

Target and Kaizen Costing

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Abstract—increased competition and increased costs of designing made it important for the firms to identify the right products and the right methods for manufacturing the products. Firms should focus on customers and identify customer demands directly to design the right products. Several management methods and techniques that are currently available improve one or more functions or processes in an industry and do not take the complete product life cycle into consideration. On the other hand target costing is a method / philosophy that takes financial, manufacturing and customer aspects into consideration during designing phase and helps firms in making product design decisions to increase the profit / value of the company. It uses various techniques to identify customer demands, to decrease costs of manufacturing and finally to achieve strategic goals. Target Costing forms an integral part of total product design / redesign based on strategic plans.

Keywords—Target Costing, Target Cost Management, Cost Management, Activity Based Costing, New product design

I. INTRODUCTION

INCREASED competition and vocal customers have made it imperative that every company should upgrade its processes constantly to stay ahead of the competition. This is achieved mainly through design and process designs and cost reductions. The process of actual designing is product-dependent and it is more important to identify the aspects of products that require designing than the process of designing. Target costing is a strategic tool for planning that takes a holistic view of products and their sub-assemblies and identifies the opportunities for cost reduction and product improvement. Target costing also uses various techniques to set and achieve the goals based on the strategic plans of a company.

II. COST MANAGEMENT

Cost management is currently one of the main topics of interest in the area of project management. This is particularly true as high technology companies, which until recently were mainly concerned with time-based competition, are being increasingly subjected, especially under the highly competitive conditions that are prevalent today, to cost-based competition. The need to improve project cost control has been emphasized by Nixon (1998), [14, 16], among others.

Project cost management is concerned with ensuring that the project is completed within the approved budget, and includes the processes of resource planning, cost estimation, cost budgeting and cost control. The management accounting discipline has developed various planning and control tools

and concepts for these processes, including: costing systems (such as Job Order Costing and Process Costing) to track the flow of costs related to the project; overhead allocation methods, such as the traditional method that allocates overhead costs to projects on the basis of hours or months used, and Activity Based Costing (ABC) method that derives the cost of a project as the sum of the costs of the activities undertaken to produce the project while accounting for various levels of overhead; budgeting, as a central mean for cost planning and cost control throughout the entire life cycle of projects; Target Costing and Target Pricing aimed at ensuring the project's profitability; Value Engineering which seeks to reduce non-value-added activities and hence non-value-added costs, as well as Standard Costing and Variance Analysis as important managerial control tools.

Some of these cost management tools and techniques have been acknowledged in the traditional industry sectors as highly successful in improving firms' operating results and performance [12].

III. COST MANAGEMENT TOOLS

Cost Management is the area in accounting that deals with methods of costing products and services, and provides managers with information relevant to planning and control of costs in the short run and in the long run (Horngren et al., 2003). Six major cost management tools have been selected for inclusion in this study and will be briefly introduced next.

A. Costing systems that follow the flow of costs

In typical Process Costing systems, conversion costs (labor and overhead costs) are accumulated uniformly throughout the process, whereas material costs are added at discrete points of completion in the process.

B. Overhead cost allocation methods

Overhead allocation is required whenever the manufacturing of a product or the delivery of a service involve costs that cannot be directly traced to these cost objects.

C. Budgeting

[12] define the budget as a quantitative expression of a proposed plan of action by management for a specified period, and an aid to coordinating what needs to be done to implement the plan.

D. Target Costing / Target Pricing

Target Costing is a cost management tool that planners use during product and process design to drive improvement efforts aimed at reducing the product's future manufacturing costs (Kaplan and Atkinson, 1998). Target Costing is price-led and customer oriented - it begins with price, quality, and

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functionality requirements as defined by the customers. This is in contrast to cost-plus pricing methods, which are cost-led [12]. [8] write: "in the Target Costing approach, the cost of a new product is no longer an outcome from the product design process; it becomes an input into the process". [3] argue that Target Costing is better suited to meet the needs of organizations in today's competitive environment.

E. Value Engineering

Value Engineering is the systematic evaluation of all aspects of the value-chain business functions, with the objective of reducing costs while satisfying customers' needs [12] [17] writes that the purpose of Value Engineering is to improve quality, and reduce inefficiency and waste for the end user - the customer.

F. Standard Costing and Variance Analysis

Standard Costing is a method that relies on pre-established rates (standards) of consumption for inputs. It traces direct costs to the produced output by multiplying the standard prices or rates of direct cost items, such as materials and labor, by the standard quantities of those inputs that were allowed for actual outputs produced.

IV. MODERN COST MANAGEMENT TECHNIQUES

A. Activity Based Costing (ABC) and Activity Based Management (ABM)

Activity Based Costing concerns itself with the way in which indirect costs (all indirect costs including both manufacturing and non-manufacturing indirect costs) is best associated with the production of different products and product groups. It is, therefore, necessary to consider the traditional method for doing this, before considering what changes supporters of ABC propose. Of course, systems of cost allocation will vary from firm to firm, but one can describe the traditional nature of general practice.

Conventionally, the cost of products for balance sheet purposes was constructed as follows:

Direct product cost (direct materials plus direct labour costs)

Plus

Indirect manufacturing costs

Equals

Total manufacturing cost

To obtain a full cost estimate, including non-manufacturing overheads, for management purposes, it was often convention simply to add a percentage of Total manufacturing cost to cover non-manufacturing costs.

Indirect manufacturing costs for each product (product group) were usually assigned to products through a two stage process. First, one would separate out the indirect costs incurred directly in the manufacturing processes (e.g. plant depreciation, supervisors' wages, factory cleaning, costs of utilities) from the costs incurred in service operations (e.g. personnel, buildings and grounds, machine maintenance) which supported manufacturing. More sophisticated systems would trace costs of support services to different production

departments using factors which seemed most appropriate. For example, one might use number of employees in each production department to allocate personnel costs, square footage to allocate buildings and ground costs or actual work tickets to charge out machine maintenance. The support services costs would then be added to the indirect product costs incurred in each production department and the sum of the two would be allocated to products which used the processes in each production department. The allocation of the indirect product costs to products was traditionally, and still is widely, performed on a direct labour basis. That is the total indirect manufacturing cost in each department forecast for the year would be divided by the budgeted number of products to be produced times the estimated labour hours required to produce each one - this would yield an indirect cost per labour hour which would be multiplied by the actual hours taken in that department by each product in order to work out its share of indirect manufacturing costs. Figure 1 outlines the whole system.

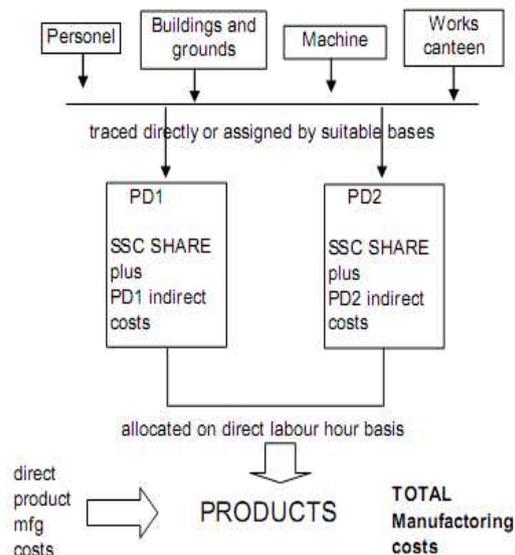


Fig. 1 Allocation of manufacturing indirect costs to add to direct product costs to determine total manufacturing costs. (Carr. C. and C. Tomkins 1997)

Figure 1 shows cost of four Service Departments assigned and added to the indirect product costs incurred in two Production Departments (PD1 and PD2) which are then allocated to products at rates appropriate for each product as it passes through each Production Department. Some systems also re-allocate costs between Service Departments before assigning them to Production Departments. Some systems do not differentiate between separate production departments, but use one blanket rate for allocating overheads to products related to total labour hours used by products in all stages of production.

Traditional systems do not necessarily use labour hour bases for overhead allocation. Other bases used include a direct labour cost basis, a direct materials cost basis or machine hours basis with a tendency towards a growth in the

latter as production becomes more dominated by technology in many industries. ABC advocates usually claim, however, that the labour hour or labour cost basis is still the most widely used basis.

B. Cost of Quality Calculations in Support of TQM

It is important to realize what "quality" means in this context. Quality means producing something or giving a service which complies with a pre-determined specification and achieving that first time without the need for alterations or amendment. The COQ is, however, more than just re-work costs, although that may constitute a significant element of COQ.

Most applications of this concept have attempted to estimate costs in four categories:

- Prevention costs
- Inspection costs
- Costs of errors discovered on the firm's premises
- Costs of errors only discovered once the goods have left the firm

Prevention costs are incurred by all those activities which are undertaken because the firm cannot trust everything to be done right first time without those activities. This might include training, planning, supplier assurance, analysis of data to prevent future failure and, indeed the cost of COQ programmers themselves.

C. Target Costing

Target costing has been given much more attention in Japan, but is increasingly being taken up in the West. It is linked with both Functional Cost Analysis and Value Engineering in order to design products and services which have the attributes that the market requires at the price that it is prepared to pay.

The initial step is to study the market place to identify the attributes that the next generation of products must have and the maximum selling price. This does not mean that the company simply provides what the market says it wants. The company may have superior knowledge of what can be provided. Depending on the type of market, there may well need to be considerable interaction between supplier and customer at this stage to decide on the bundle of attributes that will best meet the customer's needs (this may extend to trying to understand the customer's customers needs too). This will usually also involve a marketing analysis to identify market segments and how product attributes fit with each segment. It will also involve understanding the capacities of rival companies to deliver such attributes at the relevant costs.

The next stage of the target costing process is to identify what activities the company must embark upon in order to deliver those product attributes. These activities are then casted and the total cost compared to the cost level likely to be consistent with selling at the acceptable market price after deducting a desired profit. In the event that the allowable cost exceeds the predicted cost, the company then embarks upon Functional Costing and Value Engineering routines to identify where costs can be reduced without destroying the required

product attributes. This process continues until the predicted cost has been reduced to a level which, with a profit margin added, is consistent with the required market price. When this stage has been achieved, the company is ready to go ahead with its plans for investment in order to produce the product in question.

Functional Cost Analysis and Value Engineering both contribute to the search for viable cost reductions within this process. In outline, Value Engineering employs multidisciplinary or multi-functional teams to examine the specification of the product and, through intensive and creative study, reconsider how that specification can be delivered with alternate product designs or through different production processes. This Value Engineering process usually has at least two main stages: the first, early in the concept development stage, considers more radical design alternatives in terms of changing major components provided that the service required from the product can still be delivered. The second stage, coming after the concept has been largely set, usually uses separate teams to address different parts of the product design to see whether the functionality of those specific parts can be increased at no extra cost or whether the part can be reduced in cost with no loss of functionality.

D. Kaizen Costing

Kaizen costing also has a Japanese heritage. Kaizen refers to the process of seeking continuous improvement. Some Japanese companies link a target costing planning process with a kaizen process once the products are in production. Other companies, for example those with short to medium product life cycles, place more focus upon target costing. Their approach to continuing improvement is to have several generations of products at different stages of design and development (i.e. different stages of target costing). Other companies, in more mature markets with longer product life cycles, place more emphasis on kaizen during operations.

Kaizen essentially tries to ensure that everyone in the company continually reconsiders how the task is undertaken and whether there is a better way of doing it. It is not so much a costing routine as the outcome of developing an organizational culture of collaborative learning at all levels of the company. There were precedents in the West in terms of learning curves (which projected the extent to which direct labour costs could be reduced through learning undertaken in a repetitive activity) and experience curves (which traced how all costs could be reduced as a task was undertaken more and more times). There is certainly some element of this in kaizen, but the latter is even more encompassing than experience curves in so far as it does not just depend upon experience to identify improvements, but encourages the use of intelligent and shared thought and action through work-teams to search for improvements.

E. The Theory of Constraints (TOC)

The Theory of Constraints is not a cost accounting method, but it has far reaching implications for cost management. The theory was developed by Eli Goldratt who subsequently

established the Goldratt Institute to extend the practice of the theory. The initial motivation for developing the theory was to seek an improved way of production. It was designed to identify the most efficient way of increasing production throughput. Goldratt and Cox argued that the pace of the slowest process in the production run determined the pace at which production could function. Hence, everything had to be geared to ensuring that there were no delays in that slowest part of the process. Unlike JIT which has the goal of eliminating all inventories, TOC allows for a minimum buffer of stock to be held immediately before the process with the slowest pace so that unexpected interruptions in delivery from the other processes will not delay this critical process.

F. Throughput Accounting

Throughput accounting arose from Goldratt's thinking in developing his Theory of Constraints. In developing his theory, Goldratt was initially trying to maximize the profitability of the firm by maximizing the amount that could be produced given existing production configurations and constraints. He argued that plans will be drawn up to maximize production (throughput) and that once these plans have been established no section of the firm should depart from them or the co-ordinate plan would be upset. It follows that each department could be seen as having a fixed budget to spend to meet its target. Under this form of operation, Goldratt argued that no benefit, and perhaps a lot of harm, came from existing cost accounting practices which allocated indirect costs, variable and fixed, over products and / or product groups. Given a clear co-ordinate plan, all the firm needs to do is maximize throughput measured in aggregate financial terms as sales less direct materials costs and see that the throughput measured in financial terms exceeded the fixed operating expenses by as much as possible. In other words, he defined all costs as fixed except direct materials costs. Subsequently, he has softened his stance, to allow that other costs may also be variable, but still stresses that direct materials costs are the main variable costs.

G. Integrated Strategic Management Accounting

Strategic Management Accounting is not a new costing system. It is a generic term which covers the use of cost and management accounting to help inform an organization in making major strategic decisions. In this sense, all the methods described above have a role to play. More recently, however, the term has been used more precisely (see Carr and Tomkins, 1996) to describe how accounting needs to be integrated with strategic thinking in order to provide a comprehensive control system. Essentially, Carr and Tomkins, draw up a framework for system design which integrates all, or most, of the new developments described above and it does so through a general target costing approach to strategic investment decisions - i.e. those decisions concerning new markets, new products or the acquisition of new attributes by the company in order to give it a better market standing. The process will first involve a consideration of what customers need and what rival companies can deliver in order to arrive at

a project description in terms of product / service attributes and a target price at which that "bundle of attributes" which constitute the product or service will sell.

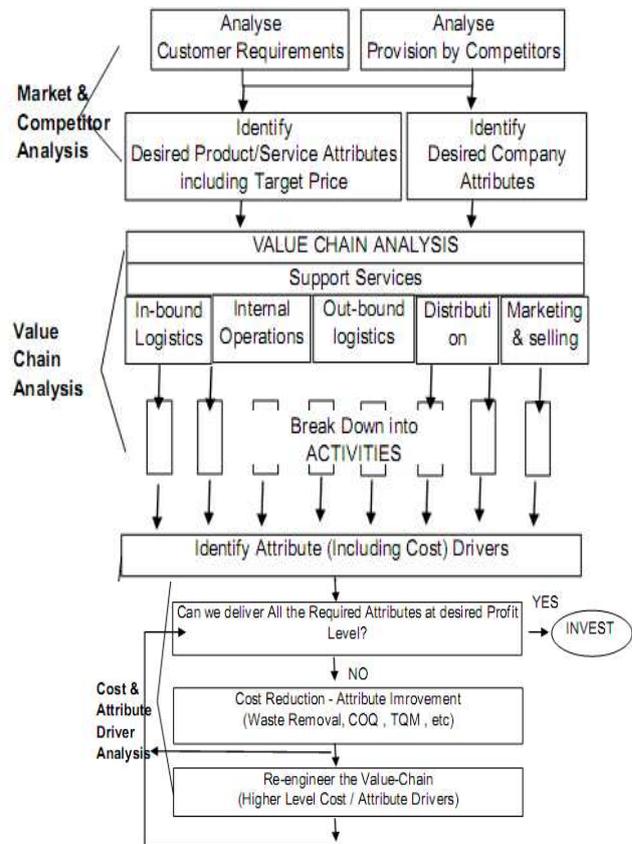


Fig. 2 A schematic formal analyses for Strategic Investment Decisions (Carr. C. and C. Tomkins 1997)

The firm must next test out whether it is capable of delivering that product at the target price. In order to do that it must specify the exact value chain for providing each of the product characteristics. This will involve specifying how the firm's inbound logistics, operating production procedures, outbound logistics, distribution system and after sales service all impact upon the proposed product attributes. If current elements of the value chain cannot deliver the product attributes, the firm has to decide whether it was being too ambitious and settle for a more easily attainable set of product attributes (provided that it can still be sold) or set about improving the relevant aspects of its value chain. If it takes the latter route, it will be necessary to establish exactly what the value chain modification will cost and whether that it still feasible within the target price. Of course, as explained above the target price it is a product attribute and the firm may discover that it can produce the non-price attributes with its current practices and resources, but not within that price. Either way attention will need to be focused upon cost reduction in order to achieve the non-price attributes within the target price (cost) or a functional cost analysis in order to

establish which attributes can best be downgraded to produce the minimum reduction in market attractiveness of the product for the maximum reduction in cost. It is likely that several iterations around this process using Functional Cost Analysis and Value Engineering will be needed before a desirable mix of product attributes and target price can be delivered, namely a mix which is attractive to the buying market and the producer/seller. Once this desirable mix has been established as a feasible proposition, the producer can ahead and invests or accept the contract. The whole system is mapped out in Figure 2.

H. Balanced Scorecards

Another recent development has been balanced scorecards (see particularly Kaplan and Norton, 1996). The thrust behind this development came from dissatisfaction with reliance on just financial statements, especially the Income Statement and Balance Sheet, as the dominant means of checking a corporate group or division's position. Initially, in 1992, Kaplan and Norton proposed that was a need for 'balanced scorecards' which reported performance along four different dimensions: a financial perspective, a customer perspective, an internal business perspective and an innovation and learning perspective.

V. CORE CONCEPT OF TARGET COSTING

The target costing process is a system of profit planning and cost management that is price led, customer focused, design centered, and cross functional. Target costing initiates cost management at the earliest stages of product development and apply it through out the product life cycle by actively involving the entire value chain.

VI. PROCESS TARGET COSTING

Target costing process consists of two phases known as establishment phase and implementation phase. The establishment phase defines goals for product concepts based on strategic plans and the implementation phase achieves the set goals. The relation between target costing and product design is illustrated in Figure 3.

The process of target costing is based on the cardinal rule, "If we cannot make the desired profit we should not launch the product".

The illustrated process of target costing for product design can be described in the following steps:

1. Consider strategic and financial goals: Top management sets long-term goals for the complete corporation and every product should be designed to help the company to achieve these goals.

2. Determine the customer attributes or demands: This process involves conducting thorough market analysis and customer surveys to determine what the customer's needs and demands are for a given product.

3. Consider costs and processes while designing: This step must result in the design specification of the product. The major tools used to obtain the design specification of a product are (a) Pugh Method and (b) QFD.

4. Determine the target price: Target price is the price a customer is willing to pay for the new product. Thorough market analysis must be conducted to determine the target price.



Fig. 3 Target costing and product development cycle. Ansari S., and J. Bell, (1996)

5. Determine the target cost: Target cost, also known as the allowable manufacturing cost, is calculated by subtracting the profit required (ROS can be used to determine the profit required from the new product) from the target price. $Target\ Cost = Target\ Price - Desired\ Profit$

6. Determine the drifting cost and product feasibility: fitting cost, also known as the actual cost of manufacturing is the present cost of manufacturing the new product and this is calculated with the help of the engineering department. It is also analyzed to see if all the desired functions can be provided in the new product. A good costing system like ABC (Activity Based Costing) will assist in determining accurate costs.

7. Process Improvements the designed product yields the required profit, the new product can be manufactured. If the new product does not yield the required profit, the product needs to be re-designed or the process of manufacturing should be improved to yield the required profit. Some tools like value engineering can be used to associate costs to components or functions in order to determine their cost efficiency. The components or functions that are cost inefficient should be re designed to reduce costs. If the products are found not to meet the financial profit requirements, they should be abandoned.

8. Implementing / Evaluating long term effects: essential to make sure that the new product will yield the required profits through its complete life and the product mix must be regularly adjusted to meet the strategic goals of the company.

VII. ADVANTAGES OF TARGET COSTING

The major characteristics or advantages of target costing as mentioned in, P. Horvath, (1994), are listed below.

- Target costing will provide management methods and analytical techniques for developing products and services whose costs support strategic objectives for market position and profit.

- Product costs will be defined from the customer's viewpoint; they will include functionality, cost of ownership and manner of delivery.

- Target costing is a critical component of product development teams and concurrent engineering.

- Target costing will incorporate as wide a range of costs and life cycle phases for the product or service as can be logically assigned and organizationally managed.

- Target costing will provide analytical techniques to indicate where cost reduction efforts on parts and processes will have most impact, and where commonality and simplification can be increased.

- The quality of cost data will be consistent with the responsiveness and level of detail required at various development phases: The system will use the logic and benefits of activity-based costing.

- The achievement of market-driven product attributes will be protected from cost reduction ambitions.

- Targets for product cost will be set for various life cycle phases in development and production.

- Target costing will aim for appropriate simplicity, relevance and ease of use by product development teams; it avoids unnecessary complexity of language and time consumption in cost assessments.

The process of target costing creates a team based, proactive atmosphere, where representatives from different departments get together to make decisions. This leads to a reduction in the information gap between different departments and makes the departments more responsive as they realize the importance of their activities. Ansari S., and J. Bell, (1996),

Another significant advantage of target costing is its inherent flexibility as mentioned by Sakurai M. ,(1989). He mentions that target costing was used by Atsugi to reduce the current level of standard costs by autonomous efforts, while Daihatsu Motor used target costing to establish a new plant to maximize profits through controlling costs by the use of automation and flexible manufacturing systems. These factors are some of the many reasons that establish target costing as a good technique.

VIII. TARGET COSTING PROCESS STEPS

The target costing process has six key steps. These steps, along with the pre-project preparation, represent a standard work plan, a framework for training, and implementation. While each target costing initiative is unique, an organization's actual implementation will likely include most or all six steps outlined in Figure 4 although not necessarily in the order presented.

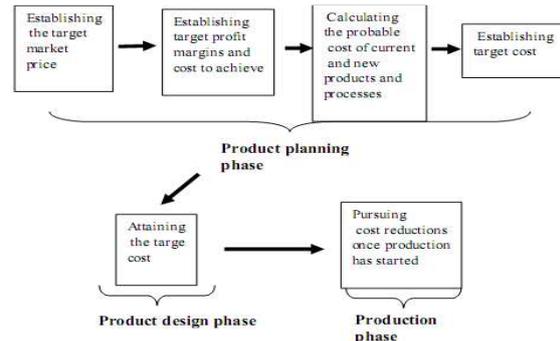


Fig. 4 Target Costing Process (V. Amara 1998)

Keeping this in mind, the six basic steps involved in implementing target costing are:

- establishing the target market price;
- establishing the target profit margin and cost to achieve;
- calculating the probable cost of current and new products and processes;
- establishing the target cost;
- attaining the target cost; and
- pursuing cost reductions once production has started

While organizations can modify these core activities to meet a particular situation, they are recommended as a guide for structuring the implementation of target costing initiatives.

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