



Product development process with focus on value engineering and target-costing: A case study in an automotive company

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Abstract

This research suggests a methodology for the product development process in an automotive company, aiming at the correct systematic approach of Value Engineering (VE) and target-costing in cost management. VE and target-costing are complementary processes, because while one allows the identification of where cost reduction could be achieved, the other shows the target to be achieved to guarantee the long-term profitability plan of a company. In order to do that, work plans were developed, with the application of the VE methodology at three subsequent stages: concept, project and validation. This proposed approach was validated in a case study focused on the engine-starter system of a vehicle, aiming at improved product cost, functionality and quality accomplishment, in accordance with customer needs and the company strategy. © 2006 Elsevier B.V. All rights reserved.

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1. Introduction

Since the beginning of the automotive industry's history, the main automotive companies have pursued several of differentiation strategies in the production of passenger cars. Technological and market changes created the potential for Henry Ford to modify the rules of the game by adopting the classic strategy of leadership by cost, based on lower production costs of a standard model sold at low price. Ford dominated the industry quickly at world level. However, by the end of the 1920s, economic growth, growing familiarity with the

automobile and technological changes had created the potential for General Motors to change the rules once again, using a strategy of differentiation with a wide range of products and details at premium price. With the growing increase in competition, in the most recent decades, companies sought to create higher value in their products for customers. Japanese companies, like Toyota, succeeded in doing so, with products of higher quality at a lower cost.

Therefore, a program of new product development must include projects designed to lower product cost and to enhance the value to the customer, because due to growing competitiveness, customers always demand new products with better quality and functionality, without an increase in price (Roy et al., 2004).

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Many studies are being undertaken in the field of Product Development Process (PDP), because it is one of the main ways to gain competitive advantage for a company. The performance of a product and a good part of its cost are defined in its development (Dekker and Smidt, 2003) and for that reason, in order to optimize these two parameters, a correct approach of cost management in the PDP is necessary.

This research demonstrates the importance of developing products not only with quality, but also with cost and functionality in conformity with customer values. These three characteristics, denominated as the “survival tripod” by Cooper (1995) and Cooper and Slagmulder (1997), are related as a rule for the success of companies, which should balance this tripod in accordance with market requirements and the company strategy. Also, according to Cooper and Slagmulder (1997), the correct term should be “cost management” and not “cost reduction”, because the latter simply implies the reduction in functionality and quality of products, while the real task would be to provide exactly the same function with better quality, but at lesser cost.

2. Theory of target-costing

At the beginning of the project phase, the knowledge of the product’s technical features by the development team is as important as the definition of the product cost. Therefore, it is at this moment that the product target-cost should be defined (Ferreira, 2000).

According to Monden (1995), a target-costing system has two objectives:

1. Reduce the cost of new products so that the level of required profit could be guaranteed, simultaneously satisfying the levels of quality, development time and price demanded by the market
2. Motivate all the employees to achieve the target-profit during the new product development, turning target-costing into an activity of profit administration for the whole company, using the creativity of employees from several departments to draw up alternative plans that allow higher cost reductions.

The definition of target-costing involves, basically, product planning so as to satisfy customer attributes and the profit generation to the company,

given the market requirements (Yoshikawa et al., 1994). This information is essential so that the product cost can be considered an active variable of the project.

2.1. Stages to determine the target-cost

The implementation of a target-costing approach and the determination of the product target-cost involve the ten steps described below, which were based on the research of Crow (1999).

1. *Re-orient culture and attitudes.* The first and most important stage is to re-orient thinking toward market-driven pricing, prioritizing customer attributes as a basis for product development. This is an essential change of attitude in most organizations, where cost is the result of design rather than one of the project requirements.
2. *Establish a market-driven target-price.* A target-price needs to be established based on market factors such as the company positioning in the market place (market-share), the market penetration strategy, competitors and competitive price, the targeted market-niche and the elasticity of demand.
3. *Determine the target-cost.* Once the target-price is established, the target-cost should be calculated by subtracting the target-profit and any uncontrollable allocations, such as taxes and some indirect fixed costs. It can be summarized in a margin-denominated Mark-up.
4. *Balance target-cost with requirements.* Before the target-cost is concluded, product requirements must be considered. The greatest opportunity to control product costs is through proper setting of requirements and specifications. This requires a careful understanding of customer needs, the use of conjoint analysis to understand the value that customers place in particular product functions and the use of techniques such as quality function deployment (QFD) to help make these tradeoffs among various product requirements, including target-cost.
5. *Establish a target-costing process and a team-based organization.* A well-defined process must integrate activities and tasks to support the target-cost, be based on early and proactive consideration of target-cost, and incorporate the tools and methodologies described subsequently. Furthermore, a team-based

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