

Methods and models for measuring costs



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Costs are associated with all types of organizations business, non-business, manufacturing, retail and service. Generally, the kinds of costs that are incurred and the way in which these costs are classified depend on the type of organization involved.

In your assignment you should explain with examples (use dollar value in your examples):

How to measure cost behaviour (cost measurement)?

In management accounting, the classification and measurement of fixed and variable cost is based on a body of knowledge that involves a number of assumptions. In many cases, the usefulness of fixed and variable cost data depends on the validity of these assumptions. In order to avoid poor operating results and faulty decision-making that is likely to occur when false cost assumptions are made, the ability to recognize and measure cost behavior is essential. Various theories of Cost behavior are as follows :

Variable Cost – varies proportionately in total but remains constant on a per unit basis.

- a. True variable costs – proportionately variable (ex. Raw material) amount used directly increases as production increases by the same percentage.
- b. Step variable costs – costs obtainable in large segments (ex. Labor costs of maintenance workers) and that increase or decrease in response to fairly wide changes in activity levels. NOTE: these costs are constant for a certain activity level (relevant range) and then vary in a step like fashion as volume increases.

2. Fixed Costs – remain constant in total but vary inversely on a per unit basis (if production increases, then per unit cost decreases; if production decreases, then per unit cost increases)

a. Committed fixed costs – relate to the investment in plant, equipment and the basic organizational structure of the firm (ex. Depreciation of building and equipment, real estate taxes, insurance, management salaries, etc.)

- are long term in nature
- cannot be reduced immediately over a short period of time without seriously impairing either the profitability or the long run goals of a firm.

b. Discretionary Fixed Costs (Managed Fixed Costs)

- arise from annual decisions by management to spend in certain fixed costs areas (ex. Advertising, research, management development programs)
- short term in nature, usually a single year
- possible to cut back on certain costs for short periods of time with minimum disruptions to long term goals.

c. Semi variable or Mixed Costs – contains both variable and fixed costs elements

- at certain levels of activity mixed costs display the same characteristics as a fixed cost
- at certain levels they display same characteristic as a variable cost
- (examples: electricity, heat, telephone, maintenance, car rental, copy machine rental)

3. Direct or Indirect Costs

- a. Direct Costs – can be physically traced to the particular segment under consideration (product line, sales territory, division, etc.)
- b. Indirect Costs – must be allocated in order to be assigned to the segment under consideration (indirect cost is manufacturing overhead). NOTE: Indirect Costs are also called Common Costs.

4. Additional Cost Terms

- a. Controllable Costs – if management at a certain level has the power to authorize and influence the cost
- b. Noncontrollable Costs – if management at a certain level is unable to influence the incurrence of the cost.
- c. Differential Cost – present under one alternative but is absent under an alternative course of action.

NOTE: Differential costs are also known as incremental costs.

- d. Opportunity Cost – potential benefit that is lost or sacrificed when selecting one course of action makes it necessary to give up a different course of action.

Opportunity cost is not recorded in the books of an organization, but is considered in every decision.

- e. Sunk Cost – already incurred and cannot be changed by any decision made now or in the future. An irrelevant cost in decision-making.

The econometrical model which is used to analyze costs is a model in which explanatory variable represents total costs and endogenous variables represent factors that influence their level. Production quantity is the most important factor which determines the level of total costs. Total costs consist of two parts:

total fixed costs, which appear independently of the production quantity (when production level is zero)

total variable costs, which are dependent only on the production quantity

Cost Function :

$$K = F + VX$$

(Where K is total cost, F is Fixed Cost , V is Variable Cost and X is volume)

What is cost accounting system and cost allocation?(Managerial Accounting)

Sol: Cost accounting is linked to tax accounting, financial accounting and managerial accounting because it is an important component of each discipline as cost accounting involves determining the cost of something, such as a product, a service, an activity, a project, or some other cost object. These costs are needed for several purposes. For example, the costs of products and services produced and sold are needed for both tax and external financial statements. In other words, tax and financial accounting depend on cost accounting to provide cost information. Information about costs is also needed for a variety of management decisions. For example, cost estimates are needed to determine whether or not a product or service

can be produced and sold at a profit. Unit costs of a product (or service) are also needed for product pricing and product discontinuance decisions. In addition, accurate cost information is required to determine whether or not a company should make (produce) or buy the raw materials, parts and subassemblies that become part of its major products and services. From this perspective, cost accounting is perhaps underrated as a discipline since none of the other disciplines including tax accounting, financial accounting or managerial accounting could exist without cost accounting.

The costs associated with a manufacturing firm are separated into two broad categories. These include manufacturing costs and selling and administrative costs. This functional separation is important because each category of cost is treated differently in the accounting records. The different treatments are required to obtain proper matching.

Manufacturing Costs

There are three types of manufacturing costs. These include: 1) direct material or raw material, 2) direct labor, and 3) indirect manufacturing costs, or factory overhead. Direct material becomes the product, or becomes a part of the product. Direct labor converts the direct material into a finished product. Factory overhead represents all the other factory costs that cannot be directly identified with a particular product. This indirect category includes a variety of costs that are discussed in more detail in subsequent chapters. These three types of costs are also referred to as product costs, or inventoriable costs, because they are capitalized in (or charged to) the inventory, i. e., they become assets.

Matching

Accountants capitalize manufacturing costs to obtain proper matching. The matching concept is pervasive in accrual accounting and requires that costs and benefits are matched or brought together on the income statement. In a production setting, the idea is to match the costs of producing a product (or service) against the benefits, i. e., revenue derived from the sale. When the inventory is sold, these costs are charged to an expense account referred to as cost of goods sold. At the end of the accounting period, cost of goods sold is closed to the income summary where, theoretically, matching takes place. Remember that unexpired costs represent assets. Expired costs represent expenses. When the inventory is sold, we say these costs have expired, i. e., the benefits to be obtained (from the effort that generated the costs) have been recognized. Thus, manufacturing costs become expenses when they reach cost of goods sold, but represent assets until the sale takes place.

Selling and Administrative Costs

In traditional accounting systems, selling and administrative costs are expensed in the period in which they are incurred. Theoretically, if there are future benefits associated with a cost, the cost should be capitalized as an asset rather than expensed. Certainly there are some future benefits associated with costs such as research and development, training, market promotion and advertising. However, these costs are expensed as incurred because it is difficult if not impossible to relate them to the future benefits. As a result, these costs are referred to as period costs.

COST BEHAVIOR AND PREDICTION

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In addition to separating costs into categories such as direct and indirect and manufacturing and non-manufacturing, costs are also frequently identified by their behavior in relation to changes in an activity level. This separation is helpful for planning and budgeting purposes. The major types of costs, in terms of cost behavior, are: 1) variable costs, and 2) fixed costs, 3) semi-variable costs and 4) semi-fixed costs. These concepts are illustrated graphically in Exhibit 1-3 and discussed individually below.

Variable Costs

Variable costs are those costs that vary with changes in the level of activity. Variable costs tend to increase at various rates that generate linear (straight line) or a variety of non-linear cost functions when the costs are plotted on a graph. The major activity that affects manufacturing costs is production volume, i. e., producing output. Production volume is frequently measured in terms of units produced, direct labor hours used, machine hours used, materials costs or some other production volume related measure. However, other activities that are not related to production volume might also be important in analyzing cost behavior. The recognition that non-production volume related activities also cause, or drive costs is a fundamental idea associated with activity based costing (ABC)

Fixed Costs

Fixed costs are defined as those costs that do not vary with changes in the activity level. However, this does not mean that fixed costs remain constant. If a production volume based measure is used as the activity, a cost that changes for some reason other than a change in production activity is

considered fixed. This simply means that the cost is driven by a non-production volume related phenomenon. For example, property taxes are considered fixed in traditional cost accounting systems that are typically based on production volume related activities. However, property taxes change when the taxing authority changes the tax rate or reassesses the property. The idea to grasp is that the designation of a particular cost as fixed or variable can change when it is analyzed in relation to a different activity. It is also important to understand that the notion of fixed and variable costs is a short run concept. All costs tend to be variable in the long run.

Semi-Variable and Semi-Fixed Costs

Semi-variable costs are part fixed and part variable. There is a minimum cost (the fixed portion) and a variable portion that increases as activity increases. There are also semi-fixed costs that do not change continuously as the level of activity changes, but do increase in steps as activity increases beyond various levels. These costs are sometimes referred to as step cost and step functions. For example, a single production supervisor (who's salary normally represents a fixed cost) might be adequate until production reaches a certain level, then a second supervisor would need to be hired. Supervisory costs might be driven by the number of production shifts.

Cost accounting system requires five parts that include: 1) an input measurement basis, 2) an inventory valuation method, 3) a cost accumulation method, 4) a cost flow assumption, and 5) a capability of recording inventory cost flows at certain intervals. These five parts and the

alternatives under each part are summarized in Exhibit 2-1. Note that many possible cost accounting systems can be designed from the various combinations of the available alternatives, although not all of the alternatives are compatible. Selecting one part from each category provides a basis for developing an operational definition of a specific cost accounting system.

1) INPUT MEASUREMENT BASES

The basis of a cost accounting system begins with the type of costs that flow into and through the inventory accounts. There are three alternatives including: pure historical costing, normal historical costing and standard costing.

Pure Historical Costing

In a pure historical cost system, only historical costs flow through the inventory accounts. Historical costs refers to the costs that have been recorded. The term actual costs is sometimes used instead, but the term “actual” seems to imply that there is one true cost associated with a particular output. But determining the cost of a product, or service requires many cost allocations, e. g., allocating the cost of fixed assets to time periods, and allocating indirect manufacturing costs, or overhead to products. Since there are many alternative allocation methods, (e. g., straight line or accelerated depreciation) the calculated cost of a unit of product or service simply represents an attempt to approximate the true cost.

Normal Historical Costing

Normal historical costing uses historical costs for direct material and direct labor, but overhead is charged, or applied to the inventory using a predetermined overhead rate per activity measure. Typical activity measures include direct labor hours, or direct labor costs. The amount of factory overhead charged to the inventory is determined by multiplying the predetermined rate by the actual quantity of the activity measure. The difference between the applied overhead costs and the actual overhead costs represents an overhead variance.

Standard Costing

In a standard cost system, all manufacturing costs are applied, or charged to the inventory using standard or predetermined prices, and quantities. The differences between the applied costs and the actual costs are charged to variance accounts as shown symbolically in the enlarged graphic below. The variances provide the basis for the concept of accounting control, that is somewhat different from the statistical control concept

2) FOUR INVENTORY VALUATION METHODS

The four inventory valuation methods that appear in Exhibit 2-1 are arranged in the order of the amount of cost that is traced to the inventory. The throughput method involves tracing the least amount of cost to the inventory, while the activity based method includes tracing the greatest amount of costs to the inventory. In direct (or variable) costing, a greater amount of cost is traced than in the throughput method, but a lesser amount

than in the full absorption method. Direct costing and full absorption costing are the traditional methods, while the throughput and activity based methods are relatively new. These inventory valuation methods are very important because they control the manner in which net income is determined. As we shall see in this chapter and subsequent chapters, the amount of net income can vary substantially for different inventory valuation methods.

The Throughput Method

The throughput method was developed to complement a concept referred to as the theory of constraints. In this method only direct material costs are charged to the inventory. All other costs are expensed during the period. The concept is symbolized in the enlargement below. Sales, less direct material costs is referred to as throughput which reflects how the method got its' name. The throughput method does not provide proper matching (as defined by GAAP) because all manufacturing cost, other than direct material are expensed when incurred rather than capitalized in the inventory. Therefore, the throughput method is not acceptable for external reporting although advocates argue that it provides many advantages for internal reporting.

The Direct or Variable Method

In the direct (or variable) method, only the variable manufacturing costs are capitalized, or charged to the inventory. Fixed manufacturing costs flow into expense in the period incurred. This method provides some advantages and some disadvantages for internal reporting. However, it does not provide proper matching because the current fixed costs associated with producing

the inventory are charged to expense regardless of whether or not the output is sold during the period. For this reason direct costing is not generally acceptable for external reporting.

The Full Absorption Method

Full absorption costing (also referred to as full costing and absorption costing) is a traditional method where all manufacturing costs are capitalized in the inventory, i. e., charged to the inventory and become assets. This means that these costs do not become expenses until the inventory is sold. In this way, matching is more closely approximated. All selling and administrative costs are charged to expense. Technically, full absorption costing is required for external reporting, although many companies apparently use something less than a pure full absorption costing system. The full absorption method is also frequently used for internal reporting. The second major section of this chapter compares the income statements for full absorption costing with those used for direct costing because they are by far the dominant methods.

The Activity Based Method

Activity based costing is a relatively new type of procedure that can be used as an inventory valuation method. The technique was developed to provide more accurate product costs. This improved accuracy is accomplished by tracing costs to products through activities. In other words, costs are traced to activities (activity costing) and then these costs are traced, in a second stage, to the products that use the activities. The concept of ABC is illustrated in the enlarged graphic below. Another way to express the idea is <https://assignbuster.com/methods-and-models-for-measuring-costs/>

to say that activities consume resources and products consume activities. Essentially, an attempt is made to treat all costs as variable, recognizing that all costs vary with something, whether it is production volume or some non-production volume related phenomenon. Both manufacturing costs and selling and administrative costs are traced to products in an ABC system. Note that treating selling and administrative costs in this way is not acceptable for external reporting.

3) FOUR COST ACCUMULATION METHODS

Cost accumulation refers to the manner in which costs are collected and identified with specific customers, jobs, batches, orders, departments and processes. The center of attention for cost accumulation can be individual customers, batches of products that may involve several customers, the products produced within individual segments during a period, or the products produced by the entire plant during a period. The company's cost accumulation method, or methods are influenced by the type of production operation and the extent to which detailed cost accounting information is needed by management.

Job Order

In job order costing, costs are accumulated by jobs, orders, contracts, or lots. The key is that the work is done to the customer's specifications. As a result, each job tends to be different. For example, job order costing is used for construction projects, government contracts, shipbuilding, automobile repair, job printing, textbooks, toys, wood furniture, office machines, caskets, machine tools, and luggage. Accumulating the cost of professional services

(e. g., lawyers, doctors and CPA's) also fall into this category. Chapter 4 illustrates a cost accounting system that includes normal historical costing as the basic cost system, full absorption costing as the inventory valuation method and job order costing as the cost accumulation method.

Process

In process costing, costs are accumulated by departments, operations, or processes. The work performed on each unit is standardized, or uniform where a continuous mass production or assembly operation is involved. For example, process costing is used by companies that produce appliances, alcoholic beverages, tires, sugar, breakfast cereals, leather, paint, coal, textiles, lumber, candy, coke, plastics, rubber, cigarettes, shoes, typewriters, cement, gasoline, steel, baby foods, flour, glass, men's suits, pharmaceuticals and automobiles. Process costing is also used in meat packing and for public utility services such as water, gas and electricity.

Back Flush

Back flush costing is a simplified cost accumulation method that is sometimes used by companies that adopt just-in-time (JIT) production systems. However, JIT is not just a technique, or collection of techniques. Just-in-time is a very broad philosophy, that emphasizes simplification and continuously reducing waste in all areas of business activity. JIT systems were developed in Japan and depend on the communitarian concepts of teamwork and continuous improvement. In fact, many of the assumptions, attitudes and practices of communitarian capitalism are included in the JIT philosophy.

One of the many goals of JIT systems is zero ending inventory. In a backflush cost system, manufacturing costs are accumulated in fewer inventory accounts than when using the job order or process cost methods. In fact, in extreme backflush systems, most of the accounting records are eliminated. The production facilities are also arranged in self contained manufacturing cells that are dedicated to the production of a single, or similar products. In this way more of the manufacturing costs become direct product costs and fewer cost allocations are necessary. Thus, more accurate costing is obtained in spite of the fact that the cost accumulation method is simplified. The just-in-time philosophy and related accounting methods are discussed in Chapter 8.

Hybrid, or Mixed Methods

Hybrid or mixed systems are used in situations where more than one cost accumulation method is required. For example, in some cases process costing is used for direct materials and job order costing is used for conversion costs, (i. e., direct labor and factory overhead). In other cases, job order costing might be used for direct materials, and process costing for conversion costs. The different departments or operations within a company might require different cost accumulation methods. For this reason, hybrid or mixed cost accumulation methods are sometime referred to as operational costing methods.

4) FOUR COST FLOW ASSUMPTIONS

A cost flow assumption refers to how costs flow through the inventory accounts, not the flow of work or products on a production line. This

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distinction is important because the flow of costs is not always the same as the flow of work. The various types of cost flow assumptions include: specific identification (e. g., by job), first in, first out, last in, first out and weighted average.

Costs flow through the inventory accounts by the job in a job order cost system which represents an example of specific identification. The requirements of the various jobs determines the timing of the cost flows. Simple jobs tend to move through the system faster than more complex jobs. The first-in, first-out (FIFO) and weighted average cost flow assumptions are used in process costing. Since costs are accumulated by the process or department in a process cost environment, a cost flow assumption is needed to determine the treatment of the beginning inventory. When FIFO is used, it is assumed that the units of product in the beginning inventory are finished first and transferred to the next department before any of the units that are started during the period. The group of units in the beginning inventory maintain their separate identity and prior period costs. However, when the weighted average cost flow assumption is used, the beginning inventory units lose their separate identity because they are lumped together with the units of product started during the period. Process costing tends to be fairly challenging, therefore you may find these introductory concepts to be confusing.

Although last-in, first-out (LIFO) is frequently used for tax reporting purposes, it is not normally used in the accounting records. For this reason, we consider the FIFO and weighted average cost flow assumptions in Chapter 5,

but leave the LIFO cost flow assumption for courses that emphasize financial and tax reporting.

5) RECORDING INTERVAL CAPABILITY

Inventory records can be maintained on a perpetual or a periodic basis. Conceptually, the perpetual inventory method provides a company with the capability of maintaining continuous records of the quantities of inventory and the costs flowing through the inventory accounts. The periodic method, on the other hand, requires counting the quantity of inventory before inventory records can be updated. In the past, manufacturers tended to keep perpetual inventories, while retailers used the periodic method. However, today a variety of modern point of sale devices and dedicated microcomputer software are readily available to provide any company with perpetual inventory capability.

Cost allocation is the assigning of a common cost to several cost objects. For example, a company might allocate or assign the cost of an expensive computer system to the three main areas of the company that use the system. A company with only one electric meter might allocate the electricity bill to several departments in the company. Allocation implies that the assigning of the cost is somewhat arbitrary. Some people describe the allocation as the spreading of cost, because of the arbitrary nature of the allocation. Efforts have been made over the years to improve the bases for allocation. In manufacturing, the overhead allocations have moved from plant-wide rates to departmental rates, from direct labor hours to machine hours to activity based costing. The goal is to allocate or assign the costs

based on the root causes of the common costs instead of merely spreading the costs.

Direct costs can be physically traced to each department. Indirect costs must be allocated. Many companies develop allocation methods to assign service department costs to the producing departments. All organizations accumulate costs for their products or services for financial reporting purposes. An accounting system will assign to a department's output all its direct costs plus all the indirect costs allocated to it. A cost driver that has a logical, cause-effect relationship to the cost will be used as a cost-allocation base.

Linking costs with cost objectives is accomplished by selecting cost drivers. When used for allocating costs, a cost driver is often called a cost-allocation base. Major costs, such as newsprint for a newspaper and direct professional labour for a law firm, may each be allocated to departments, jobs, and projects on an item-by-item basis, using obvious cost drivers such as tonnes of newsprint consumed or direct-labour-hours used. Other costs, taken one at a time, are not important enough to justify being allocated individually. These costs are pooled and then allocated together.

A cost pool is a group of individual costs that is allocated to cost objectives using a single cost driver. For example, building rent, utilities cost, and janitorial services may be in the same cost pool because all are allocated on the basis of square metres of space occupied. Or a university could pool all the operating costs of its registrar's office and allocate them to its colleges on the basis of the number of students in each faculty. In summary, all costs

in a given cost pool should be caused by the same factor. That factor is the cost driver. Many different terms are used by companies to describe cost allocation in practice. You may encounter terms such as allocate, attribute, reallocate, trace, assign, distribute, redistribute, load, burden, apportion, and reapportion, which can be used interchangeably to describe the allocation of costs to cost objectives.

The allocation of costs is necessary when the linkage between the costs and the cost objective is indirect. In this case, a basis for the allocation, such as direct-labour-hours or tonnes of raw material, is used even though its selection is arbitrary. A cost allocation base has been described as incorrigible, since it is impossible to objectively determine which base perfectly describes the link between the cost and the cost objective. Given this subjectivity in the selection of a cost-allocation base, it has always been difficult for managers to determine “ When should costs be allocated?” and “ On what basis should costs be allocated?” The answers to these questions depend on the principal purpose or purposes of the cost allocation.

Costs are allocated for three main purposes:

1. To obtain desired motivation. Cost allocations are sometimes made to influence management behaviour and thus promote goal congruence and managerial effort. Consequently, in some organizations there is no cost allocation for legal or internal auditing services or internal management consulting services because top management wants to

encourage their use. In other organizations there is a cost allocation for such items to spur managers to make sure the benefits of the specified services exceed the costs.

2. To compute income and asset valuations. Costs are allocated to products and projects to measure inventory costs and cost of goods sold. These allocations frequently service financial accounting purposes. However, the resulting costs are also often used by managers in planning, performance evaluation, and to motivate managers, as described above.

3. To justify costs or obtain reimbursement. Sometimes prices are based directly on costs, or it may be necessary to justify an accepted bid. For example, government contracts often specify a price that includes reimbursement for costs plus some profit margin. In these instances, cost allocations become substitutes for the usual working of the marketplace in setting prices.

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What is activity based costing? (ABC system)?

Sol :

In the past, the vast majority of departments used direct labour hours as the only cost driver for applying costs to products. But direct labour hours is not a very good measure of the cause of costs in modern, highly automated departments. Labour-related costs in an automated system may be only 5 percent to 10 percent of the total manufacturing costs and often are not related to the causes of most manufacturing overhead costs. Therefore,

many companies are beginning to use machine-hours as their cost-allocation base. However, some managers in modern manufacturing firms and automated service companies believe it is inappropriate to allocate all costs based on measures of volume. Using direct labour hours or cost-or even machine hours-as the only cost driver seldom meets the cause/effect criterion desired in cost allocation. If many costs are caused by non volume-based cost drivers, Activity-Based Costing (ABC) should be considered

Activity Based Costing (ABC) is an economic 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. It identifies activities in an organization and assigns the cost of each activity resource to all products and services according to the actual consumption by each: it assigns more indirect costs (overhead) into direct costs. In this way, an organization can precisely estimate the cost of individual products and services so they can identify and eliminate those tha