

## **Unit II - Activity Based Costing**

### **Introduction of Activity Based Costing**

Activity based costing (ABC) is an accounting methodology that assigns costs to activities rather than products or services. This enables resources and overhead costs to be more accurately assigned to the products and the services that consume them.

ABC is based on the principle that 'products consume activities.' Traditional cost systems allocate costs based on direct labour, material costs, revenue or other simplistic methods. As a result, traditional systems tend to over-costing and under-costing. Conventional costing systems are built on the assumption that product drives the costs directly. ABC system drives indirect and support expenses, first to the activities and processes and then to products, services, and customers, giving managers a clearer picture of economics of their operations and services.

Activities can be defined as a named process, function, or task that occurs over time and has recognized results. Activities use up assigned resources to produce products and services. Inputs are transformed into outputs under the parameters set by controls performed by the organization's employees and their tools. Activities can be perceived as consumers of resources in production of materials, services, events, or information.

Therefore, the activity-based costing (ABC) system is a method of accounting; use to find the total cost of activities necessary to make a product. The ABC system assigns costs to each activity that goes into production, such as workers testing a product. Many businesses use the cost of goods sold (COGS) to determine how much it costs to create a product. Some businesses take their overhead expenses and allocate them evenly among all products. But because some products use more overhead expenses than others, the cost of making each product is inaccurate under this method. With activity-based costing, you take into consideration both the direct and overhead costs of creating each product. You recognize that different products require different indirect expenses. By assigning both direct and overhead expenses to each product, you can more accurately set prices. And, the activity-based costing process shows you which overhead costs you might be able to cut back on.

For example, you make soap. Soap A requires more overhead, like testing, than Soap B. Using activity-based costing, you assign the right overhead costs to the appropriate products. That way, your overhead is higher for Soap A than B.

### **Meaning of Activity Based Costing**

Activity-Based Costing (ABC) is one in which costs are first identified to activities and then to the products. It is a system which focuses on activities performed to produce products. ABC system assumes that activities that are responsible for the incurrence of costs and products create the demand for activities. Costs are charged to the products based on individual product's use of each activity.

In conventional costing system, costs are first traced not to activities but to an organizational unit, such as department or plant and then to products. Therefore it means under both ABC and Conventional costing system, the second and final stage consists of tracing costs to the product. This type of costing aims at tracing as many as costs as possible to be subsequently accounted as direct costs.

Any cost that is identified to a particular product through its consumption of activity becomes direct cost of the product. For example in traditional costing system, the cost of set up and adjustment time is considered as Factory overhead later assigned to different products on the basis of direct labour hours.

But in case of ABC, set up and adjustment time is determined for each department and its cost is directly charged to each department. Therefore ABC tries to ascertain the factors which are responsible for each major activity, costs of these activities and relationship between activities and products.

### **Activity Based Costing Terms – Cost Objects, Activities, Cost Pool and Cost Drivers**

**1. Cost Objects:** Cost object is anything for which a separate measurement of cost is required. Cost object may be a product (book), a service (airline), a project, a customer, a brand category.

**2. Cost Units:** It is a unit of product, service or time (or combination of these) in relation to which costs may be ascertained or expressed. E.g. – For Power Industry, Cost Unit is Kilo Watt hour (kWh).

**3. Activities:** These consist of the aggregate of different tasks and are concerned with functions associated with cost objects. There are two types of activities-

- a) **Support activities** - Support activities are, for example, schedule production, set up machine, purchase materials, inspect items, customer orders, supplier records etc.
- b) **Production process activities** - Machine products and assembled products are included within this production process.

**4. Cost Pool:** A cost pool is a combination of various indirect costs that have similar cost behaviour. It is another name given to a cost centre and, therefore, an activity cost centre may also be termed as an activity cost pool.

**5. Cost Drivers:** A cost driver is that factor or variable which has a cause and effect relationship with the total cost. The cost driver is the 'cause', and the 'total cost incurred' is the effect of it. If we take an example of fuel cost of running a car, the cost driver (cause) would be 'No. of Kms Run', and the total cost (effect) would be 'total cost of fuel'. The relationship is quite clear. Higher the no. of km run, higher would be the total cost of fuel. In simple terms, the literal definition of cost driver could be 'the driver of cost.' Just like a driver drives the car, a cost driver drives the cost.

**Q)** Let's assume labour is employed to finish a product at Rs.5 per hour. If he works for 8 hours a day, the total cost would be Rs.40 (Rs.5x8). In this example, labour hours i.e., 8 is the cost driver which was multiplied to the rate of Rs.5 to reach a total labour cost of Rs.40.

Most importantly, a cost driver without a cost object is vague. A cost driver is always associated with something. In the given example, labour hour is the cost driver of total labour cost. Or, no. of km run is the cost driver of total fuel cost.

Following are some of the examples of cost drivers

- |                                    |                            |
|------------------------------------|----------------------------|
| i. Machine setups                  | viii. Inventory movement   |
| ii. Purchase orders                | ix. Maintenance reports    |
| iii. Quality inspections           | x. Scrap/rework orders     |
| iv. Production orders (Scheduling) | xi. Machine time           |
| v. Engineering change orders       | xii. Power consumed        |
| vi. Shipments                      | xiii. Kilometres driven    |
| vii. Material receipts             | xiv. Computer-hours logged |

The activity cost drivers can broadly be classified into following three categories:

A. Transaction drivers

B. Duration drivers

C. Intensity drivers.

**A. Transaction drivers** – These include types of transactions which result in overhead costs e.g., purchase orders processed, customer orders processed, inspections performed and the set-ups undertaken, all count the number of times an activity is performed.

**B. Duration drivers** – Mean the amount of time required to perform an activity. Examples of duration drivers are set-up hours and inspection hours.

**C. Intensity drivers** – Refer to drivers which directly charge for the resources used each time as activity is performed. Duration drivers establish an average hourly rate of performing an activity

while intensity drivers involve direct charging based on the actual activity resources relevant to a product.

#### **6. Cost Driver Rate:**

Cost driver rate is the rate at which the cost driver drives the cost. Let's continue the same example and include some additional information. Now, for finding out the total cost incurred on finishing activity in a day, we will use the following formula:

**Cost Driver Rate = Total Cost of Finishing Activity in a Day / Cost Driver Units = 40 Total Cost / 8 Hours a day = Rs.5**

### **Definitions of Activity Based Costing**

In order to overcome the problems faced in traditional approach of overhead distribution, a new and more scientific approach was developed by Cooper and Kalpan known as Activity based costing. The ABC aims to identify the activities which results in currency of the cost. The main focus is on activities performed on a particular product during its production. Thus, activities are the focal point in cost calculation.

- 1) According to Cooper and Kalpan, ABC is defined as, "ABC system calculates the cost of individual activities and assigns cost to cost objects such as product and services on the basis of activities undertaken to produce each product or services".
- 2) According to Horngren, "ABC is a system that focuses on activities and fundamental cost objects and utilizes cost of these activities as building blocks or compiling the cost of other cost objects."
- 3) CIMA defines ABC as, "Cost attribution to cost units on the basis of benefit received from indirect activities". Example – Ordering, handling, quality assurance etc. It can also be defined as "the collection of financial and operational performance information tracing the significant activities of the firm to product costs".

ABC is a special costing model 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 activity. Thus, in ABC, overhead cost is attributed to the cost centre or unit on the basis of number of activities undertaken in production

### **How Activity-Based Costing (ABC) Works**

Activity-based costing (ABC) is mostly used in the manufacturing industry since it enhances the reliability of cost data, hence producing nearly true costs and better classifying the costs incurred by the company during its production process. Activity-based costing (ABC) is a method of assigning overhead and indirect costs—such as salaries and utilities—to products and services.

The ABC system of cost accounting is based on activities, which are considered any event, unit of work, or task with a specific goal. An activity is a cost driver, such as purchase orders or machine

setups. The cost driver rate, which is the cost pool total divided by cost driver, is used to calculate the amount of overhead and indirect costs related to a particular activity.

ABC is used to get a better grasp on costs, allowing companies to form a more appropriate pricing strategy. This costing system is used in target costing, product costing, product line profitability analysis, customer profitability analysis, and service pricing.

The formula for activity-based costing is the cost pool total divided by cost driver, which yields the cost driver rate. The cost driver rate is used in activity-based costing to calculate the amount of overhead and indirect costs related to a particular activity.

## **Objectives of Activity Based Costing**

1. To bring more accuracy in calculation of cost of products and services as compared with traditional costing system, since all products are not produced equally,
  - i. As some products are produced in large batches and some in small batches.
  - ii. As manufacturing overhead costs have increased significantly and they no longer correlate with the productive machine hours or direct labour hours.
2. To understand product and customer cost.
3. To understand profitability based on the production or performing processes.
4. To have a structured analysis in respect of complex processes.
5. To provide wealth of information to the management in order to help in decision making.
6. To eliminate non-value adding activities due to diversity of products.
7. To increase value adding activities since diversity of customer demands are growing rapidly.

## **How to use the ABC system**

Because activity-based costing breaks down the costs that go into creating a product, it has many uses in business.

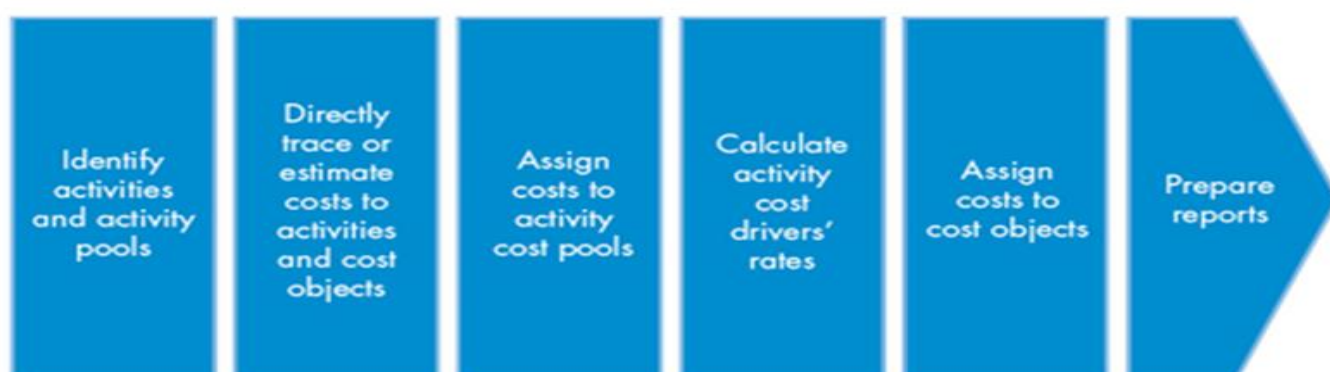
### **1) For small businesses, activity-based costing is great for making overhead decisions and pricing products:**

- i. **Overhead decisions** – The ABC system shows how overhead are used, which helps to determine whether certain activities are necessary for production i.e. If some activities cost more than they should, new methods can be found to do something. Or, steps can be cut out entirely.
- ii. **Product pricing** - The specific allocation of costs also helps to set prices that produce a healthy small business profit margin. If only direct costs which go into the products are known, and other costs are ignored, it could lessen the profit margins.

- 2) **Many large businesses, particularly in the manufacturing sector, use activity-based costing to help them accurately price their offerings.**
- 3) **Customer profitability:** Though most of the costs incurred for individual customers are simply product costs, there is also an overhead component, such as unusually high customer service levels, product return handling, and cooperative marketing agreements. An ABC system can sort through these additional overhead costs and help to determine which customers are actually earning a reasonable profit. This analysis may result in some unprofitable customers being turned away, or more emphasis being placed on those customers who are earning the company its largest profits.
- 4) **Distribution cost:** The typical company uses a variety of distribution channels to sell its products, such as retail, Internet, distributors, and mail order catalogs. Most of the structural cost of maintaining a distribution channel is overhead, so if a reasonable determination of which distribution channels are using overhead is made, decisions to alter the distribution channels used, or even to drop unprofitable channels can be taken.
- 5) **Make or buy:** ABC provides a comprehensive view of every cost associated with the in-house manufacture of a product; so that it can be seen precisely which costs will be eliminated if an item is outsourced, versus which costs will remain.
- 6) **Margins:** With proper overhead allocation from an ABC system, the margins of various products, product lines, and entire subsidiaries can be determined. This can be quite useful for determining where to position company resources to earn the largest margins.
- 7) **Minimum price:** Product pricing is really based on the price that the market will bear, but the marketing manager should know what the cost of the product is, in order to avoid selling a product that will lose company money on every sale. ABC is very good for determining which overhead costs should be included in this minimum cost, depending upon the circumstances under which products are being sold.

## Steps to develop Activity Based Costing

To use activity-based costing, the process for assigning costs to activities must be understood.



- I. **First, identify which activities are necessary to create a product.**
- II. **Then, separate each activity into its own cost pool, which is a group of individual costs associated with an activity. Determine the total overhead of each cost pool. For example, purchasing could be its own cost pool.**
- III. **Next, assign activity cost drivers to each cost pool. Cost drivers are things (e.g., units, hours, parts, etc.) that control the changes in costs. For example, purchasing costs are driven by the number of parts purchased.**
- IV. **Divide the total overhead in each cost pool by the total cost drivers to get your cost driver rate.**
- V. **Lastly, compute how many hours, parts, units, etc. that the activity used and multiply it by the cost driver rate.**

#### **Step # 1. Identifying the Activities:**

The first step in ABC is to identify the major activities which take place in an organisation. The number of activities in production may differ from product to product and organisation to organisation. An activity may be a very small activity but it should justify the cost incurred for it. An activity may be a single activity or combination of several activities. Cost-benefit analysis of each and every activity may be undertaken to judge the worthiness of activity.

#### **Step # 2. Determining Cost Pool/Cost Centres for Each Major Activity:**

Cost pool means grouping of total cost for each major activity. It simply means allocation and apportionment of various costs to a particular activity or group of activities. For example, total cost of placing orders may be grouped under ordering cost.

#### **Step # 3. Determining Cost Driver for Each Major Activity:**

Cost drivers are that activities which determine the cost. These activities result in occurrence of Overhead cost. Thus, cost driver is a factor or an event which results in consequential change in the total cost of the object.

Some of the examples of cost driver are:

- i. Number of setups is cost driver for setup related cost.
- ii. Number of production runs is cost driver for production cost.
- iii. Number of purchase orders is the cost driver for ordering cost.
- iv. Quality inspection is the cost driver for inspection cost.

#### Step # 4. Calculation of Activity Cost Driver Rate:

Next step would be to obtain activity cost driver rate by dividing the total cost of an activity by cost driver as shown below –

Activity driver rate = Total cost of an activity/Cost driver

#### Step # 5. Assigning costs to the cost objects:

The formula for assigning costs to the cost objects is –

$$\text{Costs} = \text{Resources Consumed} \times \text{Activity Cost Driver Rate}$$

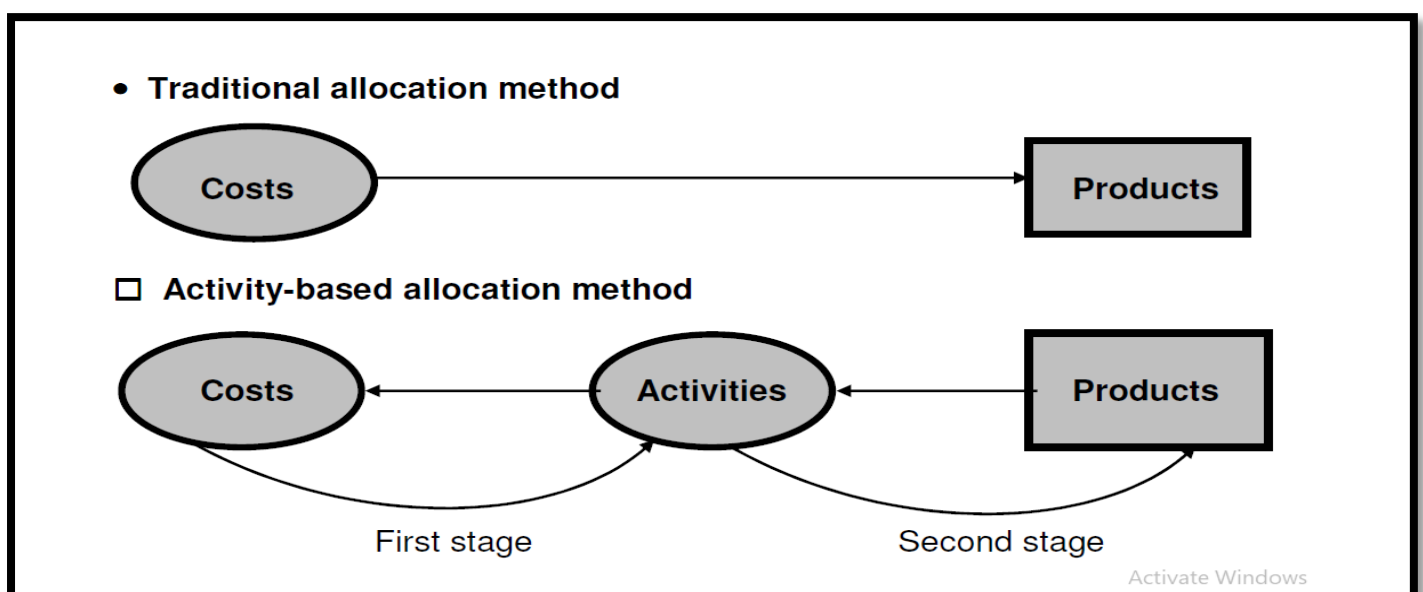
Q1) Consider Company ABC that has a Rs.50,000 per year electricity bill. The number of labour hours has a direct impact on the electric bill. For the year, there were 2,500 labour hours worked, which in this example is the cost driver. Calculating the cost driver rate is done by dividing the Rs.50,000 a year electric bill by the 2,500 hours, yielding a cost driver rate of Rs.20. For Product XYZ, the company uses electricity for 10 hours. The overhead costs for the product are Rs.200, or Rs.20 times 10.

Q2) The total cost of inspection related activity is Rs. 1, 00,000. A batch of product consisting 10 items in a batch requires 10 inspection activities. The cost drives rate will be –

Inspection cost driver rate = Rs. 1, 00,000/10 = Rs. 10,000 per batch.

The inspection related cost to each product will be Rs. 1000 (10000 for a batch of 10 items in a batch). Similarly, cost of other activities will be charged to the product to calculate total cost incurred.

#### Difference between Traditional Costing and ABC Approach





<b>BASIS OF DIFFERENCE</b>	<b>TRADITIONAL COSTING</b>	<b>ACTIVITY BASED COSTING</b>
<b>MEANING</b>	Traditional costing is the allocation of factory overhead to products based on the volume of production resources consumed.	The Activity-Based Costing (ABC) is a costing system, which focuses on activities performed to produce products. ABC is that costing in which costs are first traced to activities and then to products.
<b>COST POOLS</b>	Traditional costing system accumulates costs into facility-wise or departmental cost pools. The costs in each cost pool are heterogeneous- they are costs of many major processes and generally are not caused by a single factor.	ABC system accumulates costs into activity cost pools. These are designed to correspond to major activities or business processes. By design, the costs in each cost pool are largely caused by single factor- the cost driver.
<b>ALLOCATION BASES</b>	Traditional systems allocate costs to products using volume-based allocation bases: units, direct labour input, machine hours, revenue etc.	ABC system allocates costs to products, services and other cost objects from the activity cost pools using allocation bases corresponding to the cost drivers of activity costs.
<b>HIERARCHY OF COSTS</b>	This costing generally estimates all the costs of an organization as being driven by the volume of product or service delivered.	ABC allows for non- linearity of costs within the organization by explicitly recognizing that some costs is not caused by the number of units produced.

COST OBJECTS	Traditional Costing focuses on estimating the cost of a single cost object i.e. unit of product or service.	ABC focuses on estimating the costs of many cost objects of interest: units, batches, product lines, business processes, customers and suppliers.
DECISION SUPPORT	Because of the inability to align allocation bases with cost drivers, leads to the problems of over casting and under casting of costs.	Because of the ability to align allocation bases with cost drivers, provides more accurate information to support managerial decisions.
COST CONTROL	Cost control is viewed as a departmental exercise rather than a cross functional effort.	By providing summary costs of the organizational activities, ABC allows for prioritization of cost management efforts.
COSTING SYSTEM	Traditional costing system is relatively less expensive to implement and maintain.	ABC system is expensive to implement and maintain.
SUITABILITY	Traditional costing is suitable for labour intensive and low overhead companies.	Activity based costing system is suitable for capital-intensive, product-diverse, widely diverse set of operating activities, variation in numbers of production runs, high-overhead companies.
TYPES OF ACTIVITIES	Only two types of activities viz. Unit Level Activities and Facility Level Activities are identified.	All levels of activities in the manufacturing cost hierarchy viz. Unit Level, Batch Level, Product Level and Facility Level are identified.

<p><b>OVERHEAD RATES</b></p>	<p>Overhead Rates can be used to ascertain cost of products only.</p>	<p>Activity Cost Driver Rates can be used to ascertain cost of products and also cost of other cost objects such as customer segments, distribution channels. etc.</p>
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**CONCLUSION**

Traditional costing is the allocation of factory overhead to products based on the volume of production resources consumed. Under this method, overhead is usually applied based on either the amount of direct labour hours consumed or machine hours used. The trouble with traditional costing is that factory overhead may be much higher than the basis of allocation, so that a small change in the volume of resources consumed triggers a massive change in the amount of overhead applied. This is a particularly common issue in highly automated production environments, where factory overhead is quite large and direct labour is close to non-existent.

The Activity-Based Costing (ABC) is a costing system, which focuses on activities performed to produce Products. ABC is that costing in which costs are first traced to activities and then to products. Activity-based costing (ABC) is mostly used in the manufacturing industry since it enhances the reliability of cost data, hence producing nearly true costs and better classifying the costs incurred by the company during its production process.