
The 1-2-3 of ABC Methodologies

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- ▶ *Time Splits, Time Capture, and Time Driven*

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Introduction

One of the main deterrents from implementing and maintaining activity-based costing (ABC) is the amount of time and cost involved in collecting and collating non-system data.¹ This often involves interviewing and paper-based systems, leading people to examine other methodologies for allocating resource costs to activities.

We recommend basing the choice of methodology on the characteristics of the specific activity being costed, as well as the availability of reliable and robust data. In practice this means implementations will rarely, if ever, be based on a single methodology. So organizations should select software that can easily support all three methodologies and has the tools to facilitate and expedite the update of their models.

This paper reviews the strengths and limitations of each of the methodologies used in ABC: time splits, time capture, and time-driven costing.

Activity Costing Scenario

We created the simple scenario below to demonstrate how an organization can cost specific activities using a variety of methodologies. We are basing this scenario on a department that carries out two activities: processing applications and chasing late payments.

Driver Volumes

During the month in question, the department processes 5,000 applications and chases 1,000 late payments.

Resources

There are four people in the department, working seven hours per day, and there are 20 working days in the month, giving 560 hours (33,600 minutes) of available capacity. The supervisor spends 60% of her time managing this department, and the remainder of her time managing another department.

Cost

The direct expense (salary, benefits, etc.) incurred by running the department each month is \$16,800. The supervisor's costs are \$5,600. She estimates 60% of her time is spent on "process applications" activity and 40% on chasing late payments. Additionally, \$4,200 is assigned to the department each month to cover indirect costs such as facilities, IT, and human resources. These indirect costs are split across the two activities based on the resources they consume. The "chase late payments" activity involves making extensive outbound phone calls. As a result, this activity receives a bigger assignment of the cost at 70%, while the "process applications" activity receives 30%.

Time Splits

Time splits are the simplest ABC methodology to understand. Managers are simply surveyed to find out what proportion of their time is spent on various activities. This split is then used to allocate expenses to activities.

Calculated Example of Costing Using Time Splits

The department manager needs to provide only three numbers: the proportion of time spent processing applications, the proportion spent chasing late payments, and a figure for any excess capacity.

The team processes each day's applications, generally finishing by early afternoon, and chases late payments until the end of the day. And the manager knows there is little to no excess capacity and the activities are fairly reliably split into 66% for processing applications and 33% for chasing late payments.

Calculation

The calculation is split into two stages: first we assign resource costs to activities, and then we assign activity costs to cost objects.

In step 1, time splits are used to assign resource costs to activities. In step 2, volume drivers are used to calculate activity unit rates.

Step 1: Assigning resource costs to activities.

Activities			
	Process Applications	Chase Late Payments	Total
Time-Split	66.7%	33.3%	100.0%
Assignment of Direct Cost	$(\$16,800 \times 66.7\%)$ \$11,200	$(\$16,800 \times 33.3\%)$ \$5,600	\$16,800
Assignment of Supervisor Cost	$(\$5,600 \times 60\% \times 60\%)$ \$2,016	$(\$5,600 \times 60\% \times 40\%)$ \$1,344	\$3,360
Assignment of Indirect Cost	$(\$4,200 \times 30\%)$ \$1,260	$(\$4,200 \times 70\%)$ \$2,940	\$4,200
Total Cost of Activity	\$14,476	\$9,884	\$24,360

Step 2: Calculating activity unit rates.

Activities			
	Process Applications	Chase Late Payments	Total
Total Cost of Activity	\$14,476	\$9,884	\$24,360
Volume Driver	5,000	1,000	
Calculation	(\$14,476 / 5,000)	(\$9,884 / 1,000)	
Activity Unit Rate Assigned to Cost Object	\$2.90	\$9.88	

Strengths of Time Splits

Ease of Implementation

Costing with time splits is a straightforward process requiring little data other than the general ledger and the time it takes to interview and collect data from each responsibility center. As a result, it is frequently used for pilot studies where the imperative is to deliver early results to the business, prior to refining methodologies and adding refinements to models.

Involving the Organization

Implementing ABC based on time splits involves working with each responsibility center to develop a dictionary of the activities they carry out and allowing them to routinely report on the amount of time they spend on each activity. This allows managers to directly participate in the project and review the results knowing they contributed to them. As such, there is likely to be greater commitment to overall project success.

Weaknesses of Time Splits

Data Collection and Collation

It can be laborious to resurvey contributors every time a model is refreshed. However, the advent of web-based ABC applications that allow data to be entered directly into the database, and the deployment of work management tools that expedite routine data collection, have removed many of these issues.

Failure to Identify Excess Capacity

When asked to submit time splits, few responsibility managers will willingly reveal large amounts of excess capacity and idle time. Typically this means substantial excess capacity is rarely revealed when time splits are used.

Supposed Lack of Accuracy

Because of its simple empirical approach, time splits are viewed as being less accurate than other methodologies. However, in responsibility centers where reliable data exists on how staff members spend time, take customer contact centers for example, managers will use the information and produce results no less reliable than those generated using other methodologies.

Time Capture

Time capture is particularly useful for determining how staff members split time between projects and customers. Time capture is particularly useful when applied to functions such as research and development, IT, or in professional service organizations. As a rule of thumb, wherever time capture is already being deployed in an organization—either for billing or cross charging—it should be reviewed as the possible basis for ABC costing before any other methodology is considered. This is especially the case where capture of time data is already automated.

Calculated Example of Costing Using Time Capture

The amount of time staff spends on each activity could be captured from the systems they are using, via a specific time capture application or from time sheets. In this instance, figures show 336 hours spent on processing applications, 168 hours on chasing late payments, and 56 hours unaccounted for—which the manager records as excess capacity.

Calculation

In this instance, the actual hours are used to assign resource costs to activities in step 1. But in step 2, volume drivers are used to calculate activity unit rates, the same as in the first example.

Step 1: Assigning resource costs to activities.

Activities				
	Process Applications	Chase Late Payments	Excess Capacity	Total
Time Spent (hrs)	336	168	56	560
Assignment of Direct Cost	$(\$16,800 \times 336 / 560)$ \$10,080	$(\$16,800 \times 168 / 560)$ \$5,040	$(\$16,800 \times 56 / 560)$ \$1,680	\$16,800
Assignment of Supervisor Cost	$(\$5,600 \times 60\% \times 60\%)$ \$2,016	$(\$5,600 \times 60\% \times 40\%)$ \$1,344		\$3,360
Assignment of Indirect Cost	$(\$4,200 \times 30\%)$ \$1,260	$(\$4,200 \times 70\%)$ \$2,940		\$4,200
Total Cost of Activity	\$13,356	\$9,324	\$1,680	\$24,360

Step 2: Calculating activity unit rates.

Activities				
	Process Applications	Chase Late Payments	Excess Capacity	Total
Total Cost of Activity	\$13,356	\$9,324	\$1,680	\$24,360
Volume Driver	5,000	1,000		
Calculation	(\$13,356 / 5,000)	(\$9,324 / 1,000)		
Activity Unit Rate Assigned to Cost Object	\$2.67	\$9.32		

Strengths of Time Capture

Dedicating Blocks of Time to Specific Projects or Customers

In situations where activities are far from repetitive and time capture is already in use, it is the preferred methodology for allocating resource costs to activities.

Weaknesses of Time Capture

Exposing Excess Capacity

Unless time capture is completely automated and is not reliant on an individual triggering a recording, it is unlikely to accurately expose excess capacity (though it is more likely to do so than the time splits methodology).

Staff Resistance

If a time-capture system is already in use for billing or cross charging, using the data for ABC costing is unlikely to generate dissent among staff. However, introducing a time-capture system where none previous existed will require delicate handling.

Time-Driven ABC

Time-driven costing is where cost driver rates are based on the practical capacity of the resources supplied, measuring or estimating the amount of time taken to perform an activity. The volume of transactions is fundamental to the calculation of time-driven costing:

- ▶ Transactional cost drivers count the number of times an activity is performed. Examples include the number of purchase orders processed, the number of inbound phone calls answered, and the number of deliveries made. By definition, a transactional driver is used whenever the activity takes about the same amount of time to complete.

- Duration drivers are measurements or estimates of the time required to perform the task or activity. Examples of duration drivers are the time taken to answer a phone call or process an application. In certain responsibility centers, such as a customer contact center, duration drivers may be easily and reliably accessed from automated call handling software. In logistics operations, duration drivers may be captured from hand wands at the time of collection and delivery.

The original exponent of ABC, Dr. Robert Kaplan, promotes time-driven costing as “Simpler for estimating and maintaining an ABC model, and also more accurate.” While time-based costing undoubtedly has a place in ABC and is the preferred methodology in certain situations, it has its limitations.

Calculated Example of Costing Using Time-Driven ABC

Here the duration drivers for two activities are system generated. The processing system provides the average duration time for processing applications (four minutes) and the phone systems provide the average duration driver for the time needed to chase a late payment (10 minutes).

Calculation

In this instance, the department’s resource consisted of a team of four working seven hours per day for 20 days. The supervisor has tracked holidays and sickness and has calculated the available time should be reduced by 10% in order to accurately reflect the true resource.

Step 1: Calculating the unit cost of available time.

Total	
Direct Cost	\$16,800
Time Available (Minutes)	$(4 \times 20 \times 7 \times 60) \times 90\%$ 30,240
Cost Per Minute	$(\$16,800 / 30,240)$ \$0.555

¹ For further information, download the white paper titled “Transactional Activity-Based Costing” from www.algsoftware.com

Step 2: Calculating activity unit rates.

Activities			
	Process Applications	Chase Late Payments	Total
Volume Driver	5,000	1,000	
Cycle Time (mins)	4'00	10'00	
Total Time Used (mins)	(4 × 5,000) 20,000	(10 × 1,000) 10,000	30,000
Cost of Time Used	(20,000 × \$0.555) \$11,100	(10,000 × \$0.555) \$5,550	\$16,650
Assignment of Supervisor's Costs *	(\$5,600 × 60% × 60%) \$2,016	(\$5,600 × 60% × 40%) \$1,344	\$3,360
Assignment of indirect Cost *	(\$4,200 × 30%) \$1,260	(\$4,200 × 70%) \$2,940	\$4,200
Total Activity Cost	(\$11,100 + \$2016 + \$1260) \$14,376	(\$5,500 + \$1,344 + \$2,940) \$9,834	\$24,210
Activity Unit Rate	(\$14,376 / 5000) \$2.88	(\$9,834 / 1000) \$9.83	
Excess Capacity (mins)			(30,240 – 30,000) 240
Cost of Excess Capacity			(240 × \$0.555) \$133

* Please note while time-driven ABC is effective, it is unrealistic to expect to use it in isolation. In this example, the supervisor and indirect costs are not suited to time-driven costing, therefore the cost assignment has been based on the resource consumed by each of the activities.

Completing the calculation reveals that \$133 worth of resource cost, equivalent to 240 minutes (four hours) of the available resource, must be excess capacity.

Strengths of Time-Driven ABC

Surfacing Excess Capacity

When people estimate how much time they spend on a pre-prepared list of activities, they invariably supply percentages adding up to 100%. This is because very few people will say any of their time is unused or idle. Cost-driver rates calculated from this process may incorrectly assume resources are working at full capacity. Time-driven ABC effectively overcomes this issue and automatically reveals differences between the total amount of time needed to carry out activities in a responsibility center, and the actual amount of time available given current resources. Keep in mind, this can lead to time-driven ABC becoming closely associated with time and motion studies, which are viewed unfavourably by many workforces.

Weaknesses of Time-Driven ABC

Availability of Reliable and Robust Duration Drivers

Unless data is readily available, robust, and reliable, time-driven ABC can generate as many problems as it purports to solve. If data comes from reliable systems, like automated call handling systems, and is regularly updated, it will be infallible. However, if it is out-of-date or based on estimates, this could result in substantial errors. The difference between an estimate of four minutes and four minutes ten seconds to handle an inbound telesales call may not seem like much, but factored over 100,000 calls it becomes substantial. A time-driven methodology requires as much data collection as any other methodology if it is to be robust and reliable.

In any organization there will be responsibility centers, such as marketing, legal, research, and areas of IT, where activities are far from homogeneous and repetitive and duration drivers are unavailable. In these instances, organizations must use a different methodology.

Understanding Variances in Duration Drivers

Duration drivers can be used at the aggregated or individual level. Where duration drivers are available for each individual transaction, a time-driven methodology can be used to calculate a unique cost for each instance. For example, if the system logs that it takes an agent eight minutes to handle an inbound call, it would pick up twice as much cost as a more typical call which takes only four minutes to handle.

The cost is valid if this is a more complex call for a different type of service: the type that would be identified as a separate activity under any other ABC methodology. However, if the call took eight minutes because it was handled by an inexperienced agent, the charge is invalid and will result in erroneous results.

Be sure to exercise care when using time-driven ABC for costing in logistics operations. If you can capture the amount of time spent waiting on a customer's premises to collect or deliver a consignment, you may have some valid data to work with. This is because there is considerably less cost involved in collecting from a customer who routinely has consignments already labelled and waiting at the front desk, and collecting from one who keeps the courier waiting. However, in many instances the only time captured is the moment the bar code on each consignment is read at a customer site. So data may include a substantial amount of time spent driving between customers.

If this data were used as the basis for time-driven costing, it would result in lower costs for customers in close proximity, and higher costs for more remote customers. Similarly, costs would vary depending on the route the courier chose to make the collections. An additional complexity of time-driven costing in logistics operations is dealing with "stem time," the amount of time between the courier leaving the depot and making their first stop. One way to deal with "between time" is to calculate its cost and apportion it equally across all customers on the route.

This is not intended to provide definitive answers to the use of time-driven costing, but to simply illustrate how even in situations where hard and fast data such as duration times and cycle times is available, its use in calculating costs and profitability need to be carefully considered in order to avoid inappropriate allocations.

Data Collection

It is frequently suggested that time-driven costing eliminates the need for surveys and data collection. But this is not the case. Each time a model is refreshed and recalculated, the duration drivers should be updated. Even the most repetitive processes change. Contact center agents are frequently provided with new scripts to help them up-sell and cross-sell other products and services, and this impacts the length of each call. These process changes need to be collected and collated meaning either extracting the data from a transactional system, or asking process owners to provide an update. This is easily achieved with web-based ABC applications and work management tools that expedite data collection.

Keep in mind that if reliable systems are not in place to capture cycle times, it can create a dependency upon surveys and the people being surveyed are likely to relax their normal working patterns. And consider what happens if the computation of driver volumes and activity cycle times suggests a department is working above its theoretical capacity. This would certainly cast doubt on the reliability of any ABC model and lead managers to question the validity of the reports.

Data Volume

Costing individual transactions with a timed-based methodology quickly generates enormous amounts of data. Analyzing and generating management reports will require large databases and powerful analysis and reporting tools.

Before going to this level of granularity, by using a time-driven methodology to calculate the cost of every transaction for every customer, for example, it is worthwhile to understand exactly how managers in the organization intend to use information to influence decision making. Other than for key accounts, the focus of most strategic and operational decisions is at the customer segment level and it may be more useful, and involve considerably less effort, to provide analysis at this level.

Conclusion

The Hybrid Model

While each of the methodologies discussed has its own particular strengths, none is perfect for every activity in every responsibility center. In practice, most models are hybrids, with different methodologies used in different responsibilities centers. Even then, it is unlikely appropriate and reliable data is available for every activity and in certain instances, it may be necessary to resort to approximations using weightings.

Nevertheless, whichever methodology is chosen, it is essential to refresh non-system driver data each time a model is calculated. Web-based ABC applications such as BusinessObjects™ Activity Analysis and Predictive Planning make this remarkably easy and there is no reason why ABC data should not be produced every month as part of the traditional reporting pack.

Time-Driven Costing

It is unlikely a single methodology will be appropriate for all activities in a model, so it is essential organizations choose an ABC application capable of supporting all the methodologies, together with the flexibility to incorporate any special requirements for unique situations. In Activity Analysis or Predictive Planning, the ABC model builder can easily develop a set of rules to clearly reveal unallocated resources or unproductive capacity, using time spent, unit times, and transaction volumes to model each activity in the most appropriate way.

Excess capacity should be identified and costed, but it is also important that future periods where capacity may be exceeded are identified early enough to do something about it. Both Activity Analysis and Predictive Planning include the ability to model capacity, so under used resource can be redeployed and future capacity constraints addressed.

To make a time-driven costing model even more realistic, times should be allowed to vary across model dimensions. For example, imagine a “packing” activity needs to be assigned to products and customers based on the amount of time it takes to fulfil an order. In most cases the time taken per order is 1.5 minutes per unit volume, but for products classified as “hazardous” and sold to customers in the “chemical” sector, the unit time is taken from a user-entered driver representing “Product Packing Time.” For other hazardous products, packing might take 2.5 minutes per unit volume. Writing such a rule could be potentially complex, but Activity Analysis and Predictive Planning include a wizard that allows the model builder to easily create such a rule by simply completing a series of screens.

These applications not only deal with large volumes of data, but also include powerful modeling tools making it easy to manage models employing a range of approaches to cost allocation. Without such tools, model management would rapidly become difficult and error-prone. Applications from Business Objects can work with modeling tools to develop and maintain realistic models of an enterprise, and deliver powerful, insightful, and detailed analysis.

² Institute of Financial Services (2006), “Customer Value—Is there an information deficit?”

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