



# Design to Cost

## A management method for innovations and product development

### 1 Starting Point

For many years we have assisted our clients in preparation of business plans and evaluation of their innovations and inventions.

On many occasions we found that wrong decisions during the design of prototypes and the first serial products were made. These mistakes mostly were due to a lack of management tools. It is widely known that most cost factors of a product are decided during the development and design.

All wrong decisions during product development makes the product more expensive and less competitive for the entire life of the product. It is hard and expensive to repair, if at all.

We want to improve the situation by having an eye on the projected result of the design during the entire process and not only after finishing it. For that purpose we use the Design-to-Cost method.

### 2 What is it

Design-to-Cost ("DTC") is a management tool that helps to monitor where an innovative product is going during the design phase.

It acts as a benchmark to see how far the development has come and it helps to increase creativity for solutions when there are signs that the project is not going well enough.

As the name says the design is linked to a well defined cost target that must be achieved. Any change in the original design is permitted, as long as it brings the product closer to the target.

#### 2.1 The basic idea

At the start there is the need to define the target of the project/product development in terms of production cost and expected benefit for the customer. The benefit is mostly defined by the technical output of the product or its capacity. Let's assume you want to develop a solar thermal collector. In this case you would define the cost that should be reached and the output that the collector should have.

Many times the two factors are combined to make them easier to understand. It could be defined as a cost of 300 Euro for a capacity of 1000 W for example or as an investment of 0,30/Watt.

## DTC Design-to-Cost

The latter is often easier because the target can be selected from a wide range of existing products and their costs and various capacities.

You might find out that the competition asks a price of 0,40/Watt and you might decide that you want to be cheaper than the competition, so you set yourself a target of 0,30/Watt.

Or you might have some special benefit and decide that you want to sell your product at the same price or at a slightly higher price, but including this benefit as a competitive advantage.

Already at this stage you will get valuable results from DTC: you might see that your product will be too expensive compared to the benefits that you can offer. You might also see how much this benefit must be worth in the eyes of the customer.

And this will be the first decision to take: do you go on or is your product too weak?

## 2.2 Benefits

The main benefit for you is that DTC forces you to have a look at the expected costs and the expected output of your product. You impose a discipline on yourself that always provides you with facts about where you stand.

In cases when you have several options for solving a development problem it is also helpful. You may look at the different options you have (e.g. different materials or constructions). Then look at their comparative effect on cost and on output. Very often solutions that sound fine must be rejected. It is quite common that total output would increase by 5% with this option and total cost would increase by 10%. Unless your customer is neglecting cost and is 100% focused on the output such an option would not bring you forward to the market but rather undermine your product.

Another totally different benefit from DTC is frequently seen in situations when the existing options just are not good enough in terms of reaching your cost/output target. The feedback forces you into developing creative solutions, checking alternative concepts and more often than not unconventional approaches move you on to a break-through.

If the product development is done in a larger organisation or between several research partners DTC will be useful as a management tool for the project manager. Instead of discussing the special field of this or that technician or partner you discuss the contribution their work makes to reaching the target. And of course you don't have to be an expert in all fields to understand if the cost and performance are where they should be.

It is well known that the last few percent in efficiency are the most expensive ones. Still typical development teams work first on optimizing efficiency and only when all things are fixed by the design they come to look at the costs.

A permanent feedback from DTC helps to avoid the problem and it will have a positive impact on the climate in the team, because all people involved understand

## **DTC Design-to-Cost**

why certain developments are made or not made. Engineers will take at least the same pride in reaching the targets of DTC as they do in reaching the conventional and frequently wrong targets of a one-dimensional efficiency factor.

The DTC will make the whole team understand how cost and performance are in comparison to the competition. This information will be used in marketing and sales as soon as the product is rolled out. It will also be used for further improvement and in assessing new products from competitors.

### **3 How does it work**

The most critical step is to define well what costs and what performance is required to be successful in the market. Logically this is easy if a solution already exists from a competitor. If the product is a complete innovation it is more complicated and involves calculating the alternatives that the user has.

A good look on similar problems and solutions and their respective costs will in most cases give at least a range for the cost and performance that is required.

The next step will be a re-examination of the innovation plan and a careful study of the expected cost and performance.

If that step returns a result that is in line with the competition the project can go ahead. If there is a deficit in comparison with the targets it needs to be analysed if it is realistic to overcome the problem. If no, stop the project or review the benefits and targets.

Try to split the development into technically separated parts as far as possible. Then run a workshop to find and describe different approaches / solutions for problem areas. In many cases you will be able to define new target numbers that are subsets of the global target you set. Use these numbers to evaluate the different options and to find out which option will take you closer to your global target.

It is quite logic that consequences of changes in other areas must be observed and must be factored into the result. Do expect some solutions to provide positive, some to provide negative effects outside their direct field of application!

Once you have worked out the more detailed solutions you can bring the results back together for the whole product and define where you stand after this development step.

The more complex the project is the more often you will have to run this circle to make DTC a recurring part of your project management.

When you assess the detailed cost structure for the whole product or for a specific part of the product you can take a few shortcuts in the beginning.

The first costs that must be brought under control are material costs and costs for third parties. Since these costs will always be linked to actually paying a third party they define a lower limit for your sales price, even if you work for free and waive your margin.

## DTC Design-to-Cost

Only when there is enough buffer between the plain material costs and your target it makes sense to look at the production cost that occurs in your own company. Following a similar logic you can first of all concentrate on the direct costs and move on to indirect costs and overhead only when the target is reached when taking into account materials, third party costs and direct internal costs.

At the end naturally you will have to make a full cost analysis that also includes your profit margin and probably also the costs of sales and distribution between you and the final customer. In many industries the margin for sales, wholesale and distribution is a typical percentage that will make it easy to calculate the wholesale price or the end-user price when you have one of them.

All together this stepwise approach will save a lot of work during the first few stages of a project, because you focus on a part of the costs only.

### 4 How to get started

We are offering assistance in implementing the DTC concept in your project or make it a permanent part of you company culture.

It is up to you to decide if you want an outsider to perform these tasks within a project or if you want to train your people to do it internally.

Our company can provide the training for your internal people as well as take over this activity as part of the project magement.

#### On the Author:

Beck & Partner KG is an independent business consulting firm. They provide management and coordination services for renewable energy projects and innovation management. Key activity is to match ideas, innovation and technology with the business and financing world.

*Past and current projects range from EU-reseach projects to studies on financing water needs for developing nations and from business planning for RES (renewable energy) projects to interim management of innovation start-ups.*

#### Contact:

**Beck & Partner KG**  
**Brandmayerstr.9**  
**A-3400 Klosterneuburg**  
**Austria / Europe**

**Tel.: +43/(0)676/33 42 067**  
**Fax : +43/(0)2243/25 610**  
**Internet : [www.BeckPartner.Com](http://www.BeckPartner.Com)**  
**eMail: [office@BeckPartner.Com](mailto:office@BeckPartner.Com)**