

LEARNING OBJECTIVES

After studying this chapter, you should be able to:

1. Describe how a costing system can have multiple cost objects
2. Outline four purposes for allocating costs to cost objects
3. Describe alternative criteria used to guide decisions related to cost allocations
4. Discuss key decisions faced when collecting costs in indirect cost pools
5. Describe how the single-rate cost allocation method differs from the dual-rate method
6. Explain how the choice of budgeted versus actual allocation rates changes the risks managers face
7. Distinguish between direct allocation, step-down, and reciprocal methods of allocating support department costs
8. Distinguish between the incremental and the stand-alone cost allocation method

The terminology of cost allocation

Key terms used in this chapter include the following:

- ◆ **Cost object.** Anything for which a separate measurement of costs is desired.
- ◆ **Direct costs of a cost object.** Costs that are related to the particular cost object and can be traced to it in an economically feasible way. The term *cost tracing* describes assigning direct costs to the chosen cost object.
- ◆ **Indirect costs of a cost object.** Costs that are related to the particular cost object but cannot be traced to it in an economically feasible way. The term *cost allocation* describes assigning indirect costs to the chosen cost object.

Examples of direct costs and indirect costs for a product and for an activity area include the following:

Cost Object	Example of a Direct Cost	Example of an Indirect Cost
<i>Product:</i> Microwave oven manufactured by a home appliance company	Materials assembled to make the microwave oven	Rent for manufacturing plant Rent is paid by the company, which manufactures 200 different products.
<i>Activity area:</i> Document photocopying by a law firm	Paper and liquids used in photocopying machine	Electricity used to run machine. Electricity metered to firm but not to individual machines.

Organizations differ in how they classify costs. A direct cost item in one organization, such as assembly labour or energy, can be an indirect cost item in another organization.

Purposes of Cost Allocation

Purpose	Illustrations
1. To provide information for economic decisions	<ul style="list-style-type: none"> ◆ To decide whether to add a new airline flight ◆ To decide whether to make a component part of a television set or to purchase it from another manufacturer ◆ To decide on the selling price for a customized product or service
2. To motivate managers and employees	<ul style="list-style-type: none"> ◆ To encourage the design of products that are simpler to manufacture or less costly to service ◆ To encourage sales representatives to push high-margin products or services
3. To justify costs or compute reimbursement	<ul style="list-style-type: none"> ◆ To cost products at a "fair" price, often done with government defence contracts ◆ To compute reimbursement for a consulting firm that is paid a percentage of the cost savings resulting from the implementation of its recommendations
4. To measure income and assets for meeting external regulatory and legal reporting obligations	<ul style="list-style-type: none"> ◆ To cost inventories for financial reporting to stockholders, bondholders, and so on (under generally accepted accounting principles, inventoriable costs include manufacturing costs but exclude R&D, marketing, distribution, and customer service costs) ◆ To cost inventories for reporting to tax authorities

Why Allocate Corporate and Other Support Costs to Divisions and Departments?

Extensive survey evidence exists on the reasons why managers allocate corporate and other support costs to divisions and departments.

Canadian executives* cited the following objectives, ranked in order of importance:

1. To determine costs
2. To evaluate profit centres
3. To fix accountability
4. To allocate costs per usage
5. To promote more effective resource usage
6. To foster cost awareness

These executives encountered the following difficulties in implementing their cost allocation programs: making the allocations results in losses being reported, friction arises among managers, market prices are unstable, allocations are perceived as arbitrary, usage is hard to monitor, agreement on the allocation method is difficult to obtain, and the allocation process is time-consuming.

A survey[†] of U.S. managers revealed the following purposes, ranked by frequency:

1. To remind profit centre managers that indirect costs exist and that profit centre earnings must be adequate to cover some share of those costs
2. To encourage the use of central services that would otherwise be underutilized
3. To stimulate profit centre managers to put pressure on central managers to control service costs

A similar survey was conducted among Australian[‡] and U.K.[§] managers. The two sets of managers gave the same ranking of the following reasons for allocating corporate costs to divisions (in order of importance):

1. To acknowledge that divisions would incur such costs if they were independent units or if the services were not provided centrally
2. To make division managers aware that central costs exist
3. To stimulate divisional managers to put pressure on central support managers to control costs
4. To stimulate divisional managers to economize in usage of central services

Criteria for Guiding Cost Allocation Decisions

1. **Cause and effect.** Using this criterion, managers identify the variable or variables that cause resources to be consumed. For example, managers may use hours of testing as the variable when allocating the costs of a quality testing area to products. Cost allocations based on the cause-and-effect criterion are likely to be the most credible to operating personnel.
2. **Benefits received.** Using this criterion, managers identify the beneficiaries of the outputs of the cost object. The costs of the cost object are allocated among the beneficiaries in proportion to the benefits each receives. For example, consider a corporatewide advertising program that promotes the general image of the corporation rather than any individual product. The costs of this program may be allocated on the basis of division sales; the higher the sales, the higher the division's allocated cost of the advertising program. The rationale behind this allocation is the belief that divisions with higher sales levels apparently benefited from the advertising more than did divisions with lower sales levels and therefore ought to be allocated more of the advertising costs.
3. **Fairness or equity.** This criterion is often cited in government contracts when cost allocations are the basis for establishing a price satisfactory to the government and its supplier. The cost allocation here is viewed as a "reasonable" or "fair" means of establishing a selling price in the minds of the contracting parties. For most allocation decisions, fairness is a lofty objective rather than an operational criterion.
4. **Ability to bear.** This criterion advocates allocating costs in proportion to the cost object's ability to bear them. An example is the allocation of corporate executive salaries on the basis of divisional operating income; the presumption is that the more profitable divisions have a greater ability to absorb corporate headquarters' costs.

Allocating costs of support departments

An operating department adds value to a producer or service that is observable by a customer.

A support department provides the services that maintain other internal departments.

Support department cost allocation methods

Consider Castleford Engineering, which manufactures engines used in electric power generating plants. Castleford has two support departments and two operating departments in its manufacturing facility:

Support Departments	Operating Departments
Plant maintenance	Machining
Information systems	Assembly

Costs are accumulated in each department for planning and control purposes. For inventory costing, however, the support department costs of Castleford must be allocated to the operating departments. The data for our example are listed in Exhibit 13-6. The percentages in this table can be illustrated by reference to the Plant Maintenance Department. This support department provides a total of 8,000 hours of support work: 20% ($1,600 \div 8,000$) goes to the Information Systems support department; 30% ($2,400 \div 8,000$) to the Machining Department; and 50% ($4,000 \div 8,000$) to the Assembly Department.

Direct Allocation Method The **direct allocation method** (often called the **direct method**) is the most widely used method of allocating support department costs. This method allocates each support department's costs directly to the operating departments. Exhibit 13-7 illustrates this method using the data in Exhibit 13-6. Note how this method ignores both the 1,600 hours of support time rendered by the Plant Maintenance Department to the Information Systems Department and the 200 hours of support time rendered by Information Systems to Plant Maintenance. The base used to allocate Plant Maintenance is the budgeted total maintenance labour-hours worked in the operating departments: $2,400 + 4,000 = 6,400$ hours. This amount excludes the 1,600 hours of support time provided by Plant Maintenance to Information Systems. Similarly, the base used for allocation of Information Systems costs is $1,600 + 200 = 1,800$ hours of computer time, which excludes the 200 hours of support time provided by Information Systems to Plant Maintenance.

The benefit of the direct method is its simplicity. There is no need to predict the usage of support department resources by other support departments.

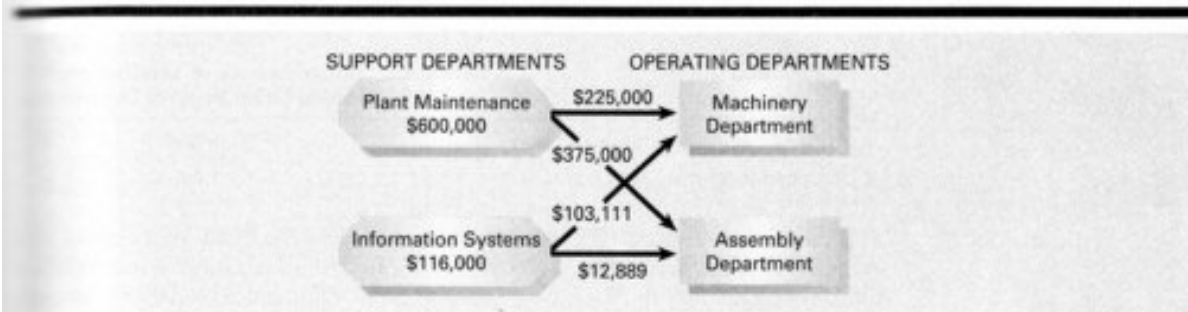
EXHIBIT 13-6

Data for Allocating Support Department Costs at Castleford Engineering for 19_7

	Support Departments		Operating Departments		Total
	Plant Maintenance	Information Systems	Machining	Assembly	
Budgeted manufacturing overhead costs before any interdepartment cost allocations	\$600,000	\$116,000	\$400,000	\$200,000	\$1,316,000
Support work furnished:					
By Plant Maintenance:					
Budgeted labour-hours	—	1,600	2,400	4,000	8,000
Percentage	—	20%	30%	50%	100%
By Information Systems:					
Budgeted computer time	200	—	1,600	200	2,000
Percentage	10%	—	80%	10%	100%

EXHIBIT 13-7

Direct Method of Allocating Support Department Costs for 19_7 at Castleford Engineering



	Support Departments		Operating Departments		Total
	Plant Maintenance	Information Systems	Machining	Assembly	
Budgeted manufacturing overhead costs before any interdepartment cost allocations	\$600,000	\$116,000	\$400,000	\$200,000	\$1,316,000
Allocation of Plant Maintenance ($\frac{3}{8}$, $\frac{5}{8}$)*	(600,000)		225,000	375,000	
	<u>\$ 0</u>				
Allocation of Information Systems ($\frac{1}{2}$, $\frac{1}{2}$)†		(116,000)	103,111	12,889	
		<u>\$ 0</u>			
Total budgeted manufacturing overhead of operating departments			<u>\$728,111</u>	<u>\$587,889</u>	<u>\$1,316,000</u>

* $\frac{3}{8}$ is $(2,400 + 4,000)$, or 6,400 hours; $2,400 + 6,400 = \frac{3}{8}$; $4,000 + 6,400 = \frac{5}{8}$.
 † $\frac{1}{2}$ is $(1,600 + 200)$, or 1,800 hours; $1,600 + 1,800 = \frac{1}{2}$; $200 + 1,800 = \frac{1}{2}$.

Step-Down Allocation Method Some organizations use the **step-down allocation method** (sometimes called the **step allocation method**, or **sequential allocation method**), which allows for *partial* recognition of the services rendered by support departments to other support departments. This method requires the support departments to be ranked (sequenced) in the order in which the step-down allocation is to proceed. The costs in the first-ranked support department are allocated to the other support departments and to the operating departments. The costs in the second-ranked department are allocated to those support departments not yet allocated and to the operating departments. This procedure is followed until the costs in the last-ranked support department have been allocated to the operating departments. Two ways to determine the sequence to allocate support department costs are as follows:

- ◆ **Approach A.** Rank support departments on the percentage of the support department's total support provided to other support departments. The support department with the highest percentage is allocated first. The support department with the lowest percentage is allocated last. In our Castleford Engineering example, the chosen order would be:

Percentage of Total Service Provided to Other Support Departments	
1. Plant Maintenance	20%
2. Information Systems	10%

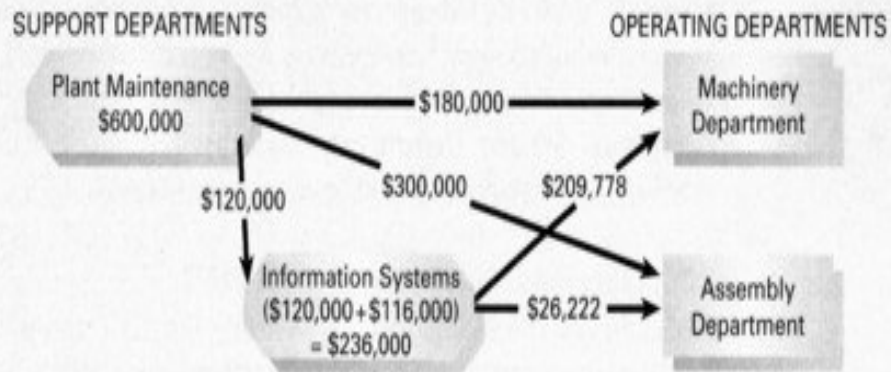
- ◆ **Approach B.** Rank support departments on the total dollars of service provided to other support departments. In our Castleford Engineering example, the chosen order would be:

Dollar Amount of Total Service Provided to Other Support Departments	
1. Plant Maintenance ($0.20 \times \$600,000$)	\$120,000
2. Information Systems ($0.10 \times \$116,000$)	11,600

Exhibit 13-8 shows the step-down method where the Plant Maintenance costs of \$600,000 are allocated first; \$120,000 is allocated to Information Systems (20% of \$600,000); \$180,000 to Machining (30% of \$600,000); and \$300,000 to Assembly (50% of \$600,000). The costs in Information Systems now total \$236,000 (\$116,000 + \$120,000 from the first-round allocation). This \$236,000 amount is then allocated between the two operating departments—\$209,778 ($\frac{2}{3} \times \$236,000$) to Machining and \$26,222 ($\frac{1}{3} \times \$236,000$) to Assembly.

Under the step-down method, once a support department's costs have been allocated, no subsequent support department costs are allocated or circulated back to it. Thus, once the Plant Maintenance department costs are allocated, they receive no further allocation from other (lower-ranked) support departments.

Step-Down Method of Allocating Support Department Costs for 19_7 at Castleford Engineering



	Support Departments		Operating Departments		
	Plant Maintenance	Information Systems	Machining	Assembly	Total
Budgeted manufacturing overhead costs before any interdepartment cost allocations	\$600,000	\$116,000	\$400,000	\$200,000	\$1,316,000
Allocation of Plant Maintenance ($\frac{2}{10}$, $\frac{3}{10}$, $\frac{5}{10}$)*	(600,000)	120,000	180,000	300,000	
	<u>\$ 0</u>	<u>236,000</u>			
Allocation of Information Systems ($\frac{8}{10}$, $\frac{2}{10}$)†		(236,000)	209,778	26,222	
		<u>\$ 0</u>			
Total budgeted manufacturing overhead of operating departments			<u>\$789,778</u>	<u>\$526,222</u>	<u>\$1,316,000</u>

*Base is (1,600 + 2,400 + 4,000), or 8,000 hours; $1,600 \div 8,000 = \frac{2}{10}$; $2,400 \div 8,000 = \frac{3}{10}$; $4,000 \div 8,000 = \frac{5}{10}$.

†Base is (1,600 + 200), or 1,800 hours; $1,600 \div 1,800 = \frac{8}{9}$; $200 \div 1,800 = \frac{1}{9}$.

Exercises

13-16 Cost allocation in hospitals, alternative allocation criteria. Dave Meltzer went to Lake Louise for his annual winter vacation. Unfortunately, he suffered a severe break in his ankle while skiing and had to spend two days at the Foothills Hospital. Meltzer's insurance company received a \$4,800 bill for his two-day stay. One item that caught Meltzer's eye was an \$11.52 charge for a roll of cotton. Meltzer was a salesman for Johnson & Johnson and knew that the cost to the hospital of the roll of cotton would be in the \$2.20 to \$3 range. He asked for a breakdown of how the \$11.52 charge was derived. The accounting office of the hospital sent him the following information:

a. Invoiced cost of cotton roll	\$ 2.40
b. Processing of paperwork for purchase	0.60
c. Supplies room management fee	0.70
d. Operating-room and patient-room handling charge	1.60
e. Administrative hospital costs	1.10
f. Research-related recoupment	0.60
g. Malpractice insurance costs	1.20
h. Cost of treating uninsured patients	2.72
i. Profit component	0.60
Total	<u>\$11.52</u>

Meltzer believes the overhead charge is obscene. He comments, "There was nothing I could do about it. When they come in and dab your stitches, it's not as if you can say, 'Keep your cotton roll. I brought my own.'"

REQUIRED

1. Compute the overhead rate Foothills Hospital charged on the cotton roll.
2. What criteria might Foothills use to justify allocation of each of the overhead items (b) through (i) in the preceding list? Examine each item separately, and use the allocation criteria listed in Exhibit 13-2 in your answer.
3. What should Meltzer do about the \$11.52 charge for the cotton roll?

13-18 Single-rate versus dual-rate allocation methods, support department

The power plant that services all manufacturing departments of West Engineering has a budget for the coming year. This budget has been expressed in the following terms on a monthly basis:

Manufacturing Departments	Needed at Practical Capacity Production Level* (kilowatt-hours)	Average Expected Monthly Usage (kilowatt-hours)
Rockford	10,000	8,000
Peoria	20,000	9,000
Hammond	12,000	7,000
Kankakee	8,000	6,000
Totals	50,000	30,000

*This factor was the most influential in planning the size of the power plant.

The expected monthly costs for operating the department during the budget year are \$15,000: \$6,000 variable and \$9,000 fixed.

REQUIRED

1. Assume that a single cost pool is used for the power plant costs. What dollar amounts will be allocated to each manufacturing department? Use (a) practical capacity and (b) average expected monthly usage as the allocation bases.
2. Assume a dual-rate method; separate cost pools for the variable and fixed costs are used. Variable costs are allocated on the basis of expected monthly usage. Fixed costs are allocated on the basis of practical capacity. What dollar amounts will be allocated to each manufacturing department? Why might you prefer the dual-rate method?

- 13-20 Dual-rate cost allocation method, budgeted versus actual costs and quantities (continuation of 13-19).** Fruit Juice, Inc. decides to examine the effect of using a dual-rate method for allocating indirect trucking costs to each truck trip. At the start of 19_7, the budgeted indirect costs were:

Variable indirect costs per trip	\$1,500
Fixed indirect costs	\$200,000

The actual results for the 300 round trips made in 19_7 were:

Variable indirect costs	\$465,000
Fixed indirect costs	<u>180,000</u>
	<u>\$645,000</u>

Assume all other information to be the same as in Exercise 13-19.

REQUIRED

- What is the indirect cost per truck trip with a dual-rate method when (a) variable indirect costs are allocated using the budgeted variable indirect rate times actual trips made and (b) fixed indirect costs are allocated using the budgeted fixed indirect cost rate times budgeted trips to be made?
- Compare the results for requirement 1 with that in requirements 1(a) and (b) for Exercise 13-19. From the viewpoint of the Orange Juice Division, what are the effects of using a dual-rate method rather than a single-rate method?

- 13-21 Allocation of common costs.** Sam, Sarah, and Tony are members of the Toronto Fire Department. They share a penthouse apartment that has a lounge room with the latest 50" TV. Tony owns the apartment, its furniture, and the 50" TV. He can subscribe to a cable television company that has the following packages available:

Package	Rate per Month
A. Basic news	\$32
B. Premium movies	25
C. Premium sports	30
D. Basic news and premium movies	50
E. Basic news and premium sports	54
F. Premium movies and premium sports	48
G. Basic news, premium movies, and premium sports	70

Sam is a TV news junkie, has average interest in movies and zero interest in sports ("They're overpaid jocks"). Sarah is a movie buff, likes sports, and avoids the news ("It's all depressing anyway"). Tony is into sports in a big way, has average interest in news, and zero interest in movies ("He always falls asleep before the end"). They all agree that the purchase of the \$70 total package is a "win-win-win" situation.

Each works on a different eight-hour shift at the fire station, so conflicts in viewing are minimal.

REQUIRED

- What criteria might be used to guide the choice about how to allocate the \$70 monthly cable fee between Sam, Sarah, and Tony?
- Outline two methods of allocating the \$70 among Sam, Sarah, and Tony.

13-23 Support department cost allocation; direct and step-down methods

Phoenix Consulting provides outsourcing services and advice to both government and corporate clients. For costing purposes, Phoenix classifies its departments into two support departments (Administrative/Human Resources and Information Systems) and two operating departments (Government Consulting and Corporate Consulting). For the first quarter of 19_7, Phoenix incurs the following costs in its four departments:

Administrative/Human Resources (A/H)	\$600,000
Information Systems (IS)	\$2,400,000
Government Consulting (GOVT)	\$8,756,000
Corporate Consulting (CORP)	\$12,452,000

The actual level of support relationships between the four departments for the first quarter of 19_7 was:

Supplied By:	Used By:			
	A/HR	IS	GOVT	CORP
A/HR	—	25%	40%	35%
IS	10%	—	30%	60%

The Administrative/Human Resource support percentages are based on head count. The Information Systems support percentages are based on actual hours of computer time used.

REQUIRED

1. Allocate the two support department costs to the two operating departments using the following methods.
 - a. Direct method
 - b. Step-down method (allocate Administrative/Human Resources first)
 - c. Step-down method (allocate Information Systems first)
2. Compare and explain differences in the support department costs allocated to each operating department.
3. What criteria could determine the sequence for allocating support departments using the step-down method? What criterion should Phoenix use if government consulting jobs require the step-down method?