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PRODUCTION COSTS AND COST MANAGEMENT PRACTICES OF TURKISH MANUFACTURING COMPANIES (ICI 500): A DESCRIPTIVE STUDY

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-Abstract-

In this paper, we aimed to determine the production costs of Turkish manufacturing companies and their managing these costs in order to contribute literature in which no comprehensive study is done on this subject. In accordance with the aim, we conducted a descriptive survey to 287 private manufacturing companies among 500 large-scale companies listed in Istanbul Chamber of Industry and 90 surveys completed by the companies are evaluated.

As a result, the estimation and determination of production costs in the pre-production phase is regarded as a beneficial process. A considerable number of companies continue this process at the beginning and end of production shows their acceptance to traditional cost approach rather than strategic cost management approach of product life cycle. Besides, we found that the relative companies have a low level of association with suppliers which have a significant impact on decreasing and managing costs.

Keywords: *Cost Management, Management Accounting, Strategic Cost management, Cost Decreasing, Cost Accounting, Production Cost*

JEL Classification: M41, M11

1. INTRODUCTION

Since the industrial revolution, technological developments along with changes in economic and social scopes have started to change step by step and especially gained fast from the beginning of 1980s. Those developments eventually cause radical changes in the structure of market. That's why; production cost management that covers product innovations and designs has become a critical issue in today's business world.

After all developments and changes, in order to survive and make profit in global competitive environment, companies have started to question their traditional production and cost systems with the aim of adaptation to global competition and supplying quick-changing demands and

expectations of consumers. Management accountants have realized that traditional costing techniques (like standard costing and cost-volume-profit analysis etc.) become any longer out of date in competitive environment because of changing cost system and increasing in competitive environment of companies. Traditional cost management and cost plus pricing strategies have also lost their influence in this new competitive environment. Because most of the costs are determined in projection and development phase, traditional cost management approaches which consider only the costs in production phase and disregard the other costs in production life cycle have lost their importance. As the companies have increasingly more control over costs in today's competitive market, companies realized that they have much lesser control than they expected as a result of prices mostly determined by increasing competitive market (Gharajedaghi,1999:65). Nowadays, cost is no longer a determinant of market price , just the opposite, market price has become the determinant of cost (Corrigan,1996:24).

In today's intense competitive environment, the production price is unable to be controlled by companies, therefore, the question here for the companies must be; "What should the product cost be according to market price?" rather than " What should the production price be according to production cost?". For this reason, production cost management in the development and projection phase become very critical issue for companies.

2. CHANGING COMPANY ENVIRONMENT AND COST MANAGEMENT

What makes cost management very important? The answer is the fact that today's industrial companies face a global competitive environment that is ever-changing and acting by its own rules.

By the technological developments, continuous changes in preference and pleasure of consumers restrict the life cycle of products and services in market-based economies. Marketing approach based on consumers (market) also make fast the restriction/shortening in that life cycle (Tek,2000:24). Besides, the differentiations in the demands of consumers prevent mass production and make it difficult that the industrial companies to benefit from scale economies. make difficult the industrial companies (Can,2004:32). Nowadays, product differentiations and also wide product range for quick supply to consumer demands take the place of mass production for similar type products (Karcıoğlu,1997:4). That eventually causes an increase for fixed cost in its part of unit output (Can,2004:32). At the same time, variety of demands and needs of consumers forces companies to be innovative and improve existing products (Ergun,2002:34).

Under these circumstances, companies can no longer hold a sustainable competitive chance by neither lowering cost nor differentiation strategy in product (Langfield-Smith and Luckett,1999:2). By the leadership in technology as a traditional competitive strategy, quality no longer provides a sustainable competitiveness (Wood,1998:63). Because quality differences between companies is getting decreased. While the quality should be high, costs should be decreased (Ansari et al,1997:4-5). This implies that companies are very effective in managing cost very effectively as well as in managing quality (by total quality management) and functionality (by innovative product projection and development) both (Langfield-Smith and Luckett,1999:2).

Cost management is certainly not a system that determines only product cost. Cost management can be conceptually categorized as; cost decreasing (cost planning) and cost control (Sakurai and

Scarbrough,1997:39). Traditional cost systems are based on controlling costs and quality and balancing them temporary, and also focus on internal efficiency. On the contrary, cost management is a process of quality planning and cost decreasing that manages the costs before its occurrence (Ansari et al,1997:6). A well-planned cost management system will provide improvements in quality, cost/price and functionality of a product.

3. PROJECTION-BASED COST MANAGEMENT

Due to rapidly-changing operational environment and intense competition, profit margins of the companies which cannot reduce costs as quickly as their competitors do, will decrease and their survival will be more difficult (Blocher et al,1999:7; Cooper,1995,7).

Hence, cost management has become increasingly crucial for the survival of companies. Cost management requires participation of external and internal contributors from different functions in order to analyze product design, raw material needs and production processes and therefore seek cost-saving opportunities to manufacture products at or below their target cost (Swenson et al,2003,13; Hilton,2005,649). Companies must develop long-term and cooperative relationships by incorporating suppliers being in the first place, distributors, service-providers, company departments, customers and other members of the value chain into cost management process. By this means, cost reduction efforts may spread through the whole value chain (Ansari et al,1997:15-16).

Cost management is considered as a key point that enables to decrease projection costs of product and its processes (Kurunsaari et al,2003:318). Because the production and process technologies are getting more integrated, a product cost becomes more dependent to its projection (Cooper and Chew,1996:89). At the same time, as product development cycle runs toward the target costing, the projection of product and necessary activities for its production becomes the most significant factor (Langfield-Smith and Luckett,1999:10). Hence, cost management systems aim to make appropriate the projection of product and processes to cost management. While traditional cost-decreasing methods concentrate on scale economies, decreasing waste and improving efficiency in order to manage costs, projection-based cost management places more emphasis on projection phase so as to eliminate probable expensive and time-consuming changes and eventually decreases product cost and its marketing duration (Ansari et al,1997:13).

Nowadays, the life cycle cost of a product, almost more than 80% is fixed and undertaken in the projection and development phases (Freeman,1998:13; Corrigan,1996:53). For instance, 70% production cost of General Motors for truck gears and similarly 80% production cost of Rolls-Royce Company for 2000 product parts occur in projection phase (Doğan,1998:200; Can,2004:34). After projection phase, the flexibility of cost-decreasing becomes largely limited in production phase (Lee,1996:68). Therefore, projection-based cost management is based on the principles of managing cost before its occurrence. Kato states that the projection and development of product is very crucial phase to decrease cost (Kato,1993:35). Even though product costs occur largely in production phase, those costs are mostly determined/ undertaken in projection phase (Ansari et al,1997:13). In other words, while the costs occur in projection and development phase of product life cycle, are future costs; in production phase the accrual costs of related term take place. In production term, because most of the accrual costs occur in production and development

phase and are also costs deferred to production phase and here, cost management applies the principles of managing cost along product life cycle (Hacırüstemoğlu and Şakrak,2002:121; Acar,2005:62; Bahşi and Can,2001:54). Hence, cost management concentrates on projection phase of a product that enables to decrease cost during its all life cycle and examines its influence on all costs from its R&D to its recycling. Cost management encourages all departments of company participated in the process examine their product projection in order to make necessary technical changes before production phase (Ansari et al,1997:13).

Projection analysis includes forecasted production cost as well as undergoing costs after production (like service and assurance costs). The company can figure out whether improvements on products will cause unexpected cost before and after production in customer value and income by examining production cost as well as downstream cost (Blocher et al,2005:7). Thus, most of required changes in product or its projection can be made before production phase. On the other hand, in traditional costing systems most relevant changes are made right after production phase (Ansari et al,1997:13).

4. THE PURPOSE, SCOPE AND CONSTRAINTS OF THE STUDY

4.1. The Purpose of the Study

The purpose of this paper is to determine and to examine the production costs and their management methods of Turkish Manufacturing Companies on which no comprehensive study has been made previously. In accordance with the purpose, a descriptive study is made on private manufacturing companies listed in top 500 index the largest-scale companies yearly reported by Istanbul Chamber of Commerce.

4.2. Universe, Scope and Constraints

The universe of the study consists of the private sector manufacturing companies listed in the "Top 500 Turkish Industrial Entities" announced yearly by the Istanbul Chamber of Commerce (ICI). Within 2007 ICI 500, there are 487 privately-held companies. Of these, 15 companies which did not want their names to be revealed; and 21 companies operating in mining and electricity production industries which were thought of not suitable for this study, were left out of the scope. Eventually, 451 companies listed in 2007 ICI 500 index made up the universe of the study.

The reason of selecting the companies listed in ICI 500 as the universe of the study is the belief that these companies are more institutionalized and hence they have the strong cost discipline necessary for determining and decreasing of manufacturing costs and that more reliable and consistent information can be derived from these companies.

5. THE METHODOLOGY OF THE STUDY

5.1. Sample Selection, Data Gathering and Survey Preparation

The data used in the study consist of the information gathered via the survey applied to the senior department executives in the ICI 500 companies selected by the simple casual method.

According to the simple casual sample method; when the standard deviation and the variance of the universe are not known, the sample size representing the universe is determined by $n = (\pi(\pi\text{-}1)$

/ $(e/Z)^2$ formula (Savaş,2003:187). Accordingly, with 95% confidence interval and 5% error margin, the sample size of this study is calculated as $(0,5 \times 0,5) / (0,05 / 1,96^2) = 384$ companies. Because the calculated sample size is larger than 5% of the universe, it is to be derogated by multiplying by the correction factor ((N-n / N-1). According to the formula, correction factor is approximately (451-384 / 451-1) = 0,149. Accordingly the necessary sample size turns out to be $0,149 \times 384 = 57$ companies. In addition, the questionnaire form was delivered to the 451 companies within the scope primarily via e-mail. Then, appointments were made with 82 of the 109 companies which accepted to response and information was gathered from the executives via face-to-face interviews. Adding the 8 questionnaires which were seen suitable out of 27 questionnaires sent via fax, e-mail and mail, 90 questionnaires were evaluated. The number of the evaluated questionnaires forms 20% of the universe.

In accordance with the purpose and scope of the study, previous studies and related literature (Kwah,2004:100-103; Borgernas and Fridh,2003:17-30; Dekker and Smidt,2003:299-303; Braxton,1999:33-78; The Consortium for Advanced Manufacturing – International The American Institute of Certified Public Accountants and The University of Akron:1-15) were examined during determination of the survey questions and the scales and preparation of the questionnaire form. Some of the survey questions are multiple-choice and open ended. Others consist of questions rated between "(1)never – (5)always.

5.2. Method of Analysis

No comprehensive research was made in Turkey regarding cost management among manufacturing companies before. Especially there is no information about determination of costs at all.

Descriptive statistical methods such as percentage, frequency and mean were used in the analysis of data obtained from the survey (which was made in order to determine suppliers' cooperation level in the cost determination process). SPSS.16 was used for the analysis of obtained data.

6. EVALUATION OF RESEARCH EVIDENCE

In this section, the number of personnel and the manufacturing methods of the participating companies, and distribution of the respondents of the questionnaire in terms of position, were assessed.

Table 1: Distribution of the Respondent Company Executives According to Positions

	Frequency	Percentage
Engineering	1	1,1%
Accounting/Finance	74	82,2%
Manufacturing/Design	8	8,9%
Marketing	3	3,3%
Other	4	4,4%
Total	**90**	**100%**

In Table 1, distribution of the respondent company executives according to their positions is given. The respondents are senior department executives. Of the respondents, approximately 1% are

engineers (cost engineering), 82% percent are accounting-finance managers, 9% are manufacturing and design managers-supervisors, 3% are marketing and purchasing managers and 4% are employees in various departments (management director, auditor, strategic planner and controller). Anket yapılan kişilerin üst yöneticiler olması ve özellikle büyük çoğunluğunun muhasebecilerden oluşması, işletmelerin maliyet yönetimi hakkında daha sağlıklı bilgi alınması açısından önemlidir.

In Table 2, the distribution of the companies in terms of number of personnel is given.

Table 2: Distribution of the Companies In Terms of Number of Personnel

	Frequency	Percentage
100 and below	3	3,3%
101-250	11	12,2%
251-500	22	24,4%
501-1000	21	23,3%
1001-2000	20	22,2%
Above 2000	13	14,4%
Total	**90**	**100%**

According to Tabel 2, approximately 3% of the companies have 100 or less, 12% have 101-250 , 24% have 251-500, 23% have 501-1.000, 22% have 1.001-2.000 and 14% have 2.000 and more employees.

Table 3 shows the company-based distribution in respect of industries and application rate.

Table 3: Distribution of the Companies Based On Industries

	Frequency	Percentage
Automotive	5	5,6%
Electric-Electronic	9	10%
Medical-Optical Instruments	1	1,1%
Medicine	2	2,2%
Machine	3	3,3%
Textile	8	8,9%
Food	14	15,6%
Iron and Steel	10	11,1%
Chemical	7	7,8%
Nonferrous Metals	5	5,6%
Oil-Rubber-Glass	14	15,6%
Paper-Gazette	4	4,4%
Cement	4	4,4%
Others*	4	4,4%
Total	**90**	**100%**

***Forestry and Construction**

According to Table 3, the most participatory industries are Food (15,6%), Oil-Rubber-Glass (15,6%), Iron and Steel (11,1%), Electric-Electronic (10%) and Textile (8,9%). The least

participatory industries are Medical-Optical Instruments (1,1%), Medicine (2,2%), Machine (3,3%), Paper-Gazette (4,4%), Cement (4,4%), Forestry and Construction (4,4%), Nonferrous Metals (5,6%), Automotive (5,6%) and Chemical (7,9%) Industries.

Table 4 shows distribution of the manufacturing methods of the companies.

Table 4: Distribution of the Manufacturing Methods of the Companies

	Frequency	Percentage
Large-Scaled, Assembly-Oriented Manufacturing	27	30%
Small-Scaled, Assembly-Oriented Manufacturing	2	2,2%
Large-Scaled, Process-Dependent Manufacturing	30	33,3%
Small-Scaled, Process-Dependent Manufacturing	3	3,3%
Custom Order Manufacturing-Assembly	28	31,1%
Total	**90**	**100%**

According to Table 4, approximately 37% of the participated companies have process-dependent manufacturing methods and 63% have assembly-oriented manufacturing methods.

According to these findings, it emphasizes the importance of our paper that most of the respondent companies have common assembly-oriented processes. Because those companies out-source much more components compared with process-oriented manufacturing companies, that's why; they should place more emphasis on cost management.

The competition environment of the participating companies using target costing or similar methods was aimed to determine by directing questions to the executives about how they perceive their operation environments. The results are presented in Table 5.

Table 5: Factors Related to the Operation Environments of the Companies

	N	Very Low	Low	Normal	High	Very High	Mean	Mode
Potential of estimating the operations of the competitors	90	2 2,2%	18 20%	49 54,4%	13 14,4%	8 8,9%	3,08	3
Degree of change in customer joy and expectations in the last 5 years	90	4 4,4%	10 11,1%	25 27,8%	37 41,1%	14 15,6%	3,52	4
Degree of change in economic, legal and political circumstances in the last 5 years	90	1 1,1%	3 3,3%	33 36,7 %	45 50%	8 8,9%	3,62	4
Degree of change in manufacturing processes and technologies	90	-	4 4,4%	28 31,1%	43 47,8%	15 16,7%	3,77	4
Intensity of the competition the company faces in the market	90	-	2 2,2%	16 17,8%	40 44,4%	32 35,6%	4,13	4

According to the data presented in Table 5; it is realized that most of the companies operate in an environment of very high ambiguity and competition.. Therefore, the use of cost management in the markets with environmental ambiguity and high competition is quite important for the success of the companies. In conclusion, it can be claimed that there is an increasing competition

combined with a dynamic environment, and this situation emphasize the importance of cost management for the success of company in cost-decreasing.

The enterprises included in the research were asked several questions concerning the stages they make cost estimation which is made at several stages for determining cost of new products and the attained results are presented in Table 6.

Table 6: Timing of New Products Cost Estimation in the Enterprises

	No idea	Yes	No	Total
After the mental determination of the new product	9 (10%)	55 (61,1%)	26 (28,9%)	90 (100%)
During the design stage of the new product	6 (6,7%)	71 (78,9%)	13 (14,4%)	90 (100%)
After beginning the production of the new product	2 (2,2%)	49 (54,4%)	39 (43,3%)	90 (100%)
After the completion of production	3 (3,3%)	25 (27,8%)	62 (68,9%)	90 (100%)
Cost estimation is not done in any stage	-	4 (4,4%)	86 (95,6%)	90 (100%)

According to Table 6, respondent enterprises make cost estimations seriously and systematically, by 61,1% percent "after the identification of product as a concept", by 78,9% "during the product designation phase" and by 54,4% "After beginning the production of the product". Hereby, it is desirable result for mentality of projection-oriented cost management that cost estimations of relevant companies center in pre-production phase, especially in product projection phase. Because in projection-oriented cost management, by market research, necessary target cost is determined in accordance with the expected functionality and quality and at the same time desired profit margins, and then the product is projected according to this target cost or cost estimation, instead of waiting for actual cost after production is started. In other words, the costs that will exist during life cycle of the product are determined at pre-production designation phase and the production is done in line with these costs after the designation. So all the costs concerning product are estimated or determined at pre-production phase. Also, the fact that 43,3% of the enterprises states they do not make any cost estimation "after the beginning of the production" and 68,9% of these enterprises do not make any cost estimation "after the end of production" and 4,4% of these do not make any cost estimation. These results show that most enterprises apply partially the projection-oriented cost management.

As a result of these findings, it is considered as positive for the mentality of projection-oriented cost management that most companies estimate their product costs in pre-production phases. Besides, nearly 45,6% of those companies do this "after the beginning of production", 27,8 of those do "at the end of production" show that those companies determine their product costs according to traditional costing approaches. That result contradicts with the mentality of projection-oriented cost management. While traditional approaches focus on determination and controlling of post-production costs, the projection-oriented cost management is based on the management and determination of costs before the materialization of costs. Therefore, the projection-oriented cost management necessitates a cost estimation system that provide an

increasing accuracy level from the concept phase of a product until being ready for the designation and an extensive cost planning.

In order to identify the extent of the cost estimation systems and cost planning, the cost components that take place in the cost estimation of a new product were asked to the enterprises included in the research and the results are presented in the Table 7.

Table 7: Cost Components in the Cost Estimation of Enterprises

	Involving	Not Involving	Total
Pre-manufacturing Costs (R&D, Market Research etc.)	58 (64,4%)	32 (35,6%)	90 (100%)
Manufacturing Costs	88 (97,8%)	2 (2,2%)	90 (100%)
Marketing Costs (advertisement, promotion, sale etc.)	77 (85,6%)	13 (14,4%)	90 (100%)
Distribution/Logistic Costs	74 (82,2%)	16 (17,8%)	90 (100%)
Service/Support Costs (Repair-Maintenance, Guarantee etc.)	51 (56,7%)	39 (43,3%)	90 (100%)
Recycling Costs	44 (48,9%)	46 (51,1%)	90 (100%)

According to Table 7, 64,4% of the enterprises uses “pre-production costs”, 97,8% uses “production costs”, 85,6% uses “marketing costs”, 82,2% uses “distribution/logistics costs”, 56,7 % uses “service/support costs” and 48,9% uses “recycling costs” in the cost estimations.

Accordingly, by almost all companies, the estimation and determination production costs as the cost component in the pre-production phase is an expected situation for the mentality of the projection-oriented cost management. On the other hand the number of enterprises that estimate pre-production costs like market research and research/development (R&D) costs is lower than the expected for the projection-oriented cost management. As reasons for this result, giving inadequate importance to market research especially to customer analysis and also allocating insufficient resources for R&D activities can be considered. So it can be said that no estimation and cost planning regarding these cost components are made. Similarly, it can not be said that the number of enterprises that estimate service and recycling costs in the pre-production phase is high. However, the majority of enterprises’ inclusion of marketing and distribution costs in the cost calculation as the cost component of a new products is a positive situation for the success of the projection-oriented cost management.

The companies unfamiliar with projection-based cost management apply mostly traditional costing approaches and tend to focus on only production phase and disregard the costs of other product life cycle. For this reason, it is concluded that those companies are not familiar with the approach of costing during product life cycle for the success of projection-oriented cost management.

The replies of the enterprises which involve in the research and makes cost estimation activities for the questions regarding cost determination and determination participation rate of departments and value chain members to cost decreasing process are presented in Table 8.

Table 8: Participation Rate of Departments and Value Chain Members to Cost Estimation and Cost Decreasing Process of Enterprises

	N	Never	Rarely	Sometimes	Usually	Always	Mean	Mode
Accounting/Finance	90	6 6,7%	8 8,9%	22 24,4%	18 20,0%	36 40,0%	3,78	5
Sales/Marketing	90	6 6,7%	3 3,3%	20 22,2%	27 30,0%	34 37,8%	3,89	5
Product Planning and Design Engineering	90	8 8,9%	4 4,4%	33 36,7%	13 14,4%	32 35,6%	3,63	3
Purchasing	90	9 10,0%	4 4,4%	33 36,7%	20 22,2%	24 26,7%	3,51	3
Production	90	3 3,3%	5 5,6%	23 25,6%	22 24,4%	37 41,1%	3,94	5
Quality Assurance	90	11 12,2%	12 13,3%	29 32,2%	17 18,9%	21 23,3	3,28	3
Distribution/Logistic	90	24 26,7%	16 17,8%	32 35,6%	8 8,9%	10 11,1%	2,60	3
Suppliers	90	34 37,8%	7 7,8%	35 38,9%	8 8,9%	6 6,7%	2,39	3

According to these results, participation level of departments in interdepartmental composed costing teams cannot be said to be high. Lower participation rate (2,39 – 15,6%[1]) of suppliers which should be the most important members of costing teams, is a constraint for the success of cost decreasing and management.

It is found that because the companies unfamiliar with projection-oriented cost management apply traditional cost management, generally interdepartmental participants in cost estimation and decreasing process are mostly organized from sale/marketing, accounting/finance and especially participation of people in production department. Besides, it can be said that the reason of the fact that the member of the value chain participated in cost estimation and decreasing processes is not at enough number is that those companies are unfamiliar about the approach of costing during product life cycle.

As a result of this data, it is impossible to be successful if the interdepartmentally composed teams are not utilized in product cost estimation and cost decreasing process or the necessary important is not given. At the same time, it can be said that the utilization level and structure of interdepartmentally composed teams depends on enterprises' adoption level of product life cycle costing approach and the scope cost planning.

The results regarding the application level of the activities that the enterprises involved in the research do for decreasing the product costs are presented in Table 9.

[1] Percentages amount the sum of Usually and Always options.

Table 9: Application Level of Strategies That Will Be Followed By Companies When Costs Foreseen In the Projection Phase Is Exceeded

	N	Never	Rarely	Sometimes	Usually	Always	Mean	Mode
The estimated sale price of the product is increased	90	12 13,3%	13 14,4%	31 34,4%	31 34,4%	3 3,3%	3,00	3
The expected profit margin from the product is decreased	90	6 6,7%	11 12,2%	42 46,7%	28 31,1%	3 3,3%	3,12	3
The features and functionality of the product are decreased	90	67 74,4%	11 12,2%	11 12,2%	-	1 1,1%	1,41	1
The cost targets of the product are increased	90	53 58,9%	15 16,7%	15 16,7%	6 6,7%	1 1,1%	1,74	1
The product is abandoned	25	27 30%	20 22,2%	34 37,8%	6 6,7%	3 3,3%	2,31	3

According to these data, most of the companies give priority to decreasing the amount of profit expected(3,12 – 34,4%[2]) and increasing the foreseen price of the product(3,00 – 37,7%) strategies. Decreasing the profit margin by the management which is determined according to the strategic purposes of the firm may be an appropriate strategy to increase the market share of the product and to position it in the market. Although decreasing the target profit margin may seem negative at first glance, with an increase in sales related with market conditions or with an decrease in the cost of the product related with its lifecycle, reaching the targeted profit rate will be possible. Secondly, in the projection-oriented cost management, increasing of target sale price, which should be determined according to wishes and solvency of customers, maybe is the last strategy to apply. Because in the competitive market conditions, acting with cost-plus pricing contrasts strongly with projection-oriented cost management. In order to determine a high price level, product should be really new product which can raise its value perceived by customers and should be different from its rival products or business should have the monopolist or price determining position in the market. But, this situation should be carefully analyzed in terms of market share or sales volume which will enable the level of profitability which the business desires. The third strategy of companies to define the implementation degree is either abandoning the product or disapproving [discarding] its production (2,31 - 10%) as a last resort. Because, too much time and effort has been allocated to the product. Although in successfully implemented projection-oriented cost management, the possibility of abandoning the product is too low, this strategy should be resorted just in the cases where alternative solutions exhausted for achieving cost targeting. However manufacturing of any product that doesn't contribute to the strategic goals of the business should not be let. The fourth strategy of companies for implementation degree is shrinking product qualities and functions (1,41 – 1,1%). This strategy should be implemented if diminishing qualities of the product affect market price, which is used for determining the cost targets, positively. The strategy of raising cost targets of a product (1,74 – 7,8%) should be resorted in extra-ordinary

[2] Percentages amount the sum of Usually and Always options.

cases if presence of a specific product increases the demand of other products that enforces continuation of the product line; or in cases on time product supply prevents market share and income loss. In such cases cost increases should be dealt immediately by over viewing design process in detail and developing other counter measures. Incautious measures distort necessary discipline for achieving cost targets.

Consequently, companies' primary strategy of increasing selling prices affects the implication of cost targeting negatively. Scarce need for application of increasing cost targets strategy is particularly good.

The results regarding the application level of the activities that the enterprises involved in the research do for decreasing the product costs are presented in Table 10.

Table 10: Application Level of the Cost Decreasing Activities Done by the Enterprises

	N	Never	Rarely	Sometimes	Usually	Always	Mean	Mode
Trying to supply inexpensive materials and parts without making concessions on quality	90	4 4,4%	3 3,3%	7 7,8%	32 35,6%	44 48,9%	4,21	5
Using low quality and more inexpensive materials and parts	90	69 76,7%	13 14,4%	5 5,6%	1 1,1%	2 2,2%	1,38	1
Focusing on product design	90	8 8,9%	13 14,4%	17 18,9%	34 37,8%	18 20%	3,46	4
Removing the features and functions that increase the cost of the product	90	36 40%	19 21,1%	27 30%	5 5,6%	3 3,3%	2,11	1
Redesigning the pre and post-production processes by continuously reviewing them	90	5 5,6%	10 11,1%	14 15,6%	28 31,1%	33 36,7%	3,82	5

In Table 10, the cost decreasing activities of the enterprises according to application level are respectively; "trying to supply cheaper materials and parts without compromising quality" (4,21 – 84,5%[3]), "examining and redesigning pre and post-production phases" (3,82 – 67,8,3%), "concentrating on product design" (3,46 – 57,8%), "extracting the features and functions that increases the product cost" (2,11 – 8,9%) and "using low-quality materials and parts" (1,38 – 3,3%).

According to these results, it can be said that a majority of the firms tend to behave according to the approach of projection-oriented cost management in order to decrease the costs of the products. Because projection-oriented cost management is a strategic profit and cost management process which aims at decreasing the total costs throughout the lifecycle of the product by concentrating on its design which will enable it to be produced at a cost level that will enable the firm to reach the target profit level or market share without giving concessions from the quality, specialty and functioning of the product that the customers are expecting and are willing top pay for. As understood from this definition, in the projection-oriented cost management, neither low quality inputs should be used or the functions and features that the customer is willing to pay for should

[3] Percentages amount the sum of Usually and Always options.

not be extracted from the product in order to decrease costs. On the contrary, the projection-oriented cost management underlines the fact that a firm should reach and go beyond the rival products in every one of these components in order to sustain its competitiveness. At the same time, projection-oriented cost management accepts the design of products and processes as the critical point of cost management and cost decreasing. Because more than 80% of the lifecycle cost of a product is determined during the design and development stage and because the product and process technologies begin to be more integrated, both the design of the product and the activities needed to produce the product is the most important factor for cost decreasing. This is why during the projection-oriented cost management process, by focusing on the design, which will enable cost decreasing throughout the lifecycle, it is determined whether the design may or may not cause after production costs which are not appropriate for customer value and income. Thus, in this way some time consuming and expensive changes that might be faced are eliminated beforehand and both the cost of the product and market entrance period is decreased.

7. CONCLUSION

Since the industrial revolution, technological developments along with changes in economic and social scopes have started to change step by step and especially gained fast from the beginning of 1980s. Those developments eventually cause radical changes in the structure of market where companies operate. That's why; production cost management that covers product innovations and designs has become a critical issue in today's business world.

The primary results of this evaluation study of the application level of the projection-oriented cost management among the Turkish manufacturing enterprises (ICI 500) can be summarized as follows:

- Majority of the companies operate in competitive market conditions increasing important of the projection-oriented cost management.
- Majority of the companies apply partially projection-oriented cost management.
- While most of the sample companies include costs of pre-production, production and marketing in estimations of product cost, almost half of the sample companies disregard service/maintenance cost along with recycling cost in cost estimations, restrict the success of cost management. This shows that the application of product-life-cycle costing is not implemented properly by companies.
- Business segments' and especially suppliers' low-level participation in cost-reduction efforts will be an important constraint in reducing costs at will. Finally, the role of suppliers is very limited in cost management in Turkish companies
- Majority of the companies tend to behave according to projection-oriented cost management in order to decrease the costs of the products.

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