Activity-Based Costing: Modified Approach

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Many companies have found it tedious to maintain their activity-based cost systems. They must re-interview employees and re-estimate resource usage by activities each time the ABC system is updated. Many managers are also uncomfortable with the degree of subjectivity involved in estimating employees' proportion of time spent on each activity. Recently, an alternative approach has been developed that both simplifies the estimation of an ABC system, enables it to be updated easily whenever changes occur in the structure of the model, and also explicitly incorporates the role of capacity.[1]

The innovation involves estimating the time required to perform a transactional activity. By definition, a transactional driver is used whenever the activity – such as *setup machine*, *issue purchase order*, or *process customer request* – takes about the same amount of time. The new approach estimates the quantity of this time and uses this quantity in the analysis. This is easier to illustrate with a numerical example than to describe.

Assume that resources, costing $560,000 per period, can perform three activities:

- handle customer orders
- process customer complaints
- perform customer credit checks.

A traditional ABC system estimates the costs of these three activities by having analysts survey the people in the department and estimate the percentage of their time spent (or that they expect to spend) on these three activities. Suppose we find out that these percentages are 50%, 30% and 20%, respectively. We also find that the actual (or estimated) quantities of the respective activity cost drivers are:

- 7,000 customer orders
- 2000 customer complaints
- 350 credit checks

The system performs the following calculations to assign the $560,000 resource cost to activities and to activity cost driver rates:

[1] The modified approach was described in Chapter 14 of R. S. Kaplan and R. Cooper, *Cost & Effect: Using Integrated Cost Systems to Drive Profitability and Performance* (Boston: HBS Press, 1998): 296-299.

Activity		Assigned Cost	Activity Cost Driver Quantity	Activity Cost Driver Rate
Handle orders	70%	$392,000	7,000	$ 56/order
Process complaints	10%	56,000	200	$280/complaint
Check credit	30%	112,000	35	$320/credit check
Total	100%	$ 560,000		

The activity cost driver rates can then be used to assign the expenses of these three activities to customers based on the number of orders handled, complaints processed, and credit checks performed for each customer.

Calculating the activity cost driver rates requires that a new survey be performed each period, to assess the distribution of effort across the three activities. This is a costly, tedious and subjective procedure. In the alternative approach, estimate first the hourly cost of the resources that perform the multiple activities. For example, suppose that the front-line people who actually perform the various customer support activities can supply 8,000 hours of useful work during the period.[2] Then, the cost per hour supplied is $560,000 / 8,000 or $70 per hour.[3] Assume also that the $560,000 of expenses are committed for the upcoming period; they are not expected to vary based on the actual number of customer orders processed, complaints handled, or credit checks performed.[4]

Next, the analyst estimates the time required to perform each instance of the activity, let us call this the unit time estimate. The unit times for each activity are then multiplied by the $70 per hour cost of the resources to obtain the activity cost driver rate, as shown below:

Activity	Unit Time (hours)	Activity Cost Driver Rate
Handle customer order	0.72	$ 50.40
Process customer complaint	3.60	$252.
Perform credit check	4.11	$288.

Notice that these rates are somewhat below those estimated before. The reason for this discrepancy will be soon become obvious.

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2 For example, suppose we had 20 front-line people who are paid for 500 hours of work each quarter. About 20% of this time is used up in breaks, training, and various administrative activities, leaving a practical capacity of 400 hours per person.

3 This rate includes, of course, not only the salary and fringe benefits of the front-line employees but also all the costs of supervisory resources, computing and telecommunications resources, and space and office equipment resources used by these employees, as well as the cost of all secondary activities performed for this department and its employees.

4 It would be simple to allow the supply of some of the resources to be flexible with respect to activity demand. In this case, you would have two rates, one for the flexible resources and a capacity-based rate for the committed resources.

Activity	Unit Time	Quantity	Total Hours
Handle customer order	0.72	7,000	5,040
Process customer complaint	3.60	200	720
Perform credit check	4.11	350	1,440
Total			**7,200**

The analysis reveals that only 90% of the practical capacity of the resources supplied during the period was used for productive work. The traditional ABC system over-estimated the costs of performing activities because its distribution of effort survey, while quite accurate – 70%, 10% and 20% of the productive work was the correct distribution across the three activities – incorporated both the costs of resource capacity used and the costs of unused resources. By specifying the unit times to perform each instance of the activity (or, at higher expense, using a duration driver to measure the actual length of time required to perform each instance of the activity), the organization gets both a more valid signal about the underlying efficiency of each activity and about any unused capacity or shortage of capacity in the resources supplied to perform the activity.

With estimates of the cost of resource supply, the practical capacity of the resources supplied, and the unit times for each activity performed by the resources, the reporting system becomes quite simple for each period. Suppose the quantity of activities shifts, in the subsequent period, to 7,100 orders handled, 220 customer complaints, and 310 credit checks performed. During the period, the costs of each of the three activities are assigned based on the standard rates, calculated at practical capacity: $50.40 per order, $252 per complaint, and $288 per credit check. This calculation can be performed in real time, as the quantity of demands becomes realized.

The period report is both simple and informative:

	Number	Unit Times	Total Time	Cost Assigned
Budgeted Expenses			8,000	$560,000
Activities:				
Handle Customer Orders	7,100	0.72	5,112	$ 357,840
Process Complaints	220	3.60	792	$ 55,440
Perform Credit Checks	310	4.11	1,275	$ 89,280
Total			7,179	502,560
Unused Capacity			821	$ 57,440

The report reveals the estimated time spent on the three activities, as well as the resource costs required to handle the activity demands. It also highlights the difference between capacity supplied (both quantity and cost) and the capacity used. Managers can review the $57,440 cost of the 821 hours of unused capacity and contemplate actions to reduce the supply of resources and the associated expense. Alternatively, since managers know how much unused capacity exists, resource by resource, as they contemplate new product introductions, expansion into new markets, or just shifts in product and customer mix, they can forecast how much of the increased business can be handled by existing capacity, and where capacity shortages are likely to arise that will require additional spending to handle the increased demands. They can also add more activities very simply, just by estimating the unit time required to perform the new activity.

Managers can update the activity cost driver rates simply. Two factors can cause the activity cost driver rates to change. First, because of changes in the prices of resources supplied, the hourly cost rate can change. For example, if employees receive an 8% compensation increase, the hourly cost increases from $70 per supplied hour to $75.60 per hour. If new machines are substituted or added to

a process, the hourly cost rate is modified to reflect the change in operating expense associated with introducing the new equipment.

The second factor leading to a change in the activity cost driver rate is a shift in the efficiency of the activity. Experience, continuous improvement activities, or the introduction of new technology can enable the same activity to be done in less time. In this case, the analyst just modifies the unit time estimates to reflect the process improvement. For example, if a computerized data base are made available to the customer administration department, they may be able to perform a standard credit check in 30 minutes rather than 4.11 hours. The improvement is simple to accommodate; just change the unit time estimate to 0.5 hours and the new activity cost driver rate becomes $35 per credit check (down from $411) (though there might also be an increase in the hourly cost to reflect the newly-acquired data base).

Following this procedure, an ABC model update is event driven rather than time driven (once a quarter, or annually). Anytime, analysts learn about a significant shift in the costs of resources supplied, they update the hourly cost estimates. And anytime they learn of a significant and permanent shift in the efficiency with which an activity is performed, they update the unit time estimate.

The key elements in the new approach are, first, estimating the practical capacity of committed resources, and, second, estimating unit times for performing transactional activities. The practical capacity should be estimated anyway for doing a valid ABC analysis to avoid potential death spirals that arise when existing products and customers are burdened with the costs of unused capacity. And the unit time estimates are implicit in the very notion of a transactions driver. These unit times need not be estimated to four significant digits. Managers will be using these unit time estimates for strategic insights, not to monitor and control the performance of individual employees and equipment. They just need a ballpark estimate, generally within 10 percent, for the strategic purposes of an ABC analysis. Gross inaccuracies in unit time estimates will eventually be revealed either in unexpected surpluses or shortages of committed resources. At the time of such surprises, analysts can focus on the unit times required by the activities performed by these resources and obtain updated and more accurate estimates.