hree Innovations in Cost Accounting

Alan Vercio and Brant Williams

e have been providing activity-cost data to decision makers for many years. But in our studies, we have identified only three innovations that are useful in this effort. Results from applying these innovations have proven successful by their adoption and positive influence on process design and product selection.

INNOVATION ONE: RESOURCES TO ACTIVITIES, THEN ACTIVITIES TO PRODUCTS (LATE 1800s)

In his book, *The One Best Way: Frederick Winslow Taylor and the Enigma of Efficiency*, Robert Kanigel writes:

> The system that [Frederick W.] Taylor . . . altered to suit his clients, was one he would apply at company after company. It gave you, monthly, a statement of expenses, broken down by jobs

Leading-edge cost measurement does not necessarily mean the latest "alphabet soup" solution or yet another vendor's software solution. The foundation for useful and relevant cost measurement has a long and time-tested history. © 2005 Wiley Periodicals, Inc.

> labeled by letters and numbers and, later, by a special mnemonic system. It applied overhead not only to wages but to each machine, with time spent on a job the basis for its proportion of the overhead.

Taylor's accounting system was just one piece of what he offered his clients, along with time study, piece rates, standardization, and the rest.

If cost accounting was a sideline to him, his contributions to it would be enough to earn the attention of accounting historians a century later and be deemed "a basis for all modern industrial accounting."¹

ASSOCIATE RESOURCES TO ACTIVITIES, AND THEN ACTIVITIES TO PRODUCTS BASED ON PROCESS TIME

In the late 1800s, overhead as we know it today was rather small. Even so, Taylor took

the effort to assign overhead to people and to machines. In many organizations today, overhead is no longer a trivial amount of the total expense structure. The increase for some of this overhead as well as the "purpose" of this overhead dates back to Taylor who created many of the job functions classified as overhead. Those include planning, industrial engineering, training, and tool management. He added these resources in order to achieve productivity improvements. Those improvements were significant, sometimes approaching 300 percent. Peter Drucker gives Frederick Taylor much of the credit for the growth in productivity during the first half of the twentieth century.

Some people may refer to Taylor's form of cost account-



ing as activity-based costing. The primary value from this innovation is the *activity* dimension. Other than direct material, products do not consume resources directly. Instead, they consume activities; it is those activities that consume resources directly. This simple logic defies the common belief that resource management or financial transparency begins with the general ledger. Instead, managing resources begins with managing activities. Managing activities begins with managing product selection and product design. Managing products begins with managing customer selection, customer training, and customer incentives. Unfortunately, management accountants who limit their focus to the general ledger will be limited in their ability to provide value to key decision processes.

Armed with financial insight about activities and processes based on Taylor's

method, many business lines have redesigned their processes, consolidated similar activities, and provided more sales time for the sales force.

INNOVATION TWO: PRACTICAL CAPACITY (1915)

In a presentation at the June 1915 meeting of the American Society of Mechanical Engineers, H. L. Gantt offered the following:

> Let us suppose that a manufacturer owns three identical plants of an economical operating size, manufacturing the same article-one in Albany, one in Buffalo and one in Chicago—and that they are all running at their normal capacity and managed equally well. The amount of indirect expense (overhead) per unit of product would be substantially the same in each of these factories, as would be the total cost. Now, suppose that business suddenly falls off to onethird of its previous amount and that the manufacturer shuts down the plants in Albany and Buffalo and continues to run the one in Chicago exactly as it has been run before. The product from the Chicago plant would have the same cost that it previously had, but the expense of carrying two idle factories might be so great as to take all the profits out of the business; in other words, the profit made

from the Chicago plant might be offset entirely by the loss made by the Albany and Buffalo plants.

If these plants, instead of being in different cities, were in the same city, a similar condition might also exist in which the expense of the two idle plants would be such a drain on the business that they would offset the profit made in the going plant.

Instead of considering these three factories to be in different parts of one city, they might be considered as being within the same yard, which would not change the conditions. Finally, we might consider that the walls between these factories were taken down and that the three factories were turned into one plant, the output of which had been reduced to one-third of its normal volume. Arguing as before, it would be proper to charge to this product only one-third of the indirect expense charged when the factory was running full.

If the above argument is correct, we may state the following general principle: The indirect expense chargeable to the output of a factory bears the same ratio to the indirect expense necessary to run the factory at normal (practical) capacity, as the output in question bears to the normal output of the factory.²

THE COST ASSIGNED TO A PRODUCT SHOULD BE BASED ON PRACTICAL CAPACITY

How should idle capacity be accounted for? The following offers some guidance:

The capacity model supports the view that idle capacity is a period cost. A period cost is attributable to the ongoing cost of running the business. But it is not a cost of the products made, or services performed, during that time. Accountants classify development, marketing, and administrative costs as period expenses. Idle capacity costs are similar and are logically period costs. These costs relate to the continuing cost of running the business, not to the products made in the plant during this period.³

Capacity measurement and improvement also explains the responsibility reason for isolating idle capacity. It is the customer and product management teams that have responsibility for determining what type and what quantity of capacity is required to execute a strategic plan. Idle capacity, which results from either incorrect strategic plans or productivity improvements, should be visible to these management teams for planning purposes. Plans may include market expansion or may include authorization for abandonment.

If the idle capacity is hidden in the unit cost, it will be difficult for the management teams to manage this type of waste.

Measuring idle capacity is not as simple as looking at when the tool or person is sitting idle. There are many different types of idle capacity (see Exhibit 2). Most types of idle capacity are present even when the operation is at full capacity. Selected types of idle capacity are driven by internal decisions, such as contingency or targeted wait times based on customer satisfaction metrics. Other types of idle capacity are driven by how customers use the enterprise's products and services.

Service industries such as the airline industry, lodging, telecommunications, financial

	Types of Idle Capacity
Exam	ples of idle capacity that should be excluded from product cos
ľ	Marketable: Peak time of the year and this resource is not required
(Dbsolete: Management has made the decision to exit a market
Exam	ples of idle capacity that should NOT be excluded from produ
Exam N	ples of idle capacity that should NOT be excluded from produ Management Directive: We will not work on Thanksgiving Day
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services, and the retail grocery industry have different demand patterns throughout a day, week, month, and year. In many cases, the valleys of low demand represent one of the largest sources of waste. So managing waste does not begin with management decisions. It begins with understanding the following:

You cannot manage what you do not measure.

You cannot measure what you do not define.

You cannot define what you do not understand.

Measuring idle capacity accelerates key decisions such as the decision to increase marketing to fill idle capacity or the decision to abandon and make room for next-generation products.

INNOVATION THREE: THE ABC HIERARCHY (1988)

In an article in the *Journal of Cost Management*, Robin Cooper wrote about a study involving the ABC system hierarchy:

> Eight of the companies in the study had recently replaced their traditional (i.e., unit-based) cost systems with a more complex kind of twostage cost system that has come to be called an activity-based cost (ABC) system. The ABC approach assumes that not all overhead resources are consumed in proportion to the number of units produced. Thus, ABC systems recognize up to two more types of allocation bases (or cost

drivers) than traditional cost systems:

1. Batch-level bases, which assume that certain inputs are consumed in direct proportion to the number of batches of each type of product produced; and

2. Product-level bases, which assume that certain inputs are consumed to develop or permit production of different products.

The three different types of bases used by an ABC system (i.e., unit-level, batch-level, and product-level bases) are designed to capture the economics of contemporary production processes. The activities performed in these processes can be described as fitting into the following hierarchy:

1. Unit-level activities, which are performed each time a unit is produced;

2. Batch-level activities, which are per-

Exhibit 3

Expanded List of Activity Types That Are Not Unit Volume-Driven

- Corporate Administration
- Business Unit Administration
- R&D
- Idle
- Customer Level
- Channel Level
- Product Level
- Process Level
- Supplier Level
- Batch Level
- Unit Level

formed each time a batch of goods is produced;

3. Product-level activities, which are performed as needed to support the production of each different type of product; and

4. Facility-level activities, which simply sustain a facility's general manufacturing process.

Three of these categories used by ABC systems contain costs that can be directly attributed to individual products. The fourth category facility-level activities contains costs that are common to a variety of products and can only be allocated to products arbitrarily.

Of all the costs systems studied, none used more than four categories of activities. For product costing purposes, one conclusion was that cost functions of the innovative firms can be adequately described as a linear formula that is the sum of the unit-level costs, batch-level costs, product-level costs, and facility-level costs. Interestingly, the most complex ABC formulas for product-related costs contain only two more categories than the simpler unit-based formula, which expresses total costs as simply the sum of fixed costs plus the variable costs multiplied by the number of units produced.

The costs of batchlevel activities (such as setting up a machine or ordering a group of parts) vary according to the number of batches made, but are common (or fixed) costs for all the units in the batch. To assign these costs to products, the more complex ABC systems used batch-level bases.

Product-level activities are performed to support different products in a company's product line. Examples of product-level activities include maintaining product specifications (such as the bill of materials and routing information), performing engineering change notices, developing special testing routines, and expediting products. The costs of these activities can be assigned to individual products, but the costs are independent (i.e., fixed) regardless of the number of batches or the number of units of each product produced. To assign these costs to products, the ABC systems used product-level bases.4

Additional "non-unit level" activity types are identified outside of the manufacturing plant.

If non-unit-level activity costs are not identified and stated separately in management reporting, it is extremely likely that high-volume customers, products, channels, and suppliers will subsidize low-volume customers, products, channels, and suppliers. Cost subsidies built into the cost accounting methodology violate the "economic mirror" objective (the objective to assign costs to the different types of capacities and their behaviors [e.g., productive,

Sidebar 1

Interesting Observation

These innovations did not come from individuals with careers or backgrounds in finance. Each came from an individual trained in engineering. Each came from an individual looking for measurements that would be useful to operations and internal decision makers.

One could derive from this observation that a management accountant is bilingual. The first language is the language of operations based on customer requirements, product requirements, processes, activities, and suppliers. The second language is the language of accounting. The translation—the economic mirror—cannot be performed if only one language is understood.

nonproductive, and idle]). These violations will interfere with quality decisions. Segregating nonunit-level activity cost from unit level has led to changes in product strategy and process design.

SUMMARY

These three innovations, when applied to today's environment and coupled with an open ear to the customer manager, product manager, and operations manager, serve as a solid foundation for useful cost measurement and better decisions. After all, the only reason for management accounting to exist is to improve the quality of an organization's decisions in an effort to attract and retain profitable customers.

NOTES

- Kanigel, R. (1997). The one best way: Frederick Winslow Taylor and the enigma of efficiency. New York: Viking; pp. 268, 269.
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Alan Vercio works for Bank of America in Quality and Productivity, where he has had responsibility for the company's strategic cost services team. He can be reached at alan.vercio@bankofamerica.com. **Brant Williams** works for Bank of America in Payments Strategy. He can be reached at brant.williams@bankofamerica.com.