

An Introduction to Cost Allocation

The Flow of Costs

What types of costs are incurred in making and selling products and services? Let's start with an organization that provides services—say, a consulting firm. That business will incur costs for wages for office personnel; rent for the office; office equipment like copy machines and computers; sales efforts; administrative items; salaries for consultants, managers, and partners; and probably many more things. What about a merchandising company—say, a retail store that buys inventory to resell to customers? That store will incur costs for the inventory it purchases for resale, employee wages, rent for the store, store equipment like cash registers and computers, administrative items, salaries for store managers, and so on. What about a manufacturing company like a T-shirt maker? That company will incur costs for material to make the T-shirts, T-shirt makers' wages, rent for the workspace, T-shirt-making equipment, sales efforts, administrative items, salaries for managers and others, and more (**Table 1**).

Table 1. Examples of costs in service, merchandising, and manufacturing organizations.

Service Organization (e.g., consulting firm)	Merchandising Organization (e.g., retail store)	Manufacturing Organization (e.g., T-shirt maker)
Wages	Item purchased for resale	Material
Rent	Wages	Wages
Equipment	Rent	Rent
Sales	Equipment	Equipment
Administrative	Sales	Sales
Salaries	Administrative	Administrative
Etc.	Salaries	Salaries
	Etc.	Etc.

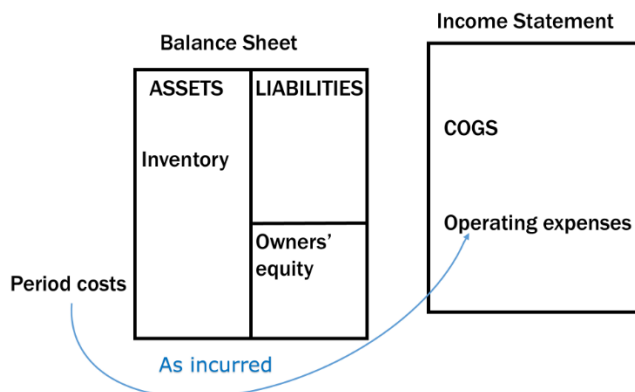
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How are all these costs treated for financial accounting purposes? In other words, how do these costs flow through the company's financial statements that are prepared according to the appropriate accounting standards? Here, a distinction between product and period costs is important. *Product costs* are the costs associated with making a product; in a manufacturing organization, they are also called *manufacturing costs*. *Period costs* are the costs not associated with making the product; they may also be called *non-manufacturing costs*, or *selling, general, and administrative (SG&A) costs*.

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How do these costs flow through the financial statements for a service organization like a consulting firm? Since the service organization is not making a product, it has no product costs and essentially no inventory. In general, its costs are period costs, and they are recorded as expenses on the income statement as they are incurred (**Figure 1**).

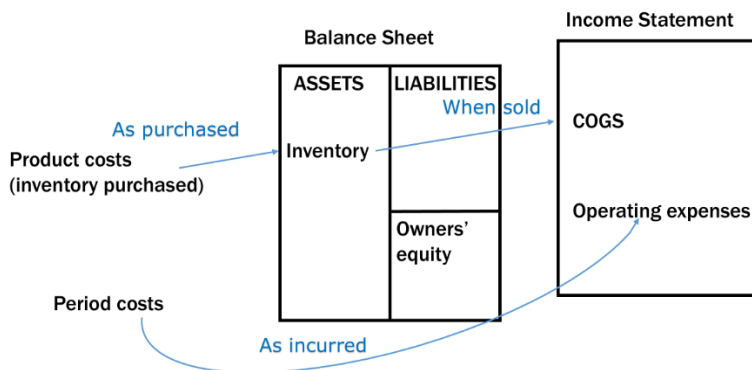
Figure 1. Period costs in a service company.



Source: All figures were created by author. Abbreviations found in the figures of this note are as follows: COGS = cost of goods sold; DM = direct materials; DL = direct labor; OH = overhead.

How do costs flow through the financial statements for a merchandising organization like a retail store? That company is not making a product, but the cost of the product it purchases to resell is included in inventory on the balance sheet when it is purchased, and it stays there until the product is sold to a customer; at that time, those costs move from inventory on the balance sheet to the income statement as cost of goods sold (COGS). Remember, though, that the merchandising organization also has other costs it incurs, like the rent on the store, the administrative costs, and so on. Those costs are period costs and recorded on the income statement as they are incurred (**Figure 2**).

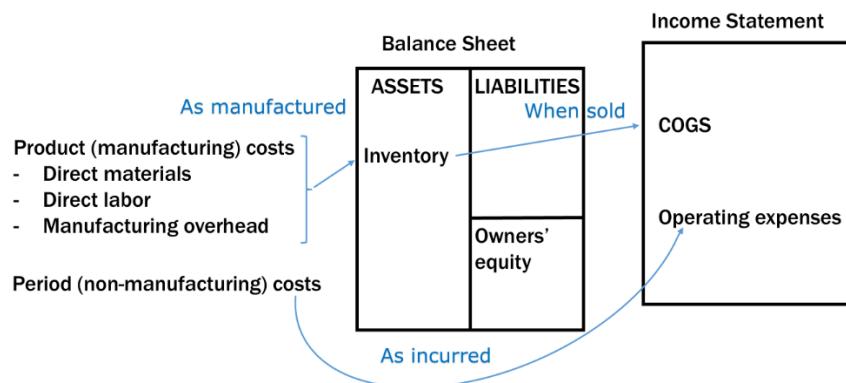
Figure 2. Product and period costs in a merchandising company.



Now let's move to a manufacturing organization, a T-shirt maker. That business incurs the costs of material, labor, and other costs to make its product. Those costs are product (manufacturing) costs, and they are included on the balance sheet in inventory as the product is being made. Once the product is sold to the customer, those costs move from inventory on the balance sheet to the income statement as a COGS expense. Like servicing and merchandising companies, the manufacturing company incurs other costs, but these costs are not incurred

to make the product. They include things like selling and administration costs, and they are treated as period costs and recorded on the income statement as expenses as they are incurred (**Figure 3**). They are not included in inventory.

Figure 3. Product and period costs in a manufacturing company.

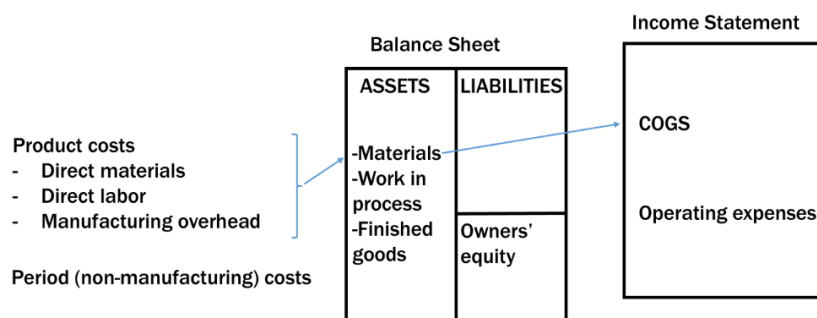


In summary, service, merchandising, and manufacturing companies incur a variety of costs, which for financial statement purposes can be thought of as product or period costs. Product costs are accumulated in inventory on the balance sheet and expensed on the income statement when the product is sold, and period costs are expensed on the income statement as incurred.

More on the Flow of Costs in a Manufacturing Setting

It is worth noting that not only do manufacturing companies have an inventory account on their balance sheet, but that the inventory account consists of three different types: raw materials inventory, work-in-process inventory, and finished goods inventory (**Figure 4**).

Figure 4. Manufacturing companies' three types of inventory.



As you can imagine from its name, materials inventory contains materials that have not yet been put into the production process. Work-in-process inventory contains inventory that has been partially but not fully completed. So the account contains the cost of material that has been used thus far in the production process, the cost of labor that has been used thus far in the process, and the overhead or indirect costs that have been incurred to get the inventory to its current state. Finally, the finished goods inventory account contains the cost of all inventory that has been completed but has not yet been sold.

There are two types of costing systems generally used by manufacturing companies. One is called a *job-costing system* and the other is called a *process-costing system*. The details of accounting for job- and process-costing systems for financial statement or financial accounting purposes can be complex and are beyond the scope of this technical note, though a brief overview here provides a general understanding of them. Further, the managerial implications of costing issues discussed in this note are similar and thus applicable for both systems; both job- and process-costing systems track direct materials and direct labor and manufacturing overhead, and the objective in both systems is to determine the cost of an individual unit of a product or service. The difference is that job-costing systems track these costs by job and determine the cost of an individual unit, after the job is completed, by dividing the costs of the job by the number of units in the job. But a process-costing system tracks these costs by process or department and determines the cost of an individual unit, at the end of a time period, by dividing the cost of the departments by the number of units completed during that time period. In both systems, product (manufacturing) costs are included in inventory on the balance sheet and moved to the income statement as an expense when the products are sold.

Examples of companies that might use a job-costing system include companies that make sports teams' uniforms that feature specific team's logo or mascot, an accounting firm that performs audits for different clients, or a T-shirt manufacturer that makes T-shirts designed for a specific 5K race or for a specific company event. These products are often customized, meaning each job is designed to meet a specific customer's needs. Examples of companies that might use process-costing systems include companies that make beverages, cereals, or pharmaceuticals. These products are made using standardized production processes that make up large quantities of identical products through a continuous flow of processes.

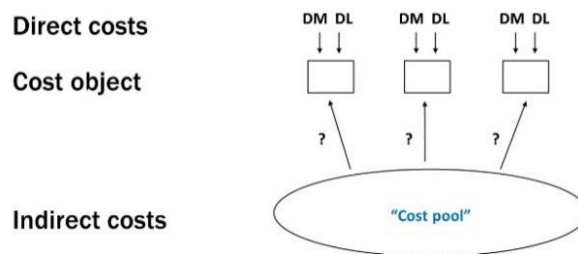
Cost Systems

A *cost system* is a system that assigns costs to products, services, or some other cost object. What is a *cost object*? It is anything whose cost we want to determine. A cost object could be a product, a service, a department, a customer process, and many more things.

For financial accounting purposes, for example, manufacturing companies are required to ensure that all manufacturing or product costs are assigned to the units of product that are in inventory and eventually sold. However, even beyond the requirements of financial accounting, determining the cost of a product, a service, or a customer can enhance management's ability to make better decisions. They determine the cost of these cost objects using a cost system. How do these cost systems work? Let's take a look.

Suppose we make three products, and we need to know the cost of each of them. In cost-system terminology, those three products are our cost objects. We can depict the details of a cost system in a cost-system diagram like **Figure 5**.

Figure 5. Cost-system diagram.



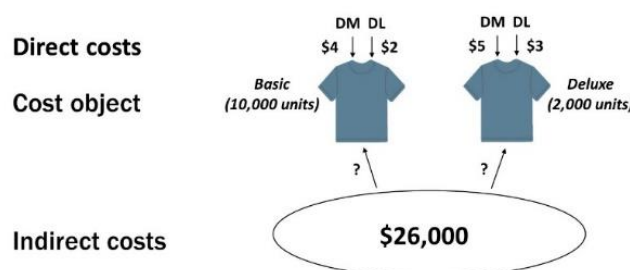
There are a lot of costs that we can trace easily to each of these products; those costs are called *direct costs*. They may include things like material that is easily traced to the products (called *direct material*) and the “touch” labor that works to build the products (called *direct labor*). You can see those represented in **Figure 5**—each of the three products has its own direct material costs and its own direct labor costs are traced directly to it.

There are a lot of other costs that cannot be easily traced directly to those products. Those are called *indirect costs*, or *overhead*. In **Figure 5**’s cost-system diagram, those are represented in a cost pool. Simply speaking, a *cost pool* is a group, or a pool, of costs. Here we have a group of indirect costs that we cannot easily trace to our individual cost objects.

For financial accounting purposes, we need to find a way to associate the indirect manufacturing costs with the products being produced so that those costs can be included in inventory on the balance sheet. But from a managerial perspective, we need to find a way to determine the amount of indirect costs (maybe both manufacturing and non-manufacturing) associated with each product so that we can make good management decisions about each product we create. As an example, we want to make sure we set a price on each product that is greater than the cost of that product. The only way we can do that is to determine the costs, both direct and indirect, that the product causes us to incur.

Let’s look at TEES, Inc., a T-shirt manufacturer. Suppose TEES, Inc., makes two different types of T-shirts, a basic model and a deluxe model. We have two cost objects, the basic T-shirt and the deluxe T-shirt (**Figure 6**).

Figure 6. Cost-system diagram for TEES, Inc.



We can easily trace the cost of the material and labor to make the shirts to the T-shirts themselves. Specifically, the cost of direct material is \$4 per basic T-shirt and \$5 per deluxe T-shirt; the cost of direct labor is \$2 per basic T-shirt and \$3 per deluxe T-shirt. The company incurs \$26,000 in additional manufacturing costs that it cannot trace easily to those shirts. But to make good decisions, the company’s managers need to know how much of the indirect manufacturing costs are associated with each type of T-shirt. So we will find a way to “allocate,” or assign, that \$26,000 of indirect costs to the T-shirts to approximate the amount of those costs that are associated with each shirt.

How could we do that? One very simple approach would be to allocate the exact same amount of overhead to each individual T-shirt. The company has \$26,000 of overhead and is making 12,000 T-shirts. So we could simply allocate each T-shirt \$2.17 in overhead ($\$26,000 / 12,000$ T-shirts). This would result in an estimated cost of \$8.17 for the basic T-shirt and \$10.17 for the deluxe T-shirt. Simple, huh? So why don’t we do that? Because it is unlikely that both a basic and a deluxe T-shirt cause the company to incur the same amount of overhead costs. Chances are that the manufacturing process is somewhat different for deluxe T-shirts than for basic T-shirts. If so, those two types of T-shirts would likely use overhead resources differently. And if that is the case, the company could make better management decisions if the product cost estimates reflected those differences.

Allocating Overhead Costs

Let's look at overhead allocation in more detail. When we need to allocate overhead costs to cost objects like products, it might be helpful to think of that allocation process in four steps:

Step 1: Determine the amount of overhead costs to be allocated. You might decide to divide the total amount of overhead cost into several cost pools to be treated separately. But for now, let's just assume that we have one pool of overhead costs: the \$26,000 for TEES, Inc.

Step 2: Choose a base for allocating those overhead costs. For the example we just looked at, we used units as the allocation base.

Step 3: Calculate an overhead-allocation rate that will be used to allocate the overhead. That rate is calculated as the relation between overhead to be allocated and the allocation base:

$$\text{Overhead allocation rate} = \frac{\text{overhead}}{\text{allocation base}}$$

In our example, this rate would be \$26,000 / 12,000 units = \$2.17 per unit.

Step 4: Use that overhead-allocation rate to allocate overhead to the cost object based on the cost object's use of the allocation base. In our example, each unit would be allocated \$2.17 in overhead.

Let's talk a little bit more about step 3, calculating the overhead-allocation rate. In determining this rate, organizations typically use budgeted information. Why would they do that? Consider the timeline in **Figure 7**:

Figure 7. Timeline from beginning to end of period for overhead-allocation rate.



At the beginning of a given period, such as a year, the organization has an estimate, or a budget, of the overhead costs it expects to incur during the upcoming year. Actual overhead incurred is not known until the end of the year. We could wait until the end of the year and allocate the actual overhead to the products made, at which point, then, we would know the actual cost of the products. However, managers need to make good management decisions during the year. For example, it is really hard to know what price to set if we don't know what a product's cost is. So we typically allocate overhead based on estimates by using information from the budget. (As a side note, we hope our estimates are relatively accurate, but no doubt, there will be some differences between the actual and the budgeted amounts. So for financial accounting purposes, once we know the actuals, we must correct for the difference between actuals and estimates in the books. Doing that particular accounting correction is beyond the scope of this technical note.) In the meantime, as long as we have relatively good estimates, those estimates can be used to make management decisions.

Let's implement these four steps to overhead cost allocation for TEES, Inc. Step 1 is to determine the amount of overhead costs that need to be allocated. That's the \$26,000. Step 2 is to choose a base for allocating

that overhead. We will talk more about how to choose a good allocation base later in this note. But for now, rather than units in our previous example, let's assume that the company has decided to use direct labor costs as its overhead-allocation base. Then step 3 is to calculate an overhead rate based on the relation between the overhead to be allocated and the allocation base. The amount of overhead to be allocated is \$26,000, and the amount of the allocation base, direct labor costs, is also \$26,000 (10,000 basic T-shirts \times \$2 direct labor per T-shirt; 2,000 deluxe T-shirts \times \$3 direct labor per T-shirt). Dividing the \$26,000 in estimated overhead by the \$26,000 in estimated direct labor costs gives us an overhead rate of 100%. So in other words, for every \$1 in direct labor that a T-shirt requires, it will be allocated \$1 in overhead costs. Finally, step 4 is to use that overhead rate to allocate overhead to the T-shirts. Since a basic T-shirt requires \$2 in direct labor, it is allocated \$2 in overhead, and since the deluxe T-shirt requires \$3 in direct labor, it is allocated \$3 in overhead (**Table 2**).

Table 2. Per-unit cost of basic and deluxe T-shirts.

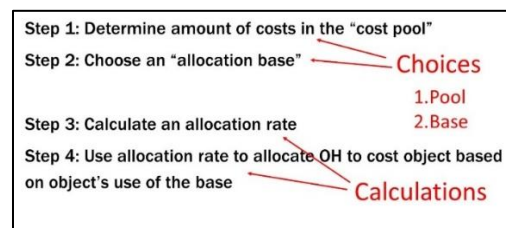
	Basic	Deluxe
Direct material	\$4	\$5
Direct labor	2	3
Overhead	2	3
Total cost	\$8	\$11

In total, the cost of the basic T-shirt is \$8 and the cost of the deluxe T-shirt is \$11. And at this point, management has estimates of the cost of each T-shirt that it can use in making decisions throughout the year.

Designing Cost-Allocation Systems

Recall the four steps to allocating overhead. Notice that the first two steps, determining the pools of overhead costs and the allocation base for each cost pool, are choices management makes. And the last two steps are purely mathematical calculations that result from the choices made in the first two steps (**Figure 8**).

Figure 8. Allocation of overhead costs: Four-step process.

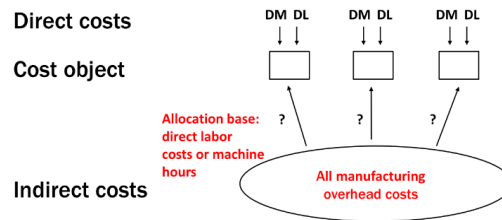


It is important to make good choices about cost pools and allocation bases because the estimated product or service costs that result from those choices will be used in making important management decisions. And to make good management decisions, managers need good cost estimates.

Let's talk about those choices. Traditionally, organizations have used relatively simple allocation systems. Two common traditional choices are (1) allocating overhead with a plant-wide allocation rate and (2) allocating overhead with a departmental allocation rate. With a plant-wide approach, we have just one cost pool containing all the manufacturing overhead costs, and those costs are allocated using a relatively simple, volume-driven allocation base like direct labor or machine hours. The aforementioned allocation system for TEES, Inc., was

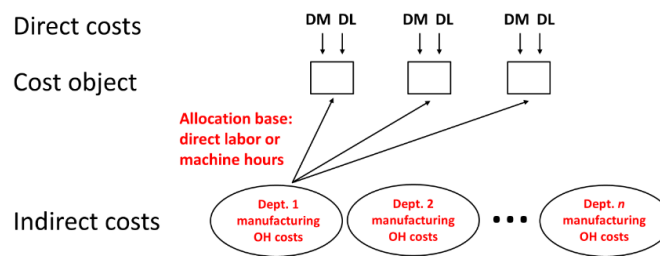
an example of this type of allocation system. All \$26,000 in manufacturing overhead costs were placed into that one cost pool and allocated to the T-shirts based on direct labor costs (**Figure 9**).

Figure 9. Sample plant-wide cost-allocation system.



With a departmental approach, a cost pool for each department contains all the overhead costs in that department, and overhead in each department is allocated separately, using a relatively simple allocation base. For companies that have more than one department in which overhead is consumed in different ways, this approach often leads to product costs that more accurately reflect the manufacturing process to make those products (**Figure 10**).

Figure 10. Sample departmental cost-allocation system.



A Changing Landscape

Traditional allocation systems, like the plant-wide and departmental approaches just discussed, have their advantages. They meet financial reporting requirements for determining the costs to assign to inventory as product cost, they are simple to use and understand, and they are based on information that is easy to obtain. And for some companies, these simple systems may result in estimated product costs that accurately capture the cost of manufacturing their products. But for other companies, they may not.

Note that these simple approaches to allocating overhead make a couple of inherent assumptions. First, they assume that over time, overhead costs, either at the plant-wide level or the departmental level, change with changes in the allocation base such as direct labor costs. Now think about that. If overhead is primarily composed of costs associated with supervision, human resource management, and administration, that assumption may be a valid one. In other words, it's likely that as a company has more direct labor costs over time, it probably does end up having more supervisory, human resource, and administrative costs. So direct labor costs likely do drive those types of overhead costs over the long term, and products that use more direct labor probably do cause more of these overhead costs to be incurred. However, if overhead costs are primarily composed of costs associated with processing customer orders, setting up the equipment to produce a new batch of products associated with those orders, and shipping the resulting orders of manufactured products, then that assumption may not be as valid. In that case, as the company accepts more and more orders, those

overhead costs will probably become larger over time. So the number of orders likely drives those overhead costs and would be a more appropriate allocation base.

The second assumption that these simple approaches to allocating overhead make is that all products are similarly responsible for the overhead costs incurred, or they use overhead in roughly the same proportions. You can imagine, though, that some products may be more complex to make or may be made in smaller batch sizes. In cases like this, the assumption that all products use overhead in the same proportions may not be a valid one. It is also worth noting that over time, the composition of costs, particularly in manufacturing organizations, has changed considerably. Long ago, manufacturing processes were very labor intensive, with little automation, little computerization, and little technology. At that time, indirect costs were a very small proportion of total manufacturing costs. As a result, the choices about overhead allocation didn't really affect the overall estimated product cost very much. But in recent times, we have seen increasing automation, manufacturing has become less labor intensive, and indirect costs now represent a much higher proportion of total costs. So choices about how overhead is allocated can change the estimated cost of a product dramatically. In other words, it can be harder for an organization to get accurate estimates of the costs of the products it makes. In addition, competition has become more global and more intense, so the implications of an organization not having accurate estimates of the costs to make its products or offer its services have become more pronounced. So it's more important than ever to design good cost systems.

Activity-Based Costing

Activity-based costing is a method of allocating overhead that focuses on activities. Its underlying principle is that the activities performed in a process are what cause costs to be incurred. With activity-based costing, we determine what activities are being performed, recognize that those activities consume resources, determine the cost of those resources, and then allocate the cost of those resources to cost objects—products or services—based on the cost objects' use of the resources. For example, if a product is responsible for 40% of a particular activity, ordering material from suppliers, that product will be allocated 40% of the cost of ordering material from suppliers. The idea is that activities (e.g., ordering material) use resources (e.g., purchasing department personnel), those resources have costs (e.g., purchasing department salaries and other costs of running that department), and the costs of using the resources should be allocated to products based on how much of the resources the products use.

Let's apply the four-step process for allocating overhead to activity-based costing.

Step 1 is to identify groups, or pools, of overhead costs. With the plant-wide allocation approach, that was easy; there was one pool and it consisted of all the indirect manufacturing costs. With activity-based costing, however, we start by identifying the key activities that take place in the production process. Activities include things like maintaining equipment, setting up equipment to make a batch of a product, taking orders from customers, ordering material from suppliers, and shipping finished products. Recognizing that those activities consume resources, we put the cost of the resources used for each activity group into a cost pool.

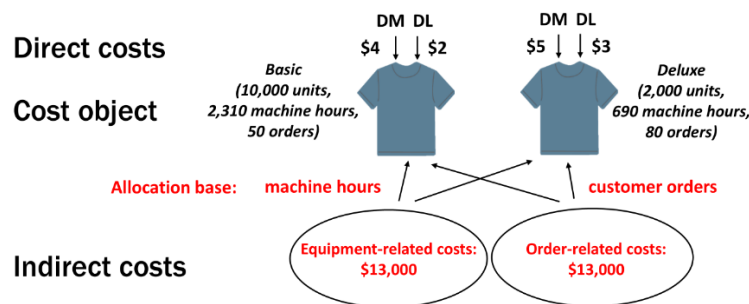
Step 2 in the allocation process is to choose an allocation base for each cost pool. With activity-based costing, we want to choose an allocation base that has a causal relationship with the costs in the cost pool. We use the term *cost driver* to refer to the allocation base in an activity-based costing system because it is something that drives or causes costs to be incurred. For example, if purchasing costs are in a cost pool, we might choose the number of orders placed with the supplier as an allocation base. If we place more orders over time, we would expect purchasing department costs to be higher, and if we place fewer orders over time, we would expect purchasing department costs to be lower.

Remember, in designing cost-allocation systems, we have to make two choices: cost pools and allocation bases. The process of making those choices makes activity-based costing different from traditional allocation systems.

Steps 3 and 4 are no different than we have seen before with traditional allocation systems. We just calculate an allocation rate for each cost pool (step 3), and we use that allocation rate to assign overhead costs to our cost objects (step 4).

Let's go back to TEES, Inc. Suppose that after studying the activities required to make the T-shirts, we observe that many activities are taking place in that workspace, but most of them are driven primarily by one of two things: running the equipment to make the T-shirts or performing work related to orders from customers. Activities driven by running the equipment would include things like operating the equipment itself, using electricity, and maintaining the equipment. So we group the costs related to all those things into one cost pool. Let's assume they total \$13,000, and let's use machine hours as the allocation base for that pool because it seems like the cost driver for those costs. Activities driven by taking orders from customers include things like taking orders, purchasing material from suppliers once the customer order has been received, receiving the material when it arrives, packing and shipping the order when it's finished, and setting up the equipment to make a new order of T-shirts. So we group the costs related to all of those things into one cost pool. Let's assume they total the remaining \$13,000, and let's use the number of orders as the allocation base for that pool since it seems like the cost driver for those costs. So what we've done is divide the \$26,000 in manufacturing overhead cost into two cost pools (here, they happen to be \$13,000 each), and we allocate one pool based on machine hours and the other pool based on customer orders (**Figure 11**).

Figure 11. Activity-based cost-allocation system at TEES, Inc.



Next, we calculate an allocation rate for each cost pool. First, we divide the \$13,000 pool of the machine-related overhead costs by the 3,000 machine hours to obtain a rate of \$4.33 per machine hour. Second, we divide the \$13,000 pool of order-related overhead costs by the 130 orders to obtain a rate of \$100 per order (**Table 3**).

Table 3. Overhead-allocation rate.

OH allocation rate	=	$\frac{\$13,000 \text{ overhead}}{3,000 \text{ machine hours}}$
	=	\$4.33 per machine hour
OH allocation rate	=	$\frac{\$13,000 \text{ overhead}}{130 \text{ orders}}$
	=	\$100 per order

Finally, we use those rates to allocate costs from each cost pool to the T-shirts. Let's allocate the first \$13,000 pool of overhead, using machine hours as the allocation base. Each basic T-shirt will be allocated \$1.00 [$(\$4.33 \text{ per machine hour} \times 2,310 \text{ machine hours}) / 10,000 \text{ T-shirts}$]. Each deluxe T-shirt will be allocated \$1.50 [$(\$4.33 \text{ per machine hour} \times 690 \text{ machine hours}) / 2,000 \text{ T-shirts}$]. Now, let's allocate the second \$13,000 pool of overhead, using orders as the allocation base. Each basic T-shirt will be allocated \$0.50 [$(\$100 \text{ per order} \times 50 \text{ orders}) / 10,000 \text{ T-shirts}$]. Each deluxe T-shirt will be allocated \$4.00 [$(\$100 \text{ per order} \times 80 \text{ orders}) / 2,000 \text{ T-shirts}$].

With this system, the total manufacturing cost of a basic T-shirt is \$7.50, and the total manufacturing cost of the deluxe T-shirt is \$13.50 (**Table 4**).

Table 4. Product costs for TEES, Inc., under an activity-based costing system.

	Basic	Deluxe
Direct material	\$4.00	\$5.00
Direct labor	2.00	3.00
Overhead: Pool 1	1.00	1.50
Overhead: Pool 2	0.50	4.00
Total cost	\$7.50	\$13.50

Note that this compares to \$8 for the basic T-shirt and \$11 for the deluxe T-shirt under the traditional system, where all \$26,000 overhead was allocated based on direct labor (**Table 5**).

Table 5. Comparison of product costs under activity-based costing and traditional cost-allocation systems.

	Basic		Deluxe	
	Activity-Based Costing	Traditional	Activity-Based Costing	Traditional
Direct material	\$4.00	\$4.00	\$5.00	\$5.00
Direct labor	2.00	2.00	3.00	3.00
Overhead: Pool 1	1.00	2.00	1.50	3.00
Overhead: Pool 2	0.50	—	4.00	—
Total manufacturing cost	\$7.50	\$8.00	\$13.50	\$11.00

Why the change? We can think about it this way. The basic T-shirt is responsible for 77% of total direct labor costs, so those basic T-shirts were assigned 77% of the overhead costs under the previous system where we used direct labor as the allocation base.¹ Basic T-shirts are also responsible for 77% of the machine hours.² But basic T-shirts are responsible for only 38% of the orders (**Table 6**).³

Table 6. Use of allocation bases by product.

	Basic	Deluxe
Direct labor costs	77%	23%
Machine hours	77%	23%
Orders	38%	62%

¹ Total direct labor costs are \$26,000 (direct labor costs for basic T-shirts is \$2 per shirt \times 10,000 shirts = \$20,000, and direct labor costs for deluxe T-shirts is \$3 per shirt \times 2,000 shirts = \$6,000). Basic T-shirts account for \$20,000 / \$26,000 of total direct labor costs, or approximately 77%.

² Total machine hours are 3,000 (2,310 for basic T-shirts and 690 for deluxe T-shirts). Basic t-shirts account for 2,310 / 3,000 of total machine hours, or 77%.

³ Total orders are 130 (50 for basic T-shirts and 80 for deluxe T-shirts). Basic T-shirts account for 50 / 130 of total machine hours, or approximately 38%.

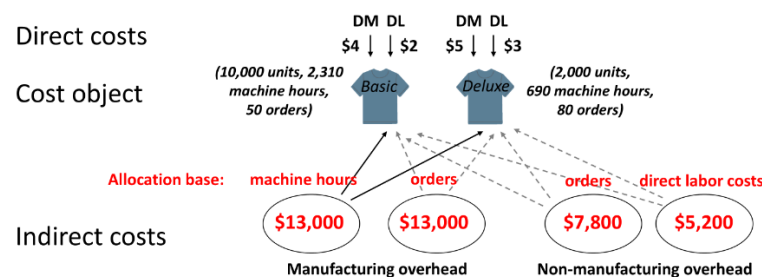
So under the activity-based costing system, basic T-shirts are allocated 77% of half of the overhead costs, which are driven by machine hours, and they're allocated 38% of the other half of the overhead costs, which are driven by customer orders. Naturally, then, the allocation of overhead to the basic T-shirts goes down and the allocation to deluxe T-shirts goes up when we consider that the deluxe T-shirts cause most of the order-related overhead costs to be incurred.

Beyond Manufacturing Costs

We've spent a lot of time talking about allocating manufacturing overhead to products. Why did we do that? Recall that manufacturing companies must allocate manufacturing costs to their products to place an inventory for financial accounting purposes. Naturally, that is a good place to illustrate concepts related to cost allocation. It is important to realize, though, that these concepts and techniques are equally applicable to some other settings. Let's consider three examples: non-manufacturing costs, service organizations, and cost objects other than products and services.

Let's start with non-manufacturing costs. In addition to the manufacturing overhead costs we have addressed in our cost-allocation system thus far, suppose that TEES, Inc., incurs non-manufacturing overhead costs as well (examples can include SG&A costs). Some products could cause more of these non-manufacturing overhead costs to be incurred; if this is the case, knowing that may affect some of the management decisions the company makes regarding its products. Let's assume that TEES, Inc., incurs \$7,800 of selling costs, and that those costs seem to be driven by customer orders. (The sales representative visits the customer to generate orders and then does the paperwork necessary to get those orders into the company's system, so the process of making T-shirts for those orders can begin.) And let's assume that the company incurs \$5,200 of other general and administrative costs that are primarily related to human resource functions like administering benefit plans and performance reviews, and those costs seem to be driven by direct labor. It seems natural to separate those costs into two different pools. We might allocate the \$7,800 of selling costs based on customer orders and the \$5,200 of general and administrative costs based on direct labor costs (**Figure 12**).

Figure 12. Activity-based cost-allocation system for manufacturing and non-manufacturing costs at TEES, Inc.



Doing so results in an allocation of selling costs of \$0.30 per basic T-shirt and \$2.40 per deluxe T-shirt. (Recall how many orders the deluxe T-shirts require compared to the basic T-shirts.) And it results in an allocation of general and administrative cost of \$0.40 per basic T-shirt and \$0.60 per deluxe T-shirt (**Table 8**).

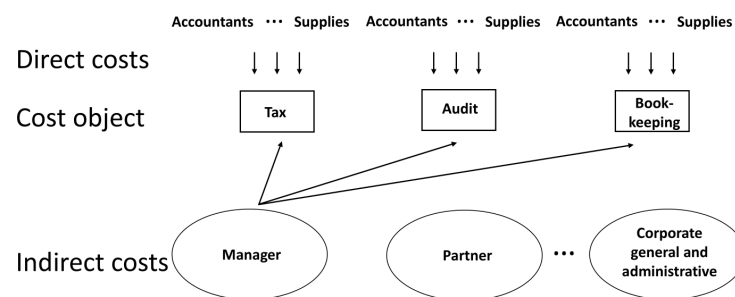
Table 8. Manufacturing and non-manufacturing costs by product for TEES, Inc., under an activity-based costing system.

	Basic	Deluxe
Direct material	\$4.00	\$5.00
Direct labor	2.00	3.00
Manufacturing OH: Pool 1	1.00	1.50
Manufacturing OH: Pool 2	0.50	4.00
Total manufacturing cost	\$7.50	\$13.50
Non-manufacturing OH: Pool 1	0.30	2.40
Non-manufacturing OH: Pool 2	0.40	0.60
Total cost	\$8.20	\$16.50

Notice that after considering just the manufacturing costs, deluxe T-shirts seem quite a bit more costly to make than basic T-shirts. That difference is even more striking when we consider the additional non-manufacturing overhead costs associated with those shirts. This may be an important decision when pricing the two models. The company should ensure that it prices the deluxe T-shirt high enough to cover those higher costs.

Now let's consider the applicability of activity-based costing to service firms. Let's take, for example, an accounting firm that provides three basic types of services for businesses: filing tax returns, performing audits of financial statements, and doing basic bookkeeping work like accounting and payroll. It might want to assess the costs of each of those types of services as it considers pricing decisions with new clients. Each of these will have direct costs associated with it. For example, since accountants often specialize in tax, audit, or general accounting, the firm may assign an accountant team to work only on each particular type of service. In addition, it may be able to trace supplies used directly to those services, and there may be other direct costs as well. But there will be indirect costs that are not easily traced to each type of service. They may include the cost of management, to the extent that management doesn't focus solely on one type of service, and the costs of the company's human resources department, as an example (Figure 13).

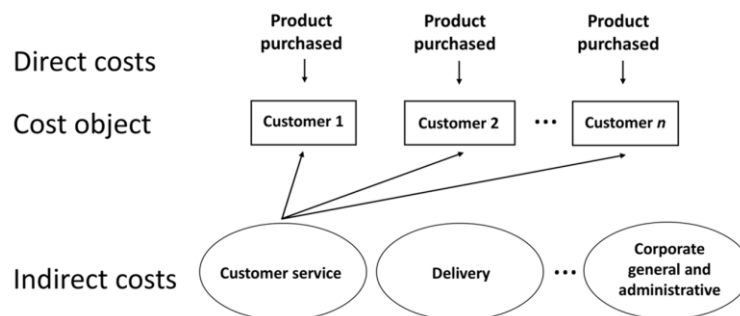
Figure 13. Example of a potential cost system for a small accounting firm.



As a final extension, let's consider the application of activity-based costing to the assessment of customer profitability. Some customers are easier to work with than others. They may require less time, fewer special orders, less frequent expediting, and fewer revisions to orders placed; they may be willing to accept more products in fewer shipments or deliveries; or they may be closer to our location such that delivery costs may be lower. In situations like these, an activity-based approach to understanding what it costs to service each customer can be extremely valuable. Take as an example a wholesale distributor. That distributor has many customers, many of whom purchase virtually identical products. If the company compares the revenues it receives and the cost of the products that the customers purchase, many of its customers may appear to be

roughly equally profitable. However, extending its review to include customer service, delivery, and other similar costs may present a different picture (**Figure 14**).

Figure 14. Example of a potential cost system for allocating customer-related costs.



Understanding which customers are more resource intensive and how much more resource intensive they are will allow a company to make better decisions as it works with them. It may decide to charge more for expedited deliveries, or to charge for those expedited situations that it hasn't been charging for, or it may realize a need to refine customer service processes to make them more efficient. It may even realize that there are some customers it would prefer to discontinue a relationship with. Either way, applying the activity-based costing concept to assess customer profitability may help management make more informed decisions relating to its customers.

To Use Activity-Based Costing or Not?

Activity-based costing has many advantages. It can result in a more accurate allocation of overhead costs to the cost objects in question, which in turn can result in better management decisions around issues like pricing, better cost control, and a keener focus on the parts of the process that matter or for which we can take actions that make a difference. On the downside, though, activity-based costing systems are not costless. They can be costly to implement and to maintain. So if we're going to use them, we need to continue to assess whether the benefits they offer in the way of better management decisions are sufficient to outweigh the costs of the system itself.