

STRATEGIC COSTING IN THE VALUE CHAIN OF PETROLIUM PRODUCTS IN NEPAL

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Abstract

The main purpose of this study is to examine the costing system of petroleum products in Nepal. Specifically, it aims at measuring the value chain analysis of Nepal Oil Corporation. The study is mostly based on secondary data while primary data is also used to reinforce the results of secondary data analysis. Import and sales, monthly price adjustment, cost charge on chain and government policies from 2003 to the end of 2012 were used in the study. This research comprises both qualitative as well as quantitative nature, so descriptive, analytical and applied research designs are used. In order to define descriptive research design, various types of secondary data are used. Primary data is used for applied research part. Similarly, qualitative data is analyzed by five points Likert. Descriptive research is essentially a fact finding approach relative largely to present and abstracting generalization by the cross section study of the current situation. Analytical approach is followed to parametric and non-parametric test of data. The primary and secondary data has collected to attain the objectives of research from NOC; findings also indicated that Strategic costing system reliability has tested in the analysis and finds that VCC system is more reliable than NOC costing system of NOC. If the NOC apply VCC system, nearly cost of petroleum products decrease by 13% to 17% on different products on comparison with international price. These applications of system reduce the cost of petroleum products and minimize the loss of NOC and burden of government and consumer of petroleum products.

1. Introduction

Nepal Oil Corporation (NOC) was established in January 1970 by the Government of Nepal as a state-owned trading company to deal with the import, transportation, storage and distribution of various petroleum products in the country. NOC, headquartered in Kathmandu, has 5 regional offices and also Branch Offices, Fuel Depots and Aviation Fuel Depots with total storage capacity of 71,558 Kilolitres (KL) and around 600 employees. Nepal is becoming more dependent on petroleum products for meeting its energy requirement. The demand of products like MS, HSD, SKO, ATF and LPG is about 1.2 million ton (MT) per annum with annual increase by 20%. Petroleum products constitute about 11% of total energy consumed in Nepal. The nearest port in India is Haldia (Kolkata) which is about 900 km from nearest international border. The transportation from nearest sea port to Nepal is the main constraint for import of POL from third country. All the petroleum products consumed in Nepal are procured and imported from Government of India (GOI) undertaking national oil company, i.e. Indian Oil Corporation Ltd (IOC) under a 5 years' Contract Agreement signed on 31st March 2007. NOC uplifts petroleum products as per its requirement from IOC's 6 nearest refineries and depots situated in eastern and northern part of India. The transportation from IOC locations to NOC depots and to retail outlets is done by Tank Trucks. To meet the increasing demand, a MOU between IOC and NOC for construction of cross border Petroleum Product Pipeline from IOC's depot (Raxaul) to NOC's depot (Amlekhgunj) has been signed. The Detailed Feasibility Report (DFR) of the proposed pipeline has also been prepared and the construction/ investment modalities are under discussion between the companies.

Objectives of the study

Nepalese economy is growing, and with this growth comes higher energy consumption and greater pressure on the country's energy resources. At present, demand for energy exceeds supply, and power outages and

planned power cuts (euphemistically termed “load-shedding”) are common. In addition to the economic costs, energy shortages can foster political instability.

This statement examine the NOC value chain (Nepal petroleum value system), and consider the contribution of individual firms to social value creation. Although all stages of the NOC value chain will be discussed, there is a deliberate emphasis on upstream operations. It describes the petroleum sector value chain and briefly discusses key drivers of value creation in the sector, illustrated by empirical data on exploration and production activities. It also describes the individual stages of the value chain of petroleum products in Nepal

- ✓ To find the strategic costing system of petroleum products.
- ✓ To calculate the corresponding costs of those activities, and evaluate the distribution cost and costing system along with the chain.
- ✓ To examine the value chain of petroleum products.

Methodological aspects

The research study analyzes the impact of strategic costing in the value chain of petroleum products in Nepal. Research design is the plan and strategy of research to attain research objectives in the study. This research comprises both qualitative as well as quantitative nature, so descriptive, analytical and applied research designs are used. In order to define descriptive research design, various types of secondary data are used. Primary data is used for applied research part. Similarly, qualitative data is analyzed by five points Likert. Descriptive research is essentially a fact finding approach relative largely to present and abstracting generalization by the cross section study of the current situation. Analytical approach is followed to parametric and non-parametric test of data. The primary and secondary data has collected to attain the objectives of research from NOC. This study has developed the regression model to examine the relationship among dependent and independent variables.

Table 1: Detail of response

No.	Details	Status	Questionnaire distributed	Questionnaire returned	Percentage of response received
1.	Employees of NOC	NOC	30	25	83.33%
2.	Distributors' of NOC	Public	30	24	80.00%
3.	Manufacturer	Public	30	19	63.33%
4.	Service sector consumer	Consumers	30	23	76.66%
5.	Consumers	personal	50	38	76.00%
	Total		170	129	75.88%

Analysis and presentation of data

Nepal oil Corporation also uses traditional costing system for price determination of petroleum products in Nepal which is outdated costing system. Current market price of petroleum products in Nepal under traditional costing system.

Table 2: Traditional costing system of petroleum products on February 14, 2013

Nepal Oil Corporation (Traditional cost pricing)						
Details	MS/ liter	HSD/ liter	SKO /liter	ATF/liter		LPG per cylinder
				National	international	
Purchase price from IOC	70.06	75.58	75.1 2	73.74	73.74	1577.54
Add: Government VAT	33.89	15.93	2.04	16.27	0.37	250.68
: interest	1.80	1.80	1.80	1.80	1.80	25.56
: Carriage	2.19	2.19	2.19	2.23	2.23	105.81
: Technical loss	0.94	0.58	0.50	0.55	0.47	1.39
: Adm. expenses	0.50	0.50	0.50	0.50	0.50	7.10
: Dealer expenses	1.27	0.87	1.03	--	--	50.00
: Dealer commission	2.47	1.75	1.97	--	--	56.00
Total cost	113.11	99.20	85.1 5	95.10	79.12	2074.08
Add: profit (Loss)	9.89	(0.20)	13.8 5	24.90	29.63	(604.08)
Retail price	123.0	99.00	99.0 0	120	108.75	1470

Table 3: NOC based costing system of petroleum products on February 14, 2013

products Details	MS	HD	SKO	ATF	ATF international	LPG
Purchase cost from international market	Rs. 60.83	Rs. 60.83	Rs. 60.83	Rs. 60.83	Rs. 60.83	Rs. 1425
Additional cost	--	2.75	3.25	4.00	4.00	
Government tax						250.68
13% vat	7.90	7.90	No			
Custom	15.02	2.00	2.00	16.27	0.27	
Road tax	4.00	2.00	No			
Pollution	0.5	0.50	No			
: interest	0.99	0.99	0.99	0.99	0.99	No
: Carriage on	1.50	1.50	1.50	1.50	1.50	65
: Technical loss	0.35	0.26	0.26	0.26	0.26	1.39
: Adm. expenses	0.23	0.23	0.23	0.23	0.23	3.00
: Dealer expenses	1.27	0.87	1.03	--	--	50.00
: Dealer comm..	2.47	1.75	1.97	--	--	56.00
Total cost	95.06	81.58	72.06	84.08	68.08	1851.07
Add: profit (Loss)	27.94	17.42	26.94	35.92	40.67	(381.07)
Retail price	123.0	99.00	99.00	120	108.75	1470

Table \$: NOC Total cost under NOC costing and VCC
Total cost under NOC costing and VCC

Details	Petrol	Diesel	Kerosene	Aviation national	Aviation international	LPG per cylinder
Total cost (traditional)	113.11	99.20	85.15	95.10	79.12	2074.08
Total cost (ABC)	95.06	81.58	72.06	84.08	68.08	1851.07
Difference in cost	18.05	17.62	13.09	11.02	11.04	223
Difference %	16%	18%	15%	12%	14%	11%

Table 5: Price of petroleum products

Price of petroleum products

Year	Petrol (MS) per liter in Rs.	Diesel (HSD) per liter in Rs.	Kerosene(SKO) Per liter in Rs.	Aviation(ATF) Per liter in Rs.	LPG in per cylinder
2012	125	99	99	120	1470
2011	97	68	68	100	1415
2010	85	58	58	75	1325
2009	80	77	57	70	1250
2008	100	77	55	100	1250
2007	73	70	65	72	1125
2006	67	53	47	55	1200
2005	62	53	47	48	900
2004	56	36	30	46	750
2003	54	28	24	33	700

The table shows the price per liter of petroleum products and LPG per cylinder in Nepal from 2003 to the period of 2012 i.e. for 10 years. Calculation of average price and standard deviation of price for the period of 10 years

Statistics	price of petrol in Rs.	Price of diesel in Rs.	Price of kerosene in Rs.	price of LPG in Rs.	price of aviation in Rs.
Mean	74.75	55.00	48.92	1048.75	64.58
Std. Deviation	23.630	24.882	23.658	321.694	30.390

Table 6: Cost of petroleum products under VCC

Year	Petrol (MS) per liter in Rs.	Diesel (HSD) per liter in Rs.	Kerosene(SKO) Per liter in Rs.	Aviation(ATF) Per liter in Rs.	LPG in per cylinder
2012	95.06	81.58	72.06	84.08	1851
2011	82.12	75.56	65.00	60.45	1375
2010	73.20	63.45	55.14	49.34	1355
2009	55.75	50.13	47.89	44.43	11265
2008	46.34	40.31	39.32	38.31	1080

2007	51.57	46.30	37.67	38.67	970
2006	43.54	38.45	35.08	37.56	1190
2005	39.30	35.76	32.43	34.74	995
2004	38.55	31.24	29.40	29.42	805
2003	34.43	29.12	24.32	23.78	775

Summary profile of respondents on a five Likert scale

The survey questionnaire were generated with a view to obtain self reported attitude of respondents, '5' denotes extremely agree and '1' denotes extremely disagree. The survey rating of respondents' opinion of value chain of petroleum products are listed in their respective sections.

Table 7: Weaknesses and strengths of Nepal Oil Corporation on a scale of 1 to 5

Nepal Oil corporation	Weakness			Strength	
	1	2	3	4	5
Policy of NOC				✓	
Petroleum resource			✓		
Pricing	✓				
Distribution		✓			
Transportation cost				✓	
Policy of government				✓	
Quality of petroleum		✓			
Tax system					✓
Supply of petroleum		✓			
Price adjustment	✓				
Employees benefit					✓
Customer satisfaction			✓		
Dependency					✓
Public awareness	✓				

The mean values of respondents ranged from 2.58 to 4.13. No factors mean values scores fall into the extremely agree (> 4.55) and extremely disagree (< 1.50) categories. This may be due to more natural indications on the part of respondents to avail extremes of subjective option than to a categorical absence of any extremely agree and disagree factors. Their scoring absence simply suggests that five point Likert scale was probably attempting to measure differences in opinion that were too subtle of the extremes and does not invalidate the distinction that were found. Therefore, the scale was reclassified in this study in moderately high agree band with mean score (3.65 – 4.50), moderately average band with mean score (2.51 – 3.75) and moderately disagree band (1.51 – 2.50).

Principal component analysis (Communalities analysis)

The sum of the squared factor loadings for all factors for a given variable (row) is the variance in that variable accounted for by all the factors, and this is called the communality. The communality measures the percent of variance in a given variable explained by all the factors jointly and may be interpreted as the reliability of the indicator. If the communality exceeds 1.0, there is a spurious solution, which may reflect too small a sample or the researcher has too many or too few factors.

. All five extracted components account for 90.82% of the variance in variable y1 ($h^2 = 0.9082$) for public needs and respectively to the entire survey questionnaire. And all communalities factor meet the standard criteria that by all the factors jointly and may be interpreted as the reliability of the indicator.

Major findings

Based on the analysis of data, the major findings of the study are summarized as follows

- NOC has lower cost than purchase from international market instead from IOC by Rs. 9, Rs. 12, Rs. 11.04, Rs.8.91, Rs.8.91 and Rs.152.5 respectively on per liter of petrol, diesel, kerosene, aviation domestic, aviation international and LPG per cylinder. It represents 13%, 15.8%, 14.7%, 12.1%, 12.1% and 9.7% respectively on per liter of petrol, diesel, kerosene, aviation domestic, aviation international and LPG per cylinder.
- The same products purchase from the international market it will reduce the government tax. By Rs. 6.47, Rs. 3.39, Rs. 0.04, Rs.0.00, Rs.0.10 and Rs.0.00 respectively on per liter of petrol, diesel, kerosene, aviation domestic, aviation international and LPG per cylinder. It represents 19.1%, 21.3.8%, 2.0%, 0.00%, 27% and 0.00% respectively on per liter of petrol, diesel, kerosene, aviation domestic, aviation international and LPG per cylinder.
- During the period of 10 years import of petroleum products increase by 8.3 % in an average but import of kerosene decrease by nearly 8% every year in an average.
- In terms of reliability the most important figures is the **Alpha** value. The Cronbach's Alpha should be at least 0.70 or higher to retain an item in an "adequate" scale; and many researchers require a cut-off of 0.80 for a "good scale." In this study, the value of Cronbach's Alpha is 0.814, which is greater than 0.70. So, the Likert scale questionnaire is reliable.

Conclusion

The present study has explored the reality of costing system of NOC and its strategy. Strategic costing system reliability has tested in the analysis and finds that VCC system is more reliable than NOC costing system of NOC. These applications of system reduce the cost petroleum products and minimize the loss of NOC and burden of government and consumer of petroleum products. Therefore, NOC suffering form losses due to unproper costing, higher transportation cost, unpropper management, unethical costing, unnecessary political pressure, unavailability of huge amount of capital, dependency, over demand, no alternative, refinery problem, technical knowledge, purchase order problem and other enviromental problem. With the relatively recent realization of global warming, pollution and its resultant adverse effects on the health of the population, the major area of concern is quality and pollution control.

Coming nearer to home, the main area of concern from the perspective of the corporation is that, in spite of the level best efforts on the part of the corporation, a significant level of air pollution has been contributed by vehicular emissions. To safeguard the health of the population, especially that of children, NOC has already made arrangements to supply the unleaded petrol in the kingdom of Nepal and has been controlling the adulteration by joining hands with other concerned government bodies.

Implications

After analyzing the primary and secondary data of NOC, the following recommendations are drawn for strategic costing of petroleum products through value chain analysis.

- ✓ If the cost of petroleum products are based on ABC, price of petroleum products are reduce by nearly 10%
- ✓ Plans, policies, and strategies should be made according to the types of petroleum products.
- ✓ If crude oil purchase directly from the international market, it is beneficial for the country as whole.
- ✓ Interest cost charge on product should be revised by NCO
- ✓ Administrative expenses should be revised to charge on product price.
- ✓ Standard measurement of technical loss to determine by Nepal Oil Corporation.
- ✓ If the Government or NOC has its own refinery, cost decreases as a profit charge by IOC and bulk purchase.
- ✓ Dependency on third country also decreases.

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