JMAR
Volume Three
Fall 1991

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Target Costing and Kaizen Costing in Japanese Automobile Companies*

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Abstract: Cost management methods used by a company must be useful for the production of new products which meet the customers' demand at lowest cost as well as an aid to cost reduction of existing products by eliminating wastes. To achieve this, companies need a total cost management system which includes target costing and Kaizen costing.

The purpose of this paper is to explain features of the system of total cost management in Japanese automobile companies. This paper thus consists of two pillars (i) "Target costing," the system to support the cost reduction process in the developing and designing phase of a new model; and (ii) "Kaizen costing," the system to support the cost reduction process in the manufacturing phase of existing products. We would also like to emphasize that the management accounting system is functioning very well through target costing and Kaizen costing in Japanese automobile companies.

Environmental changes in Japanese automobile companies—for example, the high appreciation of yen currency, the shortening of the product life-cycle, the diversification of demand and keen competition—are severe. With such changes, cost management methods used must be useful for the production of new products which meet customers' demands at lowest cost, as well as cost reduction of existing products by eliminating wastes.

On account of the above, companies have come to need total cost management which includes product development and design activities as well as production activities. This contrasts with traditional cost management which focused on cost control in the production stage. The fact that most of the costs in the production stage are determined in the stage of new product development and design indicates the need for total cost management.

The purpose of this paper is to describe the features of the total cost management system in Japanese automobile companies. As the title indi-

*This paper is in many respects a summary plus some refinements and extensions of previous research by Y. Monden.

The authors are grateful to the editor William L. Ferrara and anonymous reviewers for their helpful comments and suggestions.

cates, the paper consists of two main pillars. They are "Target costing" (the establishment of a target cost and the method of its attainment) and "Kaizen costing." They can be summarized as follows:

(i) "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. (Target costing is called "Genkakikaku" in Japanese.)

(ii) "Kaizen costing" is the system to support the cost reduction process in the manufacturing phase of the existing model of product. (Kaizen costing is called "Genkakaizen" in Japanese.) The Japanese word "Kaizen" in Kaizen costing may be a somewhat different concept from the English word "improvement." "Kaizen" refers to continuous accumulations of small betterment activities rather than innovative improvement. Therefore, "Kaizen costing" includes cost reduction in the manufacturing stage of existing products. Innovative improvement based on new technological innovations is usually introduced in the developing and designing stage.[1]

Target costing and Kaizen costing, when linked together, constitute the total cost management system of Japanese companies. The "total" cost management in this context implies cost management in all phases of product life. The concept of total cost management also comes from total involvement of all people in all departments throughout the company.

Since the concept of Kaizen costing is rather new in the U.S.A., we will clarify its concept, procedures, and its relationships with target costing in this paper. Also, the general idea in the U.S.A. seems to be that floor-level control activities are more useful in modern manufacturing plants as a result of the spread of the JIT (just in time) production system and TQC (total quality control), and that the accounting control system has become useless and unnecessary. We would like to demonstrate in this paper, however, that the management accounting system is functioning very well in both target costing and Kaizen costing in Japanese automobile companies.

FEATURES OF TARGET COSTING

Broadly speaking, the step of corporate long-term or middle-term profit planning is included in the process of target costing. Narrowly interpreting target costing would be that it consists of two processes roughly classified as: (a) the process of planning a specific product that satisfies customers' needs and of establishing the target cost from the target profit and targeted

[1]See, Imai [1986], Chapter 2. In the glossary of Imai [1986], he defines the meaning of Kaizen as follows: Kaizen means continuing improvement in personal life, home life, social life, and working life. When applied to the workplace Kaizen means continuing improvement involving everyone—managers and workers alike. Further, he says, improvement can be defined as Kaizen and innovation, where a Kaizen strategy maintains and improves the working standard through small, gradual improvements, and innovation calls forth radical improvements as a result of large investments in technology and/or equipment.

sales price of the new product, and (b) the process of realizing the target cost by using "value engineering" (VE) and a comparison of target costs with achieved costs.[2]

At this point it would be appropriate to briefly comment about VE. The basic idea of VE is that products and services have functions to perform and the amount of their value is measured by the ratio of these functions to their costs. By this process, the decision as to whether the product is to be produced is made. For this purpose, it is necessary that the functions of each product, part and service are clarified and that all functions are quantified. For example, VE activities for direct materials can be implemented concerning the material quality or a grade change, the reduction of the number of bolts in a part, the change of a part shape, the common use of an alternative part, the change of painting method, etc.

VE is different from control activities based on traditional standard cost accounting and it encourages the proposal of creative plans designed to reduce cost standards. This contrasts with standard cost accounting which overemphasizes determining and achieving cost performance standards.

The techniques of VE itself were first developed in GE (see Miles [1961]). In the case of GE, however, they were initially aiming at reduction of purchased parts costs, and their VE activities were not linked to corporate target profit and target costs as they are in Japan.

In general, target costing has the following properties.

(i) Target costing is applied in the developing and designing stage and it is different from the standard cost control system which is applied in the production stage.
(ii) Target costing is not a management method for cost control in a traditional sense, but it is one which intends to reduce costs.
(iii) In the target costing process, many methods of management science are used, because the managerial objects of target costing include the techniques of development and product design.
(iv) The cooperation of many departments is needed in the execution of target costing.
(v) Target costing is more suitable in the multiproduct-small production run firm than in the few product-large production run firm.

In addition to the reasons which we mentioned in the introduction, the reason why target costing has become important is that in Japan the ratio of variable costs to total manufacturing costs has recently increased remarkably (up to 90 percent in the auto industry) and the ratio of direct material costs to total variable costs is about 85 percent in the auto companies as the annual reports show. This means that the management of variable costs has become extremely important. Moreover, as the ratio of direct labor costs to total manufacturing costs is about six percent in the

[2]See, Monden [1986] p. 17, and Noboru and Monden [1987]. Monden [1986] is the first paper published in the U.S.A. that described Japanese target costing and Kaizen costing, which were literally translated from their Japanese terms as "cost planning" and "cost improvement." Sakurai [1989] also covers target costing in many Japanese assembly-type industries and computer software companies.

auto companies, the management of direct material costs by target costing has become more important than that of direct labor costs.

Though the direct object of consideration in target costing is costs, target costing must be closely connected with corporate profit planning. Take for example, the case of a company that can develop products whose sales prices greatly exceed their high costs because of their high quality. If a company focuses only on costs, there may be a bias against high cost/high profit products. By linking target costing and profit planning, such a bias can be prevented and it makes employees understand the fact that a company's ultimate goal is not cost reduction but higher profits.[3]

We will examine the target costing process broadly in this paper and divide its process into five steps as follows: (i) corporate planning; (ii) developing the specific new product project; (iii) determining the basic plan for a specific new product; (iv) product design; and (v) the production transfer plan. An outline of the target costing system is shown in Figure 1. In the next section, we will consider each of these steps of target costing in some detail.[4]

THE SYSTEM OF TARGET COSTING

(i) Corporate Planning

In this step, the long and medium term profit plans for the whole company are established and the overall target profit for each period is determined for each product. In the three-year profit plan, marginal income (= sales price – variable costs), contribution margin (= marginal income – traceable fixed costs), and operating profit (contribution margin – allocated fixed costs) as average figures for a series of developing models are computed. Further, based on this average figure each of these three kinds of profits is planned for several representative types of each model. In computing operating profits, depreciation costs of facilities and dies, development costs and prototype manufacturing costs, are allocated to each model. The ratio of return on sales is often used as the indicator of the profit ratio for establishing target profit, because this ratio is easily computed for each product.

A corporate plan is drafted by the corporate planning department. As part of the plan, new product development plans are drafted by the engineering planning department and a general new product plan is established. In this plan, the time frame of new product development, model changes and model modifications are established for all cars. This plan is illustrated by the form shown in Figure 2.

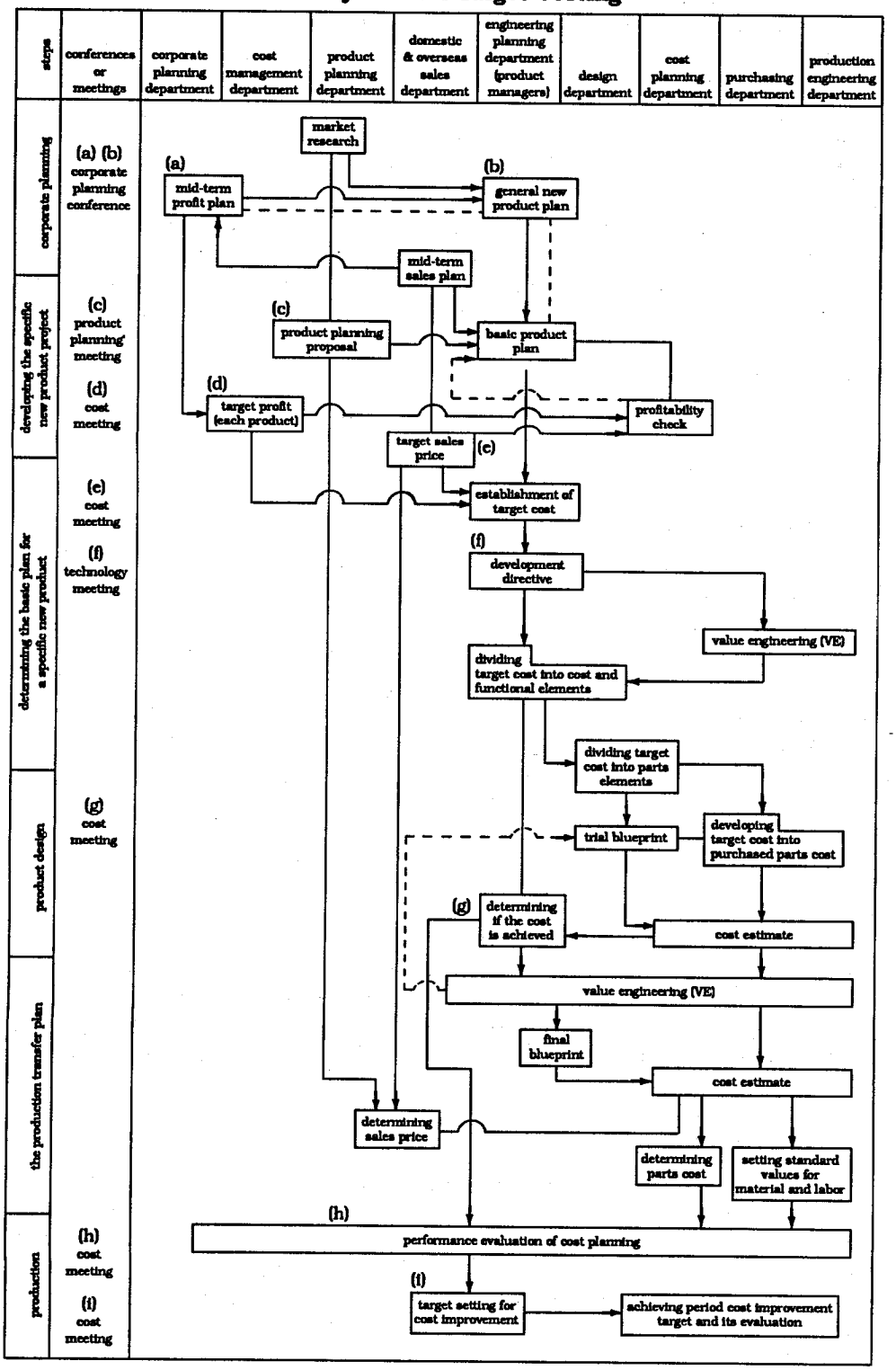
(ii) Developing the Specific New Product Project

In order to give shape to the general new product plan, the product planning department presents the engineering planning department with its wishes regarding the type of new product to be developed and the content of the model changes based on market research. This is discussed at the top management product planning meeting and the product planning

[3]See, for example, Makido [1989].

[4]See, for example, Monden [1989a], Noboru and Monden [1983], Noboru and Monden [1987].

Figure 1
The System for Target Costing



from Noboru and Monden (1987) p. 274.

proposal is prepared there. The product manager later gives shape to this plan and establishes the basic product plan.

In this stage, the cost management department estimates the costs of the plan and investigates whether the plan can achieve the target profit. Some auto companies use the payback period method as an aid in assessing profit-ability. The payback period should normally cover no more than two model lives; i.e., eight years. In the case of a specific facility used exclusively by a certain model, the payback period is usually no more than four years. For a minor model change the period is two years. One major company uses a simple accounting expenses measure (including interest costs) for the decision of adding facilities. When the project does not appear profitable, the department requests modifications and eliminations. Only the profitable projects are adopted.

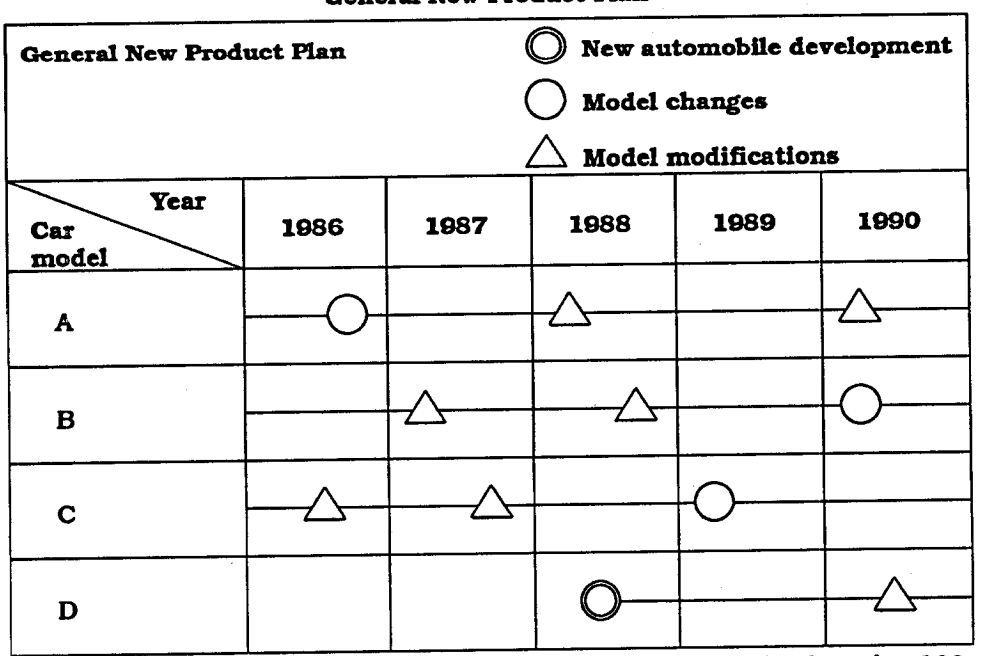
(iii) Determining the Basic Plan for a Specific New Product

In this step, the major cost factors such as design and structure are determined and target costs are established. The product manager requests each department to review material requirements and the manufacturing process, and to estimate costs. According to the reports of the departments, the total "estimated cost" is computed.

At the same time, target price figures are gathered from the domestic auto division and the foreign auto division. From these prices and target profit, "allowable cost" is computed. The method of the computation is as follows:

target sales price – target profit = allowable cost.

Figure 2
General New Product Plan



from Noboru and Monden [1983] p. 106.

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. On the other hand, the estimated cost is not 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." For this reason, studies and positive application of motivational factors regarding employee behavior are needed.

The establishment of the target cost needs to be reviewed on various dimensions regarding the size of the gap between allowable cost and estimated cost. After the target cost is determined, and if that plan is approved, top management orders development based on it. Following that, each department implements VE activities regarding the design method in cooperation with each other in order to identify cost effective products that will fulfill customers' demands.

In addition, the engineering planning department decomposes the target cost into each cost element and functional element with the help of the cost management department.[5] Cost elements are material costs, purchased parts costs, direct labor costs, depreciation costs and so on. Functional elements are engine, transmission system, chassis and so on. Important points are clarified by these detailed classifications. The form of the classification is shown in Figure 3.

[5]See M. Tanaka [1989a] about the method of target development.

Figure 3
Target Cost Broken Into Cost Elements and Functions*

Functions \ Cost Elements	Material Costs	Purchased Parts Costs	Direct Labor Costs	• • • • •	Total
Engine	¥	¥	¥		¥
Transmission System					
Chassis					
• • • • •					
Total					

*The amount should be presented either in the form of the total cost for a single car (in the case of a new model or a model change) or as a deviation from the existing model (in the case of model modifications).

from Noboru and Monden [1983] p. 108.

The design department also decomposes the target cost into each part. This classification is made to be followed up by target achievement activities in the production design stage including the purchasing department. For this reason, the classification is detailed. The form of the classification is shown in Figure 4.

(iv) Product Design

The design department drafts a trial blueprint according to the target cost set for every part. For this draft, information from each department is needed. The design department also actually makes a trial car according to the blueprint and the cost management department estimates the costs of the car.

If there is a gap between the target cost and the estimated cost, the departments execute the VE analysis in cooperation with each other and the trial blueprint is adjusted accordingly. After repeating this process several times, the final blueprint is established.

(v) The Production Transfer Plan

In this step, the preparatory condition of production equipment is checked and the cost management department estimates costs according to the final blueprint. The production engineering department establishes standard values of material consumption, labor hours and so on. Those values are presented to the factory.

Those standard values are used as a data base for computing costs for the purpose of financial accounting and for "material requirements planning" (MRP). Therefore, they are usually fixed for one year. One major firm calls this value the "basic cost." The purchasing department also starts negotiating the prices of purchased parts at this time.

Soon after the target cost is set, production begins. The performance evaluation of target costing is then implemented after new cars have been produced for three months, as abnormal values usually arise during the first three months.

The performance evaluation of target costing is implemented to examine the degree to which the target cost is achieved. If the target cost is not achieved, investigations are made to clarify where the responsibility lies and where the gap arises. These investigations also evaluate the effectiveness of the target costing activities.

The above are the features of the target costing process in Japanese automobile companies. In this process which can be summarized in Figure 5, management accounting plays an important role.

As target costing deals with the development and design of new products, many technical methods of engineering are needed. However, the management accounting system is important in effectively determining target profits, target costs and estimated costs.

FEATURES OF KAIZEN COSTING

When a Japanese accountant hears the words "Kaizen costing," he expects a relation to the cost control system based on standard cost accounting. However, Kaizen costing in Japanese automobile companies has

Figure 4
Target Cost Broken into Parts Elements

Function			Assembly Number							Name		
					Car Model					Direct Labor Cost		
Major Units	Part Number	Part Name	Quantity	Process	A	B	C	Material Cost	Purchased Part Cost	Department	Worker Hours (Minimum)	Amount
									¥	¥		¥

from Noboru and Monden [1983] p. 109.

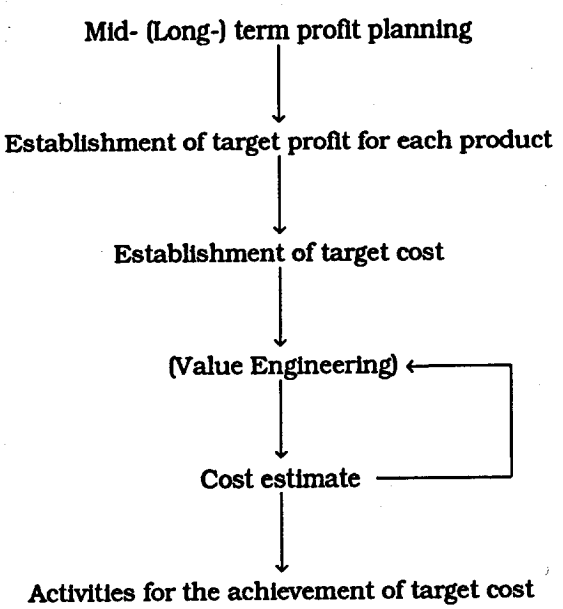
not been implemented according to standard costing. This means that the companies do not implement the traditional cost variance analysis based upon the gap between the standard cost and the actual cost for each period. Kaizen costing is implemented outside the standard cost system as part of the overall budget control system. In essence, the actual cost per car for the latest period is the Kaizen cost budget which must be reduced in each successive period in order to meet the target profit.

The reason why Japanese automobile companies implement Kaizen costing outside the standard cost accounting system is not because cost reduction in the production stage is taken less seriously, but because it is considered to be very important. Standard costing is limited by its financial accounting purpose in Japanese automobile companies and therefore it has many unsuitable features for cost reduction in the manufacturing phase.

Further, the concept of Kaizen costing covers broader meanings than the traditional cost control concept that refers to meeting cost performance standards and to investigating and responding when those standards are not met. Kaizen costing activities include cost reduction activities which requires changes in the way the company manufactures existing products. The inadequacy of standard costs for Kaizen costing purposes is obvious from the viewpoint of "Kaizen" concepts. Also the standard costs are changed only once a year.

Roughly classified, Kaizen costing activities are of two kinds. One consists of activities implemented to *kaizen* actual performance when the difference between actual cost and target cost is large after new products have been in production for three months., The other kind consists of ac-

Figure 5
General Summary of the Target Costing Process



tivities implemented continually every period to reduce any difference between target and estimated profit and thus to achieve "allowable cost."

In the former case, a special project team called a "cost Kaizen committee" is organized and the team implements VE activities. The following distinction between VE and "value analysis" (VA) can be made. VE is the cost reduction activity that involves basic functional changes in the new product development stage. VA is the cost reduction activity that involves design changes of existing products.[6] However, the distinction is not made in this case and the term "VE" is used. The establishment of a cost Kaizen committee implies that the car model's Kaizen has a top priority.

The following is a real life example of activities of the cost Kaizen committee. Just after the oil shock in 1973, the profitability of one automobile model showed a marked decrease because of cost increases due to oil. At that time, the plant manager made the following proposals to the top management meeting concerning cost reduction.

(i) Establishment of a cost Kaizen committee chaired by the plant manager.
(ii) Promotion of a company-wide cost reduction program for the specific model.
(iii) As substructures to this committee, organization of the following three subcommittees.
  (a) production and assembly
  (b) design and engineering
  (c) purchasing
(iv) Establishment of a cost reduction goal of 10,000 yen (about $75) per automobile.
(v) Expectation that the above goal would be achieved within six months.

Through a concerted effect by all departments based on the decisions of the cost Kaizen committee, the actual result of the plan was 128 percent attainment of goal at the end of six months.

The second category of Kaizen costing means reaching cost reduction targets established for every department as a result of the short term profit plan. Different methods are adopted because of the difference between variable and fixed costs. For example, the variable costs such as direct materials, coating, energy, and direct labor costs are managed by setting the amount of Kaizen cost per unit of each product type. Fixed costs are subjected to "management by objectives" based on the overall amount of Kaizen cost instead of the amount of Kaizen cost per car.

Since the purchasing department supervises the purchase prices of parts from outside suppliers, in the factory the most important subject is the use of VE activities to reduce consumption. Usually, the purchasing department is not allocated an amount of Kaizen cost target for its own department expenses, but attempts to reduce costs of parts by promoting VE proposals of vendors as well as by negotiating prices with vendors.

As for direct labor costs, monetary control as well as physical control in terms of labor hours is implemented by using the cost decrease amount as the Kaizen cost target. A similar approach is applied to material costs improvement.

[6]Some companies distinguish VA from VE as described above.

It is much easier for factory workers to understand the Kaizen targets when the amount of cost reduction targets for both fixed and variable costs are presented individually rather than presenting the total cost target. We will consider the method of computation for the second category of Kaizen costing in the next section.

COMPUTATION OF THE TARGET AMOUNT OF KAIZEN COST

Japanese automobile companies determine the amount of profit improvement (i.e., Kaizen profit) based on the difference between target profit (planned by a top-down approach) and estimated profit (computed as a bottom-up estimate). They usually intend to achieve half of that amount by sales increases and half by cost reduction.[7] Of course when the industry is in recession such as an oil crisis or a high appreciation of currency greater weight will be imposed on cost reduction.

The reasoning that the increase in sales increases profit is based partly on the notion of profit contribution. This reasoning is also based partly on the idea of ROI from the point of view that the sales increases raise the total asset turnover ratio.

A sales increase can be generated by raising the sales price or increasing sales volume. The former does not cause an increase in variable costs, whereas the latter does.

For generating cost savings, reductions of both variable costs and fixed costs are considered. As most of manufacturing fixed costs are needed for maintaining continuous growth, Japanese automobile companies generally think that the amount of Kaizen cost in the plants should be achieved mainly by the reduction of variable costs, especially direct material costs and labor costs.

However, in the non-manufacturing departments, the amount of Kaizen cost (or Kaizen expense) reduction is set for fixed costs. Departments affected include the head office, research and development and sales. The design department is usually not assigned an amount of Kaizen cost and the purchasing department is not assigned one except in special cases such as an oil crisis or a yen appreciation, etc.

The total amount of Kaizen costs in all plants (= (C) in the following formulas) is determined in the cost Kaizen meeting as follows:

amount of actual cost per car in last period (A)	=	amount of actual cost in last period	+	actual production in last period
estimated amount of actual cost for all plants in this period (B)	=	amount of actual cost per car in last period (A)	×	estimated production in this period

[7]See, for example, Monden [unpublished], T. Tanaka [1990a].

target of Kaizen cost in this period for all plants (C)	=	estimated amount of actual cost for all plants in this period (B)	×	target ratio of cost decrease amount to the estimated cost

The target ratio of cost decrease amount to the estimated cost is determined in consideration of attaining the target profit of the year. Usually that ratio is around ten percent. For a new product, the target cost that is determined in the target costing process is expected to be attained within three months from the time production is started on the new product, but after that, that figure can also be reduced further by applying the same technique of Kaizen costing.

The target amount of Kaizen cost assigned to each factory is as follows;

assignment ratio (D)	=	costs directly controlled by each plant	+	total amount of costs directly controlled by plants

total amount of Kaizen cost for each plant	=	target of Kaizen cost in this period for all plants (C)	×	assignment ratio (D)

Costs directly controlled by a plant include direct material costs, direct labor costs, variable overhead costs and so on. Excluded are the fixed costs such as depreciation costs, etc. The amount of Kaizen cost for each plant is decomposed and assigned to each division and that amount is again assigned to smaller units of the organization. Some details about the method of assignment are considered in the next section.

The Kaizen cost target is achieved by daily Kaizen activities. The JIT production system also intends to reduce various wastes in the plant by these daily activities. Therefore, Kaizen costing and the JIT production system are closely related with each other.

KAIZEN COSTING THROUGH "MANAGEMENT BY OBJECTIVES"

Each manufacturing plant has objectives about efficiency, quality and cost, etc. The concrete targets of physical objectives are determined and evaluated in the production meeting, while Kaizen costs targets are determined and evaluated in the Kaizen cost meeting.

The cost meetings are held at several organizational levels, for example, at the plant, division, department, section and process levels. In the cost meeting for each level, the amount of Kaizen cost—that is, the amount of the reduction target—is assigned through "management by objectives" at that organizational level.[8] That assignment is called "objectives decomposition" and is implemented according to concrete purposes and policies determined in advance.

[8]For the detail characteristics of Japanese management by objectives, see Monden [1989c] in Monden and Sakurai [1989] pp. 413-423.

However, it is essential that the objectives decomposition not be implemented uniformly, but implemented with the consideration of the specifics of each case. Moreover, the determination of each objective, the evaluation, the countermeasures and so on, must be implemented flexibly depending on each specific situation. The outline of objectives decomposition in the plant is shown in Figure 6.

Figure 7[9] shows an example of objectives decomposition for attaining the Kaizen cost target in a machining department. Figure 8 is another example in a stamping department.

In Figure 7, managers at each organizational level determine policies and means to attain the Kaizen cost target in their department. Their policies and means are mostly non-monetary measures, but the purpose is to realize the Kaizen cost target.[10] Managers at each level try to reduce actual labor hours, whereas the accounting department computes the actual labor costs and overhead based on these actual hours. Then actual labor hours and actual labor costs at each organizational level are publicized each month and the result is reflected via incentive pay in the salaries of the employees. This is a very strong incentive for them. Thus, both production management and accounting control are functioning at the same time in the company.

In the floor-level control activities, the JIT production system has contributed to the reduction of costs remarkably. It is a system that reduces costs by thoroughly excluding waste in plants. Reducing inventories makes managers clarify many problems in plants. If inventories are reduced, the possibility of line-stops arising becomes higher in problematic places and this forces cost reductions by investigating causes of line-stops via defective units and machine breakdowns, etc.

As indicated above, through the Kaizen costing process, accounting control is used for assigning Kaizen cost targets to plants, divisions and departments, etc. and the production and quality control by non-monetary measures is used for floor-level control activities. On the manufacturing floor, everyone is involved daily in Kaizen activities through QC circles and suggestion systems, etc. Thus, in Japanese automobile companies accounting controls as well as floor-level controls are integral parts of the Kaizen costing process.

MOTIVATIONAL CONSIDERATIONS IN TOTAL COST MANAGEMENT

It is necessary to be aware that target costing may force unreasonable demands on employees. As noted previously, motivational considerations must be considered for the attainability of target costs.

In Kaizen costing activities, it is most important to determine adequately the amount of the Kaizen cost target and to assign adequately that amount for each division, department and so on. It is important that the assignments of the amount are not overly affected by the organizational power

[9]In Japanese automobile companies each process shown in Figure 7 constitutes the "process" in the process costing system and each process is headed by a foreman.

[10]The managers also have objectives of quality and productivity (efficiency or lead-time reduction) as well as a Kaizen cost target.

Figure 6
Objectives Decomposition in Plants

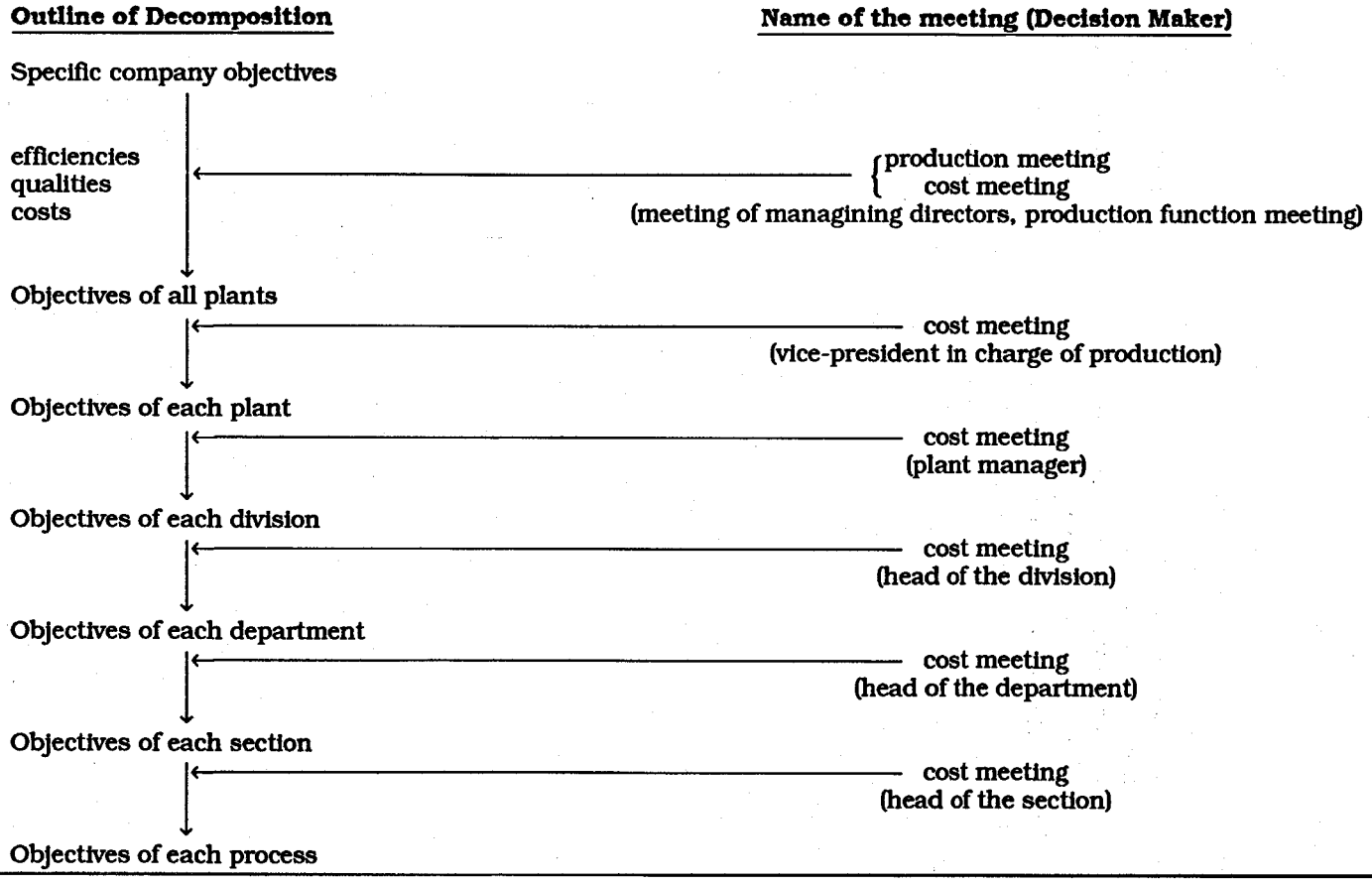


Figure 7
Example of Kaizen Cost Decomposition in a Machining Department

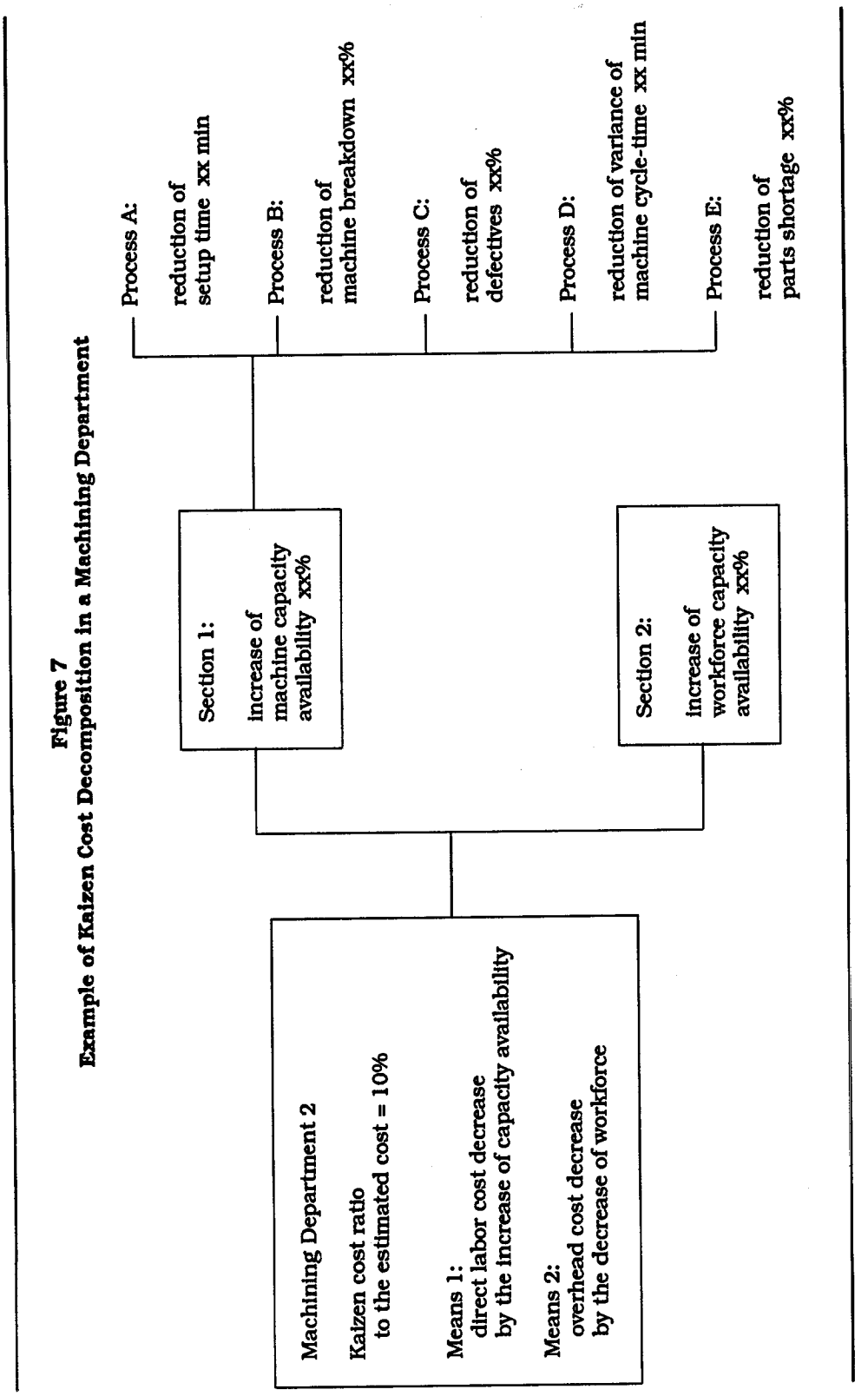
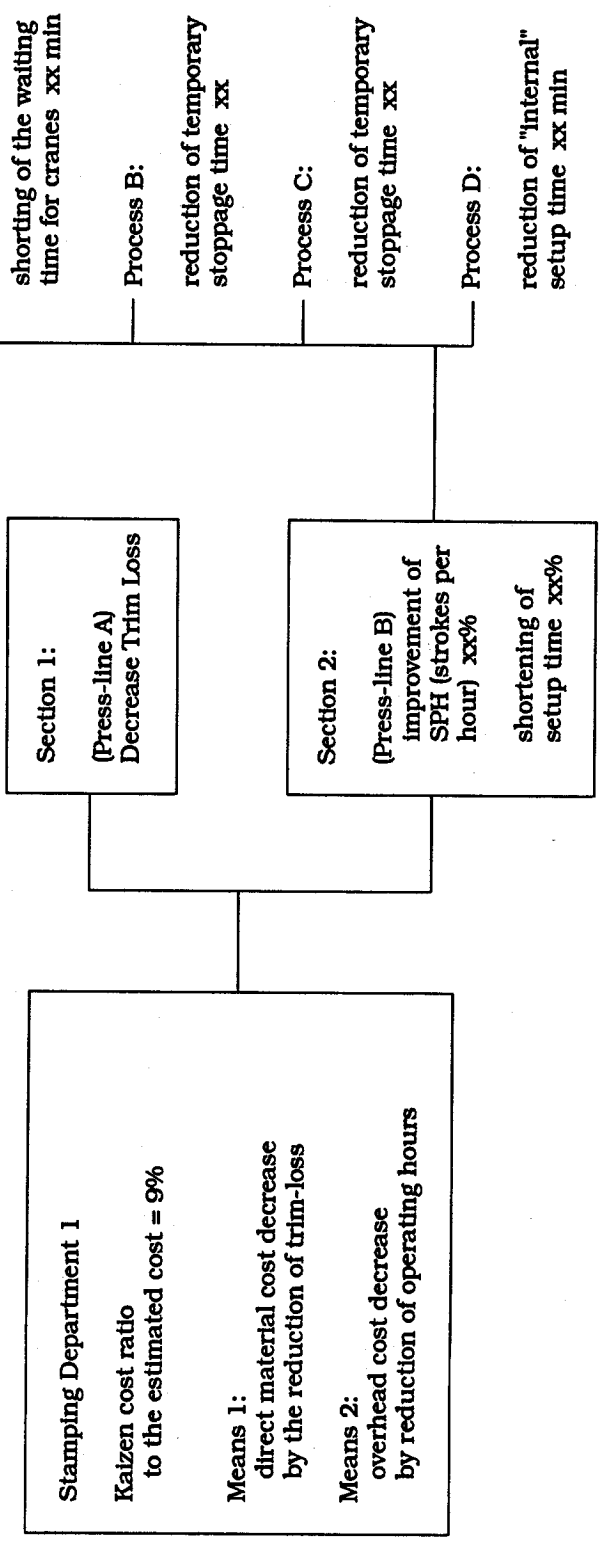


Figure 8
Example of Kaizen Cost Decomposition in a Stamping Department



structure. Rather, the "self-control" principle (autonomous management by each employee group) should prevail and each target should be determined through consultation between manager and subordinates.

For implementing target costing and Kaizen costing effectively, each employee must tackle cost reduction positively. The company needs to devise methods that motivate employees to achieve their targets positively. Moreover, as VE activities require access to many kinds of information in various departments, methods that promote group activities and cooperation need to be adopted.

As the top row of Figure 1 shows, people in all departments, including the purchasing department and suppliers, are involved in target costing, although the product manager of each model in the engineering planning department must take major responsibility throughout development and designing stages. The product manager plays the role of project leader in a matrix management system. Also as shown in Figure 6, people in every level of the plant are involved in attaining the Kaizen cost target. Thus, "people involvement" is very important in Japanese companies for executing target costing as well as Kaizen costing.

SUMMARY

In this paper, we have considered a total cost management system which includes product development and design activities as well as manufacturing activities. That is, we have considered the features of target costing and Kaizen costing that are the two important pillars in the total cost management system in all phases of the product life cycle of an automobile.

Nowadays, it is certain that the importance of target costing is increasing. However, Kaizen costing should not be slighted. Kaizen costing is entirely different from standard costing in that it aims at continuous reduction of costs in the manufacturing stage, while standard costing aims at achieving and maintaining standard costs. Target costing and Kaizen costing should be inseparably related to each other. If either of them is ignored, total cost management during the whole life of a product cannot be implemented adequately.

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