

PharmaChem

Kaneka

YOUR PARTNER IN THE
WORLD OF CHIRALITY

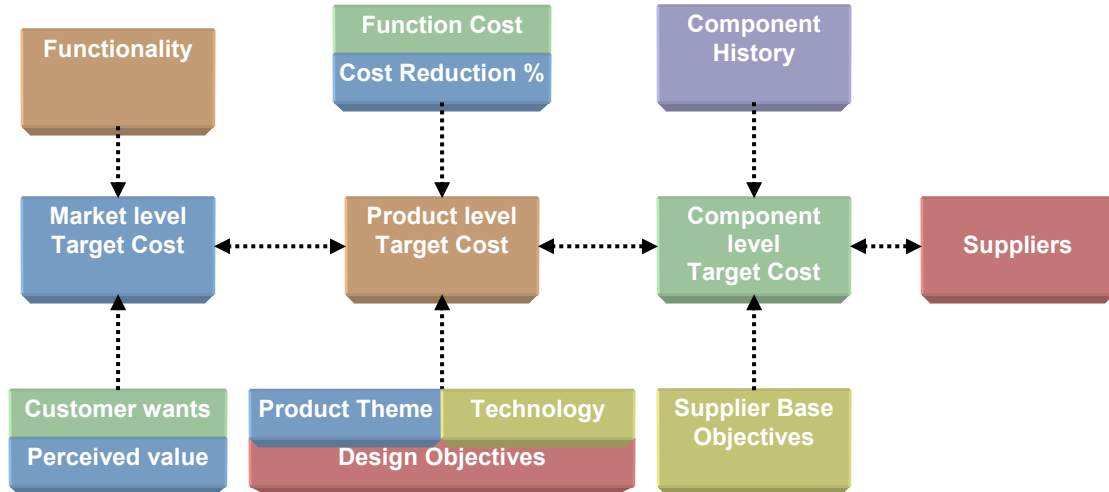
The Lean Perspective

Target Costing, A Total Cost of Ownership Approach

(The sixth in a 9 part series on Lean Enterprise and the tools and techniques employed to effect change) by **Lee Ducharme and Patrick Lucansky**.

In today's price sensitive environment, companies must manage cost. Cost management starts at the earliest stages of a product's life. With the emergence of the lean enterprise, companies face increasing pressure to be customer focused and provide value. In response to the challenge, organizations are developing selling prices, through a robust and cross functional analysis of markets, competitors, products and processes. The approach is referred to as "**Target Costing**." The target costing process is the methodology that insures profitability and competitive pricing. In other words, the target cost basically is the difference between the product sales price and the desired profitability or a total cost of ownership mentality (see inset 1 for a detailed overview). An aggressive and achievable target cost is dependent on several key factors; first, a product development (PD) process that creates value, second, the use of a cost model that incorporates every element of the total cost of ownership, and finally, an innovative product development team that is empowered to make decisions and is well resourced. The dynamic interaction of all these factors helps maintain and even reduce target costs without compromising functionality, quality, and value. (See Figure 1)

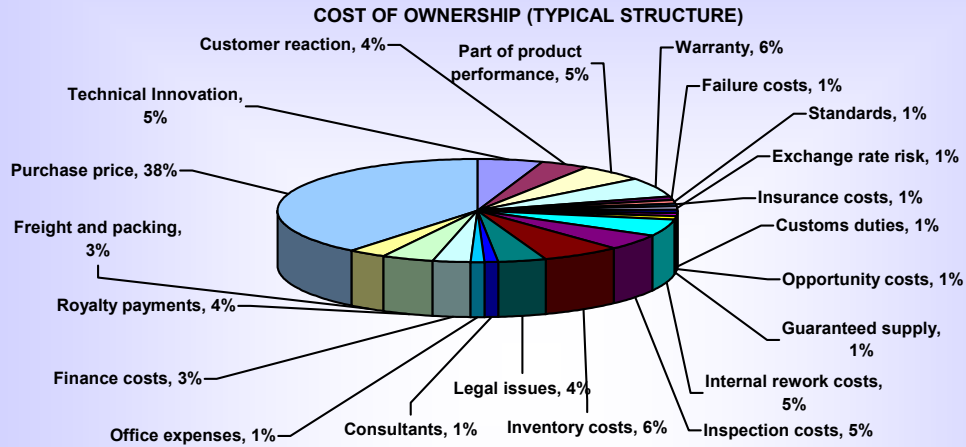
FIGURE 1: TARGET COST MANAGEMENT MODEL



Inset 1

Total Cost of Ownership

Although purchase price is only one factor when setting profitability goals, the impact procurement has on the bottom line is arguably the most significant and direct. When pricing is viewed in terms of total cost of ownership, the impact is broad and affects most aspects of the business enterprise. The total cost approach allows companies to identify the likely cost of owning and processing raw materials and finished products. A typical total cost of ownership model is broken down into two categories – cost of acquisition and cost of possession. At the component level, cost of acquisition includes unit price, administrative paperwork and processing, request for proposals, handling, inspection of product, kitting, errors, purchase order changes, acknowledgements, phone calls, and expediting. Cost of possession includes carrying costs, space, MRB, receiving, storing, handling, cycle counting, process shortages, rejects, over/early shipments, obsolescence, loss, and scrap among others. Total cost of ownership at the product level includes the initial startup costs, training, equipment related tax considerations, energy consumption, equipment maintenance, operator salaries, and insurance costs. A typical cost of ownership model is shown below.



When procurement departments are conducting price analysis on items such as capital equipment, the price is determined on the item's 'TCO' as determined by the selected model. Various analyses such as payables, discounted cash flow, ROI, and ROA augment the decision making process. Given the scrutiny of the buying company, establishing reasonable target pricing by the sellers is critical. Aside from the discipline requiring the alignment between market demands and customer wants, a thoroughly analyzed cost model that optimizes value and procurement related costs is the basis for an acceptable selling price in the current business environment. In a recent Price Waterhouse-Coopers survey, procurement as a percentage of sales was found to be significantly high, as high as 90% in some industries, and averaging between 50-60% in most manufacturing companies. Since procurement spending is such a large part of cost of goods sold, a 10% reduction in procurement cost can result in a 50% increase in profit margins. In most cases, procurement material cost reductions impact the bottom line (income statement) unimpeded and immediately. On balance, it would require an increase of over 50% in sales, and more than a 30% reduction in overhead expenses to reach similar results. Considering the impact procurement spending and cost of ownership have on the income statement and cost of goods sold, every aspect of the product structure is somehow affected. The impact on target cost and selling price is as significant. One of the objectives of total cost of ownership is to help determine the net present value of all future costs. On a yearly basis, costs should be reviewed against the original cost model, present value, and procurement's cost of working capital. The sum should be the total of the product's initial costs plus the present value of operating costs, less the present value at the time of salvage. The product with the lowest net present value is the one with the most effective TCO value, and often is the lowest purchase price. This concept is expressed in the mathematical formula below, when specific cost expenditures and variables are tracked over a period of time.

TOTAL COST OF OWNERSHIP CALCULATION

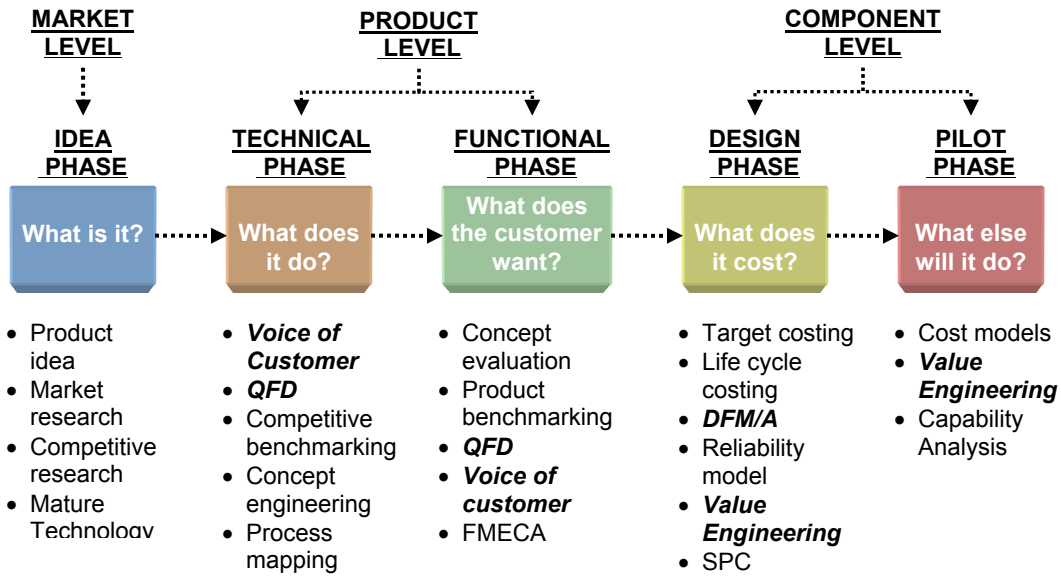
$$TCO = A + NPV \left[\left(\sum_{i=1}^n C_i \right) - S_n \right] \quad \text{where:}$$

- TCO** = Total cost of ownership
- A** = Acquisition cost
- NPV** = Net present value
- C_i** = Cost in year i
- S_n** = Salvage value in year n

Market Level Costing

Target cost management begins at the idea phase of the product development process. The product development process typically is broken down into six phases; the idea, technical, functional, design and pilot. Creating market level driven costs is the first step; costs are not finalized without a rigorous product development review of technical, functional, quality, and customer requirements. This level of design activity determines the achievable target cost by addressing and resolving product and component related questions such as what is it?, what does it do?, what does the customer want?, and what does it cost? The process culminates in determining the target cost that will be in effect at the time the product is released for production. (See Figure 2)

FIGURE 2: TARGET COST ENABLERS



The *idea phase* encompasses the identification and refinement of an idea for a new product or service. This phase may be initiated by an outside company, individual, or an internal group charged with the responsibility. Ideas are evaluated for business, process, and technical fit. The technique called concept engineering converts ideas into concept specifications. Assumptions, risks, opportunities, required investments, technology maturity levels and financial models are developed. In support of the financial models, marketing and sales vigorously analyze markets to establish financial targets and selling prices. While it is the responsibility of a designated management committee to approve ideas, establishing selling price remains the primary role of the marketing and sales functions. Besides approved ideas, the outputs from the idea phase are project plans, charters, and the creation of a product development team. From a marketing perspective, the expected output is a product selling price. In turn, the selling price becomes the target cost less the profit margin. At a minimum, the selling price or target cost must be a careful balance between market demands, customer wants, and concept specifications. The target cost now is the roadmap for allocating costs to product structure, bills of material, and defining business profit objectives.

FIGURE 3: TARGET COSTING PROCESS

Additionally, while supplier input can be beneficial at any stage, early involvement the product development process can reap the greatest benefit. For standard and non-proprietary products, suppliers frequently have the responsibility for designing components and assemblies from general performance requirements developed by the buying company.

	OBJECTIVE/GOAL	COST AREA
MARKET LEVEL	<ul style="list-style-type: none"> Define target cost Set target cost for enterprise Define product selling price 	<ul style="list-style-type: none"> Market/selling price of goods and services Profit margin
PRODUCT LEVEL	<ul style="list-style-type: none"> Define cost objectives during product development process Set target cost for manufacturing 	<ul style="list-style-type: none"> Internal costs Direct labor Overhead costs Indirect costs Non-value added costs
COMPONENT LEVEL	<ul style="list-style-type: none"> Set target costs for suppliers/external resources 	<ul style="list-style-type: none"> External cost Raw material cost Non-value added costs

When suppliers are involved in the idea phase of the PD process, typically we see an average decrease of 10% in purchased material and quality cost, development time and cost, as well as product manufacturing cost. As a result, many companies involve suppliers to help set achievable target costs and launch dates as early as possible in the design process. (See Figure 3)

The objective in establishing target cost is to achieve business profitability. The simplest way to set target profits is to adjust down from previous targets; however, the recommended way is to adjust individual product line **target cost** up or down to meet the overall business profit objectives. Over any length of time, if a product's selling price or cost is expected to change, the company can adjust accordingly. The purpose of these adjustments is to review relevant costs factors at the time target costs are determined to insure group or corporate profit margins are realized.

Product Level Costing

Successfully driving down target cost to the product level is dependent on marketing's ability to set achievable and realistic target costs. It then becomes the focus of the PD team (*see Inset 2, Cross Functional Teams*) to maintain target costs without sacrificing quality and functionality. Similar to market-driven cost, PD teams must identify cost effective components. The responsibility now lies with cross-functional teams or well-trained engineering organizations to analyze designs, production lines, and include suppliers to remove non-value added product and process costs.

During the **technical phase** of the product development process, the technical feasibility is explored by defining the product concept, in sufficient detail, to identify design options. The primary output is to provide a clear understanding and strategy that technical requirements will align with the functional, quality and cost commitments. Quality Functional Deployment (QFD) and the Voice of the Customer are the most effective tools to capture and analyze data. QFD is a means of translating customer requirements into the appropriate technical requirements for each stage of marketing, product planning, product design, manufacturing engineering, production, sales and service. Voice of the

Customer expresses the customer's original words and translates them into technical language. As part of a company's overall strategy, both techniques (QFD and Voice of the Customer) are used to prioritize PD team efforts, use of technology, and statistical methods. QFD is also a means of systematically assigning responsibility and focus on product and process development. Other effective techniques include competitive benchmarking, critical parameter management, risk analysis, and designing total life cycle cost and technical performance scorecards.

Inset 2

Cross-Functional Teams

Meeting the target cost is the primary responsibility of the product development team. High-powered PD teams include representatives from design engineering, manufacturing engineering, finance, planning, marketing, sales, procurement, and occasionally key suppliers, and customers. The PD teams break-down products into sub-systems and components and assign costs at each level. Rebuilding and value engineering these components and sub-systems while re-negotiating prices are the techniques that insure target costs are met. During this time, PD teams are working with key suppliers and customers to help redefine sub-systems and component costs. Besides target costing, other issues PD teams address are time to market, warranty costs, manufacturing yields, engineering changes, product development cycle time, on-time delivery to customers, and benchmarking. PD teams are most effective and achieve the best results when constructed and perform under the following conditions:

- Teams are established at the idea phase through the launch phase.
- Team representatives are part of the "core team" while others participate on an "as needed" basis
- Member participation is active, early, and innovative
- Stage gates are created that provide a roadmap for critical decision making
- Teams are empowered to delay, alter, and even cancel projects
- Suppliers are pre-qualified or certified suppliers are selected
- Selection and qualifying suppliers is part of the PD team's responsibility
- Performance measures and specifications are developed by the PD team and suppliers jointly
- Target cost is developed jointly buyers and suppliers
- Project teams are co-located
- Communication among functional groups and external sources is open and direct
- Formal communication systems (ERP) link key internal/external interfaces
- Databases and CAD systems are shared and maintain a high level of integrity
- Modular designs are prevalent
- A strong focus is placed on core competencies
- Non-strategic activity and sub-systems are outsourced
- Long-term contracts between buyer and sellers are developed
- Single sourcing of components and sub-assemblies is encouraged
- Product designs consider lean process capabilities
- Tooling and fixtures are integrated early in the design process
- A careful assessment of customer wants and needs is conducted periodically
- Clearly defined roles and responsibilities are documented
- Dedicated resources are provided
- Senior management support is on-going

The bulk of the design activities, including the detailed refinement of specifications, takes place during the **functional phase**. Products and supporting processes are developed to insure manufacturing, quality, service, and target costs are met at the projected time of launch. Key tools and methods include process modeling, discrete event simulation, risk analysis, geometric dimensioning, geometric tolerancing, and designing scorecards. The most prominent tools in reducing costs are design for manufacturing, test, quality, service, and logistics which makes products easier to manufacture, assemble, test and deliver. Not surprising, suppliers are invaluable in terms of providing ideas and their participation in the design for manufacturing and quality. It is well known that suppliers usually know more about the products and their capabilities than buyers and customers. When products are in the earliest stages of design, suppliers often suggest cost savings in the form of standardization, process efficiency, and alternate modes of manufacturing, to mention a few.

Component Level Costing

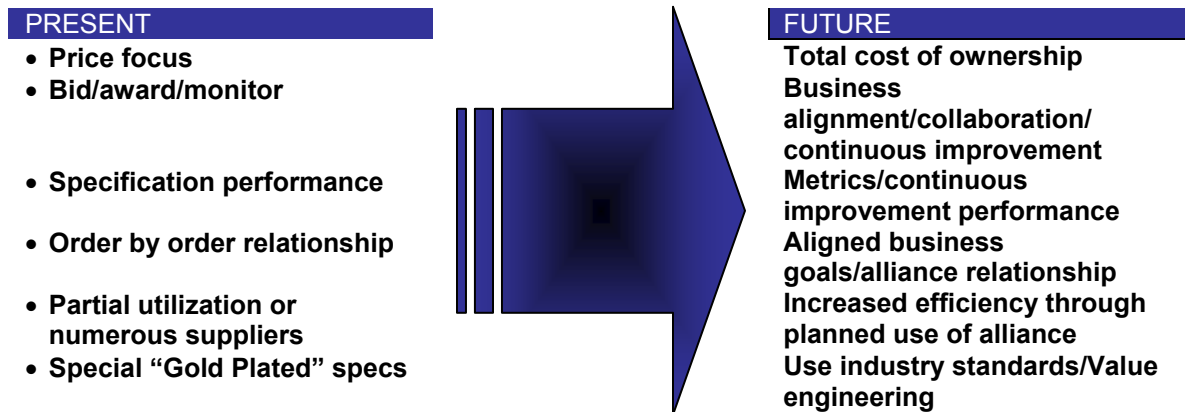
At the component level, the target costing process begins to decompose product structures and set costs on individual assemblies and purchase prices for external components. It is the **design phase** of the product development process that validates designs and verifies products that can be produced in large quantities and cost efficiently. While QFD is an effective technique that aligns functionality, features, and customer wants early in the technical phase, value engineering (VE) is an effective multifunctional approach to product design that optimizes customer value. Using the VE approach, the function of the product is defined in its simplest terms, and determinations are made regarding which design characteristics and features enhance value. It is effective during the design phase when technical and functional features are being tested and validated.

The basic approach of value engineering addresses everything about a product. A value analyst checklist normally can be categorized into several basic questions: What is the item or service? What does it cost? What does it do? What else would do the job? What are the alternate costs? Value engineering may be conducted either as an enterprise activity, and/or supplier program. The greatest benefit results when buyers and sellers communicate as part of a project or product development process. At this phase, target costing enables companies to transfer cost pressures to suppliers. The level of dependency on suppliers is extremely critical to meeting target costs, particularly in a horizontal organization. Suppliers play a vital role in jointly developing performance specifications, project targets (resource, time), target pricing, and continuous improvement objectives. Qualified suppliers (as defined by supplier certification programs) actively participate in activity based costing and total cost savings processes. Empowered PD teams do not make decisions without crucial and timely insights from suppliers.

After a thorough value analysis review, prototypes are developed during the **pilot phase**. It is expected that at the end of this phase a reproducible product is available. In a multi-functional and hi-volume mode, savings in terms of cost avoidance, faster time to market and cost targets should be achieved. If not, cost overruns can be expected once the product or service is introduced to the market. Key tools and methods insuring the product is ready for commercial release are statistical process control, measurement system analysis, process control systems, capability analysis, proactive reliability reviews, and implementation planning. (Review Figure 2)

This approach makes the selection and management of suppliers a key responsibility for product development organizations. PD teams are now considering long-term technical performance, responsiveness to change, value engineering, and a supplier's ability to work in a team environment as critical factors in the target costing process. The vision of the future will look more like the following. (See Figure 4)

FIGURE 4: A VISION OF THE FUTURE



A company's overall strategy requires that target costing drive the product development process. This requires PD teams to refrain from over or under designing products, demonstrate a strong understanding of perceived values, and remain disciplined in achieving or reducing target cost. Target cost should always be met, and when they are not, product launches should be delayed or even cancelled. Even in companies where a formal target costing is not practiced, meeting customer wants and needs still drives the creation of value and market driven selling prices through the PD process. Therefore, conforming to price pressures requires a working knowledge of customers, competitors and suppliers. The strategy and techniques that help with that level of understanding includes at least some of the following:

- Benchmark the industry, competitors, customers, and suppliers
- Communicate a well defined business strategy
- Set consistent cost objectives at every level of the organization
- Maintain a high level of performance
- Develop strong relationships with suppliers and customers
- Provide Voice of the Customer and QFD training
- Focus on core competencies
- Outsource non-strategic activities and assemblies
- Encourage and reward innovation and change
- Continuously improve an integrated and global supply chain
- Allow some flexibility in setting target costs and selling prices as a contingency plan for dramatic market changes
- Develop strong IT capabilities
- Use external consultants when required
- Periodically conduct customer satisfaction surveys

Companies have been using target costing systems to their advantage. Target costing is an enterprise wide attempt to recognize the best opportunity to reduce cost, improve quality, and enhance manufacturability of new and existing products and services. With the assistance of techniques like QFD and value engineering, target costing provides a considerable rate of return without sacrificing quality and value. Successful target costing systems provide a huge advantage in maintaining profitability in a highly competitive marketplace.