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THE ROLE OF ACTIVITY BASED BUDGETING ON TARGET COSTING PRACTICES

FAALİYET TABANLI BÜTÇELEMENİN HEDEF MALİYETLEME UYGULAMALARI ÜZERİNDEKİ ETKİSİ

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ABSTRACT

This paper aims to analyze the effects of classical (volume-based) and activity based budgeting approaches on target costing practices via a hypothetical application. Also, it is assumed that preferring activity based budgeting rather than the classical one will increase the probability of success of target costing practices. The underlying logical base of this assumption is that in target costing, the specific properties of any product and the required resources to produce it are determined before the production begins, but in classical costing not.

ÖZET

Bu çalışmanın amacı hacim tabanlı (klasik) ve faaliyet tabanlı bütçeleme yöntemlerinin hedef maliyetleme uygulamaları üzerindeki etkilerini varsayımsal bir uygulama çerçevesinde analiz etmektir. Ayrıca, klasik bütçeleme anlayışı yerine faaliyet tabanlı bütçelemenin tercih edilmesinin hedef maliyetleme uygulamalarının başarısını artıracağı varsayılmaktadır. Bu varsayımın temel çıkış noktası, hedef maliyetlemede herhangi bir ürünün spesifik özelliklerinin ve belirtilen ürünün üretilmesi için gerekli olan kaynakların, üretim süreci öncesinde tespit edilirken, aynı durumun klasik yaklaşımda söz konusu olmadığı gerçeğidir.

Target Costing, Activity Based Costing, Activity Based Budgeting
Hedef Maliyetleme, Faaliyet Tabanlı Maliyetleme, Faaliyet Tabanlı Bütçeleme

1. TARGET COSTING

The concept of *target costing* has firstly been used by the well-known Japanese automotive company named Toyota (Tanaka, 1993: 11) and

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then developed by Nissan, another Japanese manufacturing company of Japan (Horvath *et. al*., 1996: 80). However, target costing concept has been introduced to United States of America, Germany and the other European countries by Hiromoto (Hiromoto, 1989).

Target costing, firstly emerged in Japan in 1970s, has been derived from Japanese words "Genka Kikaku" (Hiromoto, 1989: 330; Horvath *et. al*., 1993: 13; Hasegewa, 1994: 5) and/or "Kokukyou Genkakaizen" (Yıldırım, 2000: 6). Then, especially after 1980s, target costing concept has gained a greater popularity in England and Germany (Saitoh, 1978; Hiromoto, 1989; Seidenschwarz, 1991: 198; Niemand 1996: 27) and various studies have been done regarding the concept. In German literature, target costing concept may sometimes be referred as "Zielkostenmanagement", meant as "Cost Management" (Seidenschwarz, 1993) and "Zielkostenrechnung", meant as "Target Cost Calculation" (Mannel, 1992: 340; Küpper, 1994: 50).

2. ACTIVITY BASED COSTING

"Activity Based Costing (ABC)" a United States of America originated concept, has been developed by Raffish (1991) and comprehensively undertaken by a series of articles by Cooper (1988; 1989; 1990a-b-c). ABC aims to determine costs related with products and/or services more healthy from point of view that it is easier to determine *some* costs without considering their production volumes (Rayburn, 1996: 120; Şakrak, 1997: 178) and is designed to inform managers about the past, present and future activities and costs related with these activities of the company (Kaplan, 1992: 58).

Activity based costing is a methodology providing accurate and useful information that has direct effects in strategic decisions about a company's pricing, profitability analysis, customer-relationships, distribution channels, employee management and production policies (Babad and Balachandran, 1993: 583; Christensen and Sharp, 1993: 38). Moreover, ABC is an information system gathering financial and non-financial data (pieces of information) about a company's resources, activities, cost-drivers and performance evaluation criteria and transforming the mentioned data into knowledge (Raffish and Turney, 1992). So, the mentioned knowledge derived from the steps of activity based costing is thought to be very useful especially in determining target costs in target costing applications and performance evaluation due to these applications.

Activity based costing methodology, widely used by many worldwide companies as a system of management, planning, budgeting and controlling has purposes mentioned below (Dugdale, 1990: 36; Cooper and Kaplan, 1992: 11; Morgan, 1993: 9; Cokins, 1996:9):

- to determine main sources of problems and to fix them,
- to remove incorrect assumptions and to fix problems caused by inefficient cost allocation, and

- to remove and/or minimize costs that have low value added and do not create value.

The above purposes confirm the connection between activity based costing and target costing methodologies and especially the last purpose plays an identical and a very vital role (Can, 2004: 131). Because, it attempts to make the cost drivers of companies more visible and understandable (Horvath, 1991: 211; Glaser, 1991: 227; Mayer, 1991: 211).

In related literature, the importance about the combination between activity based costing and target costing is underlined and it is firmly put emphasis on using the mentioned methodologies together (Buggert and Wielpütz, 1995: 129). While target costing methodology informs managers about market demand and target costs; activity based costing shows the effects of alternative production styles on indirect cost centers (Horvath, 1993; Koons, 1994: 11). In activity based costing, the cost drivers are better and more correct to be determined in order to achieve the aim of reaching the target costs related with products and/or services and this enables companies to adapt their cost management plans according with the market demand (Cervellini, 1994: 70).

3. ACTIVITY BASED BUDGETING

In today's rapidly changing business area, the advanced technological developments and automation have deeply affected production processes and techniques of companies and also the combination and cost structure of the products and/or services. Strategic planning and control have been one of the basic needs of -especially production- companies due to changes in consumer demands and increasing competition.

As classical budgeting methodologies remain insufficient to meet the demands of modern companies, the need for better and advanced budgeting methodologies as activity based costing, total quality management (TQM), re-engineering, benchmarking and target costing has emerged among the company managers (Newing, 1994: 1). Among theses methodologies, activity based costing is a system focusing on activities as subject to costs (Horngern and Foster, 1991: 409). In this system, costs are allocated to products related with the involved activities needed for the production of those products. This system also provides information about the costs of products to managers and that style of management is called as activity based management.

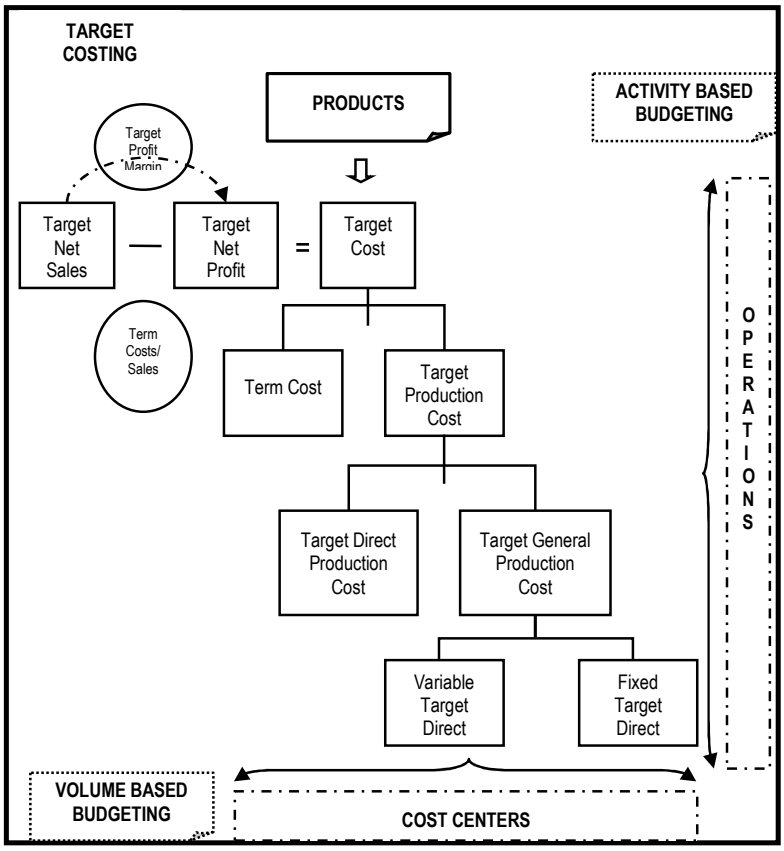
The aim of activity based management is to meet the demands of customers by creating value (Currie, 1998: 28) and to manage the relationship and interaction between production processes and product performance (Senyshen, 1998: 3). Activity based budgeting as a part of activity based management is a budgeting methodology determining the forecasted costs of activities required for the production of a specific product and/or service.

The usage of activity based costing in budgeting process enables the managers to transform the fixed costs into variable costs and to think about the costs more objectively (Cooper and Kaplan, 1998: 114). Activity based budgeting is a powerful cost planning and controlling instrument increasing cost efficiency by eliminating the activities that do not create value added (Hansen and Mowen, 1999).

Consequently, activity based budgeting is a part of activity based costing and management and ensures to analyze costs and profitability possibilities easier and more accurate. It also provides information about production process improvement, pricing and customer profitability analyses.

4. AN APPLICATION ABOUT PREFERRING ACTIVITY BASED BUDGETING INSTEAD OF VOLUME BASED BUDGETING IN TARGET COSTING PRACTICES

In this study, it is tried to be understood if preferring activity based budgeting instead of volume based budgeting will generate any difference in target costing practices via an application on a hypothetical company named HB. Thorough this aim, firstly the products that HB will produce, their qualifications, sales volumes and sales prices are determined. As seen in the figure below, target net profits are calculated by considering target net sales and target profit margin



In the figure, the calculation of target costs of products is briefly represented by separating its determinants. The application of the study is also undertaken by considering the same figure.

For the following year HB plans to produce five different products considering the related market research data. The forecasted data about the products are presented in the table given below:

Products	Annually Forecasted Demand (in units)	Target Sales Prices (net) (in Turkish Liras)
PRO 1	18,800	179.90
PRO 2	22,000	225.90
PRO 3	17,200	118.90
PRO 4	35,000	61.90
PRO 5	6,400	632.90

HB Company's forecasted target profit margin is 9.00%. This percentage is determined by considering the market, competitors and customers. According to forecasted target profit margin, target costs of the products are calculated as below:

Products	Amount of Target Sales (in Turkish Liras)	Target Profit (in Turkish Liras)	Target Cost (in Turkish Liras)
PRO 1	3,382,120.00	642,602.80	2,739,517.20
PRO 2	4,969,800.00	944,262.00	4,025,538.00
PRO 3	2,045,080.00	388,565.20	1,656,514.80
PRO 4	2,166,500.00	411,635.00	1,754,865.00
PRO 5	4,050,560.00	769,606.40	3,280,953.60
TOTAL (annually)	**16,614,060.00**	**3,156,671.40**	**13,457,388.60**

HB allocates operating and financing costs (totally 4,567,500.00 TL.) by considering the shares of products in target net sales. Due this allocation, the target production costs are calculated as below:

Products	Target Cost (in Turkish Liras)	Operating and Financing Costs (in percentages and Turkish Liras)		Target Production Cost (in Turkish Liras)
PRO 1	2,739,517.20	(20.36%)	929,804.82	1,809,712.38
PRO 2	4,025,538.00	(29.91%)	1,366,286.24	2,659,251.76
PRO 3	1.656.514,80	(12.31%)	562,228.79	1,094,286.01
PRO 4	1,754,865.00	(13.04%)	595,609.31	1,159,255.69
PRO 5	3,280,953.60	(24.38%)	1,113,570.84	2,167,382.76
TOTAL (annually)	**13,457,388.60**	**100.00%**	**4,567,500.00**	**8,889,888.60**

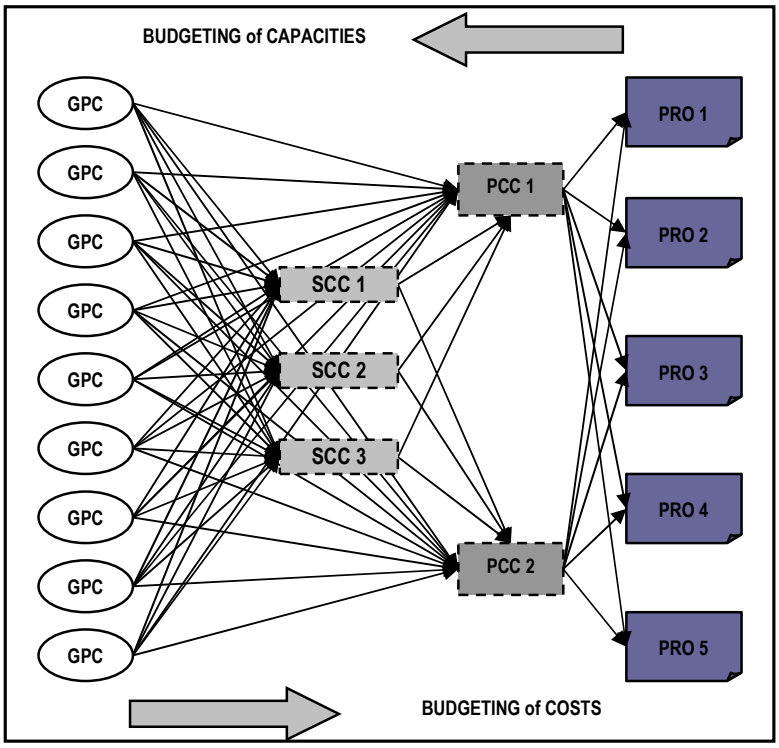
For the HB Company, in order to achieve reaching the target profit margin, the total amount of general production costs is assumed to be in

target limits and to be allocated according to the calculated general production cost ratios.

Products	Target Production Cost (in Turkish Liras)	Target Direct Production Cost (in Turkish Liras)	Target Indirect Production Cost (in Turkish Liras)	General Production Cost Ratio
PRO 1	1,809,712.38	466,775.00	1,342,937.38	22.59%
PRO 2	2,659,251.76	1,058,292.00	1,600,959.76	26.93%
PRO 3	1,094,286.01	298,564.00	795,722.01	13.39%
PRO 4	1,159,255.69	174,652.00	984,603.69	16.56%
PRO 5	2,167,382.76	947,353.00	1,220,029.76	20.52%
TOTAL (annually)	**8,889,888.60**	**2,945,636.00**	**5,944,252.60**	**100.00%**

A Target Costing Practice According to Volume Based Budgeting

Volume based budgeting considers measures related with production volume as production quantity and working hours. In volume based budgeting, budgeted general production costs are allocated via cost centers as seen in the figure below.



In HB Company, there are five cost centers in total, two of them are primary cost center (PCC)s and three of them are supplementary cost center (SCC)s. The activity volume measure for the first primary cost center (PCC 1) is direct labor hour (DLH), while the activity volume measure for the second primary cost center (PCC 2) is machine hour (MAH). Capacity usages of primary cost centers are as given below:

Products	Annually Forecasted Demand (in unit/year)	Unit Production Time (in direct labor hour/unit)	PCC 1 (in direct labor hour/year)	Unit Production Times (in machine hour/unit)	PCC 2 (in machine hour/year)
PRO 1	18,800	11.2	210,560	8.7	163,560
PRO 2	22,000	7.9	173,800	9.9	217,800
PRO 3	17,200	10.9	187,480	5.4	92,880
PRO 4	35,000	4.8	168,000	7.3	255,500
PRO 5	6,400	23.9	152,960	14.1	90,240
TOTAL (annually)			**892,800**		**819,980**

And the capacity usages of the supplementary cost centers are as given below:

Products	SCC 1 (in m^3/year)	SCC 2 (in maintenance hour (MAH)/year)	SCC 3 (in quality control activity (QCO)/year)
PRO 1	4,211,200	1,660	1,880
PRO 2	3,476,000	2,180	4,400
PRO 3	3,749,600	9,290	1,720
PRO 4	3,360,000	2,560	3,500
PRO 5	3,059,200	9,030	1,280
TOTAL (annually)	**17,856,000**	**24,720**	**12,780**

Total general production costs of each cost center are budgeted by analyzing the past years' capacity usages according to some specific methods as simple regression analysis and accounting (judgmental) methodology and are given below:

Cost Center	Fixed General Production Costs	Variable General Production Costs Per Unit	Capacity Usage	Variable General Production Costs	Total General Production Costs
PCC 1	766,000.00 TL	4.04 TL/DLH	892,800	3,606,912.00 TL	4,372,912.00 TL
PCC 2	329,400.00 TL	1.19 TL/MH	819,980	975,776.20 TL	1,305,176.20 TL
SCC 1	18,700.00 TL	0.02 TL/ m^3	17,856,000	357,120.00 TL	375,820.00 TL
SCC 2	47,500.00 TL	3.68 TL/MAH	24,720	90,969.60 TL	138,469.60 TL
SCC 3	19,200.00 TL	2.87 TL/QCO	12,780	36,678.60 TL	55,878.60 TL
TOTAL	**1,180,800.00 TL**			**5,067,456.40 TL**	**6,248,256.40 TL**

In this stage, the budgeted general production costs of supplementary cost centers are allocated to primary cost centers as given below:

SCCs	General Production Costs	Allocation Ratio	PCC 1	Allocation Ratio	PCC 2
SCC 1	375,820.00 TL	0.77	289,381.40 TL	0.23	86,438.60 TL
SCC 2	138,469.60 TL	0.41	56,772.54 TL	0.59	81,697.06 TL
SCC 3	55,878.60 TL	0.39	21,792.65 TL	0.61	34,085.95 TL
TOTAL			**367,946.59 TL**		**202,221.61 TL**

The related allocation ratios are calculated by dividing the budgeted general production costs of primary cost centers by their capacity usages and given below:

Cost Center	General Production Costs	Allocation from SCCs	Total General Production Costs	Capacity Usage	Allocation Ratio
PCC 1	4,372,912.00 TL	367,946.59 TL	4,740,858.59 TL	892,800	5.31 TL/DLH
PCC 2	1,305,176.20 TL	202,221.61 TL	1,507,397.81 TL	819,980	1.84 TL/MH

At this point, it is possible to establish a logical relationship between calculated general production costs allocation ratios and products. By using these allocation ratios, each product's (or product group)'s general products costs are allocated.

The allocated general production costs of products allocated from the first primary cost center, PCC 1, are as given below:

Products	PCC 1 Allocation Ratio	PCC 1 (Direct Labor Hours)	PCC 1 Allocation of GPC
PRO 1	5.31 TL/DLH	210,560 DLH/year	1,118,073.60 TL
PRO 2	5.31 TL/DLH	173,800 DLH/year	922,878.00 TL
PRO 3	5.31 TL/DLH	187,480 DLH/year	995,518.80 TL
PRO 4	5.31 TL/DLH	168,000 DLH/year	892,080.00 TL
PRO 5	5.31 TL/DLH	152,960 DLH/year	812,217.60 TL
TOTAL		**892,800 DLH/year**	**4,740,768.00 TL**

The allocated general production costs of products allocated from the second primary cost center, PCC 2, are as given below:

Products	PCC 2 Allocation Ratio	PCC 2 (Machine Hours)	PCC 2 Allocation of GPC
PRO 1	1.84 TL/MH	163,560 MH/year	300,950.40 TL
PRO 2	1.84 TL/MH	217,800 MH/year	400,752.00 TL
PRO 3	1.84 TL/MH	92,880 MH/year	170,899.20 TL
PRO 4	1.84 TL/MH	255,500 MH/year	470,120.00 TL
PRO 5	1.84 TL/MH	90,240 MH/year	166,041.60 TL
TOTAL		**819,980 MH/year**	**1,508,763.20 TL**

The total amount of general production costs allocated to products from both of the primary cost centers represents the amount of the budgeted general production costs. According to the volume based budgeting methodology, the budgeted general production costs of five products are given below:

Products	PCC 1 Allocation of GPC	PCC 2 Allocation of GPC	TOTAL	GPC Share
PRO 1	1,118,073.60 TL	300,950.40 TL	1,419,024.00 TL	22.71%
PRO 2	922,878.00 TL	400,752.00 TL	1,323,630.00 TL	21.18%
PRO 3	995,518.80 TL	170,899.20 TL	1,166,418.00 TL	18.66%
PRO 4	892,080.00 TL	470,120.00 TL	1,362,200.00 TL	21.80%
PRO 5	812,217.60 TL	166,041.60 TL	978,259.20 TL	15.65%
TOTAL	**4,740,768.00 TL**	**1,508,763.20 TL**	**6,249,531.20 TL**	**100.00%**

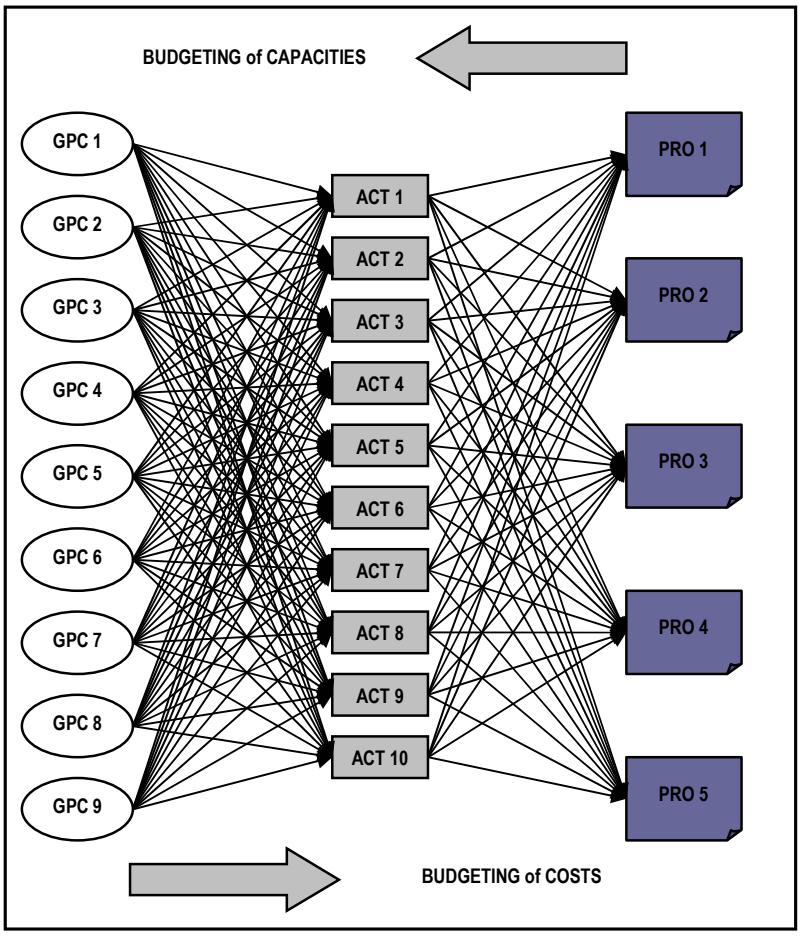
In the table given below, these results are compared with target indirect production costs:

Products	Target Indirect Production Costs	GPC Share	VBB - GPC	GPC Share	Difference
PRO 1	1,342,937.38 TL	22.59%	1,419,024.00 TL	22.71%	-76,086.62 TL
PRO 2	1,600,959.76 TL	26.93%	1,323,630.00 TL	21.18%	277,329.76 TL
PRO 3	795,722.01 TL	13.39%	1,166,418.00 TL	18.66%	-370,695.99 TL
PRO 4	984,603.69 TL	16.56%	1,362,200.00 TL	21.80%	-377,596.31 TL
PRO 5	1,220,029.76 TL	20.52%	978,259.20 TL	15.65%	241,770.56 TL
TOTAL	**5,944,252.60 TL**	**100%**	**6,249,531.20 TL**	**100.00%**	-305,278.60 TL

According the results (as seen in the table above), the total amount of budgeted general production costs should have be reduced to target general production costs. It is obvious that the resources allocated for Product 2 (PRO 2) and Product 5 (PRO 5) are scarce and should have to be increased, if possible. However, for Product 1, 3 and 4 general production costs are budgeted above the targets. Consequently, these products and the allocated resources for them are to be reconsidered. Here, there seems to be two options: (1) to allocate some amount of resources from these products to PRO 2 and PRO 5, and (2) to remove these products out of production.

A Target Costing Practice According to Activity Based Budgeting

As mentioned before, the main tenet of activity based costing is that the costs are consumed by the products. Similarly, activity based budgeting considers activities and measures related with these activities in allocation of general production costs to products. Activity based budgeting attempts to allocate general production costs on activities firstly, and then on products via related activities (see the related figure given below).



According to the cost analysis made by the managers of HB Company, it is known that 10 different activities are required for the production of target products. The consumed general production costs of each mentioned activity is determined and given in three different tables below:

	ACT 1	ACT 2	ACT 3	ACT 4	ACT 5	ACT 6	ACT 7	ACT 8	ACT 9	ACT 10	TOTAL
GPC 1	16.89%	1.38%	3.35%	9.10%	8.70%	25.34%	3.41%	7.63%	8.67%	15.53%	100.00%
GPC 2	2.64%	3.78%	29.68%	0.02%	19.44%	26.20%	5.56%	6.08%	6.11%	0.49%	100.00%
GPC 3	29.64%	57.30%	11.68%	0.00%	0.00%	0.00%	0.00%	1.29%	0.00%	0.09%	100.00%
GPC 4	0.00%	0.00%	63.70%	21.80%	2.19%	5.68%	3.01%	2.08%	1.44%	0.10%	100.00%
GPC 5	12.11%	0.00%	0.00%	3.78%	2.41%	44.39%	0.00%	0.00%	23.66%	13.65%	100.00%
GPC 6	37.39%	33.60%	0.00%	0.00%	0.00%	5.77%	0.00%	12.98%	0.00%	10.26%	100.00%
GPC 7	0.00%	0.00%	0.00%	66.00%	30.10%	0.00%	0.00%	0.00%	3.90%	0.00%	100.00%
GPC 8	0.00%	0.00%	0.00%	15.58%	74.33%	0.00%	0.00%	0.00%	1.12%	8.97%	100.00%
GPC 9	2.52%	17.40%	18.77%	21.88%	39.43%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%

GPC	Amount of Budget (in Turkish Liras)	ACT 1 (in Turkish Liras)	ACT 2 (in Turkish Liras)	ACT 3 (in Turkish Liras)	ACT 4 (in Turkish Liras)	ACT 5 (in Turkish Liras)	ACT 6 (in Turkish Liras)	ACT 7 (in Turkish Liras)	ACT 8 (in Turkish Liras)	ACT 9 (in Turkish Liras)	ACT 10 (in Turkish Liras)
GPC 1	475,688.00	80,343.70	6,564.49	15,935.55	43,287.61	41,384.86	120,539.34	16,220.96	36,294.99	41,242.15	73,874.35
GPC 2	968,267.40	25,562.26	36,600.51	287,381.76	193.65	188,231.18	253,686.06	53,835.67	58,870.66	59,161.14	4,774.51
GPC 3	1,487,355.39	440,852.14	852,254.64	173,723.11	0.00	0.00	0.00	0.00	19,186.88	0.00	1,338.62
GPC 4	1,563,779.80	0.00	0.00	996,127.73	340,904.00	34,246.78	88,822.69	47,067.77	32,526.62	22,518.43	1,563.78
GPC 5	343,689.30	41.260,77	0.00	0.00	12,991.46	8,282.91	152,563.68	0.00	0.00	81,316.89	46,913.59
GPC 6	68,955.20	25.782,35	23.168,95	0.00	0.00	0.00	3,978.72	0.00	8,950.38	0.00	7,074.80
GPC 7	971,382.11	0.00	0.00	0.00	641,112.19	292,386.02	0.00	0.00	0.00	37,883.90	0.00
GPC 8	127,500.00	0.00	0.00	0.00	19,864.50	94,770.75	0.00	0.00	0.00	1,428.00	11,436.75
GPC 9	11,863.55	298,96	2.064,26	2,226.79	2,595.74	4,677.80	0.00	0.00	0.00	0.00	0.00
TOTAL	**6,018,480.75**	**614,460.19**	**920,652.85**	**1,475,394.94**	**1,060,949.15**	**663,980.29**	**619,590.49**	**117,126.40**	**155,829.54**	**243,550.51**	**146,946.40**

(all in Turkish Liras)	ACT 1	ACT 2	ACT 3	ACT 4	ACT 5	ACT 6	ACT 7	ACT 8	ACT 9	ACT 10	TOTAL
	614,460.19	920,652.85	1,475,394.94	1,060,949.15	663,980.29	619,590.49	117,126.40	155,829.54	243,550.51	146,946.40	**6,018,480.75**
	AK 1	**AK 2**	**AK 3**	**AK 4**	**AK 5**	**AK 6**	**AK 7**	**AK 8**	**AK 9**	**AK 10**	
PRO 1	34,485.01	18,019.45	310,143.08	12,510.58	97,950.02	122,855.76	7,808.43	28,050..99	73,226.98	28,590.81	**733,641.12**
PRO 2	87,780.03	13,010.31	231,868.87	6,150.17	122,995.61	331,920.06	26,548.65	41,448.48	6,068.53	12,539.43	**880,330.15**
PRO 3	122,265.04	522,039.69	219,069.32	513,571.12	64,737.40	42,710.89	29,672.02	45,321.19	86,577.76	4,347.15	**1,650,311.58**
PRO 4	128,535.04	120,300.02	338,695.94	450,985.64	33,702.65	75,906.81	17,178.54	24,806.29	31,960.95	66,848.91	**1,288,920.78**
PRO 5	241,395.07	247,283.37	375,617.73	77,731.64	344,594.61	46,196.96	35,918.76	16,202.59	45,716.29	34,620.09	**1,465,277.12**
TOTAL	**614,460.19**	**920,652.85**	**1,475,394.94**	**1,060,949.15**	**663,980.29**	**619,590.49**	**117,126.40**	**155,829.54**	**243,550.51**	**146,949.40**	**6,018,480.75**

The general production costs budgeted related with activities given in the tables above are also budgeted by means of products according to the 10 different allocation key(AK)s each referring a different activity and are presented in the table given below:

	AK 1	AK 2	AK 3	AK 4	AK 5	AK 6	AK 7	AK 8	AK 9	AK 10
PRO 1	11	2.680	630	1.383.242	179,90	282,64	5	1.340	181	63.500
PRO 2	28	1.935	471	679.998	225,90	763,61	17	1.980	15	27.850
PRO 3	39	77.642	445	56.783.369	118,90	98,26	19	2.165	214	9.655
PRO 4	41	17.892	688	49.863.559	61,90	174,63	11	1.185	79	148.471
PRO 5	77	36.778	763	8.594.456	632,90	106,28	23	774	113	76.891
TOTAL	196	136.927	2.997	117.304.624	1.219,50	1425,42	75	7.444	602	326.367

In the table given below, these results are compared with target indirect production costs:

Products	Target Indirect Production Costs	GPC Share	Activity Based Budget – General Production Costs	GPC Share	Difference
PRO 1	1,342,937.38 TL	22.59%	733,641.12 TL	12.19%	609,296.26 TL
PRO 2	1,600,959.76 TL	26.93%	880,330.15 TL	14.63%	720,629.61 TL
PRO 3	795,722.01 TL	13.39%	1,650,311.58 TL	27.42%	-854,589.57 TL
PRO 4	984,603.69 TL	16.56%	1,288,920.78 TL	21.42%	-304,317.09 TL
PRO 5	1,220,029.76 TL	20.52%	1,465,277.12 TL	24.35%	-245,247.36 TL
TOTAL	**5,944,252.60 TL**	**100.00%**	**6,018,480.75 TL**	**100.00%**	**-74,228.15 TL**

According to the comparison results, it seems that the budgets planned to be allocated for the Product 1 and 2 are insufficient and more resources should have to be allocated for them. However, general production costs for the Product 3, 4 and 5 are budgeted above the limits. So, it will be rational to consider the appropriateness of the production of these products and to eliminate of them that can not create value added for the company.

Comparing the Results of Volume Based Budgeting and Activity Based Budgeting in Perspective of Target Costing

In this part of the study, the results related with general production costs obtained from applying volume based budgeting and activity based budgeting are re-given in the following two tables respectively to make comparison more clearly.

Products	Target Indirect Production Costs	GPC Share	Volume Based Budget – General Production Costs	GPC Share	Difference
PRO 1	1,342,937.38 TL	22.59%	1,419,024.00 TL	22.71%	-76,086.62 TL
PRO 2	1,600,959.76 TL	26.93%	1,323,630.00 TL	21.18%	277,329.76 TL
PRO 3	795,722.01 TL	13.39%	1,166,418.00 TL	18.66%	-370,695.99 TL
PRO 4	984,603.69 TL	16.56%	1,362,200.00 TL	21.80%	-377,596.31 TL
PRO 5	1,220,029.76 TL	20.52%	978,259.20 TL	15.65%	241,770.56 TL
TOTAL	**5,944,252.60 TL**	**100.00%**	**6,249,531.20 TL**	**100.00%**	**-305,278.60 TL**

Products	Target Indirect Production Costs	GPC Share	Activity Based Budget – General Production Costs	GPC Share	Difference
PRO 1	1,342,937.38 TL	22.59%	733,641.12 TL	12.19%	609,296.26 TL
PRO 2	1,600,959.76 TL	26.93%	880,330.15 TL	14.63%	720,629.61 TL
PRO 3	795,722.01 TL	13.39%	1,650,311.58 TL	27.42%	-854,589.57 TL
PRO 4	984,603.69 TL	16.56%	1,288,920.78 TL	21.42%	-304,317.09 TL
PRO 5	1,220,029.76 TL	20.52%	1,465,277.12 TL	24.35%	-245,247.36 TL
TOTAL	**5,944,252.60 TL**	**100.00%**	**6,018,480.75 TL**	**100.00%**	**-74,228.15 TL**

Before all, it is seen that the difference between two different budgeting methodologies related with general production costs is 231,050.45 TL. In aim of achieving the total target indirect production costs, activity based budgeting methodology seems to be more appropriate, as the difference between activity based budget and general production costs is smaller than the difference between volume based budget and general production costs.

On the other hand, it is also seen that according to the volume based budgeting, the most resource-consuming products are (PRO 1 and 2), while they are the less resource-consuming ones according to activity based budgeting. In the same perspective, according to volume based methodology, the most resource-consuming product is Product 5; but according to the other methodology, Product 3 is the most resource-consuming one. Consequently, it can be said that the methodologies allocate resources to products in different amounts.

The different results obtained from these different methodologies require different decision-making procedures. Here, a question arises:"Which methodology is to be used?" or "Which methodology is more appropriate for the HB Company?"

The limitations of volume based budgeting is known by managers. Volume based budgeting attempts to form a relationship between products and resources by the help of a few limited allocation keys as direct labor costs or machine hour. However, activity based budgeting relates products, their resources and the required activities to produce products simultaneously. So, it is obvious that activity based budgeting is more appropriate than volume based budgeting. The other advantage of activity based budgeting is that it fictionalizes targets about reducing general production costs related with the products.

Here, the advantages of activity based budgeting is tried to be explained by decisions related with PRO 1. In activity based budgeting methodology, it is also aimed to produce products having qualifications required by the customers. Thorough this aim, firstly it is tried to be determined the expectations of customers form PRO 1. In the table given

below, the qualifications that PRO 1 should have and the level of importance attributed to the product by the customers are given:

The qualification(Q)s that Product 1 (PRO 1) should have (in percentages)

	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Total
Importance level	47.00%	24.00%	13.00%	9.00%	5.00%	2.00%	100.00%

The main base of activity based costing is that the resources are consumed by the products, as mentioned before. So, the activities required for the production of PRO 1 and also the qualifications of it required by customers should be determined before the production stage. The related data about these are given below:

PRO1	ACT 1	ACT 2	ACT 3	ACT 4	ACT 5	ACT 6	ACT 7	ACT 8	ACT 9	ACT 10	TOTAL
Qualification 1	43.00%	27.00%	-	-	5.00%	8.00%	14.00%	-	-	3.00%	**100.00%**
Qualification 2	79.00%	-	-	-	11.00%	-	-	2.00%	8.00%	-	**100.00%**
Qualification 3	-	9.00%	43.00%	6.00%	-	-	-	37.00%	-	5.00%	**100.00%**
Qualification 4	3.00%	13.00%	37.00%	5.00%	9.00%	8.00%	14.00%	-	7.00%	4.00%	**100.00%**
Qualification 5	15.00%	-	6.00%	27.00%		11.00%	-	-	-	41.00%	**100.00%**
Qualification 6	-	-	-	-	34.00%	47.00%	19.00%	-	-	-	**100.00%**

If the qualification-activity matrices given above is weighted by the levels of importance about the qualifications of PRO 1 attributed by the customers, a new weighted matrices given below is obtained. As a result, the percentages of each activity required for the production of PRO 1 in total activities is determined also by considering the expectations of customers.

PRO1	ACT 1	ACT 2	ACT 3	ACT 4	ACT 5	ACT 6	ACT 7	ACT 8	ACT 9	ACT 10	TOTAL
Q 1	20.00%	13.00%	0.00%	0.00%	2.00%	4.00%	7.00%	0.00%	0.00%	1.00%	47.00%
Q 2	19.00%	0.00%	0.00%	0.00%	3.00%	0.00%	0.00%	0.00%	2.00%	0.00%	24.00%
Q 3	0.00%	1.00%	6.00%	1.00%	0.00%	0.00%	0.00%	5.00%	0.00%	1.00%	13.00%
Q 4	0.00%	1.00%	3.00%	0.00%	1.00%	1.00%	1.00%	0.00%	1.00%	0.00%	9.00%
Q 5	1.00%	0.00%	0.00%	1.00%	0.00%	1.00%	0.00%	0.00%	0.00%	2.00%	5.00%
Q 6	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	0.00%	0.00%	0.00%	0.00%	2.00%
TOTAL	**40.00%**	**15.00%**	**9.00%**	**3.00%**	**6.00%**	**6.00%**	**8.00%**	**5.00%**	**3.00%**	**4.00%**	**100.00%**

When the activities that should have to be bared by HB Company for the production of PRO 1 are ranked by the criteria of importance level attributed by the customers in their perspective, it is seen that Activity 1, 2 and 3 are the most important activities compared with especially Activity 10, 4 and 9 (see the table given below).

The required activities and the level of importance that customers attribute on activities for the Product 1

The required activities for the Product 1 (PRO 1)	ACT 1	ACT 2	ACT 3	ACT 7	ACT 5	ACT 6	ACT 8	ACT 10	ACT 4	ACT 9	TOTAL
The level of importance that customers attribute on activities	40.00 %	15.0 0%	9.00 %	8.00 %	6.00 %	6.00 %	5.00 %	4.00 %	3.00 %	3.00 %	100.00 %

In activity based costing and budgeting methodology, both activities and the budgeted costs of these activities are clear and obviously seen. Then, it is appropriate to consider the ratios of activity/costs with the level of importance on activities attributed by customers on them (see the table below).

The required activities	The level of importance that customers attribute on activities	Activity/Costs	Target Cost Index
ACT 1	40.00%	5.00%	8.00
ACT 2	15.00%	2.00%	7.50
ACT 3	9.00%	42.00%	0.21
ACT 7	8.00%	1.00%	8.00
ACT 5	6.00%	13.00%	0.46
ACT 6	6.00%	17.00%	0.35
ACT 8	5.00%	4.00%	1.25
ACT 10	4.00%	4.00%	1.00
ACT 4	3.00%	8.00%	0.38
ACT 9	3.00%	10.00%	0.30
TOTAL	**100.00%**	**100.00%**	

From the table above, it is obviously seen that the resources allocated for Activity 1 is extremely scarce. In opposite, the resources allocated for Activity 3 is remarkably high. Also, it is possible to form a target cost index from the table given above by dividing the levels of importance and activity/costs ratios. 1 is the ideal score in the index; as it means that the resources allocated for any product is appropriate by the level of importance attributed by the customers on that product. Any increase or decrease from the ideal score represents the disequilibrium in resource allocation.

The required activities	Target Cost Index	Analysis and Comments
ACT 1	8.00	These activities do not cost much for the company. Here, there exists a serious problem. It is known that though these activities are the most important activities in the perspective of costumers, the resources allocated to them are scarce. So, it is recommended to give more importance to these avticivities.
ACT 7	8.00	
ACT 2	7.50	
ACT 8	1.25	
ACT 10	1.00	Perfect
ACT 5	0.46	These activities cost much for the company. Here, there seems to be disequilibrium. The resources allocated to these activities are high. So, it is recommended to reduce the amount of resources allocated to these activities or to eliminate activities that do not create value added.
ACT 4	0.38	
ACT 6	0.35	
ACT 9	0.30	
ACT 3	0.21	

5. CONCLUSION

The world's rapidly changing environment has dramatically affected the needs, expectations and preferences of the customers and has led companies to compete in a more severe business environment. Customers do not only consider the price and quality of the products, but also the services given by the companies after they buy them. So, it has become more vital for companies to track costs related with their products in order to compete against their rivals.

Activity based costing and target costing methodologies are more contemporary and appropriate costing methodologies that will answer the needs and expectations of such companies compared with the traditional costing approaches. So, as done in this study, it will be better to use these two contemporary methodologies together in order to reach targets in target costing process.

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