



ACTIVITY BASED COSTING IN MANUFACTURING SECTORS OF PUBLIC ENTERPRISES IN NEPAL

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ABSTRACT

Background - *The Activity Based Costing is a costing system which focuses on activities performed to produce products. It is that costing in which costs are first traced to activities and then to products. It is a more precise way to allocate costs to cost objects. It is a costing methodology that identifies activities in an organization and assigns the cost of each activity with resources to all products and services according to the actual consumption by each.*

Purpose – *The purpose of the study is to emphasize the application of ABC in manufacturing sector of Public Enterprises in Nepal.*

Methodology – *Due to the specific nature of the research objectives, descriptive cum empirical research design has been used.*

Findings – *Only few manufacturing industries understand the concept and need of ABC and most of them use only a traditional costing system, i.e. they have not applied the application of ABC*

Practical Implications - *This study has widely tested the approach of ABC to determine the cost of product and services of different manufacturing industries, which shall be a model for other organizations in adopting ABC approach for determining costs for product or services in their organization.*

Keywords– Activity Based Costing

Paper Type – Research paper.

1. BACKGROUND

Activity-Based Costing (ABC) is that costing in which costs begin with tracing of activities and then to producing the product. In other words, it is the process of costing system which focuses on activities performed to produce products. This system assumes that activities are responsible for the incurrence of costs and products create the demand for activities. Costs are charged to products based on individual product's use of each activity.

ABC aims at identifying as many costs as possible to be subsequently accounted as direct cost of production. Any cost that is traced to a particular product via its consumption of activity becomes direct of the product. For instance, in conventional costing system, cost of setup and adjustment time is considered as factory overhead and subsequently assigned to different products on the basis of direct labour hours.

But in Activity-Based Costing, setup and adjustment time is determined for each product and its costs are directly charged to each product. Thus, by emphasizing activities, ABC tries to ascertain the factors that cause each major activity, cost of such activities and the relationship between activities and products produced (Jawahar Lal, 2003).

1.1 Designing ABC System

Four steps are involved in designing ABC system, they are:

- Identifying the major activities that take place in an organization
- Assigning costs to costs pools/cost centers for each activity
- Determining the cost driver for each major activity
- Assigning the cost of activities to products according to the product's demand for activities

The first two steps relate to the first stage and the final two steps to the second stage, (Drury, 2000).

In order to trace overhead costs to manufacturing a product, suitable Cost Drivers should be identified. The following are the few examples of Cost Drivers in Activity-Based Costing:

S.N.	Cost Drivers	Activities
1	Number of receiving order	Ordering
2	Number of deliveries	Delivery
3	Number of Purchase orders	Order Taking
4	Kilometers travelled per delivery	Deliveries
5	Number of customers' visits	Customer Visit
6	Number placing orders for purchase	Placing Orders
7	Number of returning	Items Returns
8	Number Material handling hours	Product Handling
9	Amount of labour cost incurred	Labour Transactions
10	Number of inspections	Inspection
11	Number of physical delivery and receipt of goods	Delivery

The grouping of activities is preferably done using the different levels at which activities are performed. Broadly, activities are classified into:

a. **Unit Level Activities:** Unit Level Activities are those activities which are performed each time a single product or unit is produced. These activities are repetitive in nature. For example, direct labour hours, machine hours, powers etc. are the activities used for each time for producing a single unit. Direct materials and direct labour activities are also unit level activities, although they do not overhead costs. Cost of unit level activity varies with the number of units produced.

b. **Batch Level Activity:** These activities which are performed each time a batch of products or group of identical products are produced. All the units of a particular batch are uniform in nature and in size. The cost of batch level activities vary with the number of batches are ascertained. Machine setups, inspections, production scheduling, materials handling are examples of batch level activities which are related to batches.

c. **Product Level Activities:** These activities which are performed to support the production of each different type of product. Maintenance of equipment, engineering charges, testing routines, maintaining bills of materials etc. are the few examples of product level activities.

d. **Facility Level Activities:** Facility Level Activities are those which are needed to sustain a factory's general manufacturing process. These activities are common to a variety of products and are most difficult to link to product specific activities. Factory management, maintenance, security, plant depreciation are the few examples of facility level activities.

1.2 Importance of ABC System

- a. Costing of products and services under ABC is more accurate and reliable because it focuses on the cause and effect linkage of costs and activities of products and services.
- b. Fixation of price for products and services under ABC is fair and correct because overhead are allocated on the basis of relevant cost drivers
- c. Linkage between cost and activities are clearly identified in ABC and thus provides opportunities to control overhead costs.
- d. Sufficient information can be obtained to make decisions about the profitability of different product lines.
- e. Fair allocations of overheads occupy a considerable portion in the total cost components.

2. PUBLIC ENTERPRISES (PEs) IN NEPAL

Public enterprise means state ownership and operations of industrial, agricultural, financial and commercial undertakings. “Public enterprises are autonomous or semi autonomous corporations and companies established, owned and controlled by the state and engaged in industrial and commercial activities” (Mallay). The basic aims of public enterprises are to provide goods and services to the public at a reasonable rate and social services.

2.1 Characteristics of Public Enterprises:

- Financed by the government
- Managed by the government
- Financial independence though investment is done by the government
- Aim to provide services to various sectors
- Direct channels for using foreign money
- Helpful in implementing government plan
- Autonomous and semi autonomous bodies

2.2 The major objectives of establishing public enterprises in Nepal are:

- to provide basic necessary goods and services to the public at fair prices
- to generate the employment opportunities
- to develop the economic and social infrastructure for sustainable development

- to increase efficiency and independency and to promote economic growth and people's welfare for social justice.
- to earn foreign exchange and utilize foreign aid
- to obtain economic, political and social objectives of the nation by mobilizing available capital and labor resources.

Currently there are 37 PEs operating in Nepal including banks and insurance company, telecommunication, electricity, water supply and manufacturing sectors etc. The contribution of public enterprises to GDP of Nepal has been Rs.270 billions. 37 PEs formed under five different acts operate under full and partial ownership of the Government of Nepal, they are, Company Act, Corporation Act, Special Act related to enterprises, Communication Corporation Act and Banks and Financial Institutions Act (Economic Survey, 2015).

Classification of Public Enterprises in Nepal

S. N.	Sectors	No.
1	Industrial (Manufacturing)	7
2	Business	6
3	Service	7
4	Social	5
5	Utility	3
6	Financial	9
Total		37

3. OBJECTIVES OF THE STUDY

The main objectives of the study are:

- to know whether the public enterprises have applied the approaches of ABC or not
- to investigate the extent to which public enterprises have applied ABC approach

4. METHODOLOGY USED

This study has followed both descriptive and empirical approaches of research. There are thirty seven public enterprises in Nepal, which constitute the population of the study. For this study, only seven public enterprises, i.e. Janakpur Cigarette Factory which was shut down, Nepal Orind Magnesite Pvt. Ltd. Has not started its operation, Nepal Drugs Limited (NDL), Herbal Production and Processing Company Ltd. (HPPC), Dairy Development Corporation (DDC),

Udayapur Cement Factory (UCF) and Hetauda Cement Factory (HCF) have been selected. Selection of sample was made on judgmental basis and focused was given to manufacturing sectors public enterprises.

A questionnaire survey has been conducted for getting the answer of research questions. The questionnaire survey includes twelve questions. Questionnaires were distributed to eighteen top, middle and lower level employees of various departments of public enterprises. In order to increase the reliability and number of responses, personal visits to each and every respondent were made to distribute and collect the questionnaire.

Primary data have been analyzed using different statistical tools, like means, standard deviation, and coefficient of variance. Five scale Likert Scale has been used for analysis in which 1 to 5 indicated from worst to best respectively.

Cronbach's Alpha test has been done to test the reliability of data. Each and every variable has been tested and it was found that every variable reliability test was above 77%

4.1 Respondent's Profile

In this section, characteristics of respondents have been presented first gender wise and then after designations wise.

a) Gender Wise Respondents

Name of the Public Enterprises	Male (No.)	%	Female (No.)	%	Total	%
Nepal Drugs Limited	13	14.44	5	5.56	18	20
Herbal Production and Processing Co.	12	13.33	6	6.67	18	20
Dairy Development Corporation	13	14.44	5	5.56	18	20
Udayapur Cement Factory	14	15.56	4	4.44	18	20
Hetauda Cement Factory	11	12.23	7	7.77	18	20
Total	63	70	27	30	90	100

Majority of respondents were males i.e. 70%. But female respondents were also satisfactory in number i.e. 27 out of 90.

Highest number of male respondents was in UCF and females were in HCF i.e. 14 and 7 in number out of 30 respectively. Similarly lowest number of males respondents were in HCF and female were in UCF i.e. 11 and 4 in number out of 30 respectively.

b) Designations Wise Respondents

Name of the Public Enterprises	Lower Level	%	Middle Level	%	Upper Level	%	Total
Nepal Drugs Limited	6	6.67	7	7.77	5	5.56	18
Herbal Production and Processing Co.	5	5.56	8	8.89	5	5.56	18
Dairy Development Corporation	6	6.67	7	7.77	5	5.56	18
Udayapur Cement Factory	5	5.56	6	6.67	7	7.77	18
Hetauda Cement Factory	7	7.77	6	6.67	5	5.56	18
Total	29	32.23	34	37.77	27	30	90

Majority of respondents were found in middle group 34 out of 90 i.e. 37.77%. Minority respondents fall in the group of upper level was 27 out of 90 i.e. 30%. Respondents in the group of lower level were 29 i.e. 32.23%.

5. ANALYSIS AND FINDINGS

Different sub components of ABC have been analyzed in this section.

5.1 Concept and Knowledge (CK) consists of understanding the knowledge and significance of activity based costing principle in the organizations. This is very important for every PEs for estimating actual costs of products manufactured by them. In this regards three questions were asked to the employees of each PEs

- Do you have the knowledge and significance of ABC as a management accounting technique? (KS)
- Do you consider the cost of switching from traditional costing to ABC? (SF)
- It is possible to update the ABC on a continuous basis (CB)

Name of the Public Enterprises	KS	SF	CB	Total	Mean	S. Dev	C.V.
Nepal Drugs Limited	2.7	3.1	2.8	8.6	2.87	0.21	7.32
Herbal Production and Processing Co.	2.6	3.0	2.7	8.3	2.77	0.21	7.58
Dairy Development Corporation	2.9	3.1	2.9	8.9	2.97	0.12	4.04

Udayapur Cement Factory	2.7	3.1	2.7	8.5	2.83	0.23	8.13
Hetauda Cement Factory	2.8	3.0	2.6	8.4	2.80	0.20	7.14

Concept and Knowledge (CK) has ranged between 2.77 to 2.97. This indicates that all the PEs has not understand the knowledge and significance of ABC principles. Every PEs has been feeling the importance of ABC principles and wants to switch from traditional method to ABC method.

The overall performance of the PEs in terms of concept and knowledge has not been satisfactory. In all the PEs, the value of standard deviation has been below 1 and coefficient of variation has been 4.04% to 8.13%. This clearly indicates the representative nature of the mean calculated.

5.2 Applications of Activity Based Costing (AA) consist of using approaches of ABC in the organizations. This is very important for every PEs for allocating costs using ABC. To assess the applications of ABC three questions were asked to the employees of each PEs

- a. Do you know how ABC is being applied? (KA)
- b. Does your organization apply ABC in allocating costs? (AC)
- c. It is possible for your organization to apply ABC (OA)

Name of the Public Enterprises	KA	AC	OA	Total	Mean	S. Dev	C.V.
Nepal Drugs Limited	2.4	2.3	3.0	7.7	2.57	0.38	14.79
Herbal Production and Processing Co.	2.5	2.4	3.0	7.9	2.63	0.32	12.17
Dairy Development Corporation	2.6	2.5	3.1	8.2	2.73	0.32	11.72
Udayapur Cement Factory	2.5	2.4	3.1	8.0	2.67	0.38	14.23
Hetauda Cement Factory	2.4	2.5	3.0	7.9	2.63	0.32	12.17

Applications of ABC (AA) have ranged between 2.57 to 2.73. All the PEs has not been able to apply the principles of ABC as the value of all the components KA, AC and OA of ABC have been less than 3.

The overall performance of the PEs in applications of ABC has not been satisfactory. In all the cases, the value of standard deviation has been below 1 and coefficient of variation has been 11.72% to 14.79%. This clearly indicates the mean is dependable.

5.3 Major Activities (MA) contain organizational efforts in identifying major activities that take place in the organizations. This is very important for every PEs for determining major activities within the PEs. In this regards three questions were asked to the employees of each PEs

- a. Does your organization put efforts in identifying major activities that take place in the organization? (OE)
- b. Does your organization determine the cost for each major activity? (DC)
- c. Does your organization relate the overhead cost to the activities? (RC)

Name of the Public Enterprises	OE	DC	RC	Total	Mean	S. Dev	C.V.
Nepal Drugs Limited	3.2	2.5	2.6	8.3	2.77	0.38	13.72
Herbal Production and Processing Co.	3.2	2.4	2.5	8.1	2.70	0.44	16.30
Dairy Development Corporation	3.3	2.6	2.7	8.6	2.87	0.38	13.24
Udayapur Cement Factory	3.2	2.5	2.5	8.2	2.73	0.41	15.02
Hetauda Cement Factory	3.3	2.4	2.6	8.3	2.77	0.47	16.97

Major Activities (MA) value has ranged between 2.70 to 2.87. All the PEs has not been able to identify the major activities that take place in the organizations, but they have put efforts in identifying the major activities as its value has been more than 3. The value of other components i.e. DC and RC of major activities have been less than 3 in all PEs.

The major activities of all the PEs have not been satisfactory. In all the cases, the value of standard deviation has been below 1 and coefficient of variation has been 13.24% to 16.97%. This clearly indicates the representative nature of the mean calculated.

5.4 Cost Activities (CA) entails how far organizations accumulate overhead cost for each activity and assign the cost of activities to the product. This is very important for every PEs for determining the cost for each activities using cost driver. To assess the effective cost activities three questions were asked to the employees of each PEs

- a. Does your organization determine the cost driver for each activity? (CD)
- b. Does your organization's put effort to assign cost to cost pool, i.e. a group of individual costs that is allocated to cost objectives? (CCP)

- c. How far your organizations accumulate overhead cost for each activity and assign the cost of activities to the product. (ACP)

Name of the Public Enterprises	CD	CCP	ACP	Total	Mean	S. Dev	C.V.
Nepal Drugs Limited	2.4	2.3	2.7	7.4	2.47	0.21	8.50
Herbal Production and Processing Co.	2.5	2.4	2.6	7.5	2.50	0.10	3.84
Dairy Development Corporation	2.6	2.5	2.9	8.0	2.67	0.21	7.87
Udayapur Cement Factory	2.6	2.5	2.7	7.8	2.60	0.10	3.85
Hetauda Cement Factory	2.5	2.5	2.8	7.8	2.60	0.17	6.54

Cost Activities (CA) value has ranged between 2.47 to 2.67. All the PEs has not been able to accumulate overhead cost for each activity and assign the cost of activities to the product. Value of all the components i.e. CD, CCP and ACP of cost activities have been less than 3 in all the PEs.

The overall cost activities of the PEs has not been satisfactory. In all the cases, the value of standard deviation has been below 1 and coefficient of variation has been 3.84% to 8.50%. This clearly indicates the representative nature of the mean calculated.

5.5 Overall Activity Based Costing

So far, different sub components of ABC have been analyzed. In this section, an attempt has been made to assess the overall ABC keeping in mind all the components.

Name of the Public Enterprises	CK	AA	MA	CA	Total	Mean	S. Dev	C.V.
Nepal Drugs Limited	2.87	2.57	2.77	2.47	10.68	2.67	0.18	6.74
Herbal Production and Processing Co.	2.77	2.63	2.70	2.50	10.60	2.65	0.16	6.04
Dairy Development Corporation	2.97	2.73	2.87	2.67	11.24	2.81	0.14	4.98
Udayapur Cement Factory	2.83	2.67	2.73	2.60	10.83	2.71	0.09	3.58
Hetauda Cement Factory	2.80	2.63	2.77	2.60	10.80	2.70	0.10	3.70

From the above table, it is clear that mean ABC in all the PEs has been less than the average, i.e. 3. In case of DDC and HPPC, it has been the highest, i.e.2.81 and the lowest, 2.65 respectively. This indicates that the performance of all the PEs in terms of ABC has not been satisfactory. In all the cases the value of standard deviation has been below 1 and coefficient of variation has been 3.58% to 6.74% which indicates that the average has been more representative across the PEs as well as across the different components of ABC.

CONCLUSIONS

It is concluded that ABC is a costing system which focuses on activities performed to produce products. It is that costing in which costs are first traced to activities and then to products. This costing system assumes that activities are responsible for the incurrence of costs and products create the demand for activities. Costs are charged to products based on the use of the individual product in each activity. ABC tries to ascertain the factors that cause each major activity, cost of such activities and the relationship between activities and products produced. It is the main accounting tool to measure the cost of products and services of any organizations.

All the public enterprises have not applied the principle of ABC satisfactorily. They aren't very aware about the principles of ABC. So it is recommended to all the PEs to take necessary steps to apply the approaches of ABC in the organizations so that they can be able to achieve the organization goals and objectives.

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