Middle-East Journal of Scientific Research 8 (5): 937-941, 2011
ISSN 1990-9233

Criteria of Target Costing Implementing and Lunching in Iranian Automobile Industry

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Abstract: The present study tried to point out criteria affecting launching and implementing target costing system among automobile and automotive parts manufacture companies in Tehran Stock Exchange; Fuzzy AHP was used as one of the important items regarding multi-criteria decision making. Finally, these criteria were ranked according to their importance. To this end, first of all, major criteria were classified and ranked into five main groups such as organizational, managerial, environmental, technical and project team criterion; and then minor criterion were examined and then ranked. Regarding results of Fuzzy AHP organizational criterion is the most important ones and then are managerial, environmental, technical and project team criterion. Among all minor criteria, participation all department and segments in the system, having good designing department, management strategy in competition and strong competition in market are of vital importance. These criteria primarily determine the magnitude of the benefits that the firm will generate from the application of target costing.

Key words: Criterion · Fuzzy AHP · Implementing · Launching · Target costing

INTRODUCTION

The accurate costing of objects and the reduction of those costs is one area that can influence success in organizations. Target costing is of pioneer systems in this field and have made organizations and companies use them [1]. According to the CIMA Official Terminology [2] a target cost is "a product cost estimate derived by subtracting a desired profit margin from a competitive market price." Sakurai defines target costing as a "cost management tool for reducing the overall cost of a product over its entire life cycle with the help of the production, engineering, RandD, marketing and accounting departments" [3]. Management utilizes this pricing technique to meet both the demands of its customers as well as company profit goals.

Target costing is not seen as a technique for cost control but a management process which involves all disciplines and brings a focus on the customer from the beginning of the design process. Cooper and Chew describe the value of target costing as its "ability to bring the challenge of the marketplace back through the chain of production to product designers" [4]. Most cost reduction and cost control efforts have focused on the production stage of the product life cycle. However, almost all production capabilities and costs are set during production planning and design. Effective cost management and cost control must be emphasized and start at the design stage of a product's life, accordingly, research and developments and any engineering changes must occur before production begins, resulting in lower costs and reduced "time-to-market" for new products. The use of cost information and cost management during product design has received increasing attention in the literature [5]. If we are aware of factors affecting implementing and running, it will help the system to reach its goals successfully and prevents waste of financial as well as intellectual capital and then leads to more organizational participation and trust. Companies that implement target costing run the risk of spending too much time, effort and even money on gathering and going over the data that is collected. Now, it is time to refer to the research question:

What are ranking major and minor factors implementing and launching target costing System among automobile and automotive parts manufacture companies in Tehran Stock Exchange?

Review of the Literature: A desired, or target, cost is set before creating or even designing the product.

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Management bases the target cost on the product's predicted price and the company's desired profit. In order to achieve the target cost, concentration on the cost reduction opportunities in the design stage rather than production, constantly reduction of costs during the product life cycle, participation of all departments of the company and all members of the value chain (research and development, design, production, marketing, distribution, customers and suppliers) to the process of determination and reduction of costs are required. According to the CIMA discussion paper key characteristics of successful target costing are to focus on the customer, emphasizing on cost reduction at early stages in product development, consideration of the whole product life-cycle, having a multidisciplinary process, good team members who understand their role and how it impacts cost, involvement of the whole value/supply chain, an iterative process and specific and real targets for improvement [6]. In order to ensure that total costs are minimized for both the producer and the customer, successful target costing examines the full life-cycle cost of the product. This includes consideration of the purchase price, operating costs, maintenance and distribution costs [7].

In a study of Toyota Australia's target costing system, the International Federation of Accountants' (IFAC) Financial and Management Accounting Committee (now Professional Accountants in Business) highlighted the multi-disciplinary involvement in the cost management process and the vital roles played by different functions [8]. Finance department has a co-ordinating role, managing the assignment of cost targets for individual components and subsystems, performance reporting and monitoring performance achievements across the business and promoting target achievement and highlighting the need for action when deviations occur. Sales planning and distribution department drives the formulation of the overall target cost. Purchasing department looks for cost savings through the analysis of parts and components to be used in the new product and works with suppliers to improve their cost base and to redesign parts. Engineering department uses techniques such as value engineering to identify cost savings which can be made whilst maintaining the functionality of the product. Manufacturing department looks for cost savings through improvements in the manufacturing processes, either through continuous improvement or more long-term fundamental changes.

According to Gagne and Discenza, the target costing teams which are the most successful are those whose members have a basic understanding of how their work is translated into numbers which represent the firm's performance, using indicators which are meaningful to them [9]. In addition, the best team members are those who have rotated through several departments, including design, purchasing and marketing before being assigned to a cost-planning project, as broad backgrounds give team members a unique ability to spot and implement ways to improve costs. Working with the company's supply chain to identify opportunities for cost savings is very important. This is particularly important where a high proportion of the total cost of a product is in purchased raw materials and components and target costing goals would be impossible to achieve without supplier involvement. Some companies view their supply chains as part of an "extended enterprise" where design and cost information is shared and inter-company teams are established to meet cost reduction goals [7]. Banham identifies getting suppliers to buy in to target costing as probably the most difficult aspect of target costing as experienced by US companies implementing the process [10]. Amongst the methods used to achieve this are joint classes and team-building and promises of shared savings.

Thus regarding former researches, criteria affecting implementing and running target costing system in automobile and automotive parts manufacture companies in Tehran Stock Exchange are classified into five groups such as: organizational, managerial, environmental, technical, project team criterion; minor factors are shown in Table 1. Organizational criterion considers formal and informal relationships between employees, departments and managers. Managerial criterion considers the management characteristic. On the other hand, environmental criterion is related to conditions which are outside the enterprise and managers can not control them. Technical criterion contains items which are derived from the nature of target costing System. Finally, Project team criterion includes characteristics and attribute of the planning and implementing (project) team. The purpose of this research is to prioritize and rank the criteria that influence the target costing implementation and lunching process. From such an analysis, conditions that appear to favor target costing can be identified.

Research Method: In this research, first of all, factors (criteria) affecting implementing and launching ABC System were recognized then using Fuzzy Analytical Hierarchy Process (FAHP) they were ranked. Analytic Hierarchy Process (AHP) is one of the well-known Multi-criteria decision making techniques that was first

proposed by Saaty [11]. Although the classical AHP includes the opinions of experts and makes a multiple criteria evaluation, it is not capable of reflecting human's vague thoughts. The classical AHP takes into consideration the definite judgments of decision makers [12]. Different methods for the fuzzification of AHP have been proposed in the literature. Experts may prefer intermediate judgments rather than certain judgments. Thus the fuzzy set theory makes the comparison process more flexible and capable to explain experts' preferences [13].

In this study, Chang's [14] extent analysis method is used to compare the performances of banks because of the computational easiness and efficiency of this method. Let $X=\{X_1,X_2,..., X_N\}$ be an object set and $U=\{u_1,u_2,..., u_N\}$ be a goal set. According to the method of Chang's extent analysis, each object is taken and extent analysis for each goal is performed, respectively. Therefore, m extent analysis values for each object can be obtained, with the following signs:

$$M_{gi}^{1}, M_{gi}^{2},....,M_{gi}^{m} \quad where \quad i=1,2,....,n \tag{1}$$

Where all the $M_{gi}^{j}(j=1,2,....,m)$ are TFNs.

The steps of Chang's [14] extent analysis can be given as in the following:

Step 1: The value of fuzzy synthetic extent with respect to the *i*th object is defined as

$$S_i=\sum_{j=1}^{m} M_{gi}^{j} \otimes [\sum_{j=1}^{n}\sum_{j=1}^{m} M_{gi}^{j}]^{-1} \tag{2}$$

To obtain $\sum_{j=1}^{m} M_{gi}^{j}$ perform the fuzzy addition operation of m extent analysis values for a particular matrix such that

$$\sum_{j=1}^{m} M_{gi}^{j}=(\sum_{j=1}^{m} l_j, \sum_{j=1}^{m} m_j, \sum_{j=1}^{m} u_j) \tag{3}$$

and to obtain $[\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gi}^{j}]^{-1}$, the fuzzy and to addition operation of $M_{gi}^{j}(j=1,2,....,m)$ values is performed such as

$$\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gi}^{j}=(\sum_{i=1}^{n} l_i, \sum_{i=1}^{n} m_i, \sum_{i=1}^{n} u_i) \tag{4}$$

and then the inverse of the above vector is computed in this equation such as

$$[\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gi}^{j}]^{-1}=(\frac{1}{\sum_{i=1}^{n} u_i}, \frac{1}{\sum_{i=1}^{n} m_i}, \frac{1}{\sum_{i=1}^{n} l_i})$$

Step 2: As M_2 and M_1 are two triangular fuzzy numbers, the degree of possibility of

$$M_2=(l_2,m_2,u_2) \geq M_1=(l_1,m_1,u_1)$$

Is defined as

$$V(M_2 \geq M_1)=\sup[\min(\mu_{M1}(x),\mu_{M2}(y))]$$

And can be equivalently expressed as follows:

$$V(M_2 \geq M_2)=hgt(M_1 \cap M_2)=\mu(d)=\begin{cases} 1, & if\ m_2 \geq m_1, \\ 0 & if\ l_1 \geq u_2, \\ \dfrac{l_1-u_2}{(m_2-u_2)-(m_1-l_1)}, & otherwise \end{cases}$$

Where d is the ordinate of the highest intersection point D between μ_{M1} and μ_{M2} (Fig. 1).

Step 3: The degree of possibility for a convex fuzzy number to be greater than k convex fuzzy numbers $M_I(i=1,2,....,k)$ can be defined by

$$V(M_1 \geq M_2,...,M_k)=V(M_1 \geq M_2),...,V(M_1 \geq M_k)$$

$$d(A_i)=Min\{V(S_i \geq S_k)\},$$

For k=1,2,…., n; $k \neq i$. Then the weight vector is given by

$W'=(d'(A1), d'(A2),..., d'(An))^T$,

Where A_i (i= 1,2, ..., n) are n elements.

Step 4: Via normalization, the normalized weight vectors are

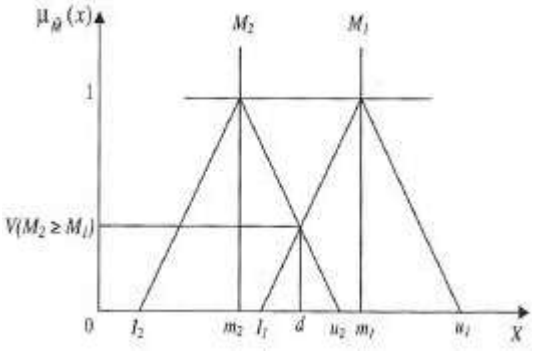

Fig. 1 The intersection between μ_{M1} and μ_{M2}

$W=(d(A1), d(A2),..., d(An))^T$,

Where W is a non-fuzzy number.

The respondent of this research were managers, financial managers, researchers, university professors and experts of ABC system. For gathering data needed for FAHP tables, the researchers used interviews, questionnaire and making expert work groups. After recording the answers, combining pair wise comparison matrix for each participant would be started.

RESULT AND DISCUSSION

In this study, the effect of 20 minor criteria in 5 major groups on implementing and launching target costing System among listed companies in Tehran Stock Exchange were examined. As Table 1 illustrates, regarding findings of the research, the importance of organizational criterion (0.302) is more than other criterion; then are other criterion such as: managerial criterion (0.232), environmental criterion (0.181), technical criterion (0.161) and project team criterion (0.124). Among organizational criteria, the importance of participation all department and segments in the system (0.375) and having good designing department (0.341) is more than other criteria. Among managerial criteria, the importance of management strategy in competition (0.296) and corporate governance characteristics (0.257), is more than other criteria. Among environmental criteria, the importance of strong competition in market (0.336) and finding customer requirements (0.243) is more than other criteria. Among technical criteria, the importance of effective management accounting system that consider full life-cycle cost of the product (0.282) and involvement of the whole value/supply chain (0.245) is more than other criteria.

Table 1: Ranking major and minor criteria implementing and launching target costing System by fuzzy AHP

Rank	Total Weight	Weight of Minor Criterion	Minor Criteria	Weight of Criterion	Criterion
1	0.113	0.375	Participation all department and segments in the system	0.302	Organizational criterion (I1)
2	0.103	0.341	Having good designing department		
7	0.054	0.178	Directions to implement and run the system		
18	0.032	0.106	Monitoring and supervising the operation		
3	0.068	0.296	Management Strategy in competition	0.232	Managerial criterion (I2)
5	0.059	0.257	Corporate governance characteristics		
6	0.058	0.251	Expert of management		
8	0.0454	0.196	Make a close relationship with suppliers		
4	0.061	0.336	Strong competition in market	0.181	Environmental criterion (I3)
10	0.0439	0.243	Finding customer requirements		
14	0.037	0.205	Nature of the industry		
13	0.039	0.216	To much customer needs		
9	0.045	0.282	Effective management accounting system that consider full life-cycle cost of the product	0.161	Technical criterion (I4)
12	0.0391	0.243	Achieve the allowable cost		
11	0.0394	0.245	Involvement of the whole value/supply chain		
15	0.037	0.230	Integrated with other informational systems		
17	0.0348	0.281	Related backgrounds and enough ability of the project team	0.124	Project Team criterion (I5)
16	0.0353	0.285	Team members rotated through several departments		
19	0.031	0.249	Logical timing of the designing and running		
20	0.023	0.185	No strict attention to details while planning		

Among project team criteria, the importance of rotated of team member through several departments (0.285) and related backgrounds and enough ability of the project team (0.281) is more than other criteria. Among all minor criteria, participation all department and segments in the system, having good designing department, management strategy in competition, strong competition in market and corporate governance characteristics are of vital importance.

CONCLUSION

To implement new cost management systems like target costing in organization is inevitable. The criteria to have a effective target costing system be classified in the five following groups including organizational criterion, managerial criterion, environmental criterion, technical criterion and project team criterion. Target costing programs require proper planning and a commitment from upper management. It is essentially to corporate all department and segments in implementing and lunching the system. The organization should have an agile designing department to make new product and move to continuous improvement rapidly. Target costing is more effective for companies which are active in a competition in market. Companies always should seek for new customers and markets and their expectation and then adopt the production with them as soon as possible. This process has a close relationship by management strategy. In the other hand management need some tools to be success in competition environments such as suitable management and cost accounting system that provide all information necessary for making timely and accurate decision.

Companies should have continuous engineering and designing process to increase the quality and decrease the cost and omit the non value added activities. Another thing a business must do when it starts the implementing the target costing is arrange a perfect combined project team. This team should include experts from different areas of the company (including finance, technology, human resources and all supply chain segments) and perhaps also an outside consultant. The head of the project team of target costing system should be brave enough; he/she should be the most interested person among all qualified individuals; he/she should be interested in consulting the matters with experienced counselors. All taken together, implementing and launching target costing system leads to less failures in companies; otherwise, while implementing and launching the system, different weak points of the system would be known; items which already have been predictable and controllable but not enough attention has been paid to them. When we are aware of the reasons of the failures, we can easily solve the problems and predict the probable problems and find solution for them. As results, we will experience more success and can enjoy benefits of target costing system more than ever and finally value of the organization would be added.

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