
Feasibility Assessment of Target Costing in Yasuj Cement Factory

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ABSTRACT

Target Costing is a powerful strategic tool which enables an organization to handle three dimensions simultaneously, i.e. the quality, cost and time and control the costs beforehand. The main issue is that whether or not the application of target costing in Yasuj Cement Factory has economic justification. The purpose of this research is to reduce the costs and improve the quality of tasks in order to enhance the customer satisfaction. The statistical population of this research consists of all the employees of Yasuj Cement Factory. A questionnaire using Cochran's formula with simple random sampling method has been used for data collection. The data analysis has been done through Pearson Correlation Coefficient and parametric tests such as one-sample t-test using SPSS software. The obtained results suggest that there is a positive and significant relationship between the target costing and the following variables: customers' needs, product design, reduction of manufacturing costs, reduction of research and development cost and increase in profitability.

Keywords: Feasibility Assessment, Product Design, Cement Factory, Target Costing.

Introduction

The target costing concept has originated from Japan and Toyota Company in 1960s. This technique has been recognized as a complete and dynamic system for cost reduction and strategic planning (Hibbets et al., 2003). This technique was firstly established in Toyota automobile manufacturing company in production cost planning for an automobile with a value of 1000\$ (Cooper, 1994). Tanaka (1994) in a widely approach to cost management in Toyota implemented the

cost reduction in design stage. In that time the Asian markets were accumulated with the products of western companies and the Japanese firms were encountering the lack of resources and skills for developing the concepts, techniques and tools required for reaching their powerful rival in the fields such as quality, price and performance. They believed that combining the marketing, engineering, financial, manufacturing and planning staff into one specialized group brings

about numerous benefits. These groups can test new methods and techniques for designing and developing new products and strive to enhance the integration between operating tasks (Namazi, 2012). The target costing was originated from such environment. A set of specialized tools including operation analysis, value engineering, value analysis and concurrent engineering was introduced for supplementing the target cost and this ranked the Japanese companies high in the field of product design and development. The European and American companies realized the value of target costing only after these developments (Namazi, 2012). The organizations success depends on their capabilities in continuous development of new products according to customer needs (Muia, 2012). Most of industries such as cement industry compete in a competitive market which demands the exact commercial strategies to be determined by organizations. In a competitive environment, the ever-increasing cost is regarded as one of the principal parameters for customers. In reply to cost improvement, many Manufacturers have embarked on accepting and utilizing the management accounting tools and techniques among them is the target based costing (Muia, 2012). In such competitive conditions of the market, the small enterprises are obliged to manage the components of product's survival triangle (cost, quality and performance) because long-term preservation of competitive advantage is impossible in current economics. The traditional cost management cannot be effective in such competitive environment. Hence, the target-based cost management is a set of techniques and systems which are designed and employed to manage the components and the development of appropriate technical, behavioral and

cultural grounds is necessary for successful implementation. In target-based costing a special attention is paid to products life cycle and continuous improvement and the customer needs are always in priority. Regarding the globalization of markets and the issue of joining world trade market, the companies would be inevitably led into competitive environment and would be forced to use the target costing in order to be survived in such environment. The increase in standards of rivals' products, economics globalization, high competition in prices and lower life cycle of products suggest that market seeks those products that are supplied with lower prices in addition to previous performance whilst they cannot reduce their profitability. Due to such changes, the company's procedures should become more effective and the products should also be manufactured with extreme quality. Target costing is among the techniques which can assist the organizations to realize the above-mentioned purposes (Namazi, 2012). The necessary grounds for applying the target costing system are as follows (Dastgir and Arabyarmohammdi, 2005).

1- Technical grounds: to use this technique, a way should be found for collecting new data and acquiring tools such as value engineering, benchmarking and executive teams. Benchmarking is defined as the continuous process of measuring the products, services and commercial activities and comparing them with powerful rivals and the pioneers of each industry.

2- Behavioral grounds: the second subject in applying the target costing is the behavioral considerations; namely, an engineer or designer of a new product should consider not only the product

functions and features, but also the cost restrictions.

3- Cultural grounds: the third and most important subject in applying target costing is its cultural grounds with this explanation that a group should consider not also its resources and working grounds, but also the functions of other groups and the common resources. To implement the target costing effectively, this technique should be propagated through value chain and all the organization's staff should accept it. If only one department disagree, it may waste the results of target costing.

Research objectives

The final objective is to reduce the costs from the design phase to product cost determination and improve the quality of tasks continuously in order to enhance the customers and beneficiaries' satisfaction.

Secondary objectives:

- 1- Investigating the relationship between the target costing and customers' needs
- 2- Investigating the relationship between the target costing and product design
- 3- Investigating the relationship between the target costing and reduction of manufacturing costs
- 4- Investigating the relationship between the target costing and research and development cost

Research background

Dastgir and Arabyarmohammadi (2005) investigated the obstacles of utilizing the target costing system in the companies listed on the Tehran Stock Exchange. The results of their research using the questionnaire showed that none of the elements of target costing implemented in those companies (Dastgir and Arabyarmohammdi, 2005). Gorganli Douji

and Fazeli (2009) addressed the theoretical explanation of cost management and its modern techniques with emphasis on target costing and quality costing. They concluded that using them, jointly or separately, can provide that management with useful and worthwhile information (Gorganli Douji and Fazeli, 2009). Investigating the target costing system in cloth-weaving industry, Brush (1994) concluded that implementing this technique has caused reduced manufacturing costs before production (Brausch, 1994). Ansari and Bell (1997) conducted a research investigating the relationship between the target costing system and the organization's competitive strategies. The results showed that the target costing system and the organization's competitive strategies are linked together from the very first because this technique pave the way for the organization to realize its objectives about drawing the market's attention in a certain and acceptable level of profit (Ansari and Bell, 1997). Oleram (2002) has addressed the role of supply management in target costing. The results of his research through case study of 11 companies showed that the supply management plays a considerable role in target costing procedure (Elram, 2002). Lobovski and Komisky (2007) conducted a research about the development procedure of products with a focus on value engineering and target costing through case study of an automobile manufacturing company. The results of their research showed that the value engineering and target costing supplement each other (Lbusuki and Kaminski, 2007). Axe et al., (2008) investigated the effects of competition and unreliability in adopting the target costing system. The results showed that there is a positive and significant relationship between the

competition rate and adopting the target costing system (Ax et al., 2008) Majali Al-Avavadeh and Adel Al-Sharayeri (2012) carried out a research investigating the relationship between the target costing and the competitive advantages in Jordan's privately-owned universities. The research results showed that the leadership of the sale price and the reduction of product life cycle scored the highest and lowest, respectively (Mjalli Al-Awawdeh and Adel Al-Sharairi, 2012). Woods et al. (2012) conducted a case study about the Economic Value Added (EVA) in target costing. The results showed that EVA highlights the saving of new costs in target costing procedure (Woods et al., 2012)

Research hypotheses

- 1- There is a significant relationship between the target costing and customer's needs.
- 2- There is a significant relationship between the target costing and product design.
- 3- There is a significant relationship between the target costing and reduction of manufacturing costs.
- 4- There is a significant relationship between the target costing and research and development cost.

Materials and Methods

The current research is of descriptive type in terms of method. Among the different kinds of descriptive researches, the current research is of correlation type because the relationships between the independent and dependent variables are investigated. Desk research, articles and web sites have been used for compiling the research literature and background. In this research, the feasibility assessment of applying the target costing has been

investigated using a questionnaire and the measured value is described finally.

Statistical population and sample size of research

The statistical population of this research consists of all the employees of Yasuj Cement Factory which amounts to 300 individuals. The sample size is equal to 172 people using the Cochran's sampling formula. The simple random sampling method has been used as an appropriate method for current research.

Data analysis method

Two methods have been used for qualitative analysis of data: descriptive statistics and inferential statistics. Hence, firstly the frequency distribution and frequency percentage distribution tables have been used for describing the comments of statistical sample about the questionnaire's questions. Then, in the second section of data analysis, the Pearson Correlation Coefficient and parametric tests such as one-sample t-test and SPSS software have been used. The Cronbach's alpha method has been used to determine the reliability.

Results

The Cronbach's alpha method and SPSS software have been used to determine the reliability in this research. Then, the following formula is used to calculate the value of alpha coefficient.

$$r_a = \frac{J}{J-1} \left(1 - \frac{\sum_{j=1}^n s_j^2}{S^2}\right)$$

Therefore, this coefficient should be at least 70% under the rule in order to consider the scale has reliability. The obtained value of Cronbach's alpha is as following table which is indicative of the

high reliability of questionnaire and internal consistency of questions.

Table 1. Reliability coefficients of the studied variables

value of Cronbach's alpha	Number of questions	variable
0.75	5	Customers' needs
0.76	5	Product design
0.79	5	Reduction of manufacturing costs
0.77	5	R&D cost

Descriptive statistics

The frequency distribution of respondents by gender shows that 168 individuals (97.7% of all respondents) were men and 2 individuals (1.2%) were women and 2 individuals (2%) haven't responded to this question. Hence, the majority of respondents were men. The frequency distribution of respondents by levels of education shows that 38.4% of respondents had education below diploma, 12.8% had diploma, 16.9% had associate degree, 29.1% had bachelor's degree and 2.9% had master's or Ph.D. degree. The frequency distribution of respondents based on their responsibility in the organization shows that 27.9% were from technical department, 18% were from financial department, 26.2% were from service department, 24.4% were from production department, 2.9% were from managers and one person hasn't respond to this question. The frequency distribution of respondents by the work experience shows that work experience of 2.9% of respondents is below 3 years, 2.9% is within 3-5 years, 54.1% is within 6-10 years and 40.1% of respondents had higher than 10 years of work experience. Therefore, the work experience of most of respondents is writhing 6-10 years. As shown in table 5, the correlation coefficient obtained from the studied variables using the SPSS

software is indicative of a positive relationship between these variables and the target costing. Hence, the correlation matrix for these variables and target costing is as shown is table 2.

Inferential statistics

As shown in table 3, the highest averages of cement factory for target costing are as follows: customer's needs (19.13), product design and R&D cost (19.08) and reduction of manufacturing costs (19.01). According to the results of one-sample t-test, the highest and lowest averages of cement factory regarding the target costing are related to 'customer's needs' and 'reduction of manufacturing costs', respectively.

The test result of first hypothesis:

The test results of hypotheses are fully described in tables 2 and 3. According to test results of first hypothesis, there is a positive significant relationship between target costing and customers' needs at 99% confidence level. Moreover, the correlation value between target costing and customers' needs is 0.526 which shoes that the percentage of correlation between target costing and customers' needs is 52.6%.

Table 3. The results of one-sample t-test with regard to variables

Significance level	Degree of freedom	t statistic	Standard deviation	average	quantity	variables
0.000	171	341.01	0.736	19.13	172	Customers' needs
0.000	171	309.73	0.808	19.08	172	Product design
0.000	171	371.80	0.670	19.01	172	Reduction of manufacturing costs
0.000	171	341.85	0.732	19.08	172	R&D cost

The test result of second hypothesis

According to test results of second hypothesis in tables 2 and 3, there is a positive significant relationship between target costing and product design at 99% confidence level. Moreover, the Correlation value between target costing and customers' needs is 0.415 which shoes that the percentage of correlation between target costing and customers' needs is 41.5%.

The test result of third hypothesis

According to test results of third hypothesis in tables 2 and 3, there is a positive significant relationship between target costing and reduction of manufacturing costs at 99% confidence level. Moreover, The correlation value between target costing and customers' needs is 0.352 which shoes that the percentage of correlation between target costing and customers' needs is 35.2%.

The test result of fourth hypothesis

According to test results of fourth hypothesis in tables 2 and 3, there is a positive significant relationship between target costing and R&D cost at 99% confidence level. Moreover, the

correlation value between target costing and customers' needs is 0.356 which shoes that the percentage of correlation between target costing and customers' needs is 35.6%.

Conclusion

The results of case studies in similar researches showed that applying the target costing will cause the company to reach a considerable cost reduction. As shown previously, having investigated the research hypotheses, it was found that there is positive significant relationship between target costing and the variables studied in this research (customer's needs, reduction of manufacturing costs, product design, R&D cost and increase of profitability) at 99% confidence level. This can assist the company to reach a higher market share and profitability as a useful strategy and will cause the products to be designed and manufactured according to customers' needs which in turn has a considerable effect on company's sales and finally it can be concluded that applying this technique will bring about a high-quality product according to customers' needs and with a considerable reduction in manufacturing costs.

Suggestion based on the results of research

1- Regarding the research results, one can suggest that the factory officials use the factors studied in this research in order to boost their presence in competitive market and produce the desired products with higher quality and more appropriate price and finally enhance their profitability.

2- Because the target costing is started with market conditions analysis, so it is suggested to determine the sale price of the product which is to be produced before the design stage.

3- It is suggested to improve the organization's performance by increasing the activities of R&D department with a constructive approach with respect to target costing.

4- It is suggested to employ the target costing in product's life cycle when the factory is producing the products with long life-cycle and enormous investment because those companies can reach a considerable reduction in their costs which reduce the costs during production stages and product's life cycle.

Suggestions for future researches

1- It is suggested to conduct this research for different time periods.

2- It is suggested to investigate factors other than those studied in this research

3- It is suggested to conduct this research in other companies such as automobile manufacturing or petrochemical companies, etc.

4- It is suggested to conduct this research using other models.

5- It is suggested to investigate the utilization and usage rate of target costing in some industrial groups.

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