

## **Activity-Based Costing in Manufacturing**

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Activity-based costing (ABC) has become one of today's most popular methods of costing by using activities to allocate indirect costs, such as overhead. Versions of ABC originated as early as the 1920's; however, advancements have been adopted in modern business. Activity-based costing is an essential aspect of accurate, more reliable cost information to produce true costs in representing financial data. Applications, implementation procedures, and changes in ABC are illustrated as a guide to better understanding ABC in manufacturing.

An organization often has no clue about the origin and creation of the company costs, nor are most particularly concerned about who implemented the costing strategy. If employees only knew that a better costing method could save a ton of money, as well as impress the boss enough to earn that cozy corner office, then they would surely be more excited. Many companies and [many](#) live in the dark ages; they often use pricing models that were developed decades ago and were never updated (7). When asked how they came up with their pricing methods, the answer is usually ‘someone who worked here 15 years ago developed it and he’s no longer here’ (7).

Is there a need to implement newer costing methods? As businesses grow, executives feel more pressure to increase profits and strategize with flawless precision. A costing method known as activity-based costing (ABC) has been around for years. It has enhanced the reliability of cost information, producing a true cost, and better representing the costs of an organization. Various industries today use activity-based costing for product costing, target costing, service pricing, customer profitability analysis, and product line profitability analysis (7). ABC is currently the leading cost method to produce the most reliable, accurate costing information for manufacturing companies today.

## **APPLICATIONS**

Knowing the strategy behind activity-based costing is the first essential facet of this guide to better understanding costs. An organization can create a better strategy and corporate focus if the costs are better understood. Activity-based costing refines a costing system by focusing on individual activities as the fundamental cost objects. An activity is an “event, task, or unit of work with a specified purpose; for example, designing products, setting up machines, operating machines, and distributing products” (4, p. 141). Put simply,

ABC is a systematic, cause and effect method of assigning the cost of activities to products, services, customers, or any cost object (7). Disregarding the definition of the method, ABC is an accounting tool that has established a breakthrough role in the world of costing – applicable in retail or manufacturing from sole proprietorships to large corporations.

The entire idea of this method being activity-based has created a different perspective in costing, one that produces more of a true cost. Many accountants and managers believe that inventory cost figures give accurate product costs, which is not usually the case (5). The true cost of a product is better calculated by tracing other costs, such as overhead, to the manufacturing of the specific product, and it identifies any non-value added activities. Understanding the true cost of providing products and services to customers is one of the key elements of survival in a competitive environment (8). Most companies need to be better informed of general costing to ensure a unified approach to operations. From the implementation of ABC, Chrysler was convinced that the true cost of some of its parts was thirty times what had been previously estimated (3). An advantage of ABC is this use of allocating indirect costs to better illustrate expenses that may be imperative to an organization.

At this point in time it may be possible to ask about the ‘true cost’ of a product and how that differs from the book cost. Activity-based costing has been developed to satisfy some of the weaknesses of the traditional systems of accounting for and controlling costs. In traditional systems, direct materials and labor are the only costs traced directly to the product. Manufacturing overhead costs, by definition, are not traced, but allocated to the product. Overhead costs may be traced to an activities related to products, but not to a product itself (6). Because costs are not traced there is more room for error by allocating overhead incorrectly. Improving upon the traditional costing methods, activity-based

costing does a much better job at tracing more costs directly to the product, which ultimately provides more accurate cost information. Therefore, ABC should provide “timely, decision-making cost information” (6, p. 117). This cost information can be further used to make more reliable decisions on cost information that has material misrepresentations; that is, the cost information may contain dramatic errors that could legitimately alter financial data.

Maximizing shareholder wealth is what most would refer to as the overall business goal. By using this ABC, organizations are now better suited to rely on cost figures for strategy planning to pursue that maximization of shareholder wealth. Wasting resources on non-value added activities prevents a company from spending its resources and money on projects that have a positive return for the company (8). Value-added will obviously make more money for the company. An organization should target their efforts into the ABC methodology, which will better identify costing categories, such as non-value added activities. These non-value added activities would only inhibit increased profitability, which will keep a company from its overall goal – maximizing shareholder wealth. A product may need to be moved from spot A to spot B, which takes human labor. This labor, over a period of time, will begin to accumulate an increased expense that does not add value to the product. For example, XYZ Inc. believes product A, its most profitable product, is being manufactured at maximum efficiency; however, it is noticed that the product must be transported 40 feet from the end of an assembly line to the beginning of another. This non-value added activity inhibits the production of product A by 100 units. At a profit of \$10 per unit, another \$1,000 could be achieved each day resulting in another quarter million dollars.

Although the general goals of each organization may differ, cost accounting systems will generally try to satisfy three goals:

- ◆ To allocate certain period costs to products so that financial statements can be prepared monthly, quarterly, and annually
- ◆ To provide process control information to cost center managers
- ◆ To provide product cost estimates to product and business managers (5, p. 248).

First, financial statements are obviously an essential aspect of illustrating an organization's yearly operations, expenses, and revenue. ABC's goal is to better enhance the reliability of the financial statements for a proper representation of the yearly production expenses. Second, cost managers rely on the ABC information to provide detailed information regarding processes and how they effect the organization. Third, product managers are in need of very accurate product cost estimates. These estimates are generally much more reliable with an ABC method rather than a traditional cost method.

Overall, these are the goals of an ABC system; however, these objectives will not be met unless the separate functions act as a whole. According to J. Maurice Clark, a professor at the University of Chicago, there are ten important functions for cost accounting:

- ◆ To help determine a normal or satisfactory price for goods sold
- ◆ To help fix a minimum limit on price-cutting
- ◆ To determine which goods are most profitable and which are unprofitable
- ◆ To control inventory
- ◆ To set a value on inventory
- ◆ To test the efficiency of different processes
- ◆ To test the efficiency of different departments
- ◆ To detect losses, wastes, and pilfering
- ◆ To separate the costs of idleness from the cost of producing goods
- ◆ To tie in with the financial accounts (5, p. 154).

Although all of these functions are important for the cost system to work properly, some of these functions appear to be more important than others. Determining which goods are profitable and which are unprofitable can often be a deciding factor in whether an organization will prosper or collapse. The costs of production must be known to fully realize which operations make money for a company. In some instances, the information reported by existing management accounting systems may actually have encouraged bad decisions (5). Having inaccurate costs will certainly make planning considerably harder. It was obvious that the cost accounting methods before 1980 were not satisfying all the [managers](#), and new practices were being requested for more ideal costing information. Also, detecting losses, wastes, and pilfering will cut costs and increase a company's profit. Often, organizations do not realize that non-value-added activities would hinder profits by using company resources in an inefficient fashion. To better improve operations, the company needs to focus on all of ABC's facets. Working as a whole is imperative to the advantages of ABC.

An example of how ABC can identify value-added and non-value-added is illustrated with The Doig Corporation. Bob Doig, CEO, implemented ABC to help with his company's continued improvement to quality processes. We were able to identify which tasks we were doing for no apparent reason, then simplified some of those tasks. Some of the tasks are mandatory – such as driving to a customer location to make a sales call – but the process got Doig and his team thinking about which customers could be served just as well by phone, thus saving both time and money for the sales reps and the company as [a](#) whole (7). Doig utilized his ABC system to better understand his company's operations by relying on the new, more reliable data. Thanks to ABC, using activities and allocating more indirect expenses allows Doig, as well as other executives, to better document costing.

Horngren, Datar and Foster compare and contrast the traditional costing method with activity-based costing using a cost analysis of baked goods, milk and fruit juice, and frozen products for a supermarket. First the supermarket must identify the activities and their rates that affect the cost of their chosen products (4, p. 162):

Ordering	\$100 per purchase order
Delivery and receipt of merchandise	\$80 per delivery
Shelf-stocking	\$20 per hour
Customer support and assistance	\$0.20 per item sold

Table 1 shows traditional allocation using support as 30% of cost of goods sold (COGS). In contrast, Table 2 lists units of support activities and their costs.

**TABLE 1. Product Line Profitability Report –Traditional Method (30% of COGS)**

	Baked Goods	Milk & Fruit Juice	Frozen Products	Total
Revenue	\$ 57,000	\$ 63,000	\$ 52,000	\$ 172,000
Costs				
COGS	38,000	47,000	35,000	120,000
Support 30%	11,400	14,100	10,500	36,000
Total Costs	\$ 49,400	\$ 61,100	\$ 45,500	\$ 156,000
<b>Operating Income</b>	<b>\$ 7,600</b>	<b>\$ 1,900</b>	<b>\$ 6,500</b>	<b>\$ 16,000</b>
Operating Income/Revenue	13.3%	3.0%	12.5%	9.3%

**TABLE 2. Product Line Profitability Report – ABC Method**

	Cost per Unit of Activity	Baked Goods		Milk & Fruit Juice		Frozen Produce		Total
		Units of Activity	Profit Report	Units of Activity	Profit Report	Units of Activity	Profit Report	All Products
Revenue			\$ 57,000		\$ 63,000		\$ 52,000	\$ 172,000
Costs								
COGS			38,000		47,000		35,000	120,000
Ordering	\$100	30	3,000	25	2,500	13	1,300	6,800
Delivery	\$80	98	7,840	36	2,880	28	2,240	12,960
Shelf Stocking	\$20	183	3,660	166	3,320	24	480	7,460
Customer Service	\$0.20	15,500	3,100	20,500	4,100	7,900	1,580	8,780
Total Cost			55,600		59,800		40,600	156,000
<b>Operating Income</b>			<b>\$ 1,400</b>		<b>\$ 3,200</b>		<b>\$ 11,400</b>	<b>\$ 16,000</b>
Operating Income/Revenue			2.5%		5.1%		21.9%	9.3%

As illustrated, the two methods result in identical total costs and operating income; however, the cost of each product is drastically different. Table 3 shows the most important differences between the two methods:

**TABLE 3. Summary of Results**

Operating Income/Revenue	Traditional	ABC	Allocated Overhead	Traditional	ABC
Baked Goods	13.3%	2.5%	Baked Goods	\$ 11,400	\$ 17,600
Milk & Fruit Juice	3.0%	5.1%	Milk & Fruit Juice	\$ 14,100	\$ 12,800
Frozen Products	12.5%	21.9%	Frozen Products	\$ 10,500	\$ 5,600

The radical differences in costs could change the strategy of a company. The costs of frozen products are nearly twice as high using the traditional method. If the department manager were to see the much lower costs, then he/she would definitely urge the general manager to push the sales of frozen products. Conversely, the costs of baked goods are actually higher than what was figured using the traditional method, which would lead to a more in-depth analysis of how that number can be decreased. Therefore, the strategy of an organization is heavily impacted by the more accurate costs provided by activity-based costing.

### IMPLEMENTATION

Now that the application and advantages of ABC have been established, the costing method must be implemented into a company's operations. To get the process started, executives must ask themselves three questions:

- ◆ Which 20% of our customers provide 80% of our pre-tax profit?
- ◆ How much does it cost to process an order?
- ◆ How profitable can I be if we eliminate:
  - non-value-added labor and overhead waste;
  - unprofitable customers; and

-unprofitable suppliers? (7)

This overly simplified version of starting ABC is too basic. According to Player and Lacerda, certified public accountants, an ABC model should follow the following seven-step template:

1. Plan the project
2. Map activities
3. Generate a database/matrix for process engineering
4. Design the model in the software
5. Feed the model with actual data
6. Validate the information
7. Implement the model (8, p. 90).

When a company is ready to implement the model, Horngren, Datar and Foster lay out the steps in constructing an ABC methodology:

**1. Identify the Products That Are the Chosen Cost Objects.**

The goal here is to calculate the total costs and the per-unit costs of manufacturing and distributing the products.

**2. Identify the Direct Costs of the Products.**

Generally, direct costs are direct materials, direct manufacturing labor, and cleaning and maintenance costs.

**3. Select the Cost-Allocation Bases to Use for Allocating Indirect Costs to the Products.**

Often, indirect costs are design, machine setups, manufacturing operations, shipment setup, distribution, and administration.

**4. Identify the Indirect Costs Associated with Each Cost-Allocation Base.**

Overhead costs incurred are assigned to activities, to the extent possible, on the basis of a cause-and-effect relationship between the cost-allocation base for an activity and the costs of the activity.

**5. Compute the Rate per Unit of Each Cost-Allocation Base Used to Allocate Indirect Costs to the Products.**

Step 3 divided by Step 4 will compute the rate per unit.

**6. Compute the Indirect Costs Allocated to the Products.**

Total indirect costs are the number of units multiplied by the cost-allocation base that was computed in step 5. This gives a total indirect cost of each product.

**7. Compute the Total Costs of the Products by Adding All Direct and Indirect Costs Assigned to the Products.**

Add up all direct costs (direct materials, direct labor) and add that to the indirect costs computed in step 6. This is the total cost of the products using activity-based costing (4, p. 144-148).

This more extensive model illustrates the necessities of using an ABC model in manufacturing. Following these guidelines will make for a much smoother transition to an ABC model; however, Bob Doig says using a consultant, software program, or other tool to assist in the changeover can be invaluable saving management a lot of time and aggravation. ABC can be such a culture change for some companies, it makes for an easier sale to have an expert from the outside come in and run through the process with the staff (7).

## CHANGE

American companies are overhauling their production systems to meet the challenge of global competition (6). New costing systems are needed that better complement the new production systems. Moreover traditional cost accounting systems are being challenged by corporate financial and production executives and by professors of both accounting and production management because of their weaknesses (6).

Most would agree that changes in competitive business must be met by changes in technology – specifically implemented information systems.

The ‘costs attached’ system accumulated all input costs – material, labor, and indirect expenses – into a single account that represented the ‘cost’ of goods produced (5, p. 145). This first method of ABC accounting in the 1920’s was rigidly simplistic; however, this was a stepping-stone towards the ABC systems implemented in modern business. Regardless of its first inception, the ‘costs attached’ method was an influential means of allocating indirect expenses, such as overhead, to the product cost. Amazingly, it took ABC 70 years to begin to prosper into more of what is seen in organizations today.

By 1925, American manufacturers had developed nearly every management accounting procedure known today (5). After 1925, the information needed by managers became more complex, yet more important as well. Financial data became essential to managers and executives everywhere, which put a much greater emphasis on better costing systems for more reliable information. It is agreed that accounting systems have been around for decades; however, Johnson and Kaplan wrote *Relevance Lost* in 1991, which is thirteen years ago. Although these authors showed great advancement in cost accounting, these procedures have become even more updated since their findings.

Now the man most responsible for the idea, Robert Kaplan, a Harvard Business School professor, is trying to revive it. His new improved ABC, he says, 'is embarrassingly simple.' It is time-based and calculates the cost of one minute of overhead and then decides how much of this time each activity uses. The idea is in its early stages (3). Kaplan may have originated the idea of ABC; however, even he knows there is room for improvement. The enhancements through ABC methodology have changed and will continue to change as business continues to evolve.

Straightforward in theory, ABC proved notoriously difficult in practice (3). It is possible to expect the application of activity-based costing to become increasingly more simplistic, and the implementation of the system should also become easier to execute. Regardless of its benefits, the systems and software must prove to be user-friendly before ABC becomes popular across the nation (9). Activity-based costing and other enhancements significantly improve a company's ability to focus on and respond to the needs of their customers. Reducing complexity along with saving time and money are key benefits ABC system (1).

## **CONCLUSION**

Beginning in the 1920's and continually improving, ABC has proven to be the leading method to produce the most reliable, accurate costing information for manufacturing companies today. Although ABC may not be easy to implement, using activities to trace costs provides more accurate information resulting in better strategy, better planning, and better forecasting. However, the most influential aspect of ABC is the ability to save money. The bottom line in business is maximizing shareholder wealth. If a company has a more accurate picture of costs, then it is in a position to achieve higher profits.

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