

New Opportunities for the Development of Education at the Technical University of Liberec

Specific objective A2: Development in the field of distance learning, online learning
and blended learning

NPO_TUL_MSMT-16598/2022



Learning Material for VM New Challenges for Management Accounting.

Chapter 7: Activity Based Costing.

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**Funded by
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Chapter 7: Activity Based Costing

Learning objectives

1. Explain how broad averaging undercosts and overcosts products or services
2. Present three guidelines for refining a costing system
3. Distinguish between simple and activity-based costing systems
4. Describe a four-part cost hierarchy
5. Cost products or services using activity-based costing
6. Evaluate the costs and benefits of implementing activity-based costing systems
7. Explain how managers use activity-based costing systems in activity-based management



Key words

activity, activity-based costing (ABC), activity-based management (ABM), cost hierarchy, batch-level costs, cost smoothing, facility-sustaining costs, output-unit-level costs, product overcosting, product-sustaining costs, product undercosting, product-cost cross-subsidisation, refined costing system, service-sustaining costs, time-driven activity-based costing (TDABC) systems



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7.1 Undercosting and Overcosting



Historically, companies (such as television and automobile manufacturers) produced a limited variety of products. These companies used few overhead resources to support these simple operations, so indirect (or overhead) costs were a relatively small percentage of total costs. Managers used simple costing systems to allocate overhead costs broadly in an easy, inexpensive, and reasonably accurate way. But as product diversity and indirect costs increased, broad averaging led to inaccurate product costs. That's because simple **peanut-butter costing** (*yes, that's what it's called*) broadly averages or spreads the cost of resources uniformly to cost objects (such as products or services) when, in fact, the individual products or services use those resources in nonuniform ways.

Cost smoothing represents a costing approach that uses broad averages to uniformly assign the cost of resources to cost objects (such as products, services or customers) when the individual products, services or customers in fact use those resources in a non-uniform way. Cost smoothing can lead to undercosting or overcosting of products or services:

Product undercosting: a product consumes a relatively high level of resources but is reported to have a relatively low total cost.

Product overcosting: a product consumes a relatively low level of resources but is reported to have a relatively high total cost.

Companies that **undercost products** may actually make sales that result in losses under the erroneous impression that these sales are profitable. That is, these sales bring in less revenue than the cost of the resources they use.

Companies that **overcost products** run the risk of losing market share to existing or new competitors. Because these products actually cost less than what is reported to management, the company could cut selling prices to maintain or enhance market shares and still make a profit on each sale.

Product-cost cross-subsidization means that if a company undercosts one of its products, it will overcost at least one of its other products. Similarly, if a company overcosts one of its products, it will undercost at least one of its other products.

Applying a simple costing system, using a single indirect-cost pool, may lead to a product-cost cross-subsidization. Companies using a single costing system allocate indirect costs using a single indirect-cost rate.

After finding the budgeted cost of the items to be produced, the managers work through the **five-step decision-making process** to decide how well such companies respond to the threat that their competitors pose to their product's market share.

7.2 Refining a Costing System

A **refined costing system** reduces the use of broad averages for assigning the cost of resources to cost objects. It provides better measurement of the costs of indirect resources

used by different cost objects, no matter how differently various cost objects use indirect resources.

There are three principal **reasons** that have accelerated **the demand for refinements**:

- **Increase in product diversity:** The growing demand for customized products has led managers to increase the variety of products and services their companies offer. These products differ in the demands they place on the resources needed to produce them because of differences in volume, process, and complexity. The use of broad averages fails to capture these differences in demand and leads to distorted and inaccurate cost information.
- **Increase in indirect costs:** The use of product and process technology such as computer-integrated manufacturing (CIM) and flexible manufacturing systems (FMS) has led to an increase in indirect costs and a decrease in direct costs, particularly direct manufacturing labor costs. Managing complex technology and producing diverse products requires additional support function resources for activities such as production scheduling, product and process design, and engineering. Because direct manufacturing labor is not a cost driver of these costs, allocating indirect costs on the basis of direct manufacturing labor does not accurately measure how resources are being used by different products.
- **Competition in product markets:** As markets have become more competitive, managers have felt the need to obtain more accurate cost information to help them make important strategic decisions, such as how to price products and which products to sell.

The three main **guidelines for refining a costing system** are:

1. **Direct-cost tracing:** Reduce the amount of costs classified as indirect, thereby minimizing the extent to which costs have to be allocated, rather than traced.
2. **Indirect-cost pools:** Expand the number of indirect-cost pools until each pool is more homogeneous. All costs in a homogeneous cost pool should have the same or a similar cause-and-effect (or benefits-received) relationship with a single cost driver that is used as the cost-allocation base.
3. **Cost-allocation bases:** Whenever possible, managers should use the cost driver (the cause of indirect costs) as the cost-allocation base for each homogeneous indirect-cost pool (the effect).

7.3 Activity-Based Costing Systems

A **simple costing system** has few indirect (often one) cost rates and allocates costs broadly. In today's complex manufacturing environment, this can lead to inaccurate product costs.

Activity-based costing (ABC) refines a costing system by identifying individual activities as the fundamental cost objects. To help make strategic decisions, ABC systems identify activities in all functions of the value chain.

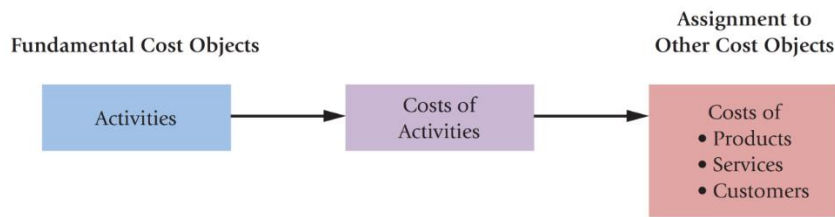


Figure 7.1 ABC systems identifying activities

Source: DATAR, S. M., RAJAN, M. V. Managerial Accounting, Making Decisions and Motivating Performance

For **implementing an ABC system** in the business, the managers from various teams identify activities. Such activity descriptions form the basis of the activity-based costing system. The ABC system then uses these activities to break down its current single indirect-cost pool into finer pools of costs related to the various activities. The management should focus on activities that account for a sizable fraction of indirect costs and combines activities that have the same cost driver into a single activity.

For **identifying the cost of each activity and the related cost driver**, companies use the three guidelines for refining a costing system:

1. For **direct-cost tracing**, a company's ABC system subdivides the single indirect-cost pool into smaller cost pools related to the different activities. Out of those pools, the direct costs are kept aside as they can be economically traced to specific cost objects.
2. For identifying **indirect-cost pools** of a company, each of the activity-related cost pools should be homogeneous. That is, each activity cost pool includes only those narrow and focused sets of costs that have the same cost driver. Determining costs of activity pools requires assigning costs accumulated in various account classifications to each of the activity cost pools, commonly referred to as first-stage allocation. In the second-stage allocation, costs of activity cost pools are allocated to products.
3. For each activity cost pool, companies use the cost driver (whenever possible) as the **cost-allocation base**. To identify cost drivers, managers consider various alternatives and use their knowledge of operations to choose among them.

The logic of ABC systems is twofold:

- **First**, when managers structure activity cost pools more finely with cost drivers for each activity cost pool as the cost-allocation base, it leads to more accurate costing of activities.
- **Second**, allocating these costs to products by measuring the cost-allocation bases of different activities used by different products leads to more accurate product costs.

ABC systems commonly use **a cost hierarchy** with four levels of costs to identify cost-allocation bases that are cost drivers of the activity cost pools:

1. **Output unit–level costs** are the costs of activities performed on each individual unit of a product or service. *For example, machine operations costs related to the activity of running an automated molding machines are output unit–level costs because, over time, the cost of this activity increases with additional units of output produced (or machine-hours used).*
2. **Batch-level costs** are the costs of activities related to a group of units of a product or service rather than each individual unit of product or service. Setup costs are an example of batch-level costs, as this cost is incurred once for each batch, regardless of the size of the batch.
3. **Product-sustaining costs (service-sustaining costs)** are the costs of activities undertaken to support individual products or services regardless of the number of units or batches in which the units are produced. *For example, design costs are product-sustaining costs. Over time, design costs depend largely on the time designers spend on designing and modifying a product, its structure, and its process.*
4. **Facility-sustaining costs** are the costs of activities that cannot be traced to individual products or services but that support the organization as a whole. In many companies, the general administration costs (including top management compensation, rent, and building security) are facility-sustaining costs.

It is usually difficult to find a good cause-and-effect relationship between these costs and the cost-allocation base, so some companies deduct facility-sustaining costs as a separate lump-sum amount from operating income rather than allocate them to products. In such cases, managers need to keep in mind that when making decisions based on costs (such as pricing), some lump-sum costs have not been allocated.

Other companies allocate facility-sustaining costs to products on some basis – for example, direct manufacturing labor-hours – because management believes all costs should be allocated to products even though these costs are allocated to products in a somewhat arbitrary way.

7.4 Implementing Activity-Based Costing

In order to implement activity-based costing, a **seven-step procedure** should be followed.

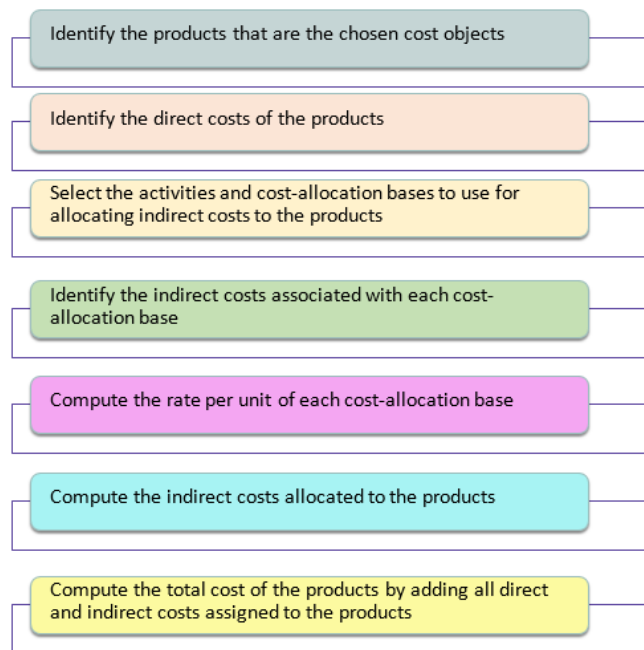


Figure 7.2 *Seven-step approach to ABC*

Source: DATAR, S. M., RAJAN, M. V. *Managerial Accounting, Making Decisions and Motivating Performance*

Step 1: Identify the products that are the chosen cost objects.

Step 2: Identify the direct costs of the products.

Step 3: Select the activities and cost-allocation bases to use for allocating indirect costs to the products. Two factors must be considered while choosing a cost-allocation base:

- Identifying the cost-allocation bases defines the number of activity pools into which costs must be grouped in an ABC system.
- Availability of reliable data and measures

Step 4: Identify the indirect costs associated with each cost-allocation base.

- All costs do not fit neatly into activity categories. Often, costs may first need to be allocated to activities before the costs of the activities can be allocated to products.

Step 5: Compute the rate per unit of each cost-allocation base.

Step 6: Compute the indirect costs allocated to the products.

Step 7: Compute the total cost of the products by adding all direct and indirect costs assigned to the products.

Figure 7.3 shows an example of Activity-Based Costing System implemented in a company.

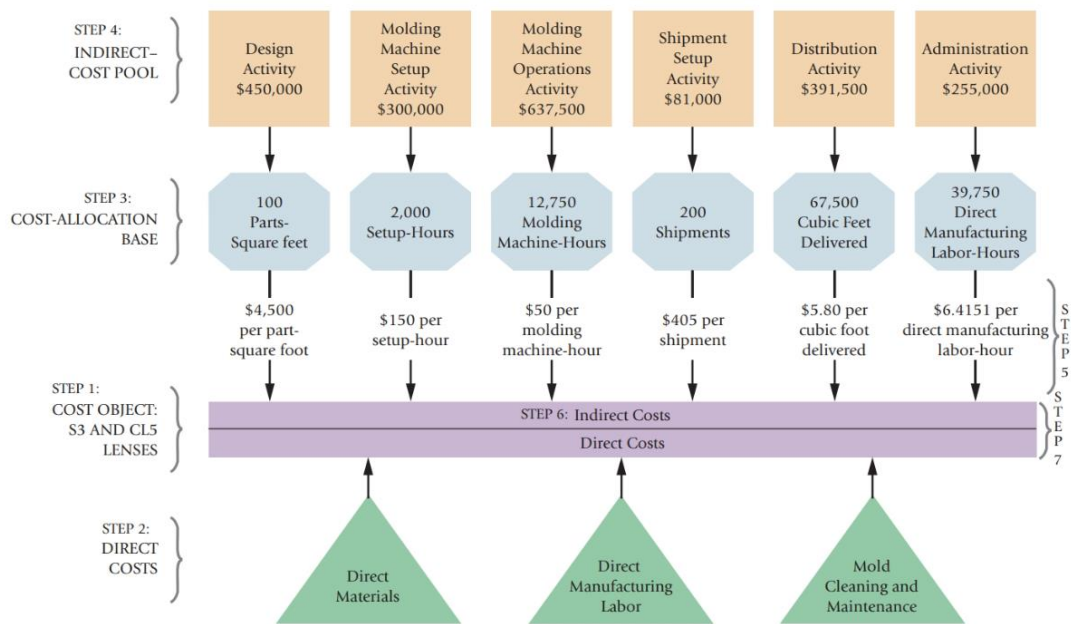


Figure 7.3 Example of the seven-step approach to ABC in a company

Source: DATAR, S. M., RAJAN, M. V. *Managerial Accounting, Making Decisions and Motivating Performance*

There are two features of ABC systems:

1. These systems **identify all costs used by products**, whether the costs are variable or fixed in the short run. When making long-run strategic decisions using ABC information, managers want revenues to exceed total costs. Otherwise, they will continue to make losses and will be unable to continue in business.
2. **Recognizing the hierarchy of costs** is critical when allocating costs to products. Management accountants use the cost hierarchy to first calculate the total costs of each product. They then derive per-unit costs by dividing total costs by the number of units produced.

The benefit of an ABC system is that it provides information to make better decisions. However, managers must weigh this benefit against the measurement and implementation costs of an ABC system.

7.5 ABC and Traditional Approach Comparison

With **the traditional approach**, overheads are first assigned to product cost centres and then absorbed by cost units based on an overhead recovery rate (using direct labour hours worked on the cost units or some other approach) for each cost centre. With **activity-based costing**, overheads are assigned to cost pools and then cost units are charged with overheads to the extent that they drive the costs in the various pools.

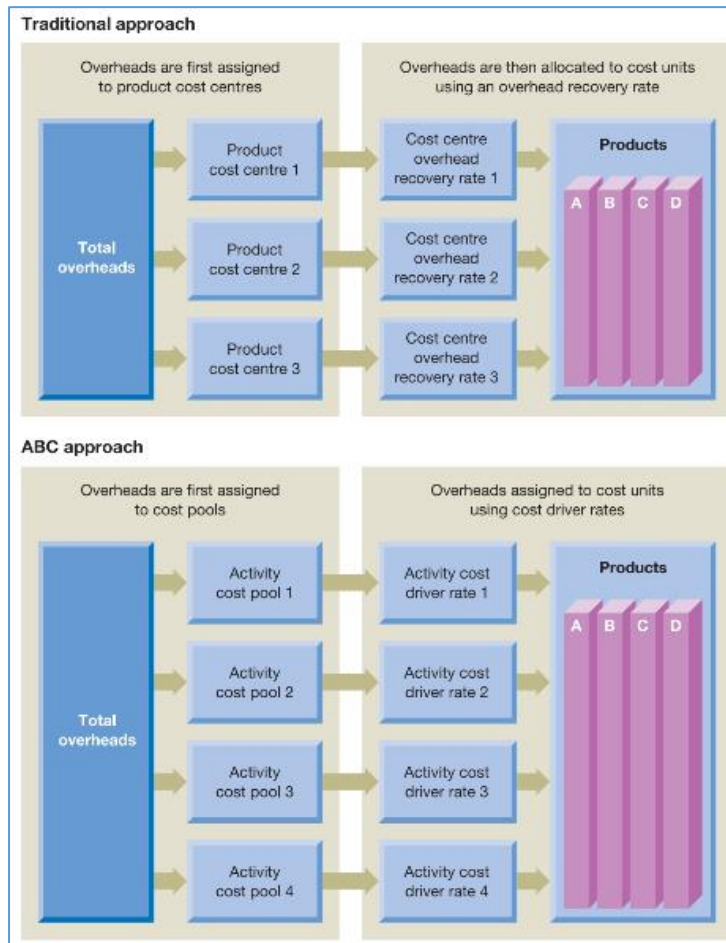


Figure 7.4 Traditional versus activity-based costing

Source: ATRILL, P. and E.J. McLANEY. Management accounting for decision makers

If we compare a simple costing system using a single indirect-cost pool and the ABC system, we notice that using only an output unit-level allocation base as the single indirect-cost pool system tends to overcost or undercost the product-mix in an organization.

However, the homogeneous cost pools and the choice of cost-allocation bases, tied to the cost hierarchy, give managers greater confidence in the activity and product cost numbers from the ABC system.

	Simple Costing System Using a Single Indirect-Cost Pool (1)	ABC System (2)	Difference (3) = (2) – (1)
Direct-cost categories	2	3	1
	Direct materials	Direct materials	
	Direct manufacturing labor	Direct manufacturing labor	
		Direct mold cleaning and maintenance labor	
Total direct costs	\$2,595,000	\$2,865,000	\$270,000
Indirect-cost pools	1	6	5
	Single indirect-cost pool allocated using direct manufacturing labor-hours	Design (parts-square feet) ¹	
		Molding machine setup (setup-hours)	
		Machine operations (molding machine-hours)	
		Shipment setup (number of shipments)	
		Distribution (cubic feet delivered)	
		Administration (direct manufacturing labor-hours)	
Total indirect costs	\$2,385,000	\$2,115,000	(\$270,000)
Total costs assigned to simple (S3) lens	\$3,525,000	\$2,998,953	(\$526,047)
Cost per unit of simple (S3) lens	\$58.75	\$49.98	(\$8.77)
Total costs assigned to complex (CL5) lens	\$1,455,000	\$1,981,047	\$526,047
Cost per unit of complex (CL5) lens	\$97.00	\$132.07	\$35.07

¹Cost drivers for the various indirect-cost pools are shown in parentheses.

Figure 7.5 Comparing alternative costing systems

Source: BHIMANI, A. et al. Management and Cost Accounting

Figure 7.5 compares the simple costing system using a single indirect-cost pool of a company Plastim and the ABC system.

Note three points in this figure, consistent with the guidelines for refining a costing system: (1) ABC systems trace more costs as direct costs; (2) ABC systems create homogeneous cost pools linked to different activities; and (3) for each activity-cost pool, ABC systems seek a cost-allocation base that has a cause-and-effect relationship with costs in the cost pool.

7.6 The Costs and Benefits of Implementing ABC Systems

ABC system is likely to be **most beneficial** when:

- Significant amounts of indirect costs are allocated using only one or two cost pools.
- All or most indirect costs are identified as output unit-level costs (few indirect costs are described as batch-level costs, product-sustaining costs, or facility-sustaining costs).
- Products make diverse demands on resources because of differences in volume, process steps, batch size, or complexity.

- Products that a company is well suited to make and sell show small profits, whereas products that a company is less suited to produce and sell show large profits.
- Operations staff has substantial disagreement with the reported costs of manufacturing and marketing products and services.

Some of the **costs and limitations of an ABC system** are as follows:

- ABC systems require managers to estimate costs of activity pools and to identify and measure cost drivers for these pools to serve as cost-allocation bases. These measurements are costly and the rates need to be updated regularly.
- As ABC systems get very detailed and more cost pools are created, more allocations are necessary to calculate activity costs for each cost pool, which increases the chances of misidentifying the costs of different activity cost pools.
- Occasionally, managers are forced to use allocation bases for which data are readily available rather than allocation bases they would have liked to use. Hence, when incorrect cost-allocation bases are used, activity-cost information can be misleading.

While implementing ABC system, some of **the behavioral issues** that managers must be sensitive to are:

- Gaining support of top management and creating a sense of urgency for the ABC effort. This requires managers to clearly communicate the strategic benefits of the ABC project.
- Creating a guiding coalition of managers throughout the value chain for the ABC effort. Getting managers to cooperate and take the initiative for implementing ABC is essential for gaining the required expertise, the proper credibility, greater commitment, valuable coordination, and the necessary leadership.
- Educating and training employees in ABC as a basis for employee empowerment. Disseminating information about ABC throughout an organization allows workers in all areas of a business to use their knowledge of ABC to make improvements.
- Seeking small short-run successes as proof that the ABC implementation is yielding results. Showing how ABC information has helped improve a process and save costs, even if only in small ways, motivates the team to stay on course and build momentum.
- Recognizing that ABC information is not perfect because it balances the need for better information against the costs of creating a complex system that few managers and employees can understand. Managers must recognize both the value and the limitations of ABC and not oversell it. Open and honest communication about ABC ensures that managers use ABC thoughtfully to make good decisions.

7.7 Activity-Based Management (ABM)

Activity-based management (ABM) is a method of management decision making that uses activity-based costing information to improve customer satisfaction and

profitability. Broadly, ABM includes decisions about pricing and product mix, cost reduction, process improvement, and product and process design.

1. **Pricing and product-mix decisions:** An ABC system gives managers information about the costs of making and selling diverse products. With this information, they can make pricing and product-mix decisions.
2. **Cost reduction and process improvement decisions:** Manufacturing and distribution personnel use ABC systems to focus on how and where to reduce costs. Managers set cost reduction targets in terms of reducing the cost per unit of the cost-allocation base in different activity areas. The supervisor attempts to take out only those costs that are non-value added. Controlling physical cost drivers is another fundamental way that operating personnel manage costs.
3. **Design decisions:** ABC systems help managers to evaluate the effect of current product and process designs on activities and costs and to identify new designs to reduce costs.
4. **Planning and managing activities:** Most managers implementing ABC systems for the first time start by analyzing actual costs to identify activity-cost pools and activity-cost rates. Managers then calculate a budgeted rate that they use for planning, making decisions, and managing activities. At year-end, managers compare budgeted costs and actual costs to evaluate how well activities were managed and make adjustments for underallocated or overallocated indirect costs for each activity using methods. As activities and processes change, managers calculate new activity-cost rates.

The widespread use of ABC systems in service and merchandising companies reinforces the idea that ABC systems are used by managers for strategic decisions rather than for inventory valuation. Service companies, in particular, find great value from ABC because a vast majority of their cost structure comprises indirect costs. The general approach to ABC in service and merchandising companies is similar to the ABC approach in manufacturing.

Summary



Product undercosting (or overcosting) occurs when a product or service consumes a relatively high (low) level of resources, but is reported to have a relatively low (high) cost.

Cost smoothing, a common cause of under-or over-costing, is the result of using broad averages that uniformly assign (spread) the cost of resources to products when the individual products use those resources in a non-uniform way.

Product-cost cross-subsidisation exists when one or more undercosted (overcosted) products results in one or more other products being overcosted (undercosted).

Refining a costing system means making changes that result in cost numbers that better measure the way cost objects (such as jobs) differentially use the resources of the organization. These changes can require additional direct-cost tracing, the choice of more indirect-cost pools, or the use of different cost-allocation bases.

An Activity Based Costing (ABC) approach differs from the traditional approach by its fundamental focus on activities. An ABC approach typically results in (a) more indirect-cost pools than the traditional approach, (b) more cost drivers used as cost-allocation bases, and (c) more frequent use of non-financial variables as cost-allocation bases.

A cost hierarchy is a categorization of costs into different cost pools on the basis of different classes of cost drivers or different degrees of difficulty in determining cause-and-effect (or benefits-received) relationships. Four levels of costs are output-unit-level costs, batch-level costs, product-sustaining costs and facility-sustaining costs.

In ABC, costs of activities are used to assign costs to other cost objects such as products or services.

Activity-based management (ABM) describes management decisions that use ABC information to satisfy customers and improve profits. ABM information can assist in decisions concerning pricing, product mix, costs reductions, process improvement, process or product redesign, and planning or managing activities.

Department-costing systems approximate ABC systems only when each department has a single activity or a single allocation base for different activities or when different products use departmental activities in the same proportions.

Organisational issues and employee behaviour affect the decision to adopt ABC as well as its consequences and perceived success.

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