



TARGET COSTING IN THE TEXTILE COMPLEX

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ABSTRACT

Cost as well as product innovations have always been very important to the textile and apparel industries. The survival of any company within the pipeline depends on offering the right product at the right price.

The traditional approach has been to develop a product and then approach the market with a price that was based on a cost-plus calculation. Target costing turns the process around by starting at the market price of the product and subtracting a target profit from this price to arrive at a target cost. Product development then takes place in an environment where the market price and the allowable cost components for a product are known.

The process of target costing for the integrated textile complex is described and its implications discussed. Forces that move textiles and apparel towards target costing are analyzed.

Keywords: Costing, target costing, target cost, market, product development

1. Introduction

Since their industrial beginnings, textiles and apparel have been leaders in terms of cost awareness as well as product innovations. For the apparel industry, development of innovations and fashions has long been the driving factor of growth, and the textile industry has reinvented itself again and again through new products and new markets. From early on, the industries utilized emerging costing techniques to control manufacturing costs and to determine product costs (Szepesi, 1922, Hergeth, 1996). With better and more cost effective transportation options and faster communication, competition has become fiercer and in many cases more cost oriented. Timing in product development has become an even bigger factor than it

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used to be, and companies cannot afford to introduce products at the wrong price or quality level. Target costing is one of the tools available to the industries that may prevent pricing errors and aid in faster and more focused product developments.

2. Traditional Pricing and Costing

Traditional product development typically starts with a basic product design developed in the Research and Development branch of a firm. This may be a design group, a research lab, and engineering team, or any other group of people in the company that is responsible for developing new products. The initial idea for the product may have come from the market, or it may have originated in development efforts inside the company. After the basic product design has

been developed, the price is typically found by adding all costs and a desired profit margin. If this price is acceptable in the market is only experienced when the product is actually introduced and offered to potential customers. If it is more than the attainable market price for the product, the product has to be redesigned until the market price can be met, or the specific product has to be dropped. Redesigning the product towards a lower cost is difficult, as most cost (including raw materials, manufacturing, and marketing and distribution) is set and fixed during the initial design stage. Typical estimates are that 70 to 80% of the costs of a product are “immune” after the design stage (Cooper and Chew, 1996, Lee, 1994, Morgan, 1993). Traditional standard costing methods are useful in assuring that actual cost stays within budgeted limits or within historical ranges, but they neither have any link to market realities nor do they give any direction to cost reduction efforts.

When using traditional costing methods for calculating new products, many feedback loops are required, making the product development cycle time less predictable. It also leads to changes in the design of a product after a lot variables in research and development as well as in manufacturing have been set, which results in very expensive changes. Last but not least, it may lead to abandoning products due to their associated costs at a stage in their development when a lot of time, money, and effort have already been spent.

Of course it is also possible that a new product is priced too low; this is the case when the company learns after introducing the product that it would have sold just as well at a higher price. An indicator for this is “a line of customers waiting to buy”, e.g., sold out retailers or extended delivery times for shipments may indicate such a situation. (S. A. Butscher and M. Laker, 2000). The forgone profit cannot be made up, and in most cases it is very difficult or impossible

to correct and raise the prices over the lifetime of a product.

There are several reasons why a new product is introduced to the market at the wrong price. A product may be “over-designed”, i.e. it offers more elaborate features than the customers want or uses far higher quality raw materials than needed for the desired performance level. More typically, the features may be desirable, but not at the cost/price they can be offered. The underlying cause of all this is the fact that product price does not enter the picture until the product has been designed, and prototypes have been manufactured. Target Costing attempts to address this issue by moving cost early into the product development phase.

### 3. Target Costing

Target Costing describes a process of first assessing a target price and then designing a product to meet this price.

Usually target costing is part of a total cost management system, leading away from traditional financial accounting to management accounting. For this paper only aspects of target costing itself are being discussed as an integrative part of the product development process.

While a lot of the literature describes Japanese companies using target costing (e.g., Hiromoto, 1991, Tanaka, 1993, Cooper, 1995, Gagne and Discenza, 1995), early uses of price-based costing can be seen in the philosophies of Ford Motor Company during its early years (Shank and Fisher, 1999). The process of target costing is usually described using examples from the assembly industry. For assembled products it is easier to associate different product functions with specific functional product components. Many researchers point out that target costing is most beneficial to assembly-oriented industries (automotive manufacturers, electronic equipment companies, etc.) rather than process-oriented

manufacturers (e.g., Gagne and Discenza, 1995, Morgan, 1993). It is also pointed out that target costing is more applicable for industries with frequent product changes and short product life cycles (Gagne and Discenza, 1993 and 1995, Lee, 1994). These criteria fit many companies in the fashion driven apparel industry, where products have short seasons, and change drives the industry more than anything else. The processes in the apparel industry are largely assembly-oriented; however the number of components is typically smaller and they are usually sourced from fewer suppliers than for example in automotive or airplane manufacturing.

Textile operations on the other hand are process oriented manufacturing operations, creating product functions through processing of a single or very few raw materials. Rather than looking at separate product components, it becomes necessary to evaluate different (but often integrated and interrelated) processing or manufacturing steps. Several researchers have pointed out that target costing should also be used in these industries. Shank and Fischer (1999) point out that many product innovations in the automotive or electronics industries are actually modifications of existing products, and they show the application of target costing in a paper mill with processes and product variations that are very similar to textile processes and products. Cooper and Chew (1996) are investigating the concept of target costing for process and service industries, showing that key concepts of target costing remain the same. Some research on target costing within the textile complex is described by Brausch (1994) and by Hergeth (2001). Additional differences between the component assembly industries and the textile or apparel industries is the fact that

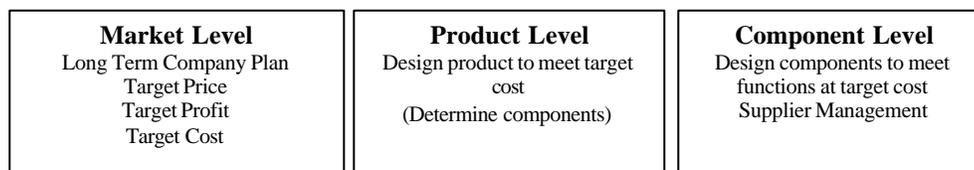
many textile companies produce intermediate products and do not market their products to the ultimate consumer. From that perspective the apparel industry seems to more closely resemble the traditional users of target costing: The apparel industry uses components, some bought, some made in-house, encounters frequent product and style changes, and apparel producers make a product for the ultimate consumer and in many cases market this product. Yet target costing is rarely used in its full extent in this industry if at all.

One of the significant differences between using the target costing concept (even for existing products) and using standard costing techniques or kaizen costing is the fact that latter concepts tend to accept existing structures and only lead to incremental cost reductions. The purpose of standard costing is to evaluate actual cost relative to a standard. This standard is derived by determining a cost at normal operation and conditions, which implicitly leads to accepting the status quo process. Target costing tends to be more radical and provides the opportunity for a completely new and innovative approach or process (Shank and Fischer, 1999, Corrigan, 1996, Cooper and Slagmulder, 1997).

#### 4. Target Costing Process

The process of target costing is supposed to be very interactive, and ideally most of the process activities happen simultaneously or parallel. In spite of this interdependency of different activities, it is useful to identify three basic phases or levels in the process: Market Level, Product Level, and Component Level (Cooper and Slagmulder, 1999). In the following it will be shown how this approach is applicable to the textile and apparel industry.

Figure 1: Basic Phases in Target Costing (variation on Cooper and Slagmulder, 1999)



#### 4.1. Market Level

The first phase of the target costing process leads to establishing the target price of the product. This is a key difference to traditional costing methods: Target Costing is price-based and therefore rooted in the market. In many cases this may be a price for a new product, or it may be a re-evaluation of the price for an existing product. In either case the starting point for the price is in the market rather than existing internal cost standards or cost estimates (cf., e.g., Shank and Fisher, 1999 or Cooper, 1995). For existing products a market price exists already, and it should be evaluated with respect to competitor activities. Potential price reductions in the market must be anticipated and actions need to be taken early to avoid being caught unprepared. It is very important to analyze the exact market the product serves – different functional or regional markets may require different pricing strategies. Last but not least it is important to consider the long-term company strategy for the market in question. In many cases a market share or market volume versus price relation needs to be established to find the optimal price range.

For new products the process of finding a market price begins with the definition of the market niche the company wants to address. The basic needs the product should address for the group of potential customers are defined as well. A detailed competitive analysis evaluates what kinds of products are presently available to potential clients through competitors, and what changes may be expected upon the introduction of a new product to this market. These two activities then lead to a specific definition of the market niche and the target group. Once the target group has been identified and defined, customer requirements for the product can be determined. Understanding and ranking the relevance of the various requirements is a key element in target costing and product development in general. In a subsequent activity product features are determined that fulfill the customer requirements at specific performance levels (Ansari et al, 1997).

Table 1 shows an example of such customer requirements for an innovative beach towel that wraps around the consumer.

Table 1: Example of Requirement Rankings (Hergeth, sine anno, unpublished manuscript)

Requirements	Ranking (1 = not important, 5 = very important)	Raw Score	% Score (relative feature ranking)
Dry well	5	5	28%
Big size	3	3	17%
Stay up	4	4	22%
Longevity	4	4	22%
Appearance	2	2	11%
TOTAL		18	100%

This table shows the company which of the features are more or less important to potential customers. In practice it may be necessary to eliminate basic requirements that constitute a required minimum condition, such as safety features or

requirements that do not allow differentiation from competitors. For example, all cars have seat belts and all shirts are delivered with buttons. In addition to exploring the relative importance of customer requirements, market research will

show certain price points that are acceptable to consumers. Additionally, companies will often try to perform an economic analysis to determine the relationship between product price and market share and then base the target price on the desired market share.

For the textile industry market prices seem to be readily available, at least for standard products. Nevertheless, it may be quite beneficial to analyze the perceived value of the product to different customers. For the apparel industry the concept of retail price points is quite established and commonly used. At least on the retail side of the business, target groups are represented by specific price ranges for specific types of products, and retailers select their merchandize accordingly.

It should be noted that this kind of research can be quite difficult, especially when completely new products are considered. Direct questioning about the relevance of product features and functions is problematic at best, so that conjoint analyses and other tools of market research need to be applied (e.g., Kotler, 2003). Goal of this market phase is to obtain a market price and a list of rated or ranked features and functions of the product.

The final activity in at the market level phase is establishing a target profit. The target profit for a specific product is based on long-term profit strategies for the company as well as short-term market share strategies for the product. Typically this target profit is based on historical returns on sales and returns on assets as well as profit planning goals (Ansari et al, 1997, Cooper and Slagmulder, 1997).

The actual target cost of the product is then simply based on the formula

$$\text{Target Cost} = \text{Target Price} - \text{Target Profit}$$

#### 4.2. Product Level

The second phase (Product Level) of the target costing process deals with designing

the product so that it will meet the target cost. The first step in this phase is to determine the status quo and computing what the cost total cost of the new product would be, based on existing cost experiences from current products. There is usually plenty of data available in textile and in apparel companies. This data is often generated by a traditional standard costing system, and additional work may have to be done in order to break down the cost by components. For completely new products this cost estimate is done by approximating the cost through comparison to existing or similar products. Comparing this cost to the target cost provides the cost gap that tells the company how much the product cost has to be lowered. In the following step cost has to be designed out of the product. This means that when designing the product cost considerations drive the process. The choice of design is influenced by its potential impact on all cost factors. It is important to note that all costs needs to be considered at this stage, including supplies, manufacturing, marketing, distribution, and customer service. The cost in all these areas is influenced by a product's design, and it needs to be addressed before any resources in these areas are committed.

The critical difference between traditional product costing and pricing and target costing is the market orientation and the price-lead product design. Throughout the process, target cost remains the overriding goal, i.e., under no circumstances may the target cost be exceeded. In traditional cost-lead pricing product design typically determines the price based on component and conversion costs.

Important techniques in designing cost out of the product include value engineering (VE), design for manufacture and assembly (DFMA), and quality function deployment (QFD) (e.g., Cooper and Slagmulder, 1999). Value is defined as Function/Cost and as such reflects the producer's perspective. Perceived Value is defined as Perceived Benefits/Price, and as such describes the

customer's perspective. VE is a systematic evaluation of cost factors with the goal of maximizing customer value. DFMA focuses on designing a product that is easy to assemble and manufacture. The QFD matrix links customer requirements and their relative importance with product functions or product components. Its results are crucial to developing a functional cost analysis for the product and the calculation of the value indices for all product components. At the same time the QFD

matrix provides information about the competitive position of the product for each customer requirement.

Table 2 shows an example for a QFD matrix, relating the customer requirements in Table 1 to design parameters of a towel. The degree of correlation between customer requirements and engineering parameters is determined by product engineers in the company.

Table 2: QFD Matrix for Wrap-A-Towel from Table 1

Design Parameter ? Requirement ?	Pile	Base	Fillin g	Seams	Prin t	Velcro ®
Dries well	75 %	5%	20%	-	-	-
Big size	30 %	35%	35%	-	-	-
Stays up	-	5%	5%	-	-	90%
Lasts long	20 %	30%	25%	10%	5%	10%
Looks good	20 %	5%	5%	10%	60%	-

While most literature on target costing and related issues describes the process for assembled products with components that have limited interrelations in their performance level (e.g., coffee makers, computers, automobiles, see Ansari et al, 1997), target costing has been discussed for process oriented manufacturing also

(Brausch, 1994, Shank and Fischer, 1999, Hergeth, 2001, Chen et al., 2002).

Table 3 shows an example of a QFD matrix linking customer requirements for a "synthetic particleboard" with manufacturing steps.

Table 3: QFD Matrix for Synthetic Particleboard – Correlation Matrix (Hergeth, 2001)

Manufacturing Steps Requirement	Web Formation	Temperature	Pressure	Surface Treatment
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<b>Strength</b>				
Screw Withdrawal Resistance				
Nail Withdrawal Resistance				
Ease of Nailing*				
Ease of Screwing*				
Weight/Ease of Handling				
Water Resistance				
Ability to Shape**				
Ability to Tool***				

||| = Strong correlation  
 || = Moderate correlation  
 | = Weak correlation

Manufacturing steps cannot easily be looked at as “independent” components, and often their basic presence (and thus the bulk of their cost) is required independent of the specific performance level that is required by the customer. Rather than linking customer requirements with product

components, the analysis is done with cost components, e.g., raw materials, auxiliary materials, equipment cost, conversion cost, distributions cost, etc. (cf. Shank and Fisher, 1999). A generic table following the Shank and Fischer model would look like Table 4.

Table 4: Generic QFD Matrix Using Cost Components

Cost Components ? Requirement?	Raw Material	Auxiliary Materials	Equipment Cost	Conversion Cost	Distribution Cost
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### 4.3. Component Level

The third phase is the component level (Cooper and Slagmulder, 1999), and in many cases this phase runs parallel with the product level target costing. Depending on the product the individual components are broken down into sub-functions, and a similar process as in the second phase begins. Typically the component level includes close involvement with suppliers, especially when complete subsystems are outsourced. All aspects of supplier selection and supplier management are part of this phase.

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The distinction between phases two and three becomes less clear when more process oriented companies are analyzed. On one level, a lot of the cost reduction pressure in component assembly industries can be directed to a large number of suppliers. As the apparel industry sources globally from many different suppliers and regions, this is likely to become a more important function. The textile industry on the other hand is more process-oriented and typically has a more limited number of outside suppliers. More of the cost reduction efforts are taking place within the company, e.g., waste

reduction, re-design of processes, and product design aspects.

## 5. How Target Costing Fits into the Textile Complex

Target Costing is not the exact same process for all companies that use it. Actually much of the work by various researchers in the field focuses on trying to identify what is common to the different processes. Originally it was thought that target costing was only useful for assembly manufacturing. With some modifications, the essence of target costing has successfully been applied to process industries as well. Typically, target costing was used for new products, so that it was considered a tool for companies with frequent product changes. However, Shank and Fischer (1999) showed that it is just as useful for existing products.

The key element in target costing is the market orientation of the entire costing and product development process. By introducing the market price as the focal point of the analysis, target costing avoids problems of other costing approaches:

- Costing becomes a managerial tool to achieve successful product design rather than documenting historical data.
- An economically relevant variable (price) becomes the driver of the product development process rather than its output. This results in a market and profit driven product development process rather.
- Due to its market orientation target costing can consider long-term corporate strategies in the market. Variable costing and activity based costing tend to focus more on short term goals.
- Due to its specific purpose target costing tends to provide decision relevant data, while traditional absorption costing models tend to document all cost, independent of the decision making relevance.

Key drivers for the use of target costing also seem to be intense competition and a price sensitive market. Both those drivers are frequently described for the textile complex. While the price sensitivity of the markets depends largely on the specific niche and customer base, competition appears to have become more intense throughout the textile complex. Driving forces appear to be “global competition”, which increases as logistical costs are reduced. Transportation has become more cost efficient and in many cases also more reliable. Communication, data exchange, etc. have become faster and better. Global supply chains have become a standard in the industry, resulting in an increased number of suppliers in every regional market, thus effectively increasing competition.

At the same time the international or global orientation of the textile complex creates some specific challenges and opportunities in this industry. Market prices are differentiated as multiple regional and functional markets are served. At the same time the number of sourcing options for components inside and outside a company has increased as has the complexity of possible product cost factors.

Product life cycles – not only in textiles and apparel – have become shorter. While short fashion cycles have clear advantages for the textile complex, the product development process must be shortened to match this trend. Here elements of target costing have long been part of the apparel product development process, probably long before target costing was widely discussed in the literature. Designing for specific price-points is nothing new. However, the overall process should be more integrated throughout the textile complex, and in many cases the design-for-price approach of the industry uses cost-plus principles and standard costing data. This is not leading to novel products or processes.

## 6. Conclusions

Target costing is a promising and important tool for the textile and apparel industries.

Textiles and apparel are typically operating in a price sensitive market, so that pricing products is extremely important. Target costing avoids the development of products

with costs that do not match market requirements.

Target costing can be used successfully in manufacturing scenarios and in assembly industries and is therefore an applicable tool for textiles.

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