



The 123 of ABC Methodologies

TIME-SPLITS, TIME-CAPTURE & TIME-DRIVEN

A White Paper
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Abstract

One of the main deterrents from implementing and maintaining activity-based costing (ABC) has been the amount of time and cost involved in collecting and collating non-system data¹, often involving interviewing and paper-based systems. This has led people to examine other methodologies for allocating resource costs to activities.

This paper reviews the strengths and limitations of each of the methodologies used in ABC; time-splits, time-capture and time-driven costing with a worked example of each.

The choice of methodology should be based upon the characteristics of the specific activity being costed and the availability of reliable and robust data. In practice this means implementations will rarely, if ever, be based on a single methodology and organisations should ensure the software they select for their project can easily support all three methodologies and has the tools to facilitate and expedite the update of their models.

¹ In a survey carried out by Business Finance Magazine and ALG Software Inc. in June and July 2004, 43% of respondents stated that data collection was the area they would most like to see improved in their ABC implementation.

Scenario

Below is a simple scenario that will be used to show how activities would be costed using each of the methodologies reviewed in this paper:

Activities

The scenario is based on a department that carries out two activities, processing applications and chasing late payments.

Driver volumes

In 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 7 hours per day and there are 20 working days in the month, giving 560 hours (33,600 minutes) of available capacity.

There is also a supervisor who spends 60% of their time managing this department. The remainder of the supervisor's time is spent managing another department.

Cost

The direct expense (salary, benefits etc.) incurred in running the department during the month is \$16,800.

The supervisor's costs are \$5,600. They estimate 60% of their time is spent on the "process applications" activity and 40% on the "chase late payments" activity.

In addition, there are costs of \$4,200 assigned to the department each month to cover indirect costs such as facilities, IT and HR. These indirect costs are split across the two activities based upon the resources that they consume. The "chase late payment" activity involves making extensive use of outbound telephone calls. Therefore, this activity receives a bigger assignment of the cost (70%), whilst the "process applications" activity receives 30%.

We will see that all of this information is required for costing, whatever methodology is used.

Time-Splits

Time-splits is the simplest ABC methodology to understand. Managers are simply surveyed to ascertain 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-Split

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

As the team processes each day's applications until this activity is completed, generally early in the afternoon, and then chases late payments until the end of the day, the manager is sure that little or no excess capacity exists and that a fairly reliable split for the activities is 66% for processing applications and 33% for chasing late payments.

Calculation

The calculation has two stages: first we assign resource costs to activities, 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		Total
	Process applications	Chase late payments	
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		Total
	Process applications	Chase late payments	
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 using time-splits is very straightforward to implement and requires little data other than the general ledger and the time to interview and collect the data from each responsibility centre. As such 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 organisation

Implementing ABC based on time-splits involves working with each responsibility centre to develop a dictionary of the activities they carry out and then allowing them to routinely report on how much time they spend on each activity. Doing this allows managers to directly participate in the project and review the results with the knowledge that they contributed to them. As such there is likely to be greater commitment to the success of the project.

Weaknesses of Time-Splits

Data collection and collation

Resurveying contributors every time a model is to be refreshed can be laborious. 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 has 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 that 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 those responsibility centres where there is reliable data on how staff spend their time, such as in customer contact centres, managers will use this information. This will produce results that are no less reliable than those generated using other methodologies.

Time-Capture

Time-capture is particularly useful for ascertaining how staff split their time between projects and customers. The main use comes when applied to functions such as Research and Development, IT, or in professional service organisations, where activities are far from repetitive or. As a rule of thumb, wherever time-capture is already being deployed in an organisation, 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 particularly so where capture of time data is already automated.

Calculated Example of Costing using Time-Capture

The amount of time staff spend on each activity could be captured from the systems they are using, from a specific time-capture application or from time sheets.

In this instance, the 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 the activity unit rates, the same as in the first worked example.

Step 1: Assigning Resource Costs to Activities

	Activities			Total
	Process applications	Chase late payments	Excess capacity	
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			Total
	Process applications	Chase late payments	Excess Capacity	
Total cost of activity	\$13,356	\$9,324	\$1,680	\$24,360
Volume driver	5,000	1,000		
Calculation	<i>(\$13,356 / 5,000)</i>	<i>(\$9,324 / 1,000)</i>		
Activity unit rate assigned to cost object	\$2.67	\$9.32		

Strengths of Time-Capture

Where blocks of time are dedicated to specific projects or customers

Where activities are far from repetitive and time-capture is already in use, time-capture 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 (although 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 requires 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 telephone calls answered and the number of delivery drops 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 telephone call or process an application. In certain responsibility centres such as a customer contact centre, duration drivers such as the amount of time taken to answer an inbound call 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 being "... 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 (4 minutes) and the telephone systems provide the average duration driver for the time to chase a late payment (10 minutes).

Calculation

In this instance, the department's resource consisted of a team of four working 7 hours per day for 20 days. The supervisor has tracked holidays and sickness and has calculated that 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(mins)	$(4 \times 20 \times 7 \times 60) \times 90\%$ 30,240
Cost per minute	$(\$16,800 / 30,240)$ \$0.555

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)	$(4 \times 5,000)$ 20,000	$(10 \times 1,000)$ 10,000	30,000
Cost of time used	$(20,000 \times \$0.555)$ \$11,100	$(10,000 \times \$0.555)$ \$5,550	\$16,650
Assignment of supervisor's costs *	$(\$5,600 \times 60\% \times 60\%)$ \$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 activity cost	$(\$11,100 + \$2,016 + \$1,260)$ \$14,376	$(\$5,550 + \$1,344 + \$2,940)$ \$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			$(240 \times \$0.555)$ \$133

* It should be noted that whilst time-driven ABC is effective it is not realistic to expect it to be used 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 that is consumed by each of the activities.

Completing the calculation reveals that \$133 worth of resource cost, equivalent to 240 minutes (4 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 that add up to 100%, as very few individuals will say that any of their time is unused or idle. Cost driver rates calculated from this process may incorrectly assume that resources are working at full capacity. Time-driven ABC effectively overcomes this and automatically reveals differences between the total amount of time needed to carry out the activities in a responsibility centre and the actual amount of time available given its current resources. (Note that 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 the data is readily available, robust and reliable, time-driven ABC can generate as many problems as it purports to solve. If the data comes from reliable systems such as automated call handling systems, and is regularly updated, it will be infallible. However, if it is out of date or based on estimates, it 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 much, but factored over 100,000 calls it becomes substantial. Therefore, a time-driven methodology requires as much data collection as any other methodology if it is to be robust and reliable.

In any organisation there will be responsibility centres, such as marketing, legal, research and areas of IT, where activities are far from homogeneous and repetitive and duration drivers are simply not available. In these instances, a different methodology must be used.

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 8 minutes to handle an inbound telephone call, it would pick up twice as much cost as a more typical call that takes only 4 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 8 minutes simply because it was taken

by an inexperienced agent, then the charge is invalid and will result in erroneous results.

Care also needs to be exercised when using time-driven ABC for costing in logistics operations. If the amount of time spent waiting on a customer's premises to collect or deliver a consignment is captured, this may be valid data to use. This is because there is considerably less cost involved in collecting from a customer who routinely has their consignments already labelled and awaiting collection at the front desk than from one who keeps the courier waiting. However, in many instances the only time-captured is the moment the bar code on each consignment was read at a customer's premises. This means that this 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 in using time-driven costing in logistics operations is how to deal with the "stem time", the amount of time between the courier leaving the depot and making their first stop. One way to deal with this time is to calculate its cost and apportion it equally over all the customers on the route.

The above discussion is not intended to provide definitive answers to the use of time-driven costing. It is simply to illustrate that even in those 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 if inappropriate allocations are to be avoided.

Data collection

It is frequently suggested that time-driven costing eliminates the need for surveys and data collection. 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 centre agents are frequently provided with new scripts in attempts to up-sell and cross-sell other products and services, and such changes impact the length of a call. These changes need to be collected and collated and this means 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.

It should be borne in mind that if reliable systems are not in place to capture cycle times there may be a dependency upon surveys, people being surveyed are likely to relax their normal working patterns so as to put themselves above reproach.

One also needs to consider what happens if the computation of driver volumes and activity cycle times suggests that a department is working above its theoretical capacity, as this would surely cast doubt on the reliability of any ABC model and lead managers to question the validity of the reports.

Volume of data

Costing individual transactions using a timed-based methodology quickly generates enormous amounts of data. Analysing and generating management reports from this requires large databases and powerful analysis and reporting tools.

Before going to this level of granularity, for instance using a time-driven methodology to calculate the cost of every transaction for every customer, it is worthwhile understanding exactly how managers in the organisation intend to use the information to inform their 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 considerably less effort, to provide analysis at this higher level.

Conclusion

The hybrid model

While each of the methodologies discussed above has its own particular strengths, none is perfect for every activity in every responsibility centre. In practice, models will be hybrids, with different methodologies being used in different responsibilities centres. Even then, it is unlikely that 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 ALG Software's **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 in ALG Software's applications

As it is unlikely that a single methodology will be appropriate for all activities in a model, it is essential that organisations 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 that 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 can be identified early enough to do something about it. Both **Activity Analysis** and **Predictive Planning** include the ability to model capacity, so that under-utilised resource can be redeployed elsewhere and future capacity constraints can be addressed.

These applications can not only deal with large volumes of data, but also include powerful modelling tools that make it easy to manage models that employ a range of approaches to cost allocation. Without such tools, model management would rapidly become difficult and error-prone. With them, ALG applications have the ability to develop and – crucially – continue to maintain realistic models of an enterprise, and to deliver powerful, insightful and detailed analysis.

About the Author

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Richard Barrett is Vice President of Global Marketing at ALG Software. He started his career within the pharmaceutical industry and gained an MBA in 1981. He has a wealth of experience in consultancy and holding national and international positions in consumer marketing, insurance and as well as business-to-business marketing with DHL Worldwide Express. Richard first became involved in product and customer profitability whilst with DHL during the late '80's and continued his interest in the topic in the insurance market, where he claims there are too many actuaries looking at loss ratios and not enough people looking at profitability.

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Lee Hawthorn is Group Product Marketing Manager at ALG Software. He started his career within the communications industry whilst training to be a management accountant. Lee's focus has been on using IT to help improve business performance from a financial and operational perspective. Lee has most recently gained experience within the Financial Services industry at MBNA Europe. It was during this period that Lee became extensively involved in performance management practices such as driver based budgeting and activity-based management.

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