Options for Costing System for Small and Medium Enterprises

Vijay Vanshal
Department of Mechanical Engineering

Tarun Kumar Yadav
Department of Mechanical Engineering

Yashwant Ahirwar
Department of Mechanical Engineering

Abstract- **Indian small scale industries are yet mostly operating on traditional costing systems. The globalization of the market has forced manufacturing organization to reduce their activity costs in order to increase the overall profit. In this scenario the newer methods like multiple head location and activity based costing have given an option to the small and medium enterprises to improve their costing system. But, there is no information available to the management at strategic as well as operational level about the choice and procedure of the newer costing methods. In this paper, a study has been conducted to analysis the costing systems in use and a comparison is done with the newer costing systems, to evaluate the advantages that could be gained by the organizations.**

Keywords – Newer costing methods, cost drivers, two production lines, traditional costing.

I. INTRODUCTION

The increasing globalised competition has put pressure on the small and medium scale enterprises involved in manufacturing in India. In such situation an attempt must be made to evaluate the costing system followed and options available for the improvements. The traditional costing methods are all having foundation of average values pertaining to the indirect costs and the finale cost of the products and / or services. The costing systems are the information systems. The specific type of information such as direct labour hours and unit produced are the prerequisites so that to be of any value.(D. Rasiah)

Proposed by R. Cooper (1988), as an alternative method to traditional cost accounting methods, ABC assigns costs to activities using multiple cost drivers, and then allocates costs to products based on each product's use of these activities (G. Kim, 1997). The risk of fluctuation can be minimized, when we use all the activities associated as cost drivers, resulting estimation of more reliable total cost incurred.

In an ABC system, the total cost of product equals the cost of the raw materials plus the sum of the cost of all value adding to produce it, (A. Gunasegaram, 1998).

In other words, the ABC method models the usage of the organization resources by the activities performed and links the cost of these activities to output, such as products, customers and services, (D. Ben, 2003). In the traditional cost accounting systems, direct materials and labor are the only costs that can be traced directly to the product.

In contrast to traditional cost-accounting systems, ABC systems first accumulate overhead costs for each organizational activity, and then assign the cost of activities to the products, services or customers (cost objects) causing that activity. Activity analysis is the processes of identifying appropriate output measure of activities and resources (cost drivers) and their effects on the costs of making a product or providing a service.

Measurement of direct costs of products and services, material and labour cost can be taken care efficiently by the traditional costing. But it is unable to estimate any relationship between indirect cost and the product cost. On the other hand ABC focuses on indirect costs, setup, engineering overheads etc, (Norhayati, 2004).

II. PROPOSED ALGORITHM

Different from the traditional cost accounting, ABC method opens the block box of costing from the new view; activity would be performed orderly at the feasible cost and profit. Being a wholly new strategic analysis technique, it supports the newly strategic approach, such as business process re-engineering (BPR), total quality management (TQM), just in time, and lean production (LP), etc. By associating cost to the activity, a clear relationship can be established between sources of activity demand and the related costs, Robert Olsen (1998).

A Traditional costing method

Under the traditional method of allocating factory overhead (manufacturing overhead, burden), most of the factory overhead costs are allocated on the basis of just one factor such as machine hours or direct labor hours. In other words, the traditional method implies there is only one driver of the factory overhead and i.e. machine hours (or direct labor hours). Traditional costing utilize a single, volume based cost driver.

(Hilton, 1994), suggested that these types of costing method assign overhead costs to products on the basis of their relative usage to direct labor. Under the traditional method, the cost of performing all the diverse activities will be contained in one cost pool and will be divided by the number of production machine hours.

(Foster and Swenson 1997) suggested that the traditional costing method fundamentally attempts to assign overhead costs directly to product rather than activities first and then these activities to product units. Traditional costing systems only have one or a few indirect cost pools for each department or whole plant. The application of costs in the traditional costing system is normally based on an indirect cost driver and that the indirect cost application are often financially based.

Steps in traditional costing method

1	Identification of indirect cost
2	Estimation of Indirect cost
3	Choose cost drivers
4	Estimation of value for cost drivers
5	Computation of overhead rate
6	Application of overhead rate

Table-1

Anderson and young (1999), Krumweide, (1998), Foster and Swenson (1997).

Formulae used in Traditional costing method. Proposed, by Lere J.C (2000).

Direct lab our hour rate = Total overhead/ total no. Of direct labor hours

Direct labor cost = direct hour rate x no. Of direct labor hour per labor

Overheads = direct labor hour rate x no. of m/c hours

S.no	Activities	Prod. line in (lac)
1	Direct material	X
2	Direct labor	X
3	Overheads	X
4	Total product cost	X

Table-2

In the traditional costing, there is certain amount of estimation in cost allocation. The cost systems do not focus on why or where cost occurred, D.R (2011). Generally, there is little insight into the causes of variances. The reporting methodology is accounting- oriented, inaccurate, not flexible and often not timely.

B Methodology

In this paper, we compare the ABC (activity based costing) method with TCA (traditional cost accounting) method in small manufacturing industries, to gain the advantages of ABC over TCA method in the Tabulation form.

In the traditional costing method, the cost system does not focus on why and where cost occurred, and true cost cannot be calculated by TCA method. In traditional method of cost accounting is inadequate to know the true cost. To overcome this difficulties an ABC method is applied to cost calculation. Activity based costing method is a well-known and often used cost calculation and management method in manufacturing industries. ABC is an economical model that identifies the cost pools or activity centers in an organization and assigns costs to cost drivers based on the number of each activity used. There is no equivalent step in a traditional costing approach.

Steps followed in ABC (Activity based costing) method.

Step 1- Inspection of manufacturing organization:

In ABC (Activity based costing) method, firstly we inspect the manufacturing organization, so that we get how many activities, how many resources are used in this manufacturing organization for further process.

Step 2- Identify the resources of an organization:

In the second stage of ABC method, we identify the resources of organization; resources represent the expenditure of an organization such as production labor, Equipments, various machines, vehicle depreciation, supporting function etc.

Step 3- Identify and define the Activities:

In order to implement ABC, the complete manufacturing process should be divided in two set of activities and we must identify the activities that form the foundation of the system such as engineering, machining, inspection that uses resources. Table-3 shows the example of activities.

Example of Activities

S.no.	Activities
1	Material procurement
2	Inspection
3	Production scheduling
4	Material handling
5	Dispatching of goods
6	M/c operation
7	Production run
8	Set-ups
9	Packing

Table-3

Step 4- Assign cost to activity cost pools

Once the main activities have been defined, a total cost of each activity can be calculated. First, the expense categories related to each activity are identified. For example, the activity cost for "quote preparation" includes costs from various expense categories such as salary, rent, utility, and office supplies. To properly trace the expenses to each activity, cost driver, also called first stage cost drivers, have to be identified for each expense category.

Activities cost

Activities	In (lac)
Set up	X
Machining	X
Packing	X
Engineering	X

Table-4

A few examples of the activities and appropriate cost drivers are stated below:

Activities	Cost drivers
Material procurement	No. Of materials procured
Material handling	Quantity of input material
Dispatch of goods	No. Of dispatches
Inspections	No. Of inspections
Machine operation	Machine hours
Production scheduling	No. Of production scheduling
Production runs	No. Of production run
Set-ups	No. Of set- ups

Table-5

In the second stage, analysis and collection of cost incurred for each cost activity.

For example if inspection cost is Rs.140, 000 for assembling 100 ordinary and 100 automatic cameras. If one ordinary camera needs 2 inspections and one automatic camera need 5 inspections, then find the inspection cost per inspection.

Solution,

Calculation of number of inspection:

No. Of inspection of ordinary cameras = 100cameras x 2 = 200
No. Of inspection of automatic cameras = 100 x 5= 500
Therefore, total no. Of inspections = 200+500= 700

Now, inspection cost per inspection = total inspection costs / no. Of inspection = 140000/700 = Rs.200 per inspection.

Step 5- Calculate the Activity rates for each Activity

In this stage firstly, we calculate the activity rate of each activities, to determine the activity rate for each activity, divide the total cost of each activity by the total expected of activity units to get an overall rate for the activity

Formulae used in ABC method to find the activity rate, Lere J.C., (2000)

1- M/C hour's overhead rate = (m/c overhead cost) / (m/c hours).
2-set up rate -= (set up overhead) / no. of production runs
3-Packing rate-= packing overhead / no. of deliveries.
4- Engg. Rate-=Engg. Overheads/no. of production orders.

By the above calculation we get the activity rate for different production line, such as m/c hours, setup rate, receiving rate, packing rate, engg. rate as shown in table-6

Step 6- Assign cost-to-cost objects using activity rates

In this stage, assign cost to cost object using activity rate can be done based on the amount of the activity for a given job or customer order.

Formulae used find out cost per unit product in ABC method,

1. Machine overheads = m/c hours rate x m/c hours given
2. Set up cost per unit = (setup cost per setup x No. of setup given)/ (no. of Unit per product)
3. packing cost per unit = packing rate x no of Deliveries / no. of unit per prod.
4. Engg. Cost per unit = Engg. Rate x no. of Prod. Order / no .of unit per prod.

By the above calculation we get the cost per unit of product such as m/c cost, setup cost, receiving cost, packing cost and engg.cost per unit as shown in table-6

S. no.	Activities	Prod. line in (lac)
1	Direct materials cost	X
2	Direct labor cost	X
3	M/c overheads	X
4	Setup costs	X
6	Packing costs	X
7	Engg.costs	X
8	Sales and production	X
9	Total costs	X

Table-6

Step 7- Prepare management table

In this stage, finally a management table can be prepared to show the each activity cost per unit, and finally compare the result to TCA method.

S. no.	Activities	Production line in (lac)
1	Direct material cost	X
2	Direct labor cost	X
3	M/c overhead	X
4	Packing cost	X

III. EXPERIMENT AND RESULT

A. Case study

As mentioned in table-7 and table-8 Activity costs data are taken from a manufacturing organization to calculate various costs using traditional costing method and Activity- based costing method. These methods will be compared for the advantages of ABC over TCA method.

S. No.	Overhead costs in (lac)	Total in (lac)
1	Setup costs	75000
2	M/c	1000000
4	Packing	650000
5	Engg.	750000
6	Total	3375000

Table-7

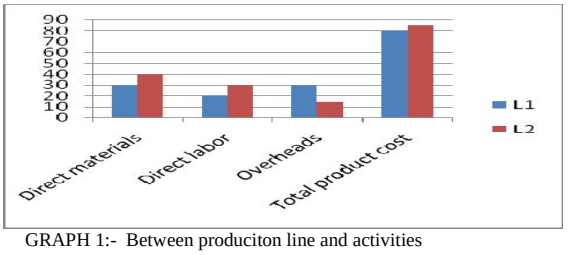
Activities	L1 in (lac)	L2 in (lac)	Total in (lac)
Sales and production units	90.000	30.000	13.5000
Raw materials usages (unit)	10	7	1320000
Direct material cost	30	40	4125000
Direct labor hours	2.5	3	337500
M/c hours	5	3	652500
Direct labor cost	20	30	2850000
No. Of production run	5	10	65.0
No. Of deliveries	18	7	75.0
No. Of production order	45	25	130

Table-8

As mentioned in table -1, the production line costing has been calculated by TCA method

S. No.	Prod. Line	L1 in (lac)	L2 in (lac)
1	Direct materials	30	40
2	Direct labor	20	30
3	Overheads	30	15
4	Total product cost	80	85

Table 9:- Cost analysis of activities in L1,L2, by TCA



GRAPH 1:- Between produciton line and activities

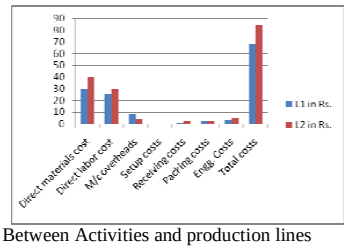
Graph-1 shows the cost for direct materials, direct labor and overheads for different production line such as L1,L2 in the traditional costing method. Base represent the different production line. In the graph-1 , the condition of overheads, the condition of direct materials and the condition of direct labor shows the costing in the different production line.

As mentioned in Table-6, in methodology, the costing for production lines have been calculated by ABC method.

S. No.	Activities	L1 in (lac)	L2 in(lac)
1	Direct materials cost	30.000	40.000
2	Direct labor cost	25.000	30.000
3	M/c overheads	7.6628	4.5977
4	Setup costs	0.0641	0.3846
6	Packing costs	1.7333	2.0222
7	Engg. Costs	2.8846	4.8077
8	Total costs	67.9546	84.3732

Table 10: - Cost analysis of activities for different

Production lines L1, L2



GRAPH 2: - Between Activities and production lines

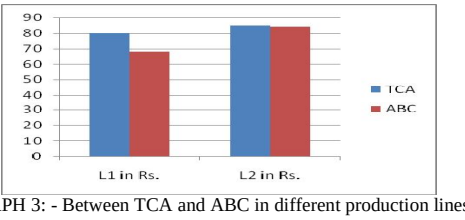
Graph -2 shows the cost per unit of each activity, with the help of ABC for different production lines such as L1, L2 . In the graph-2 the base represents the different activities for different production lines to show the costing of each activity in different production lines.

B. Result

Table-11 shows the obtained costing for different production lines L1, L2, are compared for ABC and TCA methods thus we can see that ABC is beneficial over TCA in the case of cost analysis in different production line.

Prod. Line	L1 in (lac)	L2 in (lac)
TCA	80	85
ABC	67.9	84.3

Table 11: - Comparison between ABC and TCA in term Of cost



GRAPH 3: - Between TCA and ABC in different production lines.

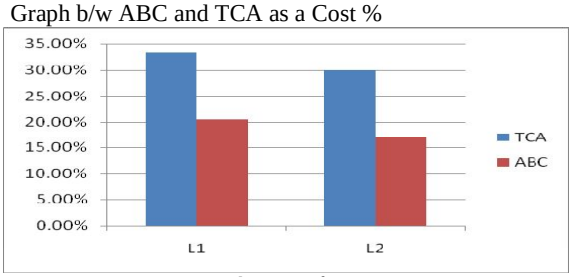
Graph-3 shows the comparison between ABC and TCA in the case of cost analysis. From the graph-3 base represent the production line L1, L2,in comparison of ABC and TCA method. Graph-3 shows the profit of ABC over TCA.
In this section, we first compare the results of the Traditional costing method and Activity based costing. Table-12 shows the total cost of activities in different production line between the ABC and TCA in term of percentage (cost %).

Now percentage of total cost

Prod. line	L1	L2
TCA	33.3%	30.0%
ABC	20.5%	17.04%

Table 12: - Comparison of ABC and TCA in cost %

Graph b/w ABC and TCA as a Cost %



GRAPH 4: - Advantage of ABC over TCA

Graph-4 shows that after comparing the ABC and TCA method, the benefits of ABC are more than TCA, in which we can examine pricing decision. With the help of ABC an organization can probably gets a scale to gain advantages.

IV.CONCLUSION

To optimize the costing in an organization we must know, how a product is produced, how much time is needed to perform an activity and finally how much money performing this task absorbs? In this paper, we compared ABC and TCA methods to optimize the overall costs by reducing the costing for activities. The case study proves the advantages over the TCA method to adopt for optimization of overall costing.

REFERENCES

[1] M.Ozbayrak, A.K. Turker. 2004. " Activity-based cost estimation in push/pull advanced manufacturing system", International journal of production economy,

[2] R.Cooper and R.S. Kaplan. 1988 "How cost accounting distorts product costs", Management accounting,

[3] A. Gunasekaran. 1998 "implementation of activity –based costing in Manufacturing ", International journal of Production Economy.

[4] D.Ben- Arieh, 2003 "Activity based cost Management for design and development stage", International journal of production Economics,

[5] Derya Eren Akyol, 2005 "A Comparative analysis of Activity-based costing and traditioinal costing" World Academy of Science, Engineering and Technology.

[6] Robert Olsen, 1998 " Activity-based costing: A Decision making Tool, December, 1998.

[7] Francesca Bartolacci, 2004 " Activity based costing in Supply chain logistics activities cost Analysis working Paper.

[8] Zoltan Bokor. 2009 "Implementation of Activity based costing in logistics" Acta Technica jaurinensis series Logistica.

[9] Z.Bokor. 2008 "Activity based costing in Logistics" Acta Technica jaurinensis series logistica vol.1 No.2.

[10] Pirttila, T., Hautaniemi,P. 1995 " Activity-based costing and Distribution Logistics Management, International Journal of Production Economics, Vol.41 No. 1-3.

[11] Bokor, Z.2002 "Appling Activity based costing in rail transport. Review of Transport science, vol.52 No. 12.

[12] Kaplan R., Anderson S. 2004, Harvard Business Review "Time-Driven Activity-Based Costing", November, p. 131-138.

[13] Anderson S. W. and Young S.M.1999 “The impact of contextual and process factors on the evaluation of activity based costing systems, Accounting, Organizations and society”.

[14] Cooper R.1990 “ cost classification in unit-based and activity-based manufacturing cost systems” journal of cost Management.

[15] Foster G. and Swenson D.1997, Meaning the success of activity-based cost management and its determinants, Journal of Management Accounting.

[16] Krumwiede K R.1998 The Implementation stages of Activity- based costing and the impact of contextual and organizational factors, Journal of Management accounting Research.

[17] Lere J.C.2002 “Activity- based costing: a powerful tool for pricing, journal o0f business and industrial marketing.