on from the beginning of conceptual design, every decision within the product development process has to be scrutinized with regard to meeting the cost target. Thus multiple conceptual and detail design alternatives for both the product and its manufacturing processes have to be considered. The employees in the product development process have to be provided with knowledge of future costs of possible design alternatives. This allows them to choose the most favourable option. The target costing process can work only if these requirements are complied to in a company.

How does the value engineering process function in the companies? What is the current status of cost evaluation during the product development process in small and medium sized enterprises (SME)? What difficulties do engineers deal with in the value engineering process in different departments? The investigation of these questions led to the survey that is described in this contribution.

2. Investigation of the Current Status in SMEs

The inquiry was conducted in the beginning of a research project. The project aims to provide an improved basis for the target costing process within the enterprises. The primary objective is the development of an approach to integrate all divisions of a company over all phases of the product development process during value engineering. An important aspect is a transparent value engineering process within every decision must be verified in regard to the later product costs. Another goal is the development of adequate instruments for the necessary cost prognosis and documentation.

For the investigation we designed a questionnaire for the analysis of the initial situation in the enterprises. The employees were questioned regarding support in the value engineering process. It comprises of questions from three topics. The questions are placed very openly, in order not to restrict the responses. The questionnaire was sent to 60 engineers in SMEs of one branch of the machine building industry. The rate of return was 40%, thus the findings are based on information from 24 employees in 21 companies.

The survey contains two parts. In the first step, it gathers general information about the working area of the respondent. The second area includes questions on the target costing process. In the first instance, this part enquires decision situations in which the engineers need cost information.

Afterwards the interviewee is asked for information about the circumstances of cost evaluation and the kind of support the engineer would like to have for this purpose.

2.1 General Information

The questions at the beginning of the survey are about the department, the size of the company and the main type of design in the enterprise wherein the interviewee works. With this knowledge, it should be possible to comprehend the answers of the participant in relation to his field of responsibility.

One third of the participants (8) are employed in the area of design & development, nearly another third (7) works for production planning and purchasing. The other thirteen are members of the controlling, preliminary costing, or distribution departments.

The size of the companies is also evenly distributed. Twelve questionnaires were sent back from medium sized enterprises. For this case, medium sized companies were defined with a number of employees from 400 to 1000 and a business volume in the range of 40 to 100 mio €. Seven forms were sent back from larger enterprises and five employees participated from smaller companies.

There are three types of design in progress in the companies. First, the original design is carried out in 17 enterprises. Second, the adaptive design is made in the companies of 17 respondents. Third, the variant design is common in nine of the participating firms. The form allowed the choosing of more than one type of design.

2.2 Cost evaluation

The main part of the inquiry comprises open posed questions to the problems of the engineers with evaluating future product costs.

2.2.1 Classification

There are many diversified responses according to the various tasks of engineers participating in the product development process. Therefore, a classification of the answers was introduced:

Table 1. Classification

C	complexity, quality, modifications, number of variants
MoB	make or buy, all topics in relation with suppliers
PM	production process (choice, costs), materials (choice, costs)
NP	new products, new production processes
M	methods for generating cost data
D	missing data

C for Complexity merges all kinds of difficulties with cost evaluation as a consequence of the complexity of the product or its processes. Modifications and an increasing number of variants also cause increasing complexity. One example for an answer is an underestimated customer requirement with consequences for the completely manufacturing process. This causes problems with cost estimations. In the same manner does, for instance, a participant want to put a focus of support on those situations.

MoB characterizes all problems dealing with the question of make or buy. MoB covers all problems or needs for support in relation with component suppliers and the involved evaluation of costs. For instance, if there is an offer of a new component, it is often difficult to evaluate if the prize is justifiable or not.

PM relates to all matters relating to the choice and/ or the costs of alternative production processes or materials. In this area, a typical problem would be the selection between feasible production processes. In many cases, the designer does not know what the costs for the processes are and which further production steps are involved by making a decision for a particular production process.

NP comprises all demands on cost evaluation of new products or new production processes. In most cases, the companies have no experience with the new products or techniques. Those kinds of

problems arise when a new, innovative product is developed or new manufacturing processes are implemented.

M stands for methods for generating cost data. Further on, it includes all concerns with the application of the target costing process. The interviewees described different problems with approaches to forecast future product costs. For example, the reasons are the estimation of costs for special components or costs that are not attributable to a certain process.

D for data includes every response in relation to an inadequate supply with cost data. The required data is information of costs for production means or production processes. In many cases this data is simply not available for the engineer, in other cases the disposable information does not suit the purpose of the cost estimation. Another topic is the suitable preparation of cost information provided to the employee.

All given responses can be assigned according to this classification.

2.2.2 Evaluation

The main part of the questionnaire addresses problems and situations with respect to cost monitoring. It is split up in three topics: Decision situations, (cost) evaluation difficulties and situations where the respondents need to have a better support.

The questions of the first issue aim at situations in which engineers have difficulties to come to a decision because of a lack of cost information. During the product development process, the final costs of product characteristics are not established. This leads to uncertainties in situations in which a decision has to be made. At this point descriptions of typical cases were expected. The evaluation of the given answers shows the situations of employees in the target costing process when cost data is needed to decide in consideration of the future product costs.

The next section of the inquiry concerns the area of cost evaluation. Every participant of the target costing process has to regard the cost target with every specification of the product. Every determination has to be evaluated in regard to consequences for the later product costs. Often it is already difficult to estimate the costs of different design alternatives. The survey investigates where in the working area of the participants arise those difficulties with the evaluation of future product costs.

Subsequently the questionnaire asks what situations of cost evaluation the respondents prioritise to be supported in their working area. An aspect is how the specified situations could be relieved, or what other situations should also be supported. Furthermore, there was the question what kind of cost information the interviewees would need for their cost estimations and cost monitoring. The final aspect was the way the participants would prefer to implement this support.

The evaluation of the questionnaires shows that employees in same departments of different companies struggle with very similar problems. They also require very comparable kind of support. It is noticeable, that members of production planning and purchasing have very similar problems. Therefore, their responses are combined to a second group in the analysis of the inquiry. The other questionnaires were sent back from employees of the controlling, preliminary costing or distribution departments. The statements sent from controlling and preliminary costing have the same emphases, but the indications from the distribution departments do not fit in at all. For this reason, the controlling and the preliminary costing build the third group in the analysis, and the distribution answers are neglected in this step.

The influence of the size of the company or the type of construction of the enterprises is insignificant. In this way, the working area of the respondents serves as distinguishing characteristic for the evaluation of the survey.

Development and design department

Employees in development and design departments have most difficulties to come to a decision when they have to choose processes or materials for the product they design. Other problematic decision situations arise when the complexity of a product is very high. Costs evaluations of complex products are often complicated.

There are various difficulties to identify the future costs of a product for the staff of development and design departments. Employees are not able to estimate costs because of inadequate methods. Having the right methods at their disposal, they frequently lack the needed cost data. A third important point represents the identification of costs of new products or new processes where again there is insufficient knowledge about the costs to expect. The respondents of development and design departments give top priority of support in the target costing process to the availability of data. The support with data, accumulated with the need for support of the execution of cost estimations amounts up to 70% of the statements. Finally, a fifth of the participants states that they need help with the choice of processes and materials.

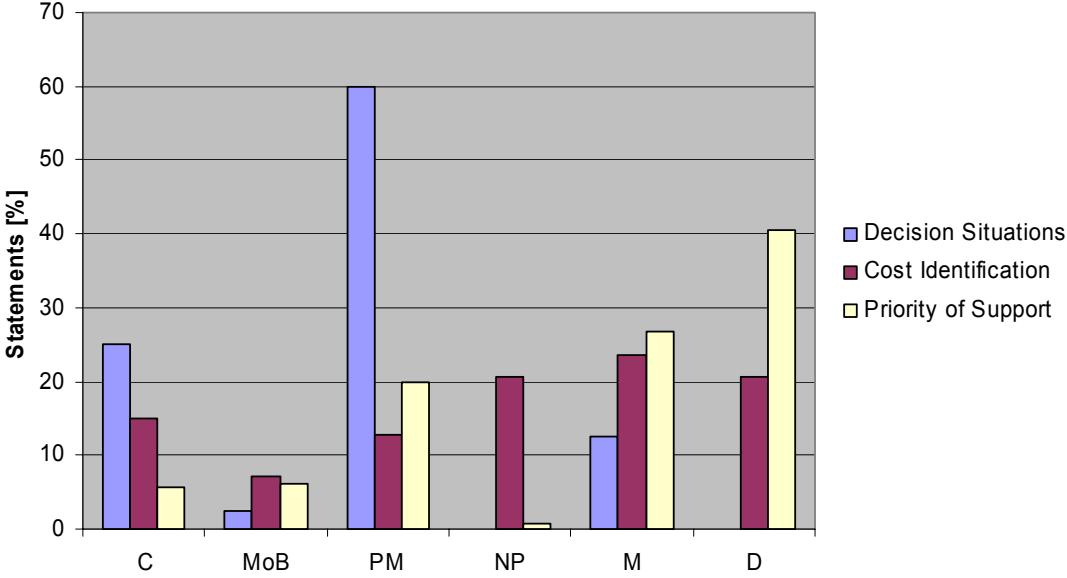


Figure 1. Development & Design

The most important decision situation in development and design departments, in which the employees need cost information, is clearly the choice of materials and production techniques. Difficulties with cost identification are distributed over all groups of the classification. Nevertheless, the emphasis of support is on data and the application of the target costing process.

Process Planning and Purchasing

The main situation in which the employees of process planning and purchasing departments have to come to a decision, is specified with more than 85% as the performance of cost prognosis in the target costing process. For instance, engineers of process planning and purchasing sections have difficulties to determine the later price of the product on basis of cost estimations from the designers. Another decision situation arises, when the costs for the development of a special component are not specified. These situations may partly originate from the problems to identify costs. More than half of the interviewees state to have difficulties in that area. A second, minor important point is the unknown costs that processes and materials involve. The participants indicate a need for support of methods to generate cost data. For this purpose, the members of process planning and purchasing need supply with available cost data and especially cost information about processes and materials.

There is one main problem the process planning and purchasing departments struggle with: A lack of methods and approaches to identify costs. In addition, this deficiency provokes the difficulties in decision situations. As a result, the priority of needed support is on methods for cost evaluation.

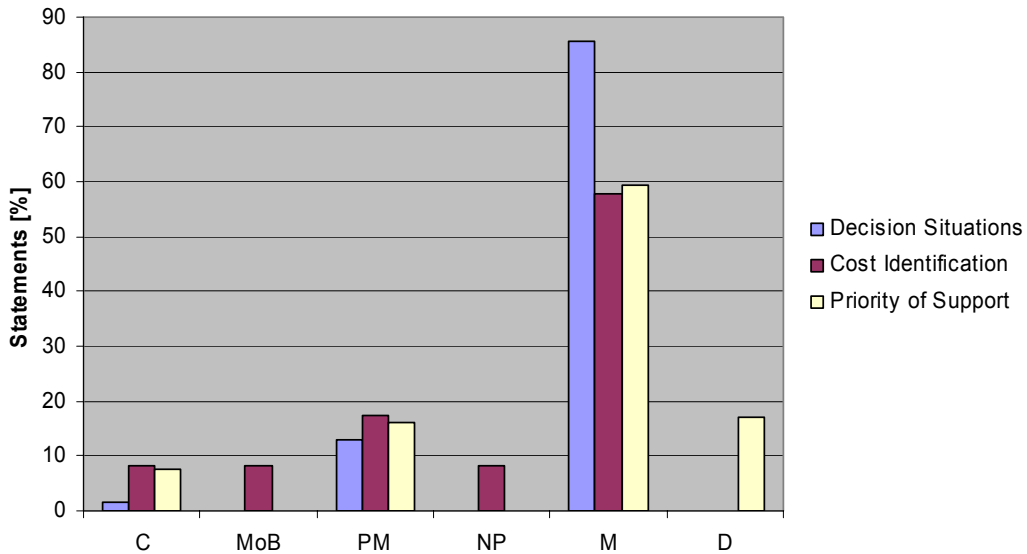


Figure 2. Process Planning and Purchasing

Controlling and Preliminary Costing

One main decision situation causes problems for the respondents of controlling and preliminary costing departments. It emerges when engineers have to come to a decision affecting the future costs of a product. Therefore the respective costs have to be evaluated.

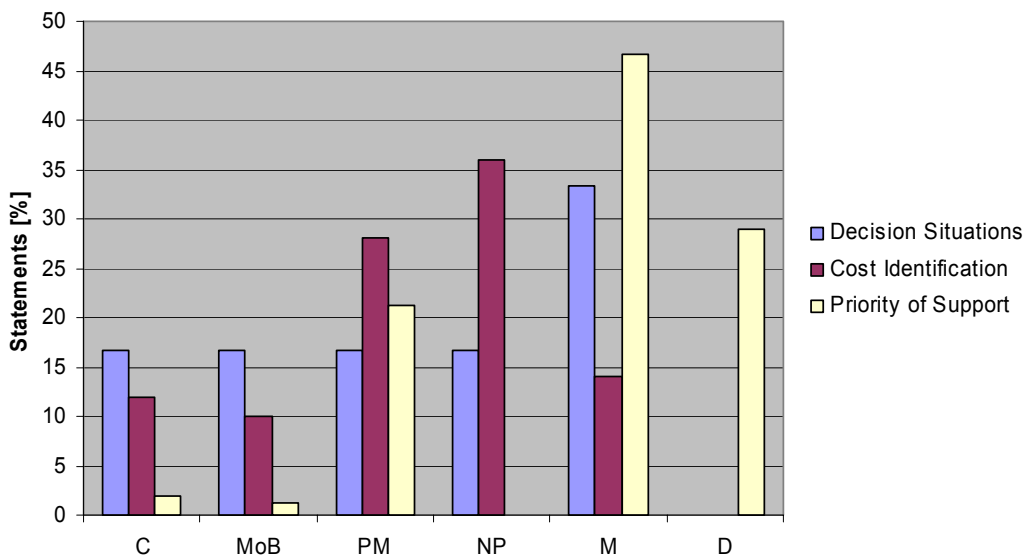


Figure 3. Controlling and Preliminary Costing

The difficulties arise, when there are no adequate methods for cost prognosis available. The further four situations are mentioned in about the same frequency. The issues are complexity of products and processes, the question of make or buy, the specification of processes or materials and the lack of knowledge of new products and manufacturing techniques.

The most frequent cause for difficulties with the evaluation of costs arise from a lack of knowledge of costs for new products and processes. The second-rate stated problems emerge with the identification of costs for production processes and materials in respect to the involved costs. In each case, more than a tenth of the statements aim at methods to forecast costs, the complexity of the product or the

process and make or buy questions. The members of controlling and preliminary costing departments prioritize assistance with cost prognosis methods. At the same time, they require support of cost information. A third point of interest is the knowledge of involved costs because of the specification of processes and materials.

In controlling and preliminary costing sections, difficult decision situations arise from insufficient methods for cost prognosis. The respondents do not regard the available data as the cause for the difficulties to identify costs. In contrast, the respondents demand better support with methods for cost evaluations associated with available cost information.

3. Results

The evaluation of the survey shows that there is still demand for support of the target costing process in SMEs. The responses from employees of diverse companies indicate that in similar departments of different enterprises, engineers struggle with comparable problems. This is independent from the company size or the type of design carried out. In addition to the set of statements from members of development and design sections, it was possible to build two further classes with similar answers: First, the responses from production planning and purchasing, and second the statements from participants of controlling and preliminary costing departments.

The answers were classified into six categories: complexity of the product or its manufacturing processes, the question of make or buy, difficulties with the choice of production processes or materials because of a lack of knowledge of involved costs, problems with new products or new production techniques, inadequate methods for cost prognosis and unavailable or deficient cost data.

The survey shows that development and design divisions struggle particularly with the specification of production processes and materials. Most problems arise with product complexity. The respondents of these departments prioritise a support of methods and appropriate data. In production planning and purchasing, 85% of difficult decision situations and most problems with cost evaluations originate from inadequate methods to estimate costs. In the enterprises, the employees of these sections demand minor support of cost data; accordingly, the supply with cost information is adequate. In controlling and preliminary costing sections, the responses regarding decision situations and problems with cost evaluation distribute among all topics except data. Again, the emphasis of support is on the methods and the data for cost prognosis. The analysis shows clearly that the participating employees have little difficulties with the question of make or buy.

The results of the evaluation indicate the starting points for the research project to support the value engineering process. The investigation ascertained that the participants require assistance with methods and approaches to forecast the costs of products and manufacturing processes. In order to carry out cost estimations they also need a supply of adequate cost information. The collaborative focus on the cost target will enable a more efficient the target costing process.

References

- Clifton, M. B., Bird, H., Albano, R., Townsend, W.:* „Target Costing“, Marcel Dekker, Inc., New York, 2004
Ehrlenspiel, K., Kiewert, A., Lindemann, U.: „Kostengünstig Entwickeln und Konstruieren“, Springer Berlin, 2003
Scholl, K.: „Konstruktionsbegleitende Kalkulation“, Vahlen Muenchen, 1998
Stoëber, R.: „Zielkostenmanagement in integrierten Produkterstellungsprozessen“, Shaker Aachen, 1999

Alexandra Nissl, Dipl.-Ing.

Technische Universität München, Institute for Product Development

Boltzmannstrasse 15, 85748 Garching, Germany

Telephone: +49 (0) 89 289 15152, Telefax: + 49 (0) 89 289 15144

E-mail: nissl@pe.mw.tum.de