A MODEL SUGGESTION FOR BUDGETING ACTIVITY COST REDUCTION UNDER ACTIVITY BASED KAIZEN BUDGETING APPROACH

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Abstract

Nowadays, competitive global business life surrounds various companies around the world. Production technology develops in a very fast manner. Also, companies are in need of advanced budgeting and costing techniques in order to make more profit and stand strong in this fast changing scene. Companies use Activity Based Budgeting (ABB), Activity Based Costing (ABC), and Activity Based Management (ABM) systems to gain successful results. These systems concentrate on overhead costs in order to assign real production cost. In this study, we consider activity based systems and introduce a new model to apply Kaizen Budgeting through ABB and ABC approach in a business organization. Also, we aim to illustrate a case study for an activity center in order to explain our kaizen budgeting model. Our ABB and ABC model has been used in many organizations in Turkey and its success has been proved for years ago. However, our new model will be the first approach for ABB and ABC model via kaizen budgeting. We aim to reduce the organization's variable cost by kaizen budgeting in an efficient manner. Furthermore, we classified costs into four categories such as resource costs on the basis of the volume of activities, resource costs on the basis of activity level, resource costs independent from the volume of activities, and direct resource cost. This approach enables us to reduce the variable costs of activities according to their characteristics.

Keywords: Activity Based Costing, Activity Based Budgeting, Cost Assignment, Kaizen Budgeting.

Introduction

Companies are in need of faster, more qualified, more efficient, and sustainable technologies in order to compete around the world. However, advanced technologies by themselves are not enough to succeed in a competitive world. Companies have been trying to reduce their costs in order to gain more profit by applying different costing and budgeting techniques. Companies have to make a decision to operate their business in a fast atmosphere. Also, the related and relevant information should be prompt, true, and accessible.

Overhead costs are very important in identifying real production cost such as rental, depreciation, maintenance, research and development, and sales expenses. "Kaizen Budgeting" is a cost reduction method that enables companies to reduce their variable costs and gain more efficient results.

Therefore, we built a new model under ABC method using Kaizen Budgeting to reduce all of the activities in terms of the cost and capacity. We developed our model under ABC Kaizen Budgeting method to be able to reduce the cost of the activities. Hence, this is aimed not only to reach the full commercial cost of products at different activity levels, but also to reduce the full commercial cost of the product's variable costs.

1. Activity Based Costing (ABC)

ABC method was first introduced by George Staubus in his book titled "Activity Costing and Input-Output Accounting" (Staubus, 1971). However, Robin Cooper and Robert S. Kaplan developed a new approach of the Balanced Scorecard and brought a notice to these concepts.

Activity Based Costing system was developed to estimate the cost of resource to produce products or services. Resources are assigned to activities, and activities are assigned to cost objects based on consumption estimates (CIMA, 2001).

1.1. Overhead Costs- ABC Approach

Activity Based Costing (ABC) assigns manufacturing overhead costs differently than the traditional costing method. Activities demanded by each product are classified; and then, costs of these activities are assigned to products based on their level of use (Kaplan & Johnson, 1991). ABC system provides a clear understanding of the exact cost consumed by a product by determining the demand of activities for that product. In addition, it is also achieved by assigning the cost of activities determined on the product which actually uses those activities. Besides providing accuracy in terms of overhead cost allocation, ABC also provides more accurate data regarding the distortion of resources as it provides value based data for management.

1.2. Activity Based Budgeting (ABB) and Activity Based Management (ABM)

Activity Based Budgeting (ABB) is a budgeting method to gather information about activities to be performed, and the cost of these activities over a specific period. Hence, it reflects the strategic goals and the current performance of a company. In ABB system, historical data produced by ABC method is used for forecasting future cost to estimate the required level of activities to access budgeted production volume.

As ABC and ABM are strongly related to each other, Institute of Management Accountants has listed their actions as follows (Institute of Management Accountants, 1998):

- ABC focuses in understanding costs and their drivers, while ABM seeks to change them.
- ABC can provide information on process, product, and market performance; hence, ABM finds ways to improve them.
- ABC is cost centered, while ABM lies in the heart of the management process.
- ABC is the result of a static analysis of the organization, while ABM is embedded in the dynamics of change.
- ABC is predominantly historical and focuses on controlling existing costs; ABM is forward looking, seeking ways to avoid unnecessary costs and putting existing resources to maximum use.
- ABC reports on internal operational and tactical results; ABM is strategic, focused on understanding the key elements of value from the customer's perspective.
- ABC is a source of explanatory data, while ABM provides actionable information.

1.3. Direct Resource Costs

If one resource is used only for a certain product, the cost of this resource should be assigned directly to the product that it is related to. For example, if a product manager only works with one product or there is a machine which is used for the production of one specific product, the costs of this type of resources should be considered as direct resource costs.

2. Definition of Kaizen Costing

The word "Kaizen" was brought to business literature by the Japanese. Basically, "Kaizen" refers to a management philosophy. Masaaki IMAI, who was described as the person of this management philosophy's founder, developed Kaizen in Japan.

Definition of the word "Kaizen" can be described as:

Kai = Change

Zen = Good
Kaizen = Continuous Improvement (BOZDEMİR, E., 2011).

Kaizen aims to carry out a continuous improvement in a business process with small steps. Since the results are effected by the processes, Kaizen helps to improve the processes in order to improve the results. Thus, competitive advantage is achieved through Kaizen strategy. If a company aims to be a permanent actor in the business field, it is obliged to respond to the customers' requests. Kaizen strategy brings improvements in time, cost, and quality. In addition, these improvements bring benefits to the customers. Therefore, all Kaizen activities are assumed to increase customer's satisfaction (IMAI, M., 1999).

Kaizen Costing can be described as continuous improvements applied in the production phase of a product in order to establish cost reduction. Kaizen Costing reduces the production costs by seeking alternative ways to increase the efficiency of the manufacturing process used for the products. In most of the companies that manufacture short-lived products, production processes have longer lives than the products. Therefore, greater savings can be achieved by focusing on the processes during the production phase of a product rather than on the product itself (COOPER, R., 1999).

When cost reduction objectives are defined clearly, Kaizen Costing works effectively like Target Costing. Unlike Target Costing, Kaizen Costing focuses on the production processes of the product, rather than the design of the product. Thus, the main purpose of Kaizen Costing is to eliminate all kinds of non-active elements of the production process (COOPER, R., 1995).

2.1. Objectives and Characteristics of Kaizen Costing

The main objective of Kaizen costing is to monitor the cost reductions on each phase of production. Thus, this is aimed at reducing the gap between the targeted (budgeted) profit and the estimated profit. This approach is different from Standard Costing both conceptually and methodologically. Conceptual and methodological features of this approach are as follows:

a) Conceptual Features

- The purpose of the cost reduction system is to reduce the actual costs down to standard costs.
- Application controls are used to achieve the goals of cost reduction.
- Current production conditions are changed continuously in order to reduce the costs

b) Methodological Features

- New cost reduction objectives are determined each month. These objectives are designed to minimize the gap between the targeted profit and estimated profit.
- To achieve the targeted cost reduction, continuous Kaizen activities were applied.
- Differences between targeted costs and actual costs were analysed.
- Researches are applied and corrective actions were taken when target cost reductions could not be achieved (MONDEN, Y., 1995).

2.2. Benefits of Kaizen Costing

In order to avoid high cost problems, poorly designed and poorly managed processes should be taken under control. In this context, when improvements are achieved, the following changes take place:

- Cost of operations reduces;
- Goods and services achieve higher quality; and
- Lower costs give the company the opportunity to reduce the product prices and increase the competitive power of the company (GURDAL, K. , 2007).

3. Kaizen Budgeting

Kaizen budgeting is part of Kaizen activity based management system and total quality control. This system is similar to a kind of contribution analysis based on the direct costs. In this system, the distribution of indirect costs is not a concern (TANAKA, Takao, 1994).

Kaizen budgeting is a budgeting approach that is based on continuous improvement in the budgeted figures during the budget period (HORNGERN, Charles T, 1997).

Kaizen budgeting activities such as plant rationalization plans include reductions in variable production cost estimations. Hence, this can be seen as the basis of Kaizen Costing activities. These plans determine the reduction targets in variable production costs where personnel plans set goals for reductions in direct and indirect labor costs (HORNGERN, Charles T, 1997).

4. A Model Suggestion

Activity Based Costing (ABC) has been the most popular costing method. It provides the most accurate way for the allocation of overheads. However, when overheads are treated the same way, there might be some inconsistence in the management of resources even though the costs assigned to products or services are exactly the right one (Pazarceviren & Şahin, 2013).

Consequently, we have developed a sub-approach for Activity Based Costing that classifies the overheads under five different categories:

1. Resource costs on the basis of the volume of activities.
2. Kaizen budgeting on the basis of activity level.
3. Kaizen budgeting through resource costs, independent from the volume of activities.
4. Direct resource cost.
5. Kaizen cost reduction for budgeting.

We have been using ABC method for most of the companies that we consult with an ERP (Enterprise Resource Planning) program designed by Professor Selim Yuksel Pazarceviren[2]. Also, we have seen the success of the method in practice. ABKB (Activity Based Kaizen Budgeting) is our new method which allows us to reduce the cost of the product or service based on the income and the managing of the company's costs efficiently.

4.1. Resource Costs on the Basis of the Volume of Activities (Per Capacity Unit)

Some resources are consumed based on the volume of activities. Most of the variable costs are considered in this category. In the case of overheads, maintenance activity is the most common example of resource that changes based on the volume of activities. This is because maintenance needs depends on the machine hours. In addition, we aim to reduce the variable cost of maintenance activity. Resource usage that changes on the basis of activity volume is consumed per capacity unit, which is the basis for the production volume of each product.

4.2. Kaizen Budgeting Through Resource Costs on the Basis of Activity Level

There are some resources that can only be used till a certain capacity level. For example, if one production expert is assigned per 50 machines and the number of the machines exceed 50, one expert himself alone will not be able to comply with the need of the department. These resources usually consist of the salary of the personnel on the activity centers as well as the depreciation of the machines in these centers. Consequently, we aim to reduce blue collar costs resulting from overtime working in an efficient manner.

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4.3. Kaizen Budgeting Through Resource Costs Independent from the Volume of Activities

When one or more resources are consumed for more than one product, the costs of these resources are assigned to a cost pool first. Then, they are allocated to products based on usage volume. Thus, these resources are consumed by the activity centers, and it is not directly related with the products. Whether or not an activity center meets a certain level of activity, the cost of these resources will be placed in the total cost. Consequently, we aim to reduce variable part of the costs via the kaizen cost reduction ratio.

4.4. Direct Resource Costs

If one resource is used only for a certain product, the cost of this resource should be assigned directly to the related product. For example, if a product manager only works on one product or there is a machine which is used for the production of one specific product, the costs of these resources should be considered as a direct resource costs.

4.5. Kaizen Cost Reduction Budgeting

When assigning kaizen cost reduction ratio, we should have standard cost data in order to assume it fairly. Kaizen cost reduction ratio assumption should be related to previous year's data. Thus, we find kaizen allocation rate which is estimated for Item A's total volume. Then, Item A's total volume is divided by the total estimated production volume. Consequently, we find kaizen cost allocation rate as kaizen allocation rate multiplied by the estimated kaizen total cost target.

5. Case Study

We aimed to illustrate the use of our approach in a company case to show the entire process of activity based kaizen cost budgeting. We simplified the illustration as much as possible for both academicians and business professional to apply the model in their studies or working processes. Subsequently, we defined the following steps in our model to illustrate the entire process:

1. Budgeting production volume.
2. Budgeting required capacity of activities.
3. Budgeting activity level.
4. Budgeting capacity unit based costs.
5. Budgeting capacity level based costs.
6. Kaizen cost budgeting target through resource costs independent from the capacity and direct resource cost.
7. Kaizen cost budgeting through budgeted capacity level.
8. Kaizen budgeting through resource costs independent from the capacity.

9. Budgeting of aftermarket warranty and service costs.
10. Budgeting of kaizen cost reduction target through kaizen target cost reduction ratio.
11. Budgeting of total kaizen cost reduction target.

6. Illustration

TDS Company is a manufacturing industry for the production of luxury bags. The activities that TDS Company performs are as follows:

1. TDS Company produced 3 items: item A, item B, and item C. These are different items that require different volume of activity (see Table 1 and Table 2).
2. TDS Company has 50 working benches in the Machining Activity Center. In this process, the leather parts get shaped. Accordingly, it is predetermined that there are 50 machining hours (MH) in a working hour. (see Table 2)
3. TDS Company performs 1 maintenance hour for 400 bench hours of machining. Maintenance activity is performed as a supportive activity, and will consist of resources on the basis of capacity unit[3].
4. TDS Company kaizen cost reduction ratio is determined to be 0.05 percent for kaizen budgeting transaction. (See Table 5.1)

Step 1: TDS company budgets the volume of production based on historical data and demand forecasts for its variable costs in order to reduce variable cost according to kaizen budgeting principle. However, the company budgets production level on a yearly basis (We assume that monthly production will be at the same level each month, so that we would divide the numbers of products budgeted yearly by 12 in order to reach monthly capacity).

Table 1: Number of Product Budgeted for 2015

Product	Number of Product Budgeted (Yearly)	Number of Product Budgeted (Monthly)
Item A	12.000	1.000
Item B	24.000	2.000
Item C	36.000	3.000

Step 2: According to historical data, TDS Company budgets machining hours (MH) that is required to produce each product. There are 50 benches in Machining Activity Center; thus, each of the products consumes different period of time. Period of time required for each product is shown in Table 2.

[3]2 : The model in the illustration does not include any direct material and direct labor as the illustration was intended to be simplified.

Table 2: Capacity Budget for Machining Activity Center					
Product	**Number of Product Budgeted (Yearly)**	**Number of Product Budgeted (Monthly)**	**Machining Capacity (Required machining hours per item)**	**Machining Capacity Budgeted (MH/Year)**	**Machining Capacity Budgeted (MH/Month)**
Item A	12.000	1.000	10	120.000	10.000
Item B	24.000	2.000	15	360.000	30.000
Item C	36.000	3.000	20	720.000	60.000
Normal Capacity of Activities Budgeted				1.200.000	100.000
Budgeted Working Hours (There are a total of 50 benches in Machining Activity Center. Accordingly, there are 50 machining hours in one working hour).				24.000	2.000

Step 3: As mentioned before, there are levels for activity centers. Activity level is dependent on the activity usage of each product. However, there might be some unused capacity. Some of the costs change based on the activity level. TDS Company calculates its activity level based on the production budget as seen in Table 3.

Table 3: Activity Center - Activity Level Budget						
Activity Level	**Number of Shifts per Day**	**Shift Types**	**Working Hours per Day (WH / Day)**	**Budgeted Work Days per Year (WD / Year)**	**Budgeted Working Hours per Year (WH / Year)**	**Budgeted Working Hours per Month (WH / Month)**
Level 1	1	Normal Working Shift	8	248	1.984	165,33
Level 2	1	Normal Working Shift	8	248	1.984	165,33
Level 2		Working Overtime			170	14,17
Level 2		Total			2.154	179,50
Level 3	2	Normal Working Shift	16	248	3.968	330,67
Level 4	2	Normal Working Shift	16	248	3.968	330,67
Level 4		Working Overtime			200	16,67
Level 4		Total			4.168	347,33
Level 5	3	Normal Working Shift	24	248	5.952	496,00

Step 4: TDS Company use lube oil for the machines based on the period of time that the machines run. Also, there is maintenance cost for each machine. The company aims to reduce lube oil and maintenance cost in accordance with the predetermined kaizen cost reduction rate. Budget of the costs based on the capacity use and their kaizen cost reduction target is shown in Table 4.1 below.

Table 4.1: Machining Activity Center - Cost Budget Based on Capacity Unit						
Budgeted Capacity (HR/ Month)						100.000
Resource Costs Based on Capacity Units						
Resources	**Resource Usage Per Capacity Unit**	**Total Budgeted Resource Usage**	**Resource Price per Capacity Unit**	**Total Budgeted Resource Cost (USD / Month)**	**Kaizen Cost Reduction Allocation Rate**	**Kaizen Cost Reduction According to Allocation Rate**
Lube Oil	0,10 liter	10000 (0,10 liter x 100.000 MH)	1	$11.000	0,0990991	$550
Cost of Resources Used in the Activity Center				$11.000	0,9009009	$5.000
Activity Level Supporting Activities (Maintenance)	0,2 HR	20000 (0,2 HR x 100.000 MH)	5	$100.000		
Budgeted Activity Cost				$111.000		$5.550
Total Cost of Kaizen Target					**$5.550**	

Step 5: As mentioned before, there are some costs which are not dependent on the exact capacity used, but on the level of activities. TDS company budgets its costs based on the capacity level. In addition, kaizen cost target aims to reduce the amount of overtime payment to blue collar employees in an efficient manner. Thus, related figures are shown in Table 4.2.

Table 4.2: Machining Activity Center - Cost Budget based on Capacity Level					
Budgeted Capacity Level			**Level 3**		
Resources	**Budgeted Resource Usage based on the Budgeted Capacity Level**	**Budgeted Standard Unit Price of the Resource Unit**	**Direct Resource Cost (USD/ Month)**	**Kaizen Cost Reduction Allocation Rate**	**Kaizen Cost Reduction According to Allocation Rate**
Foreman	2	$1.800	$3.600	0,75	$180
Apprentice					
Headworker	1	$1.200	$1.200	0,25	$60
Depreciation of Molding Machine	10	$200	$2.000		**$240**
Depreciation of Polishing Machine	2	$500	$1.000	**Total Cost of Kaizen Target**	
Depreciation of Sewing Machine	3	$400	$1.200		
Depreciation of Sealing Machine	5	$300	$1.500	**$240**	
Budgeted Activity Cost			$10.500		

Step 6: There are some cost which are completely independent from the activity level. These costs are incurred whether or not the company meets some certain activity level budget. The company does not have any objectives to reduce white collar employees' cost. However, it aims to reduce other indirect costs. TDS Company budgets the resource costs independent from the capacity as shown in Table 4.3.

Table 4.3: Machining Activity Center - Resource Costs Independent from the Capacity					
Resources	**Budgeted Resource Usage**	**Budgeted Unit Price of the Resource (USD)**	**Total Machining Activity-Direct Resource Cost (USD/ Month)**	**Kaizen Cost Reduction Allocation Rate**	**Kaizen Cost Reduction According to Allocation Rate**
Production Manager	1	$8.000	$8.000		
Production Responsible	1	$2.500	$2.500		
Cost of Resources Used in the Activity Center			$3.000	0,75	$150
Resources Used at the Company Level (Security, Air Condition, Lighting. Cleaning, Facility Depreciation etc.)			$1.000	0,25	$50
Budgeted Activity Resource Cost			$4.000		$200
Total Cost of Kaizen Target				**$200**	

Step 7: Some costs apply directly to the products rather than the activity centers. Depreciation expenses for the machines are the most common direct resource costs. Thus, TDS Company budgets direct resource cost as shown in Table 4.4.

Table 4.4: Machining Activity Center - Direct Resource Costs

Resources	Product/ Project	Direct Fixed Resource Cost (USD/Month)
Depreciation for the Conveyor Band (used only for Item A)	Item A	$200
Depreciation for the Conveyor Band (used only for Item B)	Item B	$150
Depreciation for the Conveyor Band (used only for Item C)	Item C	$275
Budgeted Direct Resource Cost		$625

Based on the production and activity budget, the total cost and the fixed cost that TDS Company has to bear is shown in Table 4.5.

Table 4.5 : Machining Activity Center- Budget Total

Resource Usage Types	Resource Costs Based on Capacity Units Total Budgeted Resource Cost (USD/ Month)	Resources Costs Based on Capacity Levels Direct Resource Cost (USD/ Month)	Resource Costs Independent from the Capacity Total Budgeted Activity Cost	Direct Fixed Resource Cost (USD/ Month)
Resources				
Lube Oil	$11.000			
Production Manager			$8.000	
Foreman		$3.600		
Headworker			$1.200	
Production Responsible		$2.500		
Depreciation of Molding Machine		$2.000		
Depreciation of Polishing Machine		$1.000		
Depreciation of Sewing Machine		$1.200		
Depreciation of Sealing Machine		$1.500		
Depreciation for the Conveyor Band (used only for Item A)				$200
Depreciation for the Conveyor Band (used only for Item B)				$150

Depreciation for the Conveyor Band (used only for Item C)				$275
Resources Used at the Company Level (Security, Air Condition, Lighting. Cleaning, Facility Depreciation etc.)			$1.000	
Activity Level Supporting Activities (Maintenance)	$100.000			
Budgeted Activity Cost	**$111.000**	**$11.800**	**$10.200**	**$625**

Table 4.6: Aftermarket Warranty and Service Costs

	Item A	Item B	Item C	Total
Changing	$1.200	$2.400	$3.600	$7.200
Spare Part	$600	$1.200	$1.800	$3.600
Repair Labor	$360	$720	$1.080	$2.160
Total	**$2.160**	**$4.320**	**$6.480**	**$12.960**

Table 4.7: Cost Allocation to Products

	Item A	Item B	Item C
Number of Product (Monthly)	1.000	2.000	3.000
Required capacity per product	10	15	20
Total Capacity (Monthly)	10.000	30.000	60.000
Resource Costs Based on Capacity Units Total Budgeted Resource Cost (USD/Month)	$11.100	$33.300	$66.600
Resources Costs Based on Capacity Levels Direct Resource Cost (USD/Month)	$1.180	$3.540	$7.080
Resource Costs Independent from the Capacity Total Budgeted Activity Cost	$1.020	$3.060	$6.120
Direct Fixed Resource Cost (USD/Month)	$63	$188	$375
Aftermarket Warranty and Service Costs	$2.160	$4.320	$6.480
Total Cost	**$15.523**	**$44.408**	**$86.655**

Step 7: TDS Company needs standard cost in order to assume kaizen cost reduction ratio for the following years' estimated production cost. Kaizen cost reduction ratio assumption should be related with previous years' data. In addition, company's budget of direct resource cost is shown in Table 4.4:

Table 5.1: Kaizen Cost Reduction Budgeting Table

Product	Production Cost for 2014	Total Production Volume for 2014	Estimated Production Volume for 2015	Kaizen Cost Reduction Ratio	Kaizen Cost Reduction Allocation Rate	Kaizen Cost Reduction According to Allocation Rate
Item A	$3.000,00	11.000	12.000	0,05	0,16666667	$281,19
Item B	$8.500,00	23.000	24.000	0,05	0,33333333	$562,37
Item C	$18.000,00	30.000	36.000	0,05	0,5	$843,56
Total	**$29.500,00**	**64.000**	**72.000**			**$1.687,11**
Actual Unit Cost for 2014		**$0,4609**				

Table 5.2:Total Kaizen Cost Reduction Budgeting Table

Product	Production Cost for 2014	Total Production Volume for 2014	Production Unit Cost for 2014	Estimated Production Cost for 2015
Item A	$3.000,00	11.000	0,273	$3.272,73
Item B	$8.500,00	23.000	0,37	$8.869,57
Item C	$18.000,00	30.000	0,6	$21.600,00
			Total Cost	**$33.742,29**

Kaizen Total Cost Reduction Budgeting Target for 2015	$1.687,11

7. Conclusion

In conclusion, company's activities are directly related to resources. In order to reach full commercial cost beyond the production cost, managing overheads is a highly important operation for companies. Therefore, since overheads results from activities, activities are the other important part of full commercial cost. In the past, companies have focused only on production cost. Full commercial cost enables companies to see the big picture regarding all activities. Thus, the companies gain the advantage of being one step forward in the market.

Activity Based Costing (ABC) method enables companies to manage their costs with better style. It gives opportunities to companies to define their resources for the activities with more details. Also, it gives companies a better, more accurate, and a more flexible data to reach the activity results.

Kaizen budgeting aims to bring about a more effective and faster solution to manufacturing companies. We aim to reach beyond the Activity Based Costing (ABC) and Activity Based Budgeting (ABB) through reducing companies' variable cost to gain more profit and make the companies' production processes to become more efficient.

Our approach with five major categories of activity costs provides information on different levels. Capacity unit based costs, kaizen budgeting through capacity level based costs, kaizen budgeting through activity costs independent from the capacity, direct resource costs, and kaizen cost reduction budgeting are the major categories in our approach along with direct labor and direct materials. This classification provides better management in reducing the variable part of the activity costs. Consequently, we use ABC and ABB approach in many companies in Turkey with an appropriate ERP system. Thus, using this method has been proven successful. However, we have been planning to use kaizen budgeting technique regarding our current model.

Through ABC and ABB techniques, we reached not only the manufacturing cost, but also the full commercial costs of products as well as the costs of activities in a more realistic way. In addition, we aim to reach kaizen budgeting target through reducing variable part of the full commercial cost. Through the use of our method, managers have the opportunity to have a more efficient cost management system via reducing variable costs. Thus, it enables companies to compete in an efficient manner.

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