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Cost Structure Analysis of Selected Oil and Natural Gas Companies in India

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Abstract:

Cost benefit analysis is a crucial issue for corporate world today. Analysis of cost is necessary for comparison over the years for cost control and cost planning. The present study attempts to analyse the cost structure of the selected oil and natural gas companies in India. To analyse the cost structure of each companies mean, standard deviation, covariance and ANNOVA have been applied. Some of the major cost components are taken for this research, like Raw materials consumed, power and fuel and Salaries and wages. Each cost component has been expressed as a percentage of Net sales. The study reveals that the cost structure of sample companies was not uniform and varies company to company. The result shows the difference in the cost component to net sales in the selected oil and natural companies were significant.

Keywords: Cost-benefit analysis, cost of production, cost structure, cost component.

1. Introduction

Energy is one of the most fundamental parts of our universe. Among the various energy present in the world most notable energy sector, which has more demand in India are oil and natural gas. It enabled for the birth of numerous oil and natural gas companies in India. India has been among the fastest growing economies of the world. It is targeted that GDP growth will be 1.22% in 2015. India's energy demand is expected to grow concurrently. India is expected to be the 3rd largest energy consumer by 2025 after USA and China with favourable economic and social developments. At present India stands as a 4th largest energy consumer in the world. The demand for oil is met by 75% of imports, whereas natural gas is concerned largely met through domestic production with imports contributing around 30% of the total gas consumption. Indian oil companies having branches in 25 countries in the world. India stands 6th largest in the world for oil refining capacity. It is proved in the beginning of 2014 that 5.7 billion barrels of oil reserves in the western parts of the country and 47 Tcf of proved natural gas reserves in the eastern coast of India to meet recent years demand. India is soon emerging as a leading exporter of refined petroleum products in the world.

1.1. Statement of Problem

The profitability of the business depends on the cost incurred for the production of goods, if the cost increases, the profit of the business is reduced and ultimately the business may go to the liquidation stage. Moreover the future development programme of the company can be designed according to the expenses and investment level. Future budgeting plan is based on the cost aspect of the companies. Therefore, the analysis of the cost structure of the selected oil and natural gas companies in India gets importance in the present day context.

1.2. Objectives of the Study

The following are the main objectives of the study:

- To identify the need and scope of the cost structure in selected oil and natural gas companies in India.
- To analyse the cost structure of selected oil and natural gas companies in India.
- To find out the impact of cost of energy sources against profitability.
- To offer valuable suggestion to manage the cost control of selected oil and natural gas companies in the competitive business world.

1.3. Scope of the Study

The study aims to make an analysis of the cost benefit of large scale oil and natural gas companies in India. The study has used the cost facts of the selected companies from 2004-05 to 2013-14. The scope of the cost structure is very wide and the study is based on accounting information.

2. Methodology

The present study is based on secondary data and is collected from the compilation made by the money control, annual reports of particular selected companies, annual report of ministry of oil and natural gas for a period of 10 years starting from 2004-05 to 2013-14. The following are the tools used to analyze the collected data.

- Arithmetic Mean (X)
- Standard Deviation (S.D)
- Co-efficient of Variation (C.V)
- Analysis of Variance (ANOVA)

2.1. Sampling Design

The oil and natural gas companies have been selected on the basis of size. Those companies which have invested more than 30,000 crore in total assets during the year 2013-14 have been selected and they have been listed below.

| Sample Companies | | |
|------------------|---|-------------------------------|
| Sl. No. | Company Name | Total Assets as on 31.03.2014 |
| 1 | GAIL (India) Limited | 51,321.36 |
| 2 | Oil and Natural Gas Corporation Limited | 2,20,651.67 |
| 3 | Indian oil corporation | 1,58,016.09 |
| 4 | Bharat Petroleum Corporation Limited | 53,385.12 |
| 5 | Hindustan Petroleum Corporation Ltd., | 61,309.46 |
| 6 | Oil India Ltd., | 30,628.13 |

Table 1

2.2. Hypotheses of the Study

The selection of the topic is made with a view to evaluate the cost structure of the selected oil and natural gas companies in India during the study period from 2005-06 to 2013-14. The following hypotheses are formulated to test the cost structure of the sample companies are uniform.

- H1: There is no significant difference in the ratio of raw material consumed to net sales
- H2: There is no significant difference in the ratio of Power and fuel cost to net sales
- H3: There is no significant difference in the ratio of Wages and salaries cost to net sales

3. Analysis and Interpretation of Data

3.1. Ratio of Raw Material Consumed to Net Sales

Raw material cost has to be ascertained for effective control and to take managerial decision.

| RAW MATERIAL COST AS PERCENTAGE OF NET SALES | | | | | | | (Values in %) |
|--|--------|---------|--------|--------|--------|--------|------------------|
| YEAR | GAIL | ONGC | IOC | BPCL | HPCL | OIL | Industry Average |
| 2004-05 | 64.35 | 11.00 | 87.97 | 94.16 | 90.2 | 0.13 | 57.96 |
| 2005-06 | 65.58 | 7.47 | 90.81 | 94.46 | 94.86 | 0.1 | 58.88 |
| 2006-07 | 69.93 | 10.80 | 88.98 | 91.75 | 92.13 | 0.09 | 58.94 |
| 2007-08 | 66.15 | 11.54 | 90.14 | 92.18 | 95.26 | 0.08 | 59.22 |
| 2008-09 | 72.01 | 14.18 | 89.02 | 90.86 | 91.16 | 0.06 | 59.54 |
| 2009-10 | 70.53 | 0.48 | 88.71 | 94.45 | 92.34 | 0.06 | 57.76 |
| 2010-11 | 73.01 | 0.43 | 89.88 | 92.88 | 93.17 | 0.06 | 58.23 |
| 2011-12 | 76.49 | 0.37 | 88.65 | 93.28 | 92.65 | 0.05 | 58.58 |
| 2012-13 | 76.52 | 0.23 | 90.25 | 93 | 91.97 | 0.06 | 58.67 |
| 2013-14 | 80.12 | 0.11 | 88.31 | 92.32 | 92.18 | 0.05 | 58.84 |
| MEAN | 71.469 | 5.661 | 89.272 | 92.934 | 92.592 | 0.074 | 58.667 |
| S.D | 4.951 | 5.5482 | 0.8897 | 1.136 | 1.456 | 0.0245 | 25.5557 |
| C.V | 6.927 | 98.0086 | 0.9967 | 1.222 | 1.5727 | 33.211 | 43.56061 |

Table 2

| ANOVA-TEST | | | | | |
|---------------------|----------|----|----------|----------|----------|
| Source of variation | SS | Df | MS | F | F Crit |
| Between groups | 96684.66 | 5 | 19336.93 | 1754.948 | 2.386069 |
| Within groups | 595 | 54 | 11.01852 | | |
| Total | 97279.66 | 59 | | | |

Table 2(a)

Source: Computed

*Significant at 5% level.

The ratio of raw material consumed to net sales has been presented in Table 2. The average raw material cost to net sales ratio of the entire study was 58.66 percent, whereas the average raw material cost of BPCL was 92.93 percent, which was highest ratio among the units under the study. While the raw material cost of OIL was 0.074 percent, which was lowest ratio among all units under study. The average raw material cost of HPCL, IOC, GAIL and ONGC were 92.59, 89.27, 71.46 and 5.66 percent respectively. Whereas the coefficient of variation (C.V) of ONGC was 98.00 percent, which was highest variation among the units under the study, while the C.V of OIL was 0.99 percent, which was the lowest variation among all units under study. The C.V of OIL, GAIL, HPCL and BPCL were 33.211, 6.92, 1.57 and 1.22 percent respectively.

3.1.1. Analyse of Variance- Ratio of Raw Material Consumed to Net Sales

- Ho: There is no significant difference in the ratio of raw material consumed to net sales among the sample companies.

F test has been applied to test the significance of variance of the ratio of raw material consumed to net sales among the sample companies under the study. Table 2(a) shows that the calculated value of 'F' ratio comes to 1754.94 between the companies. The table value of 'F' at 5 percent level of significance for V1=5 and V2=54 are 2.38. The calculated value of 'F' is more than the table value. Therefore, hypothesis is rejected. This shows the difference in the ratio of raw material consumed to net sales in the companies under the study were significant.

3.2. Ratio of Power and Fuel Cost to Net Sales

Electricity and other fuel expenses have been considered under this head. Ratio of power and fuel cost to net sales has been presented in Table 3

| POWER AND FUEL COST AS PERCENTAGE OF NET SALES | | | | | | | (Values in %) |
|--|----------|----------|----------|----------|----------|----------|------------------|
| YEAR | GAIL | ONGC | IOC | BPCL | HPCL | OIL | Industry Average |
| 2004-05 | 2.94 | 0.46 | 0.20 | 0.03 | 0.19 | 2.33 | 1.02 |
| 2005-06 | 3.48 | 0.41 | 0.19 | 0.06 | 0.18 | 1.46 | 0.96 |
| 2006-07 | 4.76 | 0.57 | 0.19 | 0.07 | 0.18 | 0.93 | 1.11 |
| 2007-08 | 4.04 | 0.53 | 0.20 | 0.06 | 0.18 | 0.77 | 0.96 |
| 2008-09 | 3.64 | 0.43 | 0.19 | 0.05 | 0.15 | 0.64 | 0.85 |
| 2009-10 | 3.64 | 0.43 | 0.42 | 0.19 | 0.44 | 0.54 | 0.94 |
| 2010-11 | 2.99 | 0.42 | 0.62 | 0.31 | 0.46 | 0.21 | 0.83 |
| 2011-12 | 2.66 | 0.41 | 0.99 | 0.34 | 0.51 | 0.39 | 0.88 |
| 2012-13 | 2.62 | 0.4 | 1.23 | 0.38 | 0.53 | 0.28 | 0.96 |
| 2013-14 | 2.91 | 0.45 | 1.35 | 0.46 | 0.29 | 0.34 | 0.96 |
| MEAN | 3.368 | 0.451 | 0.558 | 0.195 | 0.311 | 0.789 | 0.945333 |
| S.D | 0.643922 | 0.053188 | 0.441697 | 0.154612 | 0.147949 | 0.623257 | 0.07963 |
| C.V | 19.11883 | 11.79342 | 79.15712 | 79.28842 | 47.57213 | 78.99325 | 8.423526 |

Table 3

| ANOVA-TEST | | | | | |
|---------------------|----------|----|----------|----------|----------|
| Source of variation | SS | Df | MS | F | F Crit |
| Between groups | 72.53525 | 5 | 14.50705 | 74.83547 | 2.386069 |
| Within groups | 10.46804 | 54 | 0.193853 | | |
| Total | 83.00329 | 59 | | | |

Table 3(a)

Source: Computed

*Significant at 5% level.

The average power and fuel cost to net sales ratio of the entire study was 0.945 percent. The GAIL had highest ratio of 3.36 percent whereas BPCL had lowest of 0.19 percent of average power and fuel cost. The average power and fuel cost to net sales ratio of OIL, IOC, ONGC and HPCL were 0.789, 0.55, 0.45 and 0.311 percent respectively. The co-efficient of variation (C.V) of BPCL was 79.28 percent, which was the highest variation among the units under the study. While the C.V of ONGC was 11.79 percent, which was the lowest variation among the units under this study. The C.V value of IOC, OIL, HPCL and GAIL were 79.15, 78.99, 47.57 and 19.11 percent respectively.

3.2.1. Analyse of Variance- Ratio of Power and Fuel Cost to Net Sales

- Ho: There is no significant difference in the ratio of power and fuel cost to net sales among the sample companies.

'F' test has been utilized to test the significance of variance of power and fuel cost to net sales among the sample companies under the study. Table 3(a) reveals that the calculated value of 'F' ratio comes to 74.83 between the companies. The table value of 'F' at 5 percent level of significance for V1=5 and V2=54 are 2.38. The calculated value of 'F' is more than the table value. Therefore,

hypothesis is rejected. This shows the difference in the ratio of power and fuel cost to net sales in the companies under the study were significant.

3.3. Ratio of Wages and Salaries Cost to Net Sales

The ratio of wages and salaries cost to net sales has been shown in Table 4.

| WAGES AND SALARIES COST AS PERCENTAGE OF NET SALES | | | | | | | (Values in %) |
|--|-------|---------|---------|----------|----------|---------|------------------|
| YEAR | GAIL | ONGC | IOC | BPCL | HPCL | OIL | Industry Average |
| 2004-05 | 1.51 | 5.28 | 1.31 | 1.37 | 1.18 | 13.97 | 4.1 |
| 2005-06 | 1.53 | 5.79 | 1.06 | 1.17 | 0.9 | 11.8 | 3.7 |
| 2006-07 | 1.88 | 6.54 | 1.21 | 1.04 | 0.81 | 11.19 | 3.77 |
| 2007-08 | 2.6 | 7.26 | 1.18 | 1.18 | 0.83 | 15.92 | 4.82 |
| 2008-09 | 2.41 | 6.40 | 1.85 | 1.4 | 0.9 | 16.81 | 4.96 |
| 2009-10 | 2.47 | 8.79 | 2.13 | 1.76 | 1.49 | 12.47 | 4.85 |
| 2010-11 | 2.31 | 8.55 | 1.94 | 1.82 | 1.47 | 13.01 | 4.85 |
| 2011-12 | 1.78 | 7.90 | 1.24 | 1.07 | 0.88 | 19.31 | 5.36 |
| 2012-13 | 1.81 | 10.9 | 1.61 | 1.15 | 1.21 | 17.6 | 5.71 |
| 2013-14 | 1.57 | 11.53 | 1.38 | 1.11 | 0.90 | 20.35 | 6.14 |
| MEAN | 1.987 | 7.894 | 1.491 | 1.307 | 1.057 | 15.243 | 4.82983 |
| S.D | 0.398 | 1.98032 | 0.34964 | 0.265859 | 0.247873 | 3.06053 | 0.75440 |
| C.V | 20.05 | 25.0864 | 23.4501 | 20.34116 | 23.45061 | 20.0782 | 15.6196 |

Table 4

| ANOVA-TEST | | | | | |
|---------------------|----------|----|----------|----------|----------|
| Source of variation | SS | df | MS | F | F Crit |
| Between groups | 1636.973 | 5 | 327.3946 | 129.0297 | 2.386069 |
| Within groups | 137.0174 | 54 | 2.537359 | | |
| Total | 1773.99 | 59 | | | |

Table 4(a)

Source: Computed

*Significant at 5% level.

From the above table it is clear that the portion of wages and salaries cost to net sales is very low. The average wages and salaries cost to net sales ratio of the entire study was 4.82 percent, whereas the average wages and salaries cost to net sales ratio of OIL was 15.24 percent, which was the high ratio and ratio of HPCL was 1.05 percent, which was lowest among all the units under this study. The average wages and salaries cost to net sales ratio of ONGC, GAIL, IOC and BPCL were 7.89, 1.98, 1.49, and 1.30 percent respectively. Whereas, the co-efficient of variation (C.V) of ONGC was 25.08 percent, which was the highest variation among the units under the study. While the C.V of GAIL was 20.05 percent, which was the lowest variation among the units under this study. The C.V value of IOC, HPCL, BPCL and OIL were 23.45, 23.45, 20.34 and 20.07 percent respectively.

3.3.1. Analyse of Variance- Ratio of Wages and Salaries Cost to Net Sales

- Ho: There is no significant difference in the ratio of wages and salaries cost to net sales among the sample companies.

To test the significance of variance of wages and salaries cost to net sales among the sample companies, 'F' test has been used in this study. Table 4(a) exhibits that the calculated value of 'F' ratio comes to 129.02 between the companies. The table value of 'F' at 5 percent level of significance for $V_1=5$ and $V_2=54$ are 2.38. The calculated value of 'F' is more than the table value. Therefore, hypothesis is rejected. This explores the difference in the ratio of wages and salaries cost to net sales in the companies under the study were significant.

4. Limitation of the Study

The study is subject to the following limitations:

- The study period is restricted to 2004-05 to 2013-14 only.
- This study is based on secondary data taken mainly from annual reports and money control.
- The present study is mainly based on ratio analysis, which has its own limitations.
- This study has focused only to large scale companies. so, it could not be generalized to small and medium size companies in India.

5. Conclusion

From this analysis, we have concluded that the cost structure of sample companies were not uniform and vary company to company. The mean ratio of raw material cost as percentage of net sales in BPCL, power and fuel cost as percentage of net sales in GAIL and wages and salaries cost as percentage of net sales in OIL were above the industry average. Hence, these companies should give proper attention to reduce the cost by adopting the technology of the companies where the cost of production is low.

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