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Activity Based Costing Model for Cost Calculation In Gas Companies: Empirical Evidence of Iran

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Abstract: With the reduction of public funding and the government's emphasis on accountability, output control and cost–effectiveness in the delivery of services, organizations need information to measure their activities, link their inputs with outputs, correct their pricing, and measure their performance in order to facilitate accomplishing their goals. This research is to explain the steps and the benefits of implementing Activity Based Costing (ABC) for the Iranian Gas Company. Using ABC the cost of one cub meter of consuming gas in all regions of capital was determined and compared with the results of the Traditional Costing System (TCS). Implementing ABC strongly changed company managers' prospective towards the company cost of services, provided a more effective system for company internal decision-making, improved the effectiveness of the costing system and cost management, and helped the managers to correct company pricing of services and the accomplishment of strategic goals by giving more correct cost information.

Key words: Activity Based Costing, Traditional Costing Method, Iranian Gas Company.

1. Introduction

Activity-based costing (ABC) is a dynamic approach to determining costs by assigning them to the principal activities performed within an organization. Widely applied in many manufacturing and services organizations, ABC improves their competitiveness by enabling them to make better decision based on an improved understanding of their product cost behavior. The main premise behind ABC is to classify overhead or indirect costs and to allocate them to end products or services based upon the activities required to produce these products (Raz and Elanathan, 1999). Basically ABC is a two-stage procedure in which the costs of resources in the first stage are allocated to activities to form an Activity Cost Pool, which in the second stage are allocated to cost objects based on these objects' use of the different activities (Thyssen et al, 2005). This contrasts sharply with the traditional cost system which holds that products cause costs. The traditional approach does not use cost pools, and it uses a single volume-based cost driver to allocate overhead costs to products with consideration just for volume-related characteristics. Traditional systems generally fail to address the long-term nature of products and customer relationships. By gathering and reporting aggregate cost information, these systems overlook the fact that some costs incurred

in a single period are related to income that may occur over many time periods. Cooper and Kaplan bring forward ABC as a costing model that is more accurate than traditional costing accounting (TCA) when products are diverse in size, complexity, material requirements, and/or procedures (Cooper and Kaplan, 1988). This case study details an ABC system that was developed for a conveying gas company in the gas industry of Iran, Tehran Province Gas Company (TPGC). The gas industry of Iran needs correct information about the economical cost of every one cubic meter of the natural gas for setting the economical price of the natural gas consuming by consumers. TPGC believed that their current TCA system was not correctly representing the cost of the natural gas in various regions because it indicates an equal cost of every one cubic meter of the natural gas in all regions.

The paper is organized as follows. The next section summarizes the literature on ABC in the services and gas industries. In the third section, the research method is described. Section 4 provides a discussion and the results of the analysis. Finally, the paper ends with conclusions and final remarks.

2. Literature Review

Cooper and Kaplan (1980) suggest that virtually all organizational costs are traceable to the activities for which the resources are used, and that all activities, in turn, are traceable to the product lines that consume them. ABC introduces the notion that activities drive costs (Cooper, 1988). Since the efforts of Robin Cooper in the late 1980s, many industries have successfully employed ABC to improve operational performance. ABC has continued to provide relevant and accurate information about cost management. In addition, because the ABC system focuses on activities rather than products, it helps prevent distorted product cost information that can arise from the use of traditional costing systems. Examples of this research follow.

Tatikonda and Tatikonda (2001), Ellis-Newman et al, (1996), and Mitchell (1996) in similar research introduced ABC as a good method of performance evaluation, allocating resources, improving process and increasing efficiency of activities in universities. Kelline et al, (2001) and Roberson and Bernasooni (1998) studied the importance of ABC in more correct budgeting of universities and demonstrated that it is more helpful in evaluating performance and decision making. Lung (2002) and Kim (2003) checked using ABC for the telecommunication industry. The results showed that ABC by presenting more correct information about the final costs and good pricing led to increases in customers' satisfaction and firms' profitability. Kumar (2006), Jarvinen (2005), Arnabodia & Lapsly(2005), Arnaboldi & Lapsly (2004), Negrini et al. (2004), Waters et al, (2003), and Rajabi (2001) implemented ABC in different hospitals around the world and introduced this system as a strategy for the correct allocation of direct overhead to products and presentation of helpful information for managers' decision making in competitive situations. Kocakülâh and Crowe (2005), Narasimha and Thampy (2002), Mostaque and Gunasekaran (2001), Innes and Mitchell (1997) with the application of ABC in the banking industry, introduced this technique as the one that met managers information needs and helped them to have a correct understanding of costs of services. Barton and Macarthur (2003) in their research, "ABC and predatory pricing: the case of the petroleum retail industry" realized that the ABC approach improves costing in gasoline dispensing retail facilities and helps to correct the problem of product-cost subsidization of low-volume products by high-volume products that was over-costed in TCA. Ellis-Newman (2003), Detya (2001), Ellis and Robinson (1998) in similar research evaluated ABC as a helpful technique for the activities of library managers. Lievens et al, (2003) used ABC for cost calculation in radiotherapy. The management of this center

after the application of this system introduced ABC as a strong method in setting final prices of services and correct pricing. Collier (2006) calculated the cost of every crime committed using ABC. The results showed considerable benefits for both police and related government units because of identifying the activities lacking valued added, resulting in process improvement and a reduction of fraud in organizations. Also the research showed that for giving services, it is essential to profit from more resources.

3. Company Description

Located in Tehran, Tehran Province Gas Company is responsible for distributing pipe lines throughout, villages, industrial towns, constructing buildings, and checkpoints, repairing and taking care of the equipment in Tehran's towns to provide the gas used by households, business and industrial subscribers. By having qualified specialists and guiding benefits to them, this has motivated specialists to work harder, and by allowing specialists to achieve management certificates (ISO 9001-2000, 1400 OHSAS), this has resulted in a lot of progress in the gas industry. The services provided by Tehran Province Gas Company are for 23 towns. The cost of one cub meter of consuming gas by Tehran Province Gas Company is calculated as follows: The cost of consuming gas as primary material and direct salary wage and direct overhead of each of the areas of the province, according to the actual data year t, is calculated as the total of these items, treated as the direct costs. The Tehran Province Gas Company expenses are counted as indirect costs. To determine the exact and final cost, it is necessary to trace correctly these expenses to the regions. The sum of all of the expenses divided by the amount of gas used throughout the year t is the cost of one cub meter of gas in which the system cost of gas is equal in all of the regions. The cost of cubic meter of gas in 2005 is as described above.

Table1.Cost of one cubic meter of regional gas in current costing system of Tehran Gas Company

Expenses	Cost of services	Sustaining	Engineering	Total
Gas	280,855,000,000	0	0	280,855,000,000
+Beginning Gas	23,582,636	0	0	23,582,636
- Ending Gas	-39,542,584	0	0	-39,542,584
Direct Salary& wage	16,365,529,399	52,788,456,948	4,829,078,835	73,983,065,182
Indirect Salary& wage	3,601,411,846	1,455,115,897	0	5,056,527,743
Depreciation	23,527,292,525	2,781,805,924	942,943,154	27,252,041,603
Direct Overhead	108,087,003,156	1,938,360,862	181,864,623	110,207,228,641
Indirect Overhead(1)	11,883,637,457	0	0	11,883,637,457
Indirect Overhead(2)	2,027,967,436	846,485,636	0	2,874,453,072
Total	446,331,881,871	59,810,225,267	5,953,886,612	512,095,993,750
Consuming Gas in year t	6,015,000,000	0	0	6,015,000,000
Cost of one cube meter of gas	74.2031			85.14

- The fact should be mentioned that the amount of accidental costs (72.000.000) is added to the overall expensive (512.095.993.750). But because this item was not detectable to the discovered activities by the researcher, he has counted that as course expenditure.
- In Tehran Province Gas Company current system, part of the Sustaining and Engineering expenses are not taken to determine cost of gas and are part of the period's costs.

4. Research Methodology

Transforming natural gas to the final customers includes some stages including discovery, development and production, transfer and distribution. In this research, in order to calculate the cost of services in the gas transfer sector, ABC was used. It was examined for the Tehran Gas Company as a case of study in the oil and gas industry of Iran. In sampling from Provincial Gas Companies under the supervision of Iran National Gas Company, Tehran Province Gas Company which is the biggest provincial gas companies was selected. Because of the availability of the real information about the year 2005, we have calculated the cost of one cube meter of natural gas in all regions of the Tehran province for the year of 2005.

In our study, ABC includes the following eight stages:

Stage 1: Determining cost items and cost drivers: These items are determined by using the company accounting system. The cost items are costs groups of the company included in the profit and loss list. Cost drivers show causes of resource consumption by activities. These cost drivers can be determined using opinions of the managers of the financial affairs.

Stage 2: Identifying main activities and determining cost drivers: In order to identify the main activities, we make use of an operational process chart, and interviews with the experts and the researchers. After identifying activities, similar activities were put together and related cost drivers were determined. Table 2 shows the main activities, cost drivers and cost items for the company.

Table 2. Company main activities and cost drivers, cost items and cost drivers

Row	Cost items	Cost drivers	Main activities	Cost drivers
1	Salary & wage	Cost center personal	Engineering	Net work size
2	Goods	Monetary value of orders	Transportation	Number of automobiles
3	Receivable services	Monetary value of services	Telecommunication	Number of telephone lines
4	Other costs	----------	Measuring & distribution of gas	Number of stations
5	Depreciation	Monetary value of resources	Main subscribers	Number of main subscribers
6	Water& power bill	Monetary value of payments	Computer	Number of computers
7	Automobile rent	Monetary value of transport fare	Sustaining	Number of personnel
8	Training	Training hour		
9	Administrative& organization	Monetary value of office services		

Stage3: Determining the relation between cost items with activities in the Expense-Activity– Dependence Matrix (EADM): This matrix shows how resources consumed by each activity.

Stage 4: Calculating and replacing allocation rates in the EADM: Based on the cost drivers, which are determined in stage 1, the share of each activity of the company from resources was calculated and put in the matrix cell. According to the calculated numbers, allocation rates of cost items to activities were calculated and placed in matrix cells. The sum of rates in each column of EADM should be equal to one. This matrix is based on the real information in the years 2003, 2004, and 2005 because for the Tehran Gas Company, just the

financial information of these three years was available. The average of allocation rates over the three years was considered as the final rates of resources consumed by activities.

Stage 5: Calculating activities' expenses: Activities' expenses are calculated by the following formula:

$$TCA\ (i) = \sum_{j=1}^{m} \{E\ (j)^*\ EDAM\ (i,j)\ \} \quad \textbf{(1)}$$

where *TCA (i), m, E (j),* and *EDA(i, j)* denote the total expenses of activity, number of cost items, the rate of consuming resources by activity and *i* the row and *j* the column in EADM, respectively. After calculating the cost of each activity, the new matrix of EADM with monetary values was formed. Table 3 shows completed Expense-Activity–Dependence Matrix (EADM).

Table 3. Expense-Activity–Dependence Matrix (EADM)

Activi-ties / Cost items	Engineeri-ng	Transportat-ion	Telecommu-nication	Main-subscribers	Measuring& distribution of gas	computer	sustaining	Sum
Water& power bill	24.03%	0.74%	5.27%	3.67%	1.09%	1.49%	63.72%	100%
	102,796,908	3,156,869	22,543,392	15,682,806	4,669,814	6,353,523	272,596,954	427,800,266
Automobile rent	3.15%	91.78%	0.04%	0.54%	0.19%	0.21%	4.08%	100%
	25,534,931	742,938,232	325,615	4,385,466	1,556,946	1,706,451	33,035,763	809,483,350
Administrative and organization	51.70%	2.31%	0.06%	9.97%	2.34%	3.95%	29.13%	100%
	1,860,996,372	83,303,263	21,751,257	358,799,825	84,135,722	142,254,704	1,048,533,883	3,599,775,145
Other costs	6.67%	6.21%	0.02%	6.02%	0.19%	0.11%	79.79%	100%
	38,797,835	31,428,926	107,224	30,432,566	952,872	534,416	403,418,157	505,871,997
Salary& wage	10.46%	0.70%	0.52%	1.64%	0.43%	1.02%	85.24%	100%
	6,553,573,565	440,124,964	326,148,707	1,025,534,346	269,095,466	636,456,931	53,423,131,635	62,674,063,524
Depreciation	2.21%	31.70%	0.55%	53.98%	0.06%	2.59%	8.99%	100%
	792,520,180	11,831,689,875	207,083,767	20,150,196,286	23,106,234	967,982,783	3,355,845,143	37,328,425,512
Receivable services	20.11%	1.66%	0.39%	3.08%	0.75%	1.95%	72.06%	100%
	2,152,116,574	177,603,634	41,477,783	329,711,141	80,478,473	208,457,974	7,710,029,761	10,699,875,698
Training	35.29%	1.62%	12.33%	10.97%	5.93%	2.64%	31.23%	100%
	149,796,038	6,855,694	52,315,946	46,546,567	25,161,248	11,208,906	132,579,091	424,463,490
Goods	17.28%	9.73%	1.30%	2.32%	0.53%	8.26%	60.59%	100%
	335,988,951	189,289,077	25,271,335	45,140,835	10,244,595	160,553,139	1,178,405,418	1,944,893,350
Total	12,011,891,617	13,506,261,257	697,008,847	22,006,399,407	499,394,708	2,135,399,310	67,556,973,516	118,413,328,662

Stage 6: Determining the relation between activities and Activity–Product-Dependence Matrix (APDM): In this stage, the activities consumed by the regions are determined and APDM is formed.

Stage 7: Calculating and replacing allocation ratse in APDM: Based on cost drivers determined in stage 2 and applying calculation methods, the allocation rates of activity expenses to product are calculated and placed in the APDM cells. The sum of the rates in each of the columns of the matrix should be equal to one. To compute indirect overhead costs of regions, the following formula was applied:

$$OCP\ (i) = \sum_{j=1}^{n} \{TCA\ (j) * APDM\ (i, j)\} \quad \textbf{(2)}$$

where OCP (i), n, TCA (j), and APD (i, j) are indirect overhead costs of product, number of activities, total costs of activity, and i the row and j the column in APDM. After calculating the amount of activity overhead for each region, the new APDM with monetary values was formed. Table 4 and 5 show the allocation rates and the monetary values of activity expenses to products.

Table 4. Activities- product- dependence matrix (APDM)

No.	Activities / Regions	Engineering	Transportation	Telecommunication	Main subscribers	Measuring& distribution of gas	Computer	Sustaining
1	Eslamshahr	5.90%	6.35%	7.57%	2.02%	5.29%	9.94%	8.79%
2	Pakdasht	5.51%	6.35%	8.37%	38.87%	11.06%	3.51%	2.20%
3	Pishva	1.48%	3.17%	2.39%	1.62%	0.96%	1.75%	4.40%
4	Damavand	3.30%	3.17%	5.58%	0.40%	1.44%	4.09%	2.20%
5	Robat karim	2.69%	3.17%	1.59%	0.81%	3.37%	2.34%	3.30%
6	Gharchak	2.81%	3.17%	2.39%	11.34%	1.44%	2.34%	2.20%
7	Vavan	0.86%	1.59%	1.20%	0.20%	0.96%	1.75%	0.55%
8	Varamin	5.85%	9.52%	8.76%	2.83%	6.73%	14.62%	11.54%
9	Eshtehard	0.52%	3.17%	3.19%	3.85%	1.44%	0.58%	1.65%
10	Shahregods	3.29%	4.76%	4.78%	3.04%	1.92%	4.68%	3.30%
11	Shahriyar	6.91%	7.94%	3.59%	0.61%	5.29%	7.02%	7.69%
12	Fardis	6.86%	6.35%	1.99%	1.82%	10.10%	2.92%	4.95%
13	Karaj	30.42%	17.46%	25.50%	11.94%	25.48%	22.81%	28.57%
14	Nazarabad	5.19%	4.76%	1.59%	4.05%	3.37%	2.92%	3.85%
15	Vardavard	2.08%	1.59%	2.79%	0.81%	0.48%	2.34%	2.20%
16	Hashtgerd	2.90%	6.35%	3.59%	0.61%	2.88%	3.51%	4.40%
17	Bagherabad	0.78%	1.59%	0.80%	0.20%	1.44%	0.58%	0.55%
18	Gheyamdasht	0.59%	1.59%	7.57%	0.20%	0.48%	2.92%	1.10%
19	Chahrdange	5.28%	1.59%	0.40%	13.97%	3.37%	2.34%	0.55%
20	Rodehen	1.82%	1.59%	3.19%	0.40%	2.40%	1.17%	1.65%
21	Golestan	0.20%	1.59%	0.40%	0.20%	4.33%	2.34%	1.65%
22	Nasimshahr	2.19%	1.59%	1.59%	0.00%	1.92%	1.75%	1.65%
23	Malard	2.55%	1.59%	1.20%	0.20%	3.85%	1.75%	1.10%
	Total	1	1	1	1	1	1	1

Stage 8: Calculating cost of products/services: With allocating indirect overhead costs to the gas transferred regions in the APDM, the cost of one cub meter of natural gas in those regions, direct overhead costs, and value of consumed raw materials of each region were calculated by the following formula:

Cost of one cub meter = Region raw materials+ region direct overheads + region indirect overheads

Cub meters of consuming gas of the region

Table 6 shows cost of one cubic meter of regional gas in the ABC system, and Table 6 compares the cost of one cub meter of gas in ABC and two traditional costing systems. As shown in table 7, there are significant differences among the cost of one cubic meter of gas under the three methods of calculation. One of the reasons why the amounts of cost of one cubic meter of gas in these two methods are different is that in TCS, some costs are considered in calculating cost of products, but in ABC, all the costs traceable to product are considered in calculating cost. Another reason is the method of tracing indirect costs to products. In the TCS, product consumes organizational resources but in ABC, activities consume organizational resources are traced to products based on drivers related to each activity.

Table 5. APDM with monetary items

Row	Regions	Engineering	Transportation	Telecommunication	Main Subscribers	Measuring	Computer	Sustaining	Sum of Indirect Overhead
1	Eslamshahr	708,497,600	857,540,397	52,761,626	445,473,672	26,410,297	212,291,159	5,939,074,595	8,242,049,347
2	Pakdasht	661,500,577	857,540,397	58,315,481	8,553,094,506	55,221,530	74,926,292	1,484,768,649	11,745,367,432
3	Pishva	177,944,855	428,770,199	16,661,566	356,378,938	4,801,872	37,463,146	2,969,537,297	3,991,557,873
4	Damavand	396,816,538	428,770,199	38,876,988	89,094,734	7,202,808	87,414,007	1,484,768,649	2,532,943,923
5	Robat karim	322,897,217	428,770,199	11,107,711	178,189,469	16,806,553	49,950,861	2,227,152,973	3,234,874,982
6	Gharchak	337,320,786	428,770,199	16,661,566	2,494,652,564	7,202,808	49,950,861	1,484,768,649	4,819,327,433
7	Vavan	103,087,591	214,385,099	8,330,783	44,547,367	4,801,872	37,463,146	371,192,162	783,808,021
8	Varamin	702,335,372	1,286,310,596	61,092,409	623,663,141	33,613,105	312,192,882	7,795,035,406	10,814,242,910
9	Eshtehard	63,016,466	428,770,199	22,215,421	846,399,977	7,202,808	12,487,715	1,113,576,487	2,493,669,073
10	Shahregods	395,481,095	643,155,298	33,323,132	668,210,508	9,603,744	99,901,722	2,227,152,973	4,076,828,473
11	Shahriyar	830,320,557	1,071,925,497	24,992,349	133,642,102	26,410,297	149,852,583	5,196,690,270	7,433,833,655
12	Fardis	824,367,849	857,540,397	13,884,638	400,926,305	50,419,658	62,438,576	3,340,729,460	5,550,306,883
13	Karaj	3,654,555,564	2,358,236,093	177,723,371	2,628,294,666	127,249,613	487,020,895	19,301,992,433	28,735,072,635
14	Nazarabad	623,820,325	643,155,298	11,107,711	890,947,344	16,806,553	62,438,576	2,598,345,135	4,846,620,943
15	Vardavard	249,581,000	214,385,099	19,438,494	178,189,469	2,400,936	49,950,861	1,484,768,649	2,198,714,507
16	Hashtgerd	348,944,232	857,540,397	24,992,349	133,642,102	14,405,617	74,926,292	2,969,537,297	4,423,988,286
17	Bagherabad	94,066,497	214,385,099	5,553,855	44,547,367	7,202,808	12,487,715	371,192,162	749,435,505
18	Gheyamdasht	70,451,477	214,385,099	52,761,626	44,547,367	2,400,936	62,438,576	742,384,324	1,189,369,406
19	Chahrdange	634,826,961	214,385,099	2,776,928	3,073,768,338	16,806,553	49,950,861	371,192,162	4,363,706,902
20	Rodehen	218,621,042	214,385,099	22,215,421	89,094,734	12,004,680	24,975,431	1,113,576,487	1,694,872,895
21	Golestan	23,816,707	214,385,099	2,776,928	44,547,367	21,608,425	49,950,861	1,113,576,487	1,470,661,874
22	Nasimshahr	263,189,987	214,385,099	11,107,711	0	9,603,744	37,463,146	1,113,576,487	1,649,326,174
23	Malard	306,431,321	214,385,099	8,330,783	44,547,367	19,207,489	37,463,146	742,384,324	1,372,749,530
	Total	12,011,891,617	13,506,261,257	697,008,847	22,006,399,407	499,394,708	2,135,399,310	67,556,973,516	118,413,328,662

Table 6. Cost of one cubic meter of regional gas in ABC

Row	Regions	Direct Overheads (1)	Indirect Overheads (2)	Consuming Gas (3)	Total cost (4)=(1)+(2)+(3)	Cubic Gas (5)	Cost of One Cubic Gas (4)/(5)
1	Eslamshahr	10,973,641,432	8,242,049,347	11,359,939,170	30,575,629,949	242,600,000	126.03
2	Pakdasht	7,064,689,498	11,745,367,432	1,269,392,461	20,079,449,391	340,070,000	59.05
3	Pishva	2,126,767,048	3,991,557,873	2,990,935,777	9,109,260,698	64,900,000	140.36
4	Damavand	5,837,942,052	2,532,943,923	62,514,770,316	70,885,656,290	1,300,250,000	54.52
5	Robat karim	3,217,622,823	3,234,874,982	1,982,723,623	8,435,221,428	43,100,000	195.71
6	Gharchak	4,311,379,402	4,819,327,433	7,105,227,713	16,235,934,548	148,800,000	109.11
7	Vavan	1,005,137,925	783,808,021	1,685,034,240	3,473,980,186	32,300,000	107.55
8	Varamin	10,058,556,657	10,814,242,910	9,969,785,922	30,842,585,489	78,750,000	391.65
9	Eshtehard	966,087,288	2,493,669,073	1,140,206,503	4,599,962,864	24,100,000	190.87
10	Shahregods	4,205,979,077	4,076,828,473	7,975,828,737	16,258,636,287	166,060,000	97.91
11	Shahriyar	7,904,874,527	7,433,833,655	7,863,493,121	23,202,201,304	170,430,000	136.14
12	Fardis	4,069,206,106	5,550,306,883	3,510,488,001	13,130,000,990	324,200,000	40.5
13	Karaj	35,261,349,391	28,735,072,635	135,364,417,305	199,360,839,332	1,760,260,000	113.26
14	Nazarabad	4,210,894,392	4,846,620,943	7,807,325,313	16,864,840,648	160,700,000	104.95
15	Vardavard	878,271,904	2,198,714,507	454,959,245	3,531,945,656	10,600,000	333.20
16	Hashtgerd	4,160,669,071	4,423,988,286	3,044,295,194	11,628,952,551	64,940,000	179.07
17	Bagherabad	636,483,417	749,435,505	1,291,859,584	2,677,778,506	101,110,000	26.48
18	Gheyamdasht	714,941,592	1,189,369,406	449,342,464	2,353,653,462	32,100,000	73.32
19	Chahrdange	355,541,763	4,363,706,902	5,111,270,529	9,830,519,194	106,800,000	92.05
20	Rodehen	1,383,979,312	1,694,872,895	645,929,792	3,724,781,999	22,430,000	166.06
21	Golestan	813,384,650	1,470,661,874	2,134,376,704	4,418,423,228	311,200,000	14.20
22	Nasimshahr	1,482,235,723	1,649,326,174	1,460,363,008	4,591,924,905	165,400,000	27.76
23	Malard	1,131,989,986	1,372,749,530	3,707,075,329	6,211,814,844	343,900,000	18.06
	Total	112,771,625,036	118,413,328,662	280,839,040,052	512,023,993,750	6,015,000,000	85.12

Table 7. Comparing cost of one cub meter of gas in ABC and TCS

Row	Regions	Cost of One Cub Meter of Gas in ABC System	Cost of One Cub Meter of Gas in TCS
1	Eslamshahr	126.03	74.2
2	Pakdasht	59.05	74.2
3	Pishva	140.36	74.2
4	Damavand	54.52	74.2
5	Robat karim	195.71	74.2
6	Gharchak	109.11	74.2
7	Vavan	107.55	74.2
8	Varamin	391.65	74.2
9	Eshtehard	190.87	74.2
10	Shahregods	97.91	74.2
11	Shahriyar	136.14	74.2
12	Fardis	40.5	74.2
13	Karaj	113.26	74.2
14	Nazarabad	104.95	74.2
15	Vardavard	333.20	74.2
16	Hashtgerd	179.07	74.2
17	Bagherabad	26.48	74.2
18	Gheyamdasht	73.32	74.2
19	Chahrdange	92.05	74.2
20	Rodehen	166.06	74.2
21	Golestan	14.20	74.2
22	Nasimshahr	27.76	74.2
23	Malard	18.06	74.2

5. Results of Data Analysis

Table 8 shows the Iranian Gas Company cost model. As can be seen, eighty percent of the Tehran Gas Company resources are used by sustaining activity and main subscribers, and the remaining 20 percent is consumed by other activities. In the cost model of Tehran Gas Company, 75% of 80% consuming resources was used by sustaining activities. This means that the managers of Tehran Gas Company should pay attention to this cost center to control and decrease the costs.

Table 8. Iranian Gas Company cost model

	Activities	Cost of activities
80% indirect overhead	Sustaining	67,556,973,516
	Main subscribers	22,063,999,407
20% indirect overhead	Transportation	13,506,261,257
	Engineering	12,011,891,617
	Computer	2,135,399,310
	Telecommunication	697,008,847
	Measuring &distribution of gas	499,394,708
	Total	118,413,328,662

Table 9 analyzes the allocation of the indirect overhead to different regions. In Table 9, the amount of indirect overhead of regions in ABC has been ordered descending. As it is clear, 80% of the total indirect overheads are dedicated to Karaj, Pakdasht, Varamin, Eslamshar Shahriyar, Fardis, Nazarabad, Gharchak, Hashtgerd, Chahardange and Shahregods. As shown, Karaj city has the highest share of indirect overheads.

Table 9. The analysis of the allocation of the indirect overhead to regions

Row	Regions	Indirect Overhead	
1	Karaj	28,735,072,635	80% Indirect Overhead
2	Pakdasht	11,745,367,432	
3	Varamin	10,814,242,910	
4	Eslamshar	8,242,049,347	
5	Shahriyar	7,433,833,655	
6	Fardis	5,550,306,883	
7	Nazaabad	4,846,620,943	
8	Gharchak	4,819,327,433	
9	Hashtgerd	4,423,988,286	
10	Chahardange	4,363,706,902	
11	Shahregids	4,076,828,473	
12	Pishva	3,991,557,873	20% Indirect Overhead
13	Robatkarim	3,234,874,982	
14	Damavand	2,532,943,923	
15	Eshtehard	2,493,669,073	
16	Vardavard	2,198,714,507	
17	Rodehen	1,694,872,895	
18	Nasimshahr	1,649,326,174	
19	Golestan	1,470,661,874	
20	Malard	1,372,749,530	
21	Ghiyamdasht	1,189,369,406	
22	Vavan	783,808,021	
23	Bagherabad	749,435,505	
	Sum	118,413,328,662	

Table 10 analyzes allocating the cost of main subscribers and sustaining. As it is clear in Table 9, sixty percent of the total costs of sustaining activity, which has the highest cost in Tehran Gas Company cost model, are placed in Karaj, Pakdasht, Varamin, Eslamshahr and Shahriyar. Seventy percent of total cost of main subscribers' activity, which is in the second row of table 7, is placed in Pakdasht, Chahardange, Karaj and Gharchak. Because sustaining activity consist of 75% of the total cost of sustaining and main subscribers, the management of Tehran Gas Company should pay attention to this critical region; in this manner it can control almost 50 percent of the company costs.

Table 10. Analysis of allocating the cost of main subscribers and sustaining

	Regions	Indirect Overhead (Sustaining)	Indirect Overhead Main Subscribers))	Regions	
70% cost of main subscribers	Karaj	19,301,992,433	8,553,094,506	Sakdasht	
	Pakdasht	7,795,035,406	3,073,768,338	Chahrdange	
	Varamin	5,939,074,595	2,628,294,666	Karaj	
	Eslamshahr	5,196,690,270	2,494,652,564	Gharchak	
	Shahriyar	3,340,729,460	890,947,344	Nazarabad	60% cost of sustaining activitv
	Fardis	2,969,537,297	846,399,977	Eshtehard	
	Nazarabad	2,969,537,297	668,210,508	Shahgods	
	Gharchak	2,598,345,135	623,663,141	Varamin	
	Hashtgerd	2,227,152,973	445,473,672	Eslamshahr	
	Chahardange	2,227,152,973	400,926,305	Fardis	
	Shahrgods	1,484,768,649	356,378,938	Pishva	
	Pishva	1,484,768,649	178,189,469	Robatkarim	
	Robatkarim	1,484,768,649	178,189,469	Varavard	
	Damavad	1,484,768,649	133,642,102	Shahriyar	
	Eshtehard	1,113,576,487	133,642,102	Hashtgerd	
	Vardavard	1,113,576,487	89,094,734	Damavand	
	Rodehen	1,113,576,487	89,094,734	Rodehen	
	Nasimshahr	1,113,576,487	44,547,367	Vavan	
	Golestan	742,384,324	44,547,367	Bagherabad	
	Malard	742,384,324	44,547,367	Gheyamdasht	
	Gheyamdasht	371,192,162	44,547,367	Golestan	
	Vavan	371,192,162	44,547,367	Malard	
	Bagherabad	371,192,162	0	Nasimshahr	
	Sum	67,556,973,516	22,006,399,407	Sum	

Conclusions and Remarks

Unfortunately, most governments and not-for-profits employ fund accounting systems that are designed primarily to insure legal compliance rather than to provide decision useful information. As public demand for increased accountability becomes more intense, governments must demonstrate that the benefits of the programs and activities in which they engage are commensurate with their costs. Accordingly they need accounting systems that properly measure and report these costs. In this study, we compute and analyze the transforming cost of gas in Tehran Gas Company of Iran, using the ABC model. Traditional costing systems employed within the Iranian gas industry provide little information that is useful for making resource allocation and control decisions. The conventional virtue of ABC is that it results in cost determinations that better capture the full measure of a service's cost. This is achieved mainly by tying overhead allocations to the factors with which the overhead most closely varies. It was apparent from the ABC analysis that various regions do not consume overhead costs on a volume basis as represented by their current TCA system and

valuable overhead cost driver information was obtained. Our study was premised on the notion that cost information is an essential ingredient of cost control and setting price. For example, in this study, sustaining and subscribers activities used eighty percent of the Tehran Gas Company resources and the remaining 20 percent is consumed by other activities. Indeed, ABC can provide interesting insights into the costs of programs and activities for government managers. The authors believe that one of the main contributions of ABC in governments and not-for-profits may be in encouraging the entity to establish the rudiments of a management-oriented accounting system. The authors suggest that further research is needed about using ABC in the oil and gas industry such as "an ABC model for gas oil and benzene gas" and using other cost management techniques in governments and not-for-profits.

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