

Chapter 4 – Activity-based Costing Systems

ABC costing may use five different cost categories that reflect different levels of production activities and that sum to total production costs.

- **Unit-level cost:** The cost of resources dedicated to an activity that is performed for every unit of product.
- **Batch-level cost:** The cost of resources dedicated to an activity that is performed for every batch of multiple units that receive simultaneous processing.
- **Product-level cost:** The cost of resources dedicated to an activity that is performed for every product line of units produced.
- **Customer-level cost:** The cost of resources dedicated to an activity that is performed for every unique customer served.
- **Facility-level cost:** The cost of resources dedicated to an activity that is performed for a production facility.

At a minimum, one can see that the ABC approach splits total production cost into more categories that reflect 'higher levels' of product aggregation.

LO 1: Describe how traditional costing could lead to under-costing and over-costing products.

The traditional cost system that many companies use does not assign indirect product costs, such as supervisors' salaries or utilities, directly to the product. Instead, using a traditional cost system, companies allocate indirect costs to the product according to a volume measure, such as how many direct labour hours or machine hours are used.

- The advantage of a traditional cost system is its simplicity and ready access of needed data. However, the resulting cost data are typically not as accurate as those that more complex and expensive cost systems provide.

A traditional cost system can be sufficient to meet managers' cost information requirements, particularly if

- (a) the proportion of indirect costs is relatively low compared to direct costs,
- (b) product diversity is low, or
- (c) the accuracy of cost information is not critical to the company's success.

In traditional cost systems complex products are under-costed, which simpler products are over-costed.

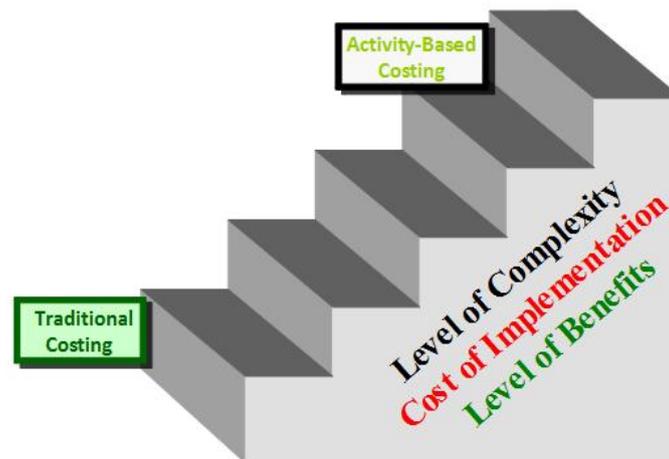
Three relatively low-cost steps could refine a traditional costing system to improve cost information for reporting and decision making.

1. Trace as many costs directly to the product as feasible by simply improving the use of existing documentation.
2. Categorize indirect costs, which are not easily traced to the product, into functional cost pools. A cost pool is a group of individual cost items that are grouped together because they have a similar function. Continue this categorisation until all indirect costs have been appropriately grouped into pools.
3. Use cost allocation to assign indirect costs to products. In general, cost allocation is a systematic process of assigning indirect costs to products or organisational units. Select an

appropriate cost allocation base, which is a measure that reflects the indirect cost to be allocated for each cost pool established in item 2. Ideally, the allocation base has an observable relationship to the cost pool and readily available data. Divide the indirect cost amount by the amount of the cost allocation base to obtain the cost allocation rate. Multiply the cost allocation rate by the amount of the cost allocation base that represents each product to measure the indirect cost allocated.

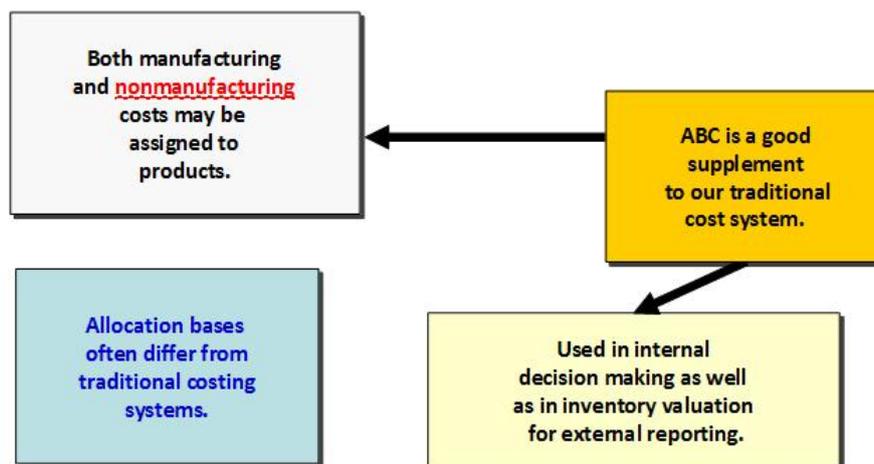
One indication of a possible need for a cost-system upgrade rather than a simple revision is when indirect costs are a large multiple of value-based direct costs, as in the previous example.

ABC vs Traditional Costing



LO 2: Discuss the four steps used in an activity-based costing system.

Activity-based costing: A costing method that, first, traces costs to activities, which act as activity-cost pools and second, assigns these costs to goods and services based on how much each good or service uses the activities.

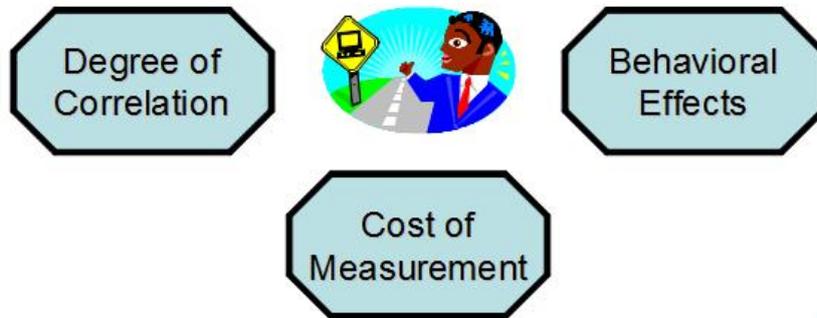


Activity: Any discrete task that an organization undertakes to make or deliver a good or service.

Trace: Accurately estimating the costs of resources used, which are resources consumed to perform a specific activity.

Cost driver: A plausible explanation of the cost to perform an activity.

A characteristic of an event or activity that results in the incurrence of costs. In selecting a cost driver, we must consider . . .



Cost-driver rate: The cost of resources consumed to perform an activity per unit of the cost driver.

Activity-based analysis uses **four steps** to measure the cost of goods and services:

1. Identify and classify the activities related to the company's products. Activities in all areas of the value chain must be included. Analysts identify these activities in an activity dictionary, which is a list of activities performed by an organisation to build its products. As activities are identified, they are classified as unit level, batch, product, customer or facility level.
2. Estimate the cost of each activity.
3. Calculate a cost-driver rate for each activity cost pool. An alternative is to directly observe or 'meter' costs, such as tracing the cost of power consumed. This is not feasible for all activities.
4. Assign activity costs to products.

LO 3: Identify five different levels of resources and activities used in production processes.

Analysing all resources and activities needed to produce and support a company's products and services is made easier by recognizing that these resources and activities support different levels of work within the company:

1. **Unit-level resources and activities:** Resources acquired and activities performed specifically for individual units of product or service. Resources that are traceable to each unit of output.
2. **Batch-level resources and activities:** The resources acquired and the activities performed to make a group, or batch, of similar products. Includes work to set up the production machinery to produce a certain batch of products or to test quality control for a batch of product.
3. **Product-level resources and activities:** Resources acquired and the activities performed to produce and sell a specific type of good or service. Could include design or advertisement.
4. **Customer-level resources and activities:** The resources acquired and the activities performed to serve specific customers. Could include specialized equipment and personnel dedicated to serving specific customers.
5. **Facility-level resources and activities:** The resources acquired and the activities performed to provide the general capacity to produce goods and services. Could include land,

buildings, costs of management and, in some cases, the labour force, which some companies by policy or by regulation maintain without laying people off because of changes in products, customers, batches and units of output.

Objectives of classifying resources and activities are to:

1. Enable accurate descriptions of how the organisation performs its work.
2. Enable tracing the costs of resources acquired to specific activities performed.
3. Ultimately assigning costs to goods and services by the activities they require.

Methods for identifying and classifying activities

- Top-down approach: Some organisations use ABC teams of people from the top levels of management. This top-down approach can generate an activity dictionary quickly and inexpensively.
- Interview or participative approach: This approach relies on the inclusion of operating employees on the team and/or interviews with them. This approach is likely to generate a more accurate activity dictionary than is the top-down approach.

LO 4: Measure the costs to supply various of activities and calculate cost-driver rates using practical capacity.

Step 2. The next step in the ABC process is to trace or estimate the costs of the activities that were identified in step 1. Estimate the human resources consumed by asking all employees to indicate how much time they spent on each activity in an average week and then identified the physical resources that supported various activities.

Cost-driver rates: An appropriate cost-driver base should:

- Arguably have a plausible relationship that describes the activity and its costs;
- Be measurable;
- Predict or explain the activity's use of resources with reasonable accuracy;
- Be based on the resource's practical capacity to support activities, which is the most a resource can be used for normal operations.

Theoretical capacity: The most that the resource could be used for any purpose.

Practical capacity: The amount of the resource that could be used for normal purposes.

Reserve capacity: A set-aside of capacity for flexible or unexpected storage needs.

Normal production capacity: The practical capacity less the reserve capacity. But it should not be the basis for assigning capacity costs. This set-aside should be charged as a period cost at the normal cost-driver rate because the reserve capacity has an opportunity cost.

Differences between resources supplied (theoretical capacity) and resources used (capacity costs applied to products) generally occur because managers have committed to supply a certain level of resources before using them, which are resources supplied. Knowing the difference between resources used and supplied helps managers to identify unused capacity.

Our objection to using normal capacity for decision-making is that it can obscure over-investment in resources that are chronically under-used.

Few companies assign all of their costs to products. Furthermore, we recommend against assigning the cost of unused capacity to products.

LO 5: Assign activity costs to goods and services.

Unused manufacturing capacity is caused by differences between actual and practical activity volumes. As described earlier, this cost may be partly the cost of maintaining buffer capacities. This cost may be expensed in a period as part of cost of goods sold if it is immaterial or included in other operating expenses.

LO 6: Analyse the profitability of products and customers.

Under-applied overhead cost: The normal overhead cost less overhead applied to products.

LO 7: Distinguish between ABC unit-level costing and ABC full costing of goods and services.

ABC full costing method: Assigns as many costs as can be applied to products.

An alternative is **ABC unit-level costing**, which assigns only the costs of unit-level resources to products. Thus, unit-level costing separates costs that are used incrementally for each unit produced.

Full costing approximates the long-run average costs over the time span when all resources can or must be changed.

Unit-level costing is close to the out-of-pocket cost analysis. This type of analysis assumes that all of the batch and higher-level resources have accrual and committed costs. Accrual costs that are allocations of sunk costs cannot be changed, except by changing the allocation base or method.

The concept of ABC unit-level costing is to assign only the costs clearly and certainly driven by specific units to these units.

Managers may have less discretion if they seek to use ABC costs for external reporting, however and ABC full costing probably would be preferred for that purpose.

The per-unit costs for each product using each method differ dramatically because they are different costs for different purposes. The full costing approach says, in effect, that a firm has costs because it produces units and it must cover all costs from sales turnover. Therefore, all costs related to the production (and sale) of the units should be assigned to units.

The unit-costing approach says, however, that resources supplied for higher-level activities, such as batch-level and product-level activities, are not caused by the current production and sale of each unit. Therefore, these higher-level resources should not be applied to the units.

ABC full costing seems better suited to support long-term decisions. Furthermore, ABC full costing separates the costs of resources supplied from the costs of resources used by assigning costs via cost-driver rates and by charging unused capacity costs to the period. For short-run decisions, when capacity cannot be changed easily, ABC unit-level costing seems more appropriate to support incremental production decisions.

LO 8: Apply activity-based costing to service and merchandising companies.

Service and merchandising organisations implement ABC as described earlier in this chapter; no changes are necessary.

1. Identify and classify the activities related to the company's products. As activities are identified, they are classified as unit-level batch-level, product-level, customer-level or facility-level activities.
2. Estimate the cost of activities identified in step 1.
3. Calculate a cost-driver rate for each activity.
4. Assign activity costs to products.

Costs and benefits of activity based-costing. We should remember, however, that implementing ABC is costly.

Time-driven ABC: uses the time to complete an activity as its summary cost driver. It simplifies the search for appropriate cost driver to only time.

Several 'red flags' indicate problems with an organisation's costing system and the likely need to refine it. Some of these problems follow:

- Indirect costs are large in proportion to direct costs and are allocated to goods and services using one or two cost pools (and therefore one or two cost-driver rates). Some analysts believe that a cost allocation rate of 300 per cent or more of direct labour costs is a sign that ABC should be considered.
- Goods and services are complex and require many different processes and inputs that use common allocation bases differently.
- Generic high-volume goods and services show losses or small profits while complex low-volume goods and services show large profits.
- Different departments within the company believe that the costs identified for producing goods and providing services are not accurate and often are misleading.
- The company loses bids it thought were priced relatively low and wins those it thought were priced relatively high.
- The company has not changed its costing system despite major changes it has made to its operations.