

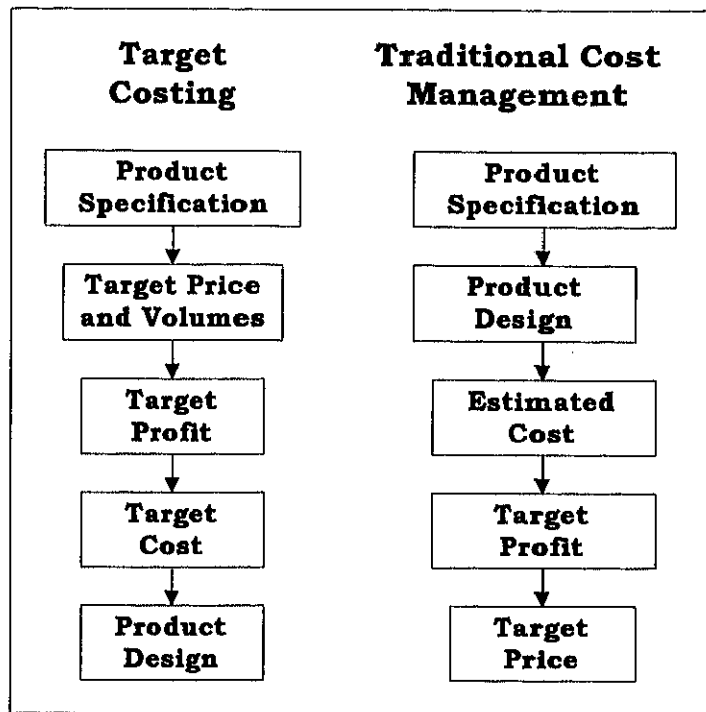
CHAPTER 1

INTRODUCTION

Today's businesses face a globally competitive environment where the companies from all countries competing towards a common goal that is to provide better quality products with more features at an affordable price. Price and quality competition is becoming increasingly severe, product life cycles are becoming shorter, wide-variety and a small-lot production is increasing in response to diversification of customer needs. The closing of the quality gap among the products of different manufacturers has led more buyers to focus solely upon price. Due to this, the companies need to launch a new strategy of avoiding price increases by working instead to lower manufacturing costs. They recognize that lowering the cost is the only way they can hope to increase their price competitiveness. For improving all-around competitiveness, the only other means would be to incorporate innovative technologies that would establish a new quality edge over the competitor product. Faced with this recent situation, the companies have had to systematically and rationally construct management systems that realize price-competitive cost levels. This type of system is known as "target costing" system, developed in Japan over the course of nearly 30 years following the introduction of value engineering (VE) in the US. Target costing focuses on searching for opportunities for cost reduction at the product planning stage, as well as providing continuous cost reductions once a product commences manufacture. It is a multidisciplinary tool of cost management to reduce overall costs applied at the planning and design stages with cooperation of the engineering, production, marketing, development and accounting departments (Sakurai and Scarbrough, 1997).

1.1. Target Costing versus Traditional Cost Management

The differences between traditional and target costing approaches to profit and cost planning reflect the different intellectual foundations on which each is built. These foundations have their origins in systems theory, from which many of our contemporary ideas about management and control have emerged (Ansari, Bell and CAM-I, 1997). A traditional approach to profit planning used by many companies is a *cost plus* approach and represents a “closed systems” approach. This approach ignores the interaction between an organization and its environment, considers very few variables in explaining system behavior, takes corrective action after observing actual results, and attempts to conform to a predetermined standard. This approach typically estimates costs of production first, then adds a profit margin to obtain a market price. If the market is unwilling to pay the price, then the firm tries to find cost reductions. On the other hand, target costing represents an “open systems” approach. This approach recognizes the importance of an organization’s adaptation to its environment, considers a more complex set of interactions in explaining system behavior, takes corrective action before actual outcomes occur, and recognizes the importance of the need to move to higher standards over time. Target costing starts with a market price and a planned profit margin for a product and establishes an allowable cost for the product. Product and process design is used thereafter to reduce product cost so it is equal to this allowable cost. The differences between target costing and traditional cost management approaches in terms of sequences of price and cost determination is displayed in Figure 1-1.



Source: Joseph Fisher (1995)

Figure 1-1. Sequence of price and cost determination

Target costing contrasts markedly with the sequence of traditional cost management as shown in Figure 1-1. Like target costing, traditional cost management begins with product specification. Product design, however, follows immediately after product specification. Product cost is not a major factor in product design, and production costs are estimated only after product design occurs. The focus at the design stage is on product specifications and product scheduling. Price is set by means of a mark-up over the estimated cost to return a satisfactory profit. The major flaw in the traditional cost management is the relatively late consideration of product cost in the product life cycle. The problems inherent in the traditional cost management can be overcome by using target costing and the Japanese manufacturing enterprises should be indebted to target costing technique as one of the main instruments for getting competitive edge over the rest of the world.

1.2. Comparison of Target Costing and Cost-plus Approaches

The overall differences between target costing and traditional cost management approaches can be grouped in the following way:

Cost Plus	Target Costing
<ul style="list-style-type: none">• Market considerations are not part of cost planning.• Costs determine price.• Waste and inefficiency is the focus of cost reduction.• Cost reduction is not customer driven.• Cost accountants are responsible for cost reduction.• Suppliers are involved after product is designed.• Minimizes initial price paid by customer.• Little or no involvement of value chain in cost planning.• Ignores external environment; cost system focuses on internal measures of efficiency.• No consideration of cross-functional or extra-organizational impact of cost system.• After the fact, based on cost incurred and correction of error using variance information.• Keep costs to a pre-specified limit set by standards or budgets.	<ul style="list-style-type: none">• Competitive market considerations drive cost planning.• Prices determine costs.• Design is key to cost reduction.• Customer input guides cost reduction.• Cross-functional teams manage costs.• Suppliers are involved early.• Minimizes cost of ownership to customer.• Involves the value chain in cost planning.• Interacts with external environment to respond to customer needs and competitive threats.• Considers many complex relationships among functions and across the value chain.• Before the fact, by anticipating and designing costs out of a product before production.• Continuous improvement of cost for both customers and producers over a product's life.

1.3. Target Costing in a Confrontational Environment

Cooper (1995) argues that effective cost-management systems are developed in response to changing competitive conditions. Target costing is an example of such a system that has a special relevance to companies in the process and assembly industries. This contention is supported by the results of a survey conducted in Japan by Tani *et al.* (1994). In these industries, firms are no longer able to achieve a sustainable competitive advantage by pursuing either a low-cost or a differentiation

strategy. Rather, firms realize that any competitive advantage they achieve is likely to be short-lived as their competitors move quickly to match new product offerings at competitive prices. Moreover, competitors will often supply their new products with more advanced features, providing further challenges that require a firm to respond. Rather than attempting to create a sustainable competitive advantage based on either low cost or commanding price premiums through product differentiation, firms become involved in continual head-on competition, which has been referred to as a “confrontation strategy” (Cooper, 1995).

A central argument underlying a confrontation strategy is that firms must compete in terms of the “survival triplet”. The survival triplet consists of three strategic dimensions that characterize a product: cost/price, quality and functionality. These dimensions are illustrated in Figure 1-2. When firms engage in a confrontation strategy, customers expect both high quality and functionality at low prices. To survive, a firm must meet or surpass its competitors’ performance on all three dimensions. In turn, this means that as well as managing quality (for example, through total quality management programs) and functionality (for example, with innovative product design and development), firms must become highly efficient in managing costs.

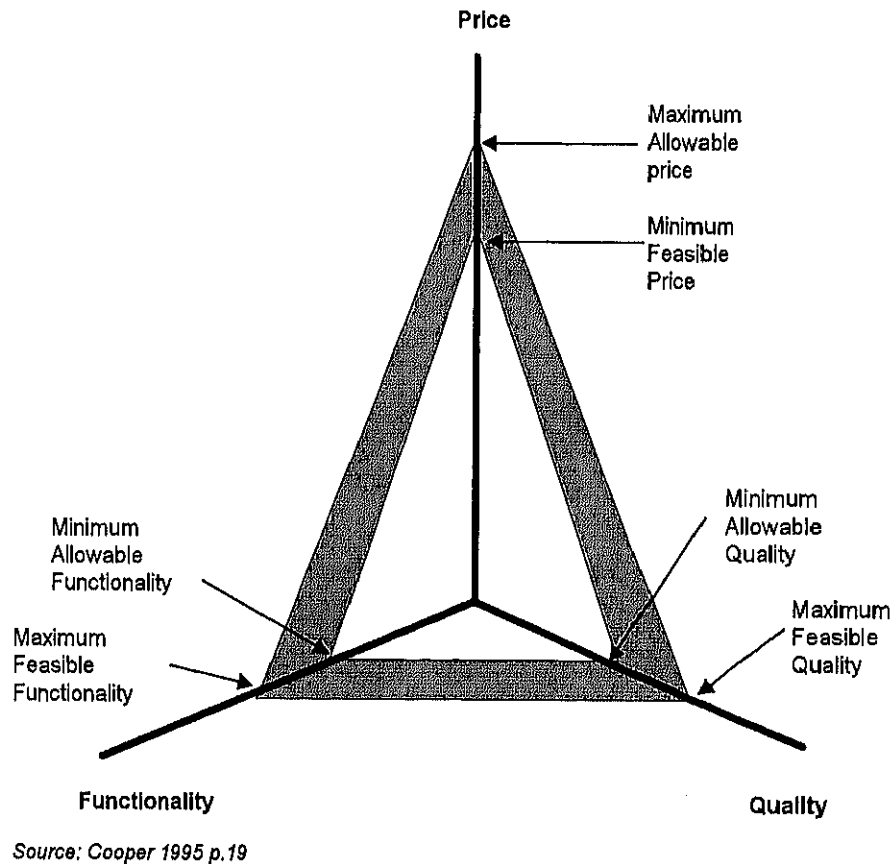


Figure 1-2. The survival zone

The challenge facing a firm is to identify the nature of its “survival zone” and then operate within it. In Figure 1-2, the survival zone is the shaded area and is the area bounded by the maximum allowable price/cost and the minimum feasible price/cost, and the minimum allowable functionality and quality and the maximum feasible functionality and quality. Where the difference between the minima and maxima for each dimension is very narrow, firms must compete confrontationally if they expect to survive. For example, for a given level of quality and functionality, customers will not tolerate increased prices. In addition, further demands are placed on the firm as customers usually expect the next generation or model to have greater functionality and quality but without any increase in price (or even at a lower price).

Hence, profitability (and, ultimately, survival) becomes very sensitive to the effectiveness of cost control.

An important element of surviving in this confrontationist world is to manage the future cost of products very effectively – this is where target costing has an important role to play. Success also depends on being able to manage the costs of existing products (e.g. through kaizen costing and continuous improvement) and harnessing the entrepreneurial spirit of the workforce (e.g. through worker empowerment, performance measurement systems and reward systems) (see Cooper and Slagmulder, 1997, 7-8). Target costing is particularly important at the design (pre-production) stage of a product's life-cycle, as it is at this stage that there are the best opportunities for significant life-cycle cost reductions. Once the product has been designed and is in production, major cost-reduction opportunities tend to be limited. Figure 1-3 illustrates the major stages of the product life cycle. It has been estimated that up to 80% of the cost of a product are *committed* at the product design stage (Lorino, 1995). Nevertheless, target costing can provide opportunities for effective cost reduction at both the pre-production and post-production stages.

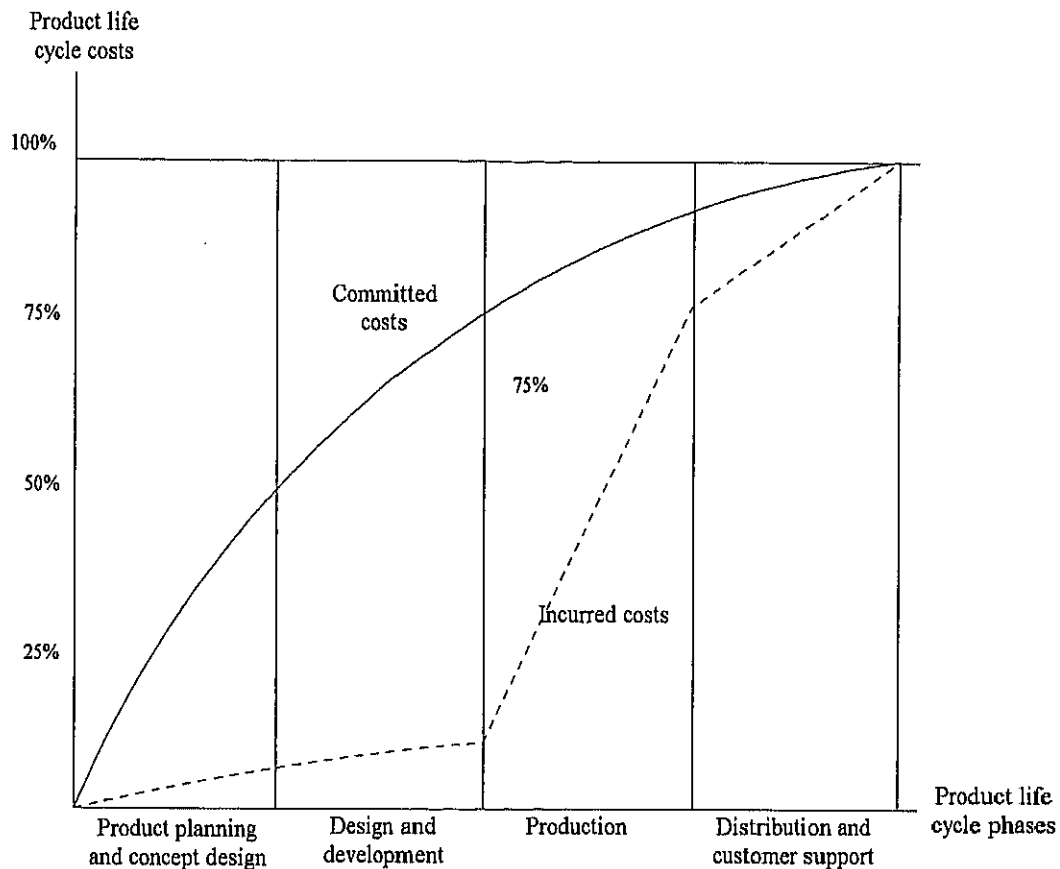


Figure 1-3. Life-cycle costs and cost commitment

1.4. The Origins of Target Costing

In Japan, target costing is widely practiced, with more than 80 percent of companies in the assembly industries, and more than 60 percent of companies in processing industries are adopting the practice (Kato, 1993). Target costing emerged in Japan in the 1960s, as a response to difficult market conditions. A proliferation of consumer and industrial products of western firms was overcrowding the markets in Asia. Also, Japanese companies were experiencing shortages of resources and skills needed for the development of new concepts, tools and techniques, which were required to achieve parity with the toughest competitor in terms of quality, cost and productivity.

Many Japanese companies considered that cross-functional activities, as used by Western firms for manufacturing could be effectively modified. They believed there were advantages in combining employees from strategy, planning, marketing, engineering, finance and production into expert teams. These teams were able to examine new methods and techniques for the design and development of new products, and aimed to enhance the degree of integration between the upstream and downstream activities of a company's operations. Target costing emerged from this environment. A range of specialized tools, including functional analysis, value engineering, value analysis and concurrent engineering were introduced to support target costing. Target costing provided a way to link profit planning, feasibility, market surveys, value analysis, management accounting, budgetary control and financial management. This made Japanese companies particularly effective in the areas of product design and development, where they were able to identify all relevant elements to formulate a holistic management approach, in order to achieve performance levels to meet the company's objectives.

Target costing offers a range of advantages as follows:

It reinforces top-to-bottom commitment to process and product innovation, and is aimed at identifying issues to be resolved, in order to achieve some competitive advantage.

It helps to create a company's competitive future with market-driven management for designing and manufacturing products that meet the price required for market success.

It uses management control systems to support and reinforce manufacturing strategies; and to identify market opportunities that can be converted into real savings to achieve the best value rather than simply the lowest cost.

While target costing emerged over thirty years ago, it is only in the 1990s that these systems have been documented (in both the Japanese and western literature), and introduced into western companies. Several reasons have been suggested for this (Kato, 1993). First, the popularity of the Japanese just-in-time inventory systems dominated the attention of industry in the 1980s, at the expense of target costing. Second, many Japanese companies in the 1980s and 1990s were still refining their target costing systems. Third, target costing focuses heavily on new product development activities, which are often treated with great secrecy in Japan.

1.5. An Overview of the Target Costing Approach

There are several definitions of target costing. Target costing is defined as “a structured approach to determining the cost at which a proposed product with specified functionality and quality must be produced, to generate a desired level of profitability at its anticipated selling price” (Cooper and Slagmulder, 1997, 359). A critical aspect of this definition is that it emphasizes that target costing is much more than a management accounting technique. Rather, it is an important part of a comprehensive management process aimed at helping an organization survive in an increasingly competitive environment. In this sense, the term “target costing” is a misnomer: it is not a product costing system, but rather a management technique aimed at reducing a product’s life-cycle costs (Kato, 1993). Several writers have described the main features of target costing systems and the way the systems operate. These descriptions are informed by the practices in a number of Japanese companies that have been the subject of detailed case studies. While some of the details may vary between companies, a general conceptualization of the process has emerged. The following discussion provides an overview of the process and introduces a series of

terms used when discussing target costing. The intention is to provide a framework within which the target costing practices can be understood.

Target costing is viewed as an integral part of the design and introduction of new products. As such, it is part of an overall profit management process, rather than simply a tool for cost reduction and cost management. Figure 1-4 summarizes the steps in the target costing process. The first part of the process is driven by customer, market and profitability considerations. Given that profitability is critical for survival, a target profit margin is established for all new product offerings. The target profit margin is derived from the company's long-term business plan, which incorporates its long-term strategic intent and profit margins. Each product or product line is required to earn at least the target profit margin.

For any given product, a target-selling price is determined by using various sales forecasting techniques. Critical to setting the target selling price are the design specifications (reflecting certain levels of functionality and quality) of the new product. These specifications are based on customer requirements and expectations and are often influenced by the offerings of competitors. Importantly, when setting the target selling price, competitive conditions and customers' demands for increased functionality and higher quality, without significant increases in price, are clearly recognized, as charging a price premium may not be sustainable. Hence, the target-selling price is market-driven and should encompass a realistic reflection of the competitive environment.

Integral to setting the target selling price is the establishment of target production volumes, given the relationship between price and volume. The expected target volumes are also critical to computing unit costs, especially with respect to capacity-related costs (such as tooling costs), as product costs are dependent upon the

production levels over the life cycle of the product. Once the target-selling price and required profit margin have been determined, the difference between these two figures indicates the allowable cost for the product. Ideally, the allowable cost becomes the target cost for the product. However, in many cases the target cost agreed upon will exceed the allowable cost, given the realities associated with existing capacities and capabilities.

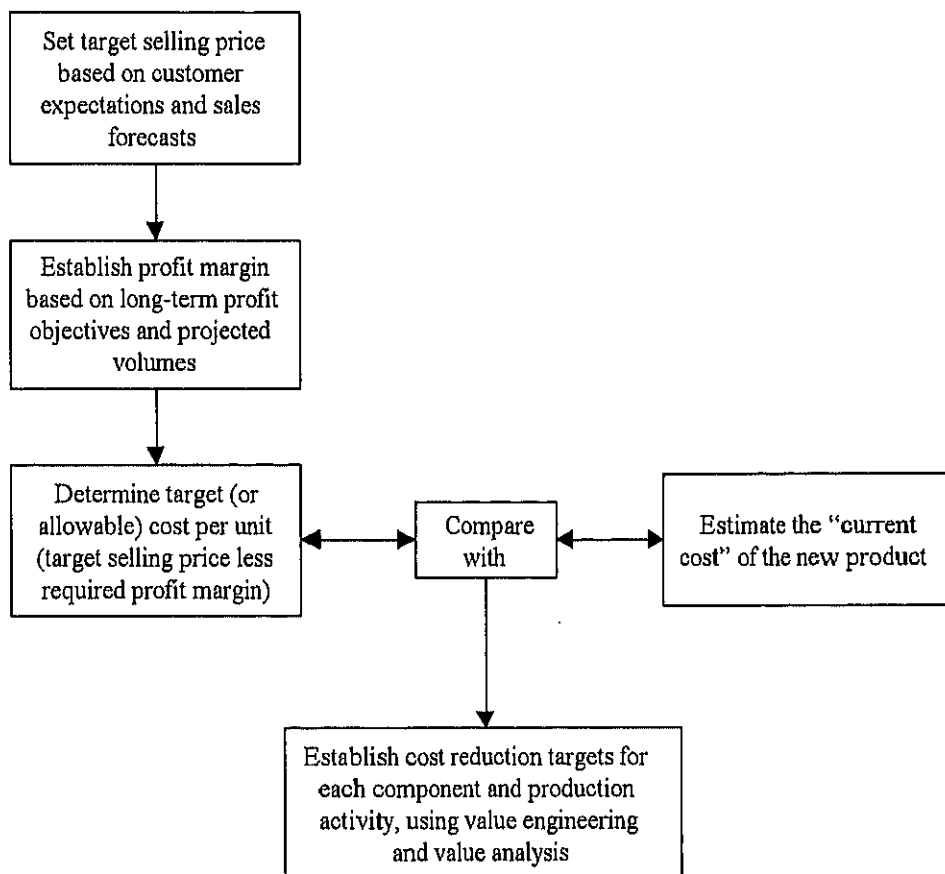


Figure 1-4. Steps in the target costing process

The next stage of the target costing process is to determine cost reduction targets. Some firms will do this by estimating the 'current cost' of the new product. The current cost is based on existing technologies and components, but encompasses the functionality and quality requirements of the new product. The difference between

the current cost and the target cost indicates the required cost reduction. This amount may be divided into a target cost-reduction objective and a strategic cost-reduction challenge. The former is viewed as being achievable (yet still a very challenging target), while the latter acknowledges current inherent limitations. After analyzing the cost reduction objective, a product-level target cost is set which is the difference between the current cost and the target cost-reduction objective.

It should be noted that a fair degree of judgment is needed where the allowable cost and the target cost differ. As the ideal is to produce at the allowable cost, it is important that the difference is not too great. Once the product-level target cost is set, however, it generally cannot be changed, and the challenge for those involved is to meet this target.

Having achieved consensus about the product-level target cost, a series of intense activities commence to translate the cost challenge into reality. These activities continue throughout the design stage up until the point when the new product goes into production. Typically, the total target is broken down into its various components, each component is studied and opportunities for cost reductions are identified. These activities are often referred to as *value engineering* (VE) and *value analysis* (VA). Value engineering involves searching for opportunities to modify the design of each component or part of a product to reduce cost, but without reducing functionality or quality of the product. Value analysis entails studying the activities that are involved in producing the product to detect non-value-adding activities that may be eliminated or minimized to save costs, but without reducing the functionality or quality of the product. Where components are sourced from suppliers (which is often the case in the automotive industry), target prices are established for each part and the company's employees work with the suppliers to ensure the targets

are achieved. Overall, the aim of the process is to ensure that when production commences, the total cost will meet the target, and profit goals will be achieved.

While the above description captures the essential features of the target costing process, it should be emphasized that successful target costing requires careful planning, attention to detail and a strong degree of commitment from those involved.

1.6. Previous Literature on Target Costing

The first recognized work on target costing is done by Noboru and Monden (1983) while explaining the comprehensive cost management system in the automobile industries. After this, several case studies have been published (Monden (1986); Tanaka (1992, 1993, 1994); Monden and Hamada (1991); Kato, Boer and Chow (1995); Cooper (1995, 1996); Fisher (1995); Lee and Monden (1996); Yoshikawa, Innes and Mitchell (1990); Carr and Julia (1995) etc.). Results of questionnaire research have also been reported (Sakurai (1991); Tanaka (1990); Tani and Kato (1994); Tani *et al.* (1994); Tani (1995); Yoshikawa (1990) etc.). Through these researches, some common features of the objectives, tools, processes and the diversity of target costing practices have been explained. Contingency theory approach of target costing has also been studied by some of the researchers, such as, Tani and Kato (1994). As the first work on the behavioral issues in target costing system, Monden, Akter and Kubo (1997) and Akter, Lee and Monden (1999) have conducted two laboratory experiments. This study will focus on behavioral issues in target cost determination and allocation processes. Review of literature shows that there is no study so far in target costing that uses goal-setting theory, expectancy theory and cognitive dissonance theory to explain the behavioral issues in target cost determination and allocation processes.

1.7. Behavioral Issues in Target Costing

To compete effectively, organizations need to adopt target costing as a strategic initiative. Believing in the need for target costing is only a first step in institutionalizing this initiative. Integrating target costing in the daily actions of an organization requires more than a belief; it requires organization-wide deployment. Target cost deployment requires determining the technical and structural changes needed; the behaviors desired; the cultural values, symbols, and mind-sets to be reinforced; and the political issues that need to be addressed. The behavioral base of target costing deals with the behaviors needed to succeed at target costing, including issues of employee motivation, morale, and performance measurement and evaluation.

Since 50's till to date, the behavioral accounting researchers (Argyris, 1952, 1990; Ansari, 1976; Brownell, 1982; Hofstede, 1967; House, 1971; Murry, 1991; Ronen and Livingstone, 1975) were extensively investigating the motivational aspects mainly relating to the budgetary control system in management accounting research. Before the emergence of target costing, there was hardly any room for further research in management accounting applying the theories of motivation. With its advent, motivational considerations regain its importance to study the attainability of target cost on which the success of any target costing system depends. This study focuses the behavioral issues relating to the determination of the target cost of product and its allocation to parts.

1.7.1. Behavioral Issues in Target Cost Determination Process

Target costing is the system to support the cost reduction process in the developing and designing phase of an entirely new model, a full model change or a minor model change of a product (Monden and Hamada, 1991). For its successful implementation,

the target cost must be determined in a rational manner. It is necessary to control the designing activity to cut costs dramatically at this stage. If it is not determined rationally, the designing activities cannot be controlled, and targets will be ineffective. An effective way to determine the target cost rationally is to link cost reduction activity to profit planning, and to approach the target cost based on long-range profit planning (Makido, 1989). By this method, subtracting the target profit margin from the target-selling price gives the allowable cost. It represents the cost at which, according to top management, the product must be manufactured if it is to achieve the target profit margin when sold at its target price. It acts as a signal to all involved in the target costing process as to the magnitude of cost-reduction objective that eventually must be achieved (Cooper and Slagmulder, 1997).

The allowable cost is the cost that top management strongly desires to attain. If this cost is adopted as the target of efforts, the requirement is very severe and not immediately attainable (Monden and Hamada, 1991). Since allowable cost is derived from external conditions and does not take into account the internal design and production capabilities of the firm, the risk that the allowable cost will not be achievable (Cooper and Slagmulder, 1997). On the other hand, the cost estimated by a simple accumulation of the present conditions, which is also called the drifting cost, cannot be the appropriate target of efforts. Thus, it is necessary to establish a "target cost" that is attainable and motivates employees to make efforts to ultimately achieve the "allowable cost" (Monden and Hamada, 1991). There is usually a gap between the allowable cost and the drifting cost. Therefore, it needs to be filled by allocating a certain portion of it to each process. Then the formal target cost is determined. From the management point of view, it is desirable to realize the largest possible target profit, the first allowable cost is likely to be severe (Monden, 1985). An unrealistic

allowable cost can be made to an achievable one that reflects the relative competitive position of the firm when it is increased by reducing the target profit margin.

The process of product-level target costing increases the allowable cost of the product to a level that can reasonably be expected to be achievable, given the capabilities of the firm and its suppliers. The difference between the allowable cost and the product-level target cost is called the strategic cost reduction challenges. The strategic cost reduction challenge should reflect the true inability of the firm to match its competitors' efficiency. To ensure that, the target cost-reduction objective must be set so that it is achievable only if the entire organization makes a significant effort to reach it. If the target cost reduction objective is consistently set too high, not only the work force be subjected to excessive cost-reduction objectives, risking burn-out, but also the discipline of target costing will be lost as target costs are exceeded frequently. If the target cost reduction objective is set too low, the firm will lose competitiveness because new products will have excessively high target costs (Cooper and Slagmulder, 1997). Moreover, some Japanese companies find that the constant pressure to meet target cost goals can cause management burnout. In addition, one of the leading causes of engineering burnout is the tight schedule imposed by company's target costing systems. Target costing systems can also cause problems with suppliers, who must meet the tight schedules imposed by the target costing system when the cost-reduction demands are passed down to them (Kato, Boer and Chow, 1995). *Therefore, deciding the degree of tightness of target cost is of greatest importance for a meaningful target costing system.*

1.7.2. Behavioral Issues in Target Cost Allocation Process

In target cost allocation process, to attain the per-unit target cost of a product, the designers initially break down this target cost into functional elements assigned to

corresponding design departments which are again broken into parts elements. If the target cost cannot be achieved, i.e. if the estimated cost is greater than the target cost, the cost-reduction activities will be repeated by investigating alternative designs, until the estimated cost becomes, at most, equal to the target cost. The cost-reduction activities in the real world are essentially based on ideas created by designers. The idea generation capability or cost-reduction performance of product designers may vary since different levels of participation and performance-evaluation methods will motivate them in different ways.

High employee performance emerges when their performance evaluation measures are confined only to controllable items, and the inclusion of uncontrollable items in the performance evaluation measures will cause their performance to decline. In addition, participation is positively and significantly associated with performance. Even some contradictory results are also found where participation is negatively associated with performance or there is no direct correlation between them. Due to the interaction of different levels of participation and performance-evaluation factors, different types of cognitive elements will be created which will produce dissonance or consonance of different magnitudes that will motivate the employees in different ways. *Therefore, determining the appropriate level of designers' participation and their performance evaluation measures is an important factor for a successful target costing system.*

It is necessary to be aware that the target costing may force unreasonable demands on employees. Motivational considerations must be taken into account for the attainability of target costs. It is important that the assignments of the amount are not overly affected by the organizational power structure. Each target should be determined through consultation between manager and subordinates. For

implementing target costing effectively, each employee must tackle cost reduction positively. The company needs to devise methods that motivate employees to achieve their targets positively (Monden and Hamada, 1991).

The behavioral factors in target cost and determination and allocation processes that are covered by this study are portrayed in Figure 1-5 (See next page).

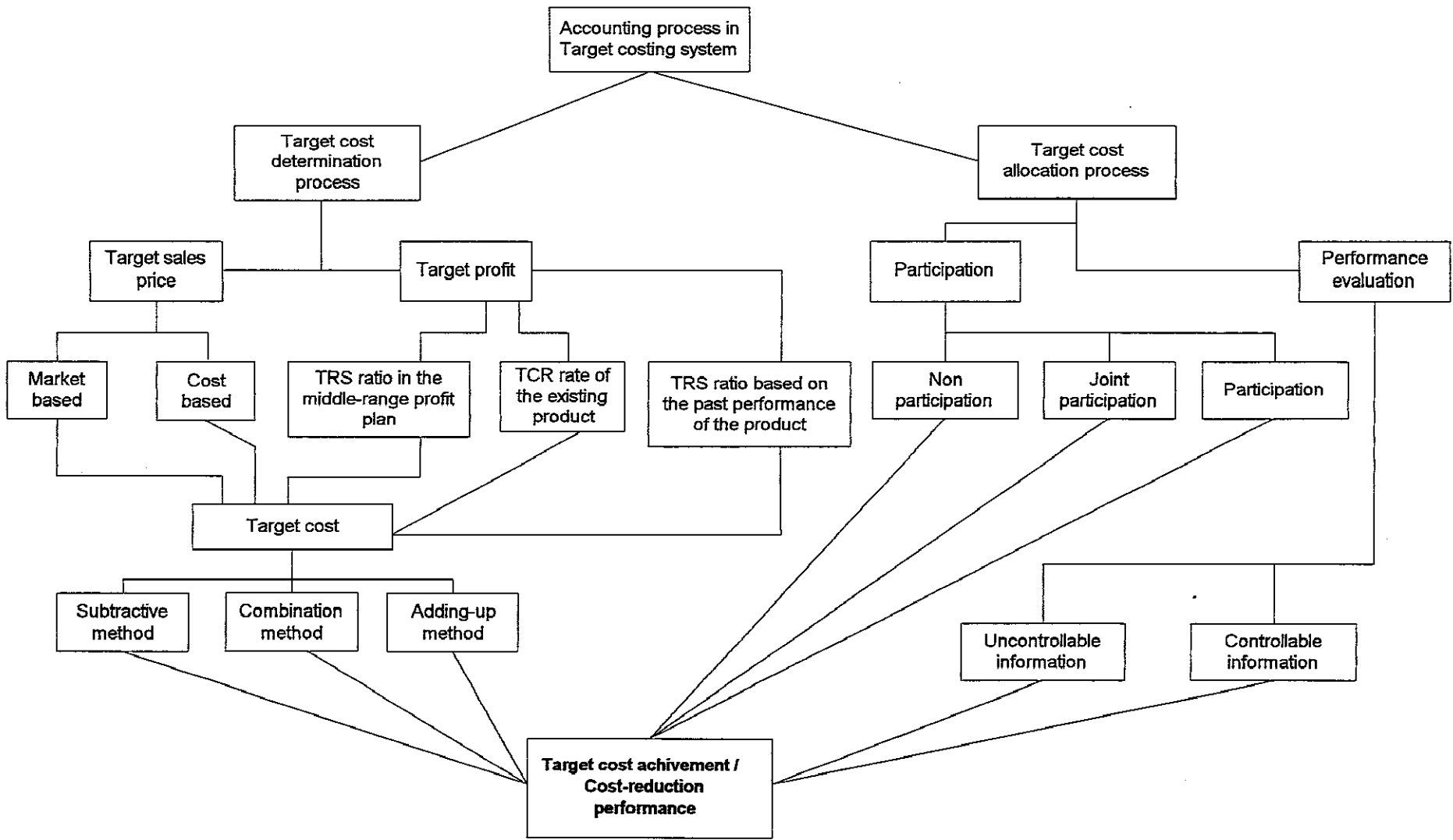


Figure 1.5. Behavioral factors in the accounting process of target costing system

1.8. Motivation of the Study

Target costing is a profit management technique. It is used to ensure that future product will contribute to planned long-term profits. The process used to achieve the planned cost reduction and profit increase often exerts intense pressure over the product designers. The constant pressure to meet the target cost goals can cause management burnout and create problems with the suppliers when the cost-reduction demand is passed down to them.

Target costing systems derive their strength from the application of cardinal rule: the target cost must never be exceeded. If a firm continuously sets over aggressive target cost, violation of target cost would be common and the discipline of the target costing process would be lost. Even worse, if the target cost is known to be unachievable, the design team might give up even trying to achieve it. The entire target costing process is futile if the long-term profit objectives underlying it are unrealistic. A literature review reveals that there has been no study thus far, on how these behavioral factors affect the achievement of target cost.

Target costing system has two major steps to bring the competitive challenge of the market place through the organization to the product designers to ensure that only profitable products are launched. The first phase of target costing is the establishment phase where a product concept is defined and the target cost is set for the product. The second phase is the attainment phase where the product target cost is transformed into achievable target cost. The objective of this study is to investigate how the target costing performance is affected by the behavioral factors of these two phases.

In this paper, the behavioral factors influencing in determining the target cost of a product and that in the allocation of the product's target cost into parts elements

will be studied and their resultant impacts on the target cost achievement will be observed. The present empirical study will try to find out and analyze the behavioral aspect of cost reduction policy that would be helpful in achieving target cost reduction amount. Therefore, the main objectives of this paper are:

- (a) to examine how the degrees of tightness exercised in determining target cost influences target cost achievement level,
- (b) to examine how participation of product designers and controllability in their performance evaluation information in target cost allocation influence the achievement of target cost, and
- (c) to identify how target cost achievement level is influenced by joint effects of the tightness of target cost determination methods, participation of product designers and controllability in their performance evaluation information in target cost allocation.

For verifying these relationships, we conducted the research at two phases: first, we conducted laboratory experiment to generate valid causal inference, second, to address the generalizability or external validity we did the survey research. We went through these two phases for examining first two objectives, but for the third one, we used survey data only.

1.9. Structure of the Thesis

This paper is organized into eight chapters. The first section introduces the research with an overview of target costing, its difference with traditional cost management, behavioral issues in target costing and objective of the study. The second presents research design and methodology that includes samples and statistical methods applied for both laboratory experiment and survey research. The third describes a

laboratory experiment on motivational impacts of the type and tightness of target cost. The fourth presents a survey research on effects of the tightness of target profit & cost on target cost achievement. Chapter five discusses a laboratory experiment on target costing performance based on alternative participation and evaluation methods. The sixth presents a survey research on effects of behavioral factors in target cost allocation on target cost achievement. The seventh describes a survey research on effects of target cost determination and behavioral factors in its allocation on target cost achievement. Chapter eight concludes the thesis with some brief directions for future research. The overall structure of the thesis is displayed in Figure 1-6.

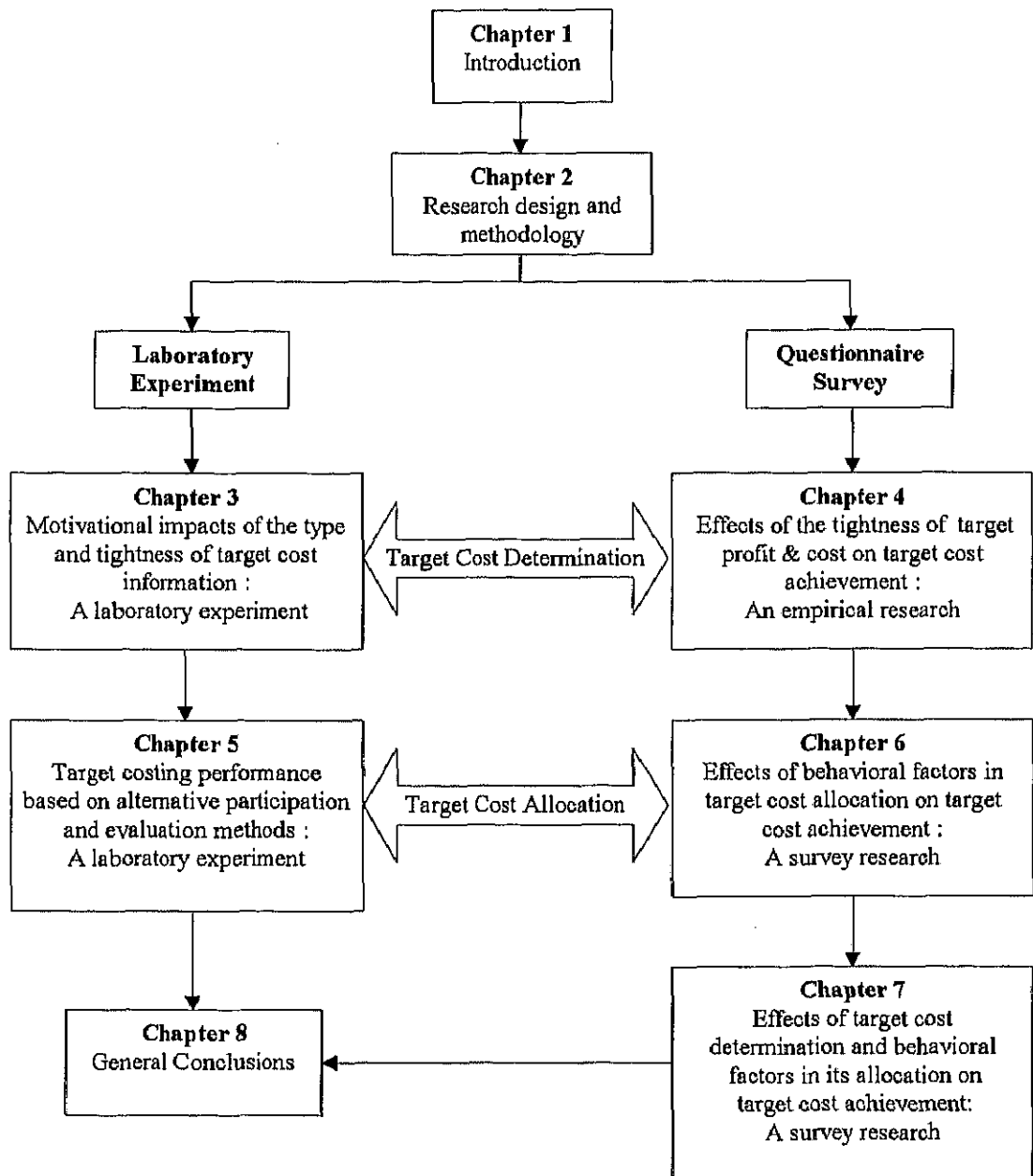


Figure 1-6. Overall structure of the thesis