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Best Practices in Target Costing

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Here is how four "model" companies—The Boeing Company, Caterpillar, DaimlerChrysler, and Continental Teves—apply this costing technique.

The Consortium for Advanced Manufacturing—International (CAM-I), the American Institute of CPAs, and the University of Akron recently sponsored a major study to benchmark best practices in target costing. This study examined the ways in which target costing has been applied in a variety of industries, the level of success and measurable improvements achieved, and the factors that influenced the success of these applications.

The study began with a survey to collect information about target costing practices throughout the United States. After analyzing the survey results, conducting telephone interviews, and reviewing secondary research, the research team selected four companies as having best practices in target costing. The team then conducted site visits at each of the "best practice" companies, namely The Boeing Company, Caterpillar, DaimlerChrysler, and Continental Teves (a supplier of automotive brake systems). The results of the study are discussed here.

Target-Costing Principles

Target costing can best be described as a systematic process of cost management and profit planning. The six key principles of target costing are:[1]

1. **Price-led costing.** Market prices are used to determine allowable—or target—costs. Target costs are calculated using a formula similar to the following: market price – required profit margin = target cost.
2. **Focus on customers.** Customer requirements for quality, cost, and time are simultaneously incorporated in product and process decisions and guide cost analysis. The value (to the customer) of any features and functionality built into the product must be greater than the cost of providing those features and functionality.
3. **Focus on design.** Cost control is emphasized at the product and process design stage. Therefore, engineering changes must occur before production begins, resulting in lower costs and reduced "time-to-market" for new products.
4. **Cross-functional involvement.** Cross-functional product and process teams are responsible for the entire product from initial concept through final production.
5. **Value-chain involvement.** All members of the value chain—e.g., suppliers, distributors, service providers, and customers—are included in the target costing process.

6. **A life-cycle orientation.** Total life-cycle costs are minimized for both the producer and the customer. Life-cycle costs include purchase price, operating costs, maintenance, and distribution costs.

The Target Costing Process

Essentially, companies use target costing to establish concrete and highly visible cost targets for their new products. To maximize cost control and enhance profit improvement, most companies set relatively aggressive targets. The process begins when top management establishes a target cost for a new product, for example, a Chrysler Neon or a Caterpillar Excavator. A cost estimating group will then decompose the target cost for the product as a whole into cost targets for subassemblies and individual component parts—engine, transmission, seats, and so on.

Frequently a "gap" exists between the target cost and cost projections for the new product based on current designs and manufacturing capabilities. Closing the gap through cost reduction is central to the target costing process. This is accomplished through cross-functional target costing teams, which analyze the product's design, raw material requirements, and manufacturing processes to search for cost savings opportunities. The cross-functional teams employ a variety of management tools and initiatives to help them achieve their objectives. The following section describes some of these tools and initiatives and other characteristics of successful target costing companies.

Target Costing Enablers

The best practice companies demonstrated certain commonalities in their operations and the way in which they supported the target costing process. They all had very effective organizational structures, responded to the "voice of the customer," streamlined their product development process, and actively engaged their supply chain to achieve target costing objectives. To better understand these practices, we visited the four companies that had achieved the most success in each area. Our objective was to document "best practices" in deploying these key elements of target costing.

At each best practice company, target costing is supported by a matrix organizational structure where a vertical, functional organization combines with horizontal, cross-functional teams. For example, U.S. Operations for DaimlerChrysler has five platform teams that cover large cars, small cars, mini-vans, trucks, and jeeps. Each team is cross-functional and includes members from design engineering, manufacturing engineering, purchasing, production, and finance. The target costing system determines cost objectives and performance goals for each platform team, and meeting these goals is an important component of team members' annual performance reviews.

The target costing system at DaimlerChrysler makes use of a "toolbox" of management initiatives to improve productivity and reduce costs. The toolbox includes value engineering/value analysis, design for manufacturing assembly, paper kaizen, and lean manufacturing. Each initiative is implemented through workshops composed of multifunctional teams. The teams vary from five to 30 individuals and meet anywhere from one to five days. The workshops are "working" sessions where participants brainstorm, troubleshoot, and generally try to solve problems and improve operations.

- **Value Engineering/Analysis** is used to increase the value of DaimlerChrysler's products to consumers through improved designs. Changing a part's design can be quite expensive because it generally requires new tooling. Therefore, the benefits of the new design to the consumer must more than offset the cost of the new tooling.
- **Design for Manufacturing Assembly (DFMA)** occurs throughout product design but before the first pilot vehicle is built. Essentially, DFMA evaluates the effectiveness of the design with regard to assembly operations. One benchmark is to minimize the number of vehicle components and to simplify the assembly processes. The result is fewer assembly errors and improved reliability and serviceability of the vehicles.
- **Paper Kaizen** is the term used to promote the concept of continuous improvement. It is most effective immediately after a new part is designed but before the manufacturing process begins. During this stage in a product's life cycle, workstation setups, assembly steps, and process flows are simulated and optimized on paper before expenses are incurred.
- **Lean Manufacturing** occurs after product launch

and extends beyond DaimlerChrysler to include its supply chain. Benefits from this "hands-on" workshop include improved material flow and the elimination of unnecessary inventory movement, reduced setup times, and a general optimization of the workforce.

Voice of the Customer

The best practice companies actively solicit input from the customer on design issues. While this practice is no different from those of many other companies, these companies take it a step further—they examine whether or not their customers are willing to *pay* for the design innovations. If the cost of the innovation is greater than its value to the customer, the innovation should be abandoned. We found numerous examples of "value analysis" during the site visits. For example:

- One of Boeing's customers requested heated floors. Before target costing, The Boeing Company was inclined to provide almost whatever the customer wanted without regard to cost. The company now prices airplane options separately. When this particular customer learned that the price for heated floors was more than $1 million, it reconsidered its request.
- DaimlerChrysler used value analysis to evaluate many of the options that are available for its vehicles. After considering the tradeoff between cost and customer value for several lighting options, one of the platform teams decided to provide lighting for interior controls but forgo under-the-hood lighting.
- Continental Teves went beyond its direct customers to learn from the automobile consumer. It discovered that once vehicle purchasers were educated on the use of anti-lock brake systems (ABS) and the resulting safety benefits, they were more interested in purchasing ABS as an option for their vehicle. To leverage this discovery, Continental built a trailer that serves as a "mobile exhibit" to teach the public about ABS. One section of the trailer has a foot pedal simulator that allows the consumer to feel the "pulsating" motion of the pedal when he or she applies ABS brakes.

Product Development

The product development process at The Boeing Company has changed markedly in recent years. The characteristics of new airplanes are dependent upon the size of the market (potential sales volume), the number of seats required, and customer choices with regard to technological requirements. Before target costing was introduced, engineers tended to design "engineering marvels" with little regard to cost. These airplanes had hundreds of customer-specific product features, most of which were not transferable from one customer to the next. Boeing now tries to minimize unique customer requirements and incorporate changes that will provide value to a large customer base.

Through target costing, the costs associated with adding new components or changing aircraft configurations, such as moving kitchen galleys to new locations on the airplane, are much more visible. Any changes that are incorporated into a new airplane must satisfy a life-cycle-based business case. In other words, customers must be willing to pay for the incremental, nonrecurring costs of the change. Furthermore, many of the technological advancements are expensive to implement on a "piecemeal" basis. Therefore, as technology improves, some strategic advancements are incorporated into existing models, and others are held "in a drawer" until a new family of airplanes is developed (such as the new Boeing 777). For example, the product development team recently learned that a competitor had developed a common cockpit design for its airplanes. This new design will be evaluated using the above criteria, as it is expected to save money for both the manufacturer (fewer new cockpit components to design and manufacture) and the customer (lower training costs and fewer component parts to inventory).

Supply Chain

In addition to internal operations, each of the best practice companies relies on cost savings opportunities from its supply chain to meet cost targets. At both DaimlerChrysler and Continental Teves, approximately 75% of the value of their products comes from purchased raw materials and components. In this environment, target-costing goals would be almost impossible to achieve without the participation of their suppliers. In fact, both companies view their supply chains as part of an "extended enterprise" where they share design information, cost information, and establish inter-company teams to meet cost reduction goals.

Table 1: Modification of Current Product: Known Adjustments

	Current Costs	Projected Savings	Adjusted Costs	Explanation of Known Adjustments
Assembly	5.4%	1.5%	3.9%	Efficiency improvements due to redesigning sheet metal, as documented on current production models.
Cab	7.9	.8	7.1	Replace current cab with the "Classy Cab." PF quote already received.
Engine	8.6	.7	7.9	Cost estimate from Engineering for switching to different configuration.
Hydraulics	19.1	1.6	17.5	New pump design.
Power Train	12.0	0	12.0	
Structures	20.0	0	20.0	
Linkage	18.0	0	18.0	
Other	9.0	0	9.0	
Total	**100.0%**	**4.6%**	**95.4%**	

To encourage process improvements among its suppliers, DaimlerChrysler rates the performance of each supplier on a yearly basis. A major component of the rating system is the "**SCORE**" (**S**upplier **CO**st **R**eduction **E**ffort) program. Each supplier is asked to achieve the equivalent of a 5% annual cost reduction based on its total annual sales to DaimlerChrysler. This cost reduction goal includes any supplier suggestions that result in lower costs for DaimlerChrysler. For example, one supplier suggested changing a vehicle's front rail system from several pieces to one unit. While the new design did not reduce the supplier's cost, it did improve the unit's quality and reduce DaimlerChrysler's assembly costs. Under DaimlerChrysler's SCORE system, the supplier received credit for this innovation.

Continental Teves has developed a cost-modeling tool to determine target costs for the components it outsources. The cost targets are based on material costs, cycle times, labor rates, overhead, and other characteristics. The model is sophisticated, and it adjusts wage and occupancy rates to correspond with the appropriate rates for the region of the country in which the supplier operates. Furthermore, the model's overhead allocation rates differ based on the type of supplier. Full-service suppliers, responsible for product research and design, are allowed higher overhead allocation rates than suppliers that simply "build to print." If a supplier is unable to meet its target costs, Continental might ask to send a team there to view its operations. Continental will then analyze the supplier's manufacturing processes, tolerances, and material content and generally verify the assumptions in its cost-modeling tool. After negotiations, however, if Continental still believes the supplier's costs are too high, it might consider bids from other suppliers.

Target Costing Steps at Caterpillar

Once companies have the tools and systems in place to support target costing, they often develop a standardized approach for achieving their target costing objectives. Caterpillar offers a good illustration to highlight the target costing process for one of its new products. For this particular vehicle, management set the target cost at 94.6% of a comparable model, creating an initial gap of 5.4%. The cost of the comparable model is based

Table 2: Modification of Current Product: Sample Questionnaire*

	Assembly	Cab	Engine	Hydraulics	Power Train	Structures	Linkage	Other	TOTAL
1. Are there more than five suppliers from whom you can purchase materials?	0	0	0	1	1	1	1	0	
2. Are you more costly than best-in-class supplier (either Caterpillar or non-Caterpillar)?	0	0	0	1	0	0	0	0	
3. Do you plan to survey your supplier cost breakdown?	0	0	0	1	0	0	1	0	
4. Is the current manufacturing process younger than two years?	0	0	0	1	0	0	0	0	
5. Does labor represent more than 40% of your total cost?	0	0	1	1	0	0	1	0	
6. Is your "unit setup cost/total unit cost" ratio greater than 5%?	0	0	1	1	0	0	0	0	
7. Do you see potential for material specification changes?	0	0	0	1	0	0	0	0	
8. Do you see potential for tolerance loosening?	0	0	0	1	0	0	1	0	
9. Does the current family of parts contain nonapproved parts?	0	0	0	1	0	1	1	0	
10. Can the current design or manufacturing processes be subjected to emerging innovative technologies?	0	0	0	1	0	0	0	0	
Total	0	0	2	10	1	2	5	0	20
Relative Proportions	0%	0%	10%	50%	5%	10%	25%	0%	100%
Distribution of .8% in Cost Reduction	.0%	.0%	.08%	.40%	.04%	.08%	.20%	.0%	.80%

*Yes = 1; No = 0

on current manufacturing capabilities. Therefore, to achieve the target, costs must be reduced by 5.4%.

Current costs for a comparable model	100.0%
Target cost for new product	94.6%
Cost gap	5.4%

A cost improvement team is then assembled from product design, manufacturing engineering, production, marketing, and purchasing to determine how to close the gap. Initially, the group evaluates component part substitutions that would reduce costs but still provide the product features and benefits necessary to satisfy customer requirements. The group also considers opportunities to reduce costs through efficiency improvements. Table 1 shows that the cost improvement team identified 4.6% in "known" savings through an initial evaluation of cost savings opportunities.

Having reduced the gap by 4.6%, the team must find an additional 0.8% in savings to achieve the 5.4% cost

Table 3: Modification of Current Product: Final Target Cost Assignments

	Adjusted Costs	Distribution of .8% in Cost Reduction	Target Cost for New Product
Assembly	3.9%	0.00%	3.90%
Cab	7.1	0.00	7.10
Engine	7.9	.08	7.82
Hydraulics	17.5	.40	17.10
Power Train	12.0	.04	11.96
Structures	20.0	.08	19.92
Linkage	18.0	.20	17.80
Other	9.0	0.00	9.00
Total	**95.4%**	**.80%**	**94.60%**

reduction target. At this stage, the cost improvement team surveys the operational groups to identify potential cost savings opportunities. The responses to the questionnaire do not recommend specific solutions, but they do identify where improvement opportunities are more likely to be successful (see Table 2). Each "yes" response on the questionnaire indicates an opportunity for cost reduction, and the component part category (cab, engine, hydraulics, etc.) that has the largest number of positive responses is viewed as having the greatest potential for saving money. Table 2 highlights a sample questionnaire, and a tally of the responses indicates the extent to which each part category will be targeted for cost reduction. In this case, hydraulics will be responsible for achieving the highest percentage (50%) of the cost savings that are needed. Therefore, the cost of hydraulics must be reduced by .4% (.50 × .08).

Table 3 illustrates the final step in the process. It takes the adjusted costs column from Table 1 and subtracts the additional savings that are required for each component part category. The right-hand column in Table 3 illustrates the target cost for the new vehicle, broken down to the component level. To recap, Caterpillar began with current costs for a comparable product (100%) and, after deducting known savings based on existing technology (Table 1) and potential savings based on an analysis of the questionnaire (Table 2), established cost targets for each component of the new vehicle.

Best Practice Companies Consistent in Approach

Target costing is still relatively new to U.S. companies. Nevertheless, it is being adopted in some key industries, namely the transportation and heavy equipment industries. Intensive competition, extensive supply chains, and relatively long product development cycles characterize these industries.

The best practice companies were relatively consistent in the way in which they applied target costing. The other companies follow a similar approach to the target costing steps at Caterpillar that were highlighted in the last section, All of the best practice companies employ a cross-functional organizational structure, listen to the "voice of the customer," emphasize cost reduction during the new product development cycle, and are very effective at removing costs throughout the supply chain. For these companies, target costing has proven to be a very effective means of cost control and profit enhancement. ■

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1 These principles are adopted from S. Ansari, J. Bell, and the CAM-I Target Cost Core Group, *Target Costing, The Next Frontier in Strategic Cost Management*, Irwin, Chicago, 1997.