

# Duration-Based Costing: Utilizing Time in Assigning Costs

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## EXECUTIVE SUMMARY

Duration-Based Costing is a simplified costing system potentially as effective as activity-based costing (ABC).

Companies can use it to assign costs and provide information for management decision making.

**W**hat is the best way to assign overhead costs? The answer depends on the nature of the company and its information needs. For instance, if time greatly affects a company's production of goods and services, then perhaps a time-oriented driver may be more appropriate. From my 2009 dissertation from Oklahoma State University and the published article that was derived from it, I developed Duration-Based Costing (DBC), a type of system that uses a time-oriented driver as an alternative to activity-based costing (ABC).<sup>1</sup> Companies can use DBC to assign costs to any cost object. This article provides practitioners two scenarios to illustrate how DBC works—one on product costing and the other on customer costing. Prior research has shown that DBC has potential to provide cost assignments close to those of ABC.

Before I present the scenarios, a literature review makes sense. Much of the prior research on costing models has considered ABC to have the greatest accuracy.<sup>2</sup> Performed in two stages, ABC was developed to improve the specificity of the systems.<sup>3</sup> This improved specificity, however, causes ABC to be a costly and complex costing model that requires a significant amount of information for the activities.<sup>4</sup>

To improve ABC, researchers created Resource Consumption Accounting (RCA), a combination of ABC and

the German costing system, Grenzplankostenrechnung (GPK).<sup>5</sup> Because it requires even more detailed information, however, RCA is more complex than ABC.<sup>6</sup> Gathering this detailed information is time-consuming and, thus, costly. Consequently, one could argue that an ideal costing model provides information for decision making without being overly complex and complicated to implement, maintain, and update. A few researchers have tried to develop simplified costing methods, but those methods not only require a fully implemented ABC system, but they also show that trade-offs exist between cost and accuracy.<sup>7</sup>

So what about creating a system that does not require a fully implemented ABC system and, at the same time, has a good degree of accuracy? In one attempt to achieve this, Robert Kaplan and Steven Anderson introduced time-driven ABC (TDABC), which is simpler than ABC and uses duration drivers that increase cost assignment accuracy.<sup>8</sup> TDABC skips the surveying and interviewing of employees to assign resource costs to activities. Yet a company must still identify all activities for TDABC to develop time equations in which the activities are broken down into smaller ones.<sup>9</sup> Consequently, a good degree of complexity remains in TDABC. In addition, duration drivers are not entirely a new idea. Robin Cooper was one of the first to discuss duration drivers, explaining they are more effective in assigning short-term variable costs than are transaction drivers.<sup>10</sup>

In contrast to the complexity of ABC and TDABC, Duration-Based Costing is a simpler costing model that, similar to TDABC, drives cost based on time.<sup>11</sup> Unlike TDABC and ABC, a practitioner does not have to gather data concerning all activities. DBC uses the production cycle time, which is an observed value, to assign resource (overhead) costs to the product lines. A practitioner determines DBC by clocking how long it takes to do a production run from start to finish—from the time the materials leave inventory to the completion of the production run, which can consist of one to a batch of units of a product.

The DBC model involves only one stage vs. two for ABC, meaning that DBC assigns resource overhead costs to cost objects based on time. First, the DBC model calculates cost per unit of time by dividing the

total overhead cost by the total time in the system. It then calculates the total time for the product line by taking the number of production runs and multiplying it by the production cycle time. Finally, the model determines the cost of the product line by multiplying the cost per unit of time by the total time for the product line.

Equivalency conditions exist in which DBC provides product cost assignments that match those of ABC.<sup>12</sup> These equivalency conditions are based on two linear correlation coefficients: the correlation between the activity consumption ratios for a certain cost object and activity costs and the correlation between the activity consumption ratios for a certain cost object and the total time for the activity. Based on simulations in the 2013 study to analyze the product costs of DBC and ABC, the results show that DBC cost assignments are close to those of ABC and conclude that the cycle time has the potential to accurately summarize the duration drivers of ABC.<sup>13</sup>

In addition, I further extended this research in 2014 by evaluating whether DBC and ABC provide relevant production information.<sup>14</sup> I used data envelopment analysis (DEA) to compare the technical efficiency of the production functions—not to be confused with cost functions—within DBC and ABC for 1,000 simulated cases.<sup>15</sup> Technical efficiency represents the ability to maximize output given a set of inputs. Multiproduct companies that experience economies of scope, nonlinear production technology, and nonconstant returns to scale will find that ABC will provide less accurate cost information.<sup>16</sup>

In my 2014 study, the inputs for the ABC model are the consumption of an activity's time by the corresponding product line, whereas the output is the number of production runs for each product line. Furthermore, the input for DBC is the production cycle time for the product line, and the output is the number of production runs. My study shows ABC can overstate the technical efficiency of the inputs as compared to that of DBC.<sup>17</sup> This means ABC will provide cost assignments that seem to show more output (number of production runs) is achieved given a set of inputs (activity times) than is the case.

The next section presents two scenarios to introduce

the DBC model: a product-costing scenario and a customer-costing scenario. For these scenarios, I show ABC first and then DBC to compare the cost assignments of the two systems.<sup>18</sup> The analysis concludes with an examination of the implications of DBC.

### SCENARIO 1: PRODUCT COSTING

Assume that a company has seven resources (Labor1, Labor2, Labor3, Machine1, Machine2, Machine3, and energy), six activities (Setting Up Equipment, Machining, Cutting, Assembly, Painting, and Moving), and three product lines (Push Mower, Premium Push Mower, and Riding Lawnmower). The ABC data appears in Table 1.

Panel A provides the activities' consumption of resource drivers in units of resource. The units of resource in Panel A do not always need to be in units of time to use DBC because DBC collapses Stage 1 into Stage 2 and then summarizes Stage 2 information for the cost assignments. Panel B takes the data from Panel A and creates resource consumption ratios. For example, Setting Up Equipment's resource consumption ratio for Labor1 is 0.25 (rounded), which is  $2,174/8,610$  from Panel A. Thus, I calculate the consumption ratio by taking the resource units that the activity consumes divided by the total units of the resource available.

In addition, Panel B of Table 1 provides the Stage 1 cost assignments by assigning resource costs to activities. To calculate the activity cost, I first assign a portion of the total cost of each resource to the activity by multiplying the consumption ratio for an activity by its corresponding resource cost. In other words, the Labor1 cost assigned to Setting Up Equipment is 0.25 multiplied by \$29,801, which equals approximately \$7,450 (not shown in Panel B). I calculate this for each resource for Setting Up Equipment. To find the total cost for the activity, I assign each resource cost to the activity, then add the assigned resource cost amounts. Hence, the cost assigned to Setting Up Equipment is:

$$(0.25 \times \$29,801) + (0.10 \times \$48,815) + (0.19 \times \$25,165) + (0.16 \times \$45,112) + (0.12 \times \$23,897) + (0.18 \times \$45,016) + (0.27 \times \$38,951) = \$45,818.31$$

The cost assigned to Machining is:

$$(0.09 \times \$29,801) + (0.09 \times \$48,815) + (0.05 \times \$25,165) + (0.15 \times \$45,112) + (0.23 \times \$23,897) + (0.24 \times \$45,016) + (0.17 \times$$

$$\$38,951) = \$38,022.31$$

The cost assigned to Cutting is:

$$(0.25 \times \$29,801) + (0.35 \times \$48,815) + (0.27 \times \$25,165) + (0.11 \times \$45,112) + (0.16 \times \$23,897) + (0.19 \times \$45,016) + (0.14 \times \$38,951) = \$54,122.07$$

I also use this procedure to find the cost assigned to Assembly (\$33,208.55), Painting (\$34,241.57), and Moving (\$51,344.19).

Panels C and D of Table 1 provide the Stage 2 cost assignments of assigning activity costs to the product lines. Panel C provides the consumptions of the activity drivers in units of time by the product lines that are used to calculate the activity consumption ratios in Panel D. Stage 2 must be in minutes, hours, etc., to be able to compare to DBC later. For example, in Panel D, the Setting Up Equipment activity consumption ratio for Push Mower is 0.52, which is equal to  $814/1,561$ . Then Panel D shows the cost assignment to the product lines based on multiplying those activity consumption ratios by their corresponding activity costs. Note that the product lines can contain many units. For example, the cost assigned to the Push Mower Line is:

$$(0.52 \times \$45,818.31) + (0.46 \times \$38,022.31) + (0.06 \times \$54,122.07) + (0.09 \times \$33,208.55) + (0.05 \times \$34,241.57) + (0.18 \times \$51,344.19) = \$58,505.91$$

The cost assigned to the Premium Push Mower Line is:

$$(0.03 \times \$45,818.31) + (0.16 \times \$38,022.31) + (0.31 \times \$54,122.07) + (0.52 \times \$33,208.55) + (0.49 \times \$34,241.57) + (0.64 \times \$51,344.19) = \$91,143.06$$

The cost assigned to the Riding Mower Line is:

$$(0.45 \times \$45,818.31) + (0.38 \times \$38,022.31) + (0.63 \times \$54,122.07) + (0.39 \times \$33,208.55) + (0.46 \times \$34,241.57) + (0.18 \times \$51,344.19) = \$107,108.03$$

Figure 1 shows the mathematical formulas in abstract form for assigning costs for ABC and DBC.

Table 2 provides cost assignments using the DBC model. First, to use DBC, I must estimate the production cycle time by observation for each product line. Thus, the production cycle time to produce a Push Mower from start to finish is 84.64 units of time, the Premium Push Mower is 81.18, and the Riding Mower is 325.92. The practitioner should know the number of production runs, which can consist of one unit to a batch of units.

**Table 1: Illustration of Product Costing Using Activity-Based Costing**

**Panel A, Consumption Amounts of Resource Drivers:**

	Labor1	Labor2	Labor3	Machine1	Machine2	Machine3	Energy
Setting Up Equipment	2,174	676	1561	1,511	1,291	1,700	1,748
Machining	774	610	409	1,415	2,391	2,305	1,076
Cutting	2,138	2,384	2,225	1,047	1,713	1,835	906
Assembly	981	58	2,064	1,446	2,196	1,301	847
Painting	475	1,180	1,163	1,973	681	1,081	725
Moving	2,068	1,823	813	2,106	2,341	1,398	1,159
Total Resource Driver	8,610	6,731	8,235	9,498	10,613	9,620	6,461

**Panel B, Stage 1 of ABC:**

**Consumption Ratios (Rounded from Panel A)**

	Labor1	Labor2	Labor3	Machine1	Machine2	Machine3	Energy	Activity Cost
Setting Up Equipment	0.25	0.10	0.19	0.16	0.12	0.18	0.27	\$45,818.31
Machining	0.09	0.09	0.05	0.15	0.23	0.24	0.17	\$38,022.31
Cutting	0.25	0.35	0.27	0.11	0.16	0.19	0.14	\$54,122.07
Assembly	0.11	0.01	0.25	0.15	0.21	0.14	0.13	\$33,208.55
Painting	0.06	0.18	0.14	0.21	0.06	0.11	0.11	\$34,241.57
Moving	0.24	0.27	0.10	0.22	0.22	0.14	0.18	\$51,344.19
Total Resource Cost	\$29,801	\$48,815	\$25,165	\$45,112	\$23,897	\$45,016	\$38,951	\$256,757.00

**Panel C, Consumption Amounts of Activity Drivers (Time):**

	Setting	Machining	Cutting	Painting	Assembly	Moving	Total Time
Push Mower	814	765	86	136	107	208	2,116
Premium Push Mower	48	270	412	803	970	744	3,247
Riding Mower	699	645	840	600	922	205	3,911
Total Time	1,561	1,680	1,338	1,539	1,999	1,157	9,274

**Panel D, Stage 2 of ABC:**

**Consumption Ratios (Rounded from Panel C)**

	Setting	Machining	Cutting	Painting	Assembly	Moving	Product Cost
Push Mower	0.52	0.46	0.06	0.09	0.05	0.18	\$58,505.91
Premium Push Mower	0.03	0.16	0.31	0.52	0.49	0.64	\$91,143.06
Riding Mower	0.45	0.38	0.63	0.39	0.46	0.18	\$107,108.03
Activity Cost	\$45,818.31	\$38,022.31	\$54,122.07	\$33,208.55	\$34,241.57	\$51,344.19	\$256,757.00

By knowing the production cycle time and the number of production runs, I can easily calculate the total time for a product line. Thus, the total time for the Push Mower Line is equal to 2,116 units of time, which is calculated by multiplying 84.64 (production cycle time) by 25 (the number of production runs). Does 2,116 look familiar? It should. See the Total Time of

the Push Mower Line in Panel C of Table 1.

Once I calculate the total time for each product line, I can find the total time for the system (9,274) by adding the total times for each product line. The total time of 9,274 for the system should also look familiar. The 9,274 in Table 2 is equal to the total time found for each activity in Panel C of Table 1. This shows that the

## Figure 1: Theoretical Definitions of ABC and DBC\*

**Theoretical Definition of ABC:** Assuming  $m$  activities and  $n$  resources, the cost assigned in Stage 1 to activity  $a$  is the sum of the resource consumption ratios ( $\rho_{aj}$ ) multiplied by the associated resource costs ( $c_j$ ), which is as follows:

$$\begin{aligned} A_a &= \sum_{j=1}^n \frac{\lambda_{aj}}{\lambda_j} C_j \\ &= \sum_{j=1}^n \rho_{aj} C_j, \quad j = 1, \dots, n \text{ and } a = 1, \dots, m, \end{aligned} \quad (1)$$

Where

- $A_a$  = cost assigned to activity  $a$  using ABC;
- $\lambda_{aj}$  = the consumption of resource  $j$  by activity  $a$ ;
- $\lambda_j$  = total amount of resource  $j$  ( $\sum_{a=1}^m \lambda_{aj}$ );
- $\rho_{aj}$  = the proportion of consumption of resource  $j$  by activity  $a$ ; and
- $C_j$  = total cost of resource  $j$ .

Next, assuming  $k$  product lines and  $m$  activities, the cost assigned to product line  $i$  in Stage 2 is the sum of the activity consumption ratios ( $\nu_{ia}$ ) multiplied by the associated activity costs ( $A_a$ ) found in Stage 1, which is as follows:

$$\begin{aligned} A_i &= \sum_{a=1}^m \frac{\varphi_{ia}}{\varphi_a} A_a \\ &= \sum_{a=1}^m \nu_{ia} A_a, \quad a = 1, \dots, m, \quad i = 1, \dots, k, \end{aligned} \quad (2)$$

Where

- $A_i$  = cost assigned to product line  $i$  using ABC;
- $A_a$  = total cost of activity  $a$  from Stage 1;
- $\varphi_{ia}$  = the consumption of activity  $a$ 's time by product line  $i$ ;
- $\varphi_a$  = total time of activity  $a$  ( $\sum_{i=1}^k \varphi_{ia}$ ); and
- $\nu_{ia}$  = the proportion of consumption of activity  $a$ 's time by product line  $i$ .

**Theoretical Definition of DBC:** Since many  $\lambda_{aj}$ 's and  $\varphi_{ia}$ 's would need to be found to perform ABC, DBC would be a simpler alternative. The cost of product line  $i$  is the cost per unit of time multiplied (1) by the production cycle time for product line  $i$  and (2) then multiplied by the number of production runs for product line  $i$ . When the production cycle time for product line  $i$  is multiplied by the number of production runs for product line  $i$ , the result is the total time for product line  $i$ . The DBC model is as follows:

$$D_i = \frac{\sum_{j=1}^n C_j}{\sum_{i=1}^k \beta_i \theta_i} \beta_i \theta_i = c \beta_i \theta_i, \quad i = 1, \dots, k, \quad (3)$$

Where

- $D_i$  = cost of product line  $i$  using DBC;
- $\beta_i$  = production cycle time for product line  $i$ ;
- $\theta_i$  = number of production runs for product line  $i$  at practical capacity; and
- $c$  = the resource (overhead) cost per unit of time, or  $\sum_{j=1}^n C_j / \sum_{i=1}^k \beta_i \theta_i$ .

Note that each of the  $\varphi_{ia}$ 's is unknown in the DBC model. The  $\varphi_{ia}$ 's are summarized by the production cycle time for product line  $i$  multiplied by the number of production runs for product line  $i$ .

\*Source: Anne-Marie Lelkes, *Simplifying Activity-Based Costing*, dissertation, Oklahoma State University, December 2009; Anne-Marie Lelkes and Donald Deis, "Using the Production Cycle Time to Reduce the Complexity of Activity-Based Costing Systems," *Journal of Theoretical Accounting Research*, October 2013, pp. 57-84; Anne-Marie Lelkes, "The Technical Efficiency Portrayed by Duration-Based and Activity-Based Costing Systems," *Advances in Management Accounting*, September 2014, pp. 61-76.

**Table 2: Illustration of Product Costing Using Duration-Based Costing**

**Duration-Based Costing:**

	Number of Production Runs	Production Cycle Time	Total Time	Cost per Unit of Time	Product Cost
Push Mower	25	84.64	2,116	\$27.6857	\$58,582.90
Premium Push Mower	40	81.175	3,247		\$89,895.40
Riding Mower	12	325.9167	3,911		\$108,278.70
			9,274		\$256,757.00

Total Resource Cost	\$256,757	
Total Time	9,274	(Note: 9,274 is the same as that in Panel C in Table 1)
Cost per Unit of Time	\$27.6857	(rounded)

	DBC Cost	ABC Cost	% Difference Between DBC and ABC
Push Mower	\$58,582.90	\$58,505.91	0.13%
Premium Push Mower	\$89,895.40	\$91,143.06	-1.37%
Riding Mower	\$108,278.70	\$107,108.03	1.09%
	\$256,757.00	\$256,757.00	

production cycle time summarizes the consumptions of the activities' times by product lines. The production cycle time should be even more accurate than finding the times for each activity. Why? In ABC, the practitioner interviews employees to determine what percent of time they spend doing each activity. It usually adds up to 100% when, in fact, it might not be 100%. DBC avoids this inaccuracy by observing production cycle times.

Once I determine the total time of 9,274, I then calculate the cost per unit of time. The cost per unit of time is approximately \$27.69, which I calculate by taking the total resource cost of \$256,757 (same as in Panel B of Table 1) and dividing it by the total time of 9,274. To find the cost of each product line, I multiply the total time of the product line by the cost per unit of time. Hence, the cost for the Push Mower Line is \$58,582.90, which is the total time of 2,116 multiplied by \$27.69 (rounded). The Premium Push Mower Line cost equals \$89,895.40, which is the total time of 3,247 multiplied by approximately \$27.69. Finally, Riding Mower Line cost equals \$108,278.70, which is the total

time of 3,911 multiplied by \$27.69.

Notice I did not need to show Stage 1 of ABC in this scenario. The only information that was repeated from Table 1 for ABC in Table 2 for DBC is the total resource (overhead) cost and the total times for each product line and in total for the system. When performing DBC, the practitioner does not need to know resource drivers and activity drivers, which makes an activity dictionary unnecessary.

The differences between the DBC cost assignments in Table 2 and the ABC Stage 2 cost assignments in Panel D of Table 1 are quite close—1.35% or less. To calculate the percent difference for a product line, I take the DBC cost assignment for the product line minus the ABC cost from Panel D of Table 1 and then divide by the ABC cost. In other words, for the Push Mower Line, the percent difference is 0.13%, which is  $(\$58,582.90 - \$58,505.91) / \$58,505.91$ . This scenario shows that DBC cost assignments are on average close to those of ABC.<sup>19</sup> In addition, some researchers have found that a highly detailed cost assignment system such as ABC could cause measurement errors, espe-

cially for multiproduct companies.<sup>20</sup> Thus, it is possible that DBC could outperform ABC in certain situations.

## SCENARIO 2: CUSTOMER COSTING

To demonstrate customer costing, assume that there are three activities (ordering, billing, and service) and four customers. Stage 1 of ABC does not appear in this scenario as the most important part of the scenarios in this article is comparing cost assignments in ABC Stage 2 with those of DBC. In this scenario, the number of production runs is now called the number of customer orders. In addition, the production cycle time becomes the order cycle time.

Panel A of Table 3 provides the number of minutes of each activity the customers consume. Panel B takes the information in Panel A to create consumption ratios. For instance, Customer1 consumes 200 minutes of 778 total minutes for the Ordering activity. Thus, the activity consumption ratio for Customer1 for the Ordering activity is approximately 0.26 (200 minutes/778 total minutes). Panel B also uses those consumption ratios along with the costs of those activities to determine the cost assigned to each customer. For instance, the cost assigned to Customer1 is:

$$(0.26 \times \$7,000) + (0.28 \times \$1,500) + (0.30 \times \$3,500) = \$3,290$$

The cost assigned to Customer2 is:

$$(0.22 \times \$7,000) + (0.17 \times \$1,500) + (0.26 \times \$3,500) = \$2,705$$

Using the same procedure for Customer3 and Customer4, the costs assigned are \$2,055 and \$3,950, respectively.

Panel C of Table 3 provides the DBC cost assignments. To calculate those, I first estimate the order cycle time for each customer. For example, the order cycle time for Customer1 from the time the customer calls in the order to the time the service is complete is 29.85 minutes. The order cycle time is 12.15 minutes for Customer2, 35.7 for Customer3, and 34.8 for Customer 4. Then once I know the number of orders, the total minutes for each customer will be the number of orders multiplied by the order cycle time. For Customer1, the total minutes is 597 (20 orders  $\times$  29.85 minutes per order). Notice that the 597 minutes for Customer1 in Panel C is identical to that in Panel A of Table 3.

Once I find the total minutes and add them together

for each customer, the total minutes for the system is 2,136, as Panel C of Table 3 shows. This is identical to that in Panel A of Table 3. I can now determine the cost per minute by taking the total activity (overhead) cost of \$12,000 from Panel B of Table 3 and dividing it by 2,136 minutes to get approximately \$5.62 (rounded). Finally, to find the cost of each customer, I multiply the cost per minute by the total minutes for each customer. In other words, I calculate the cost of Customer1 by taking the total minutes of 597 and multiplying it by \$5.62 (rounded) to obtain approximately \$3,353.93. Customer2's cost is \$2,730.34, which is 486 minutes multiplied by \$5.62. Using the same procedure for Customer3 and Customer4, the costs are \$2,005.62 and \$3,910.11, respectively.

Panel C of Table 3 also provides the percentage difference between DBC and ABC. The cost assignments between the two systems are close, with a difference of 2.40% or less. The procedure to calculate the percentage differences is parallel to that in the product-costing scenario.

Although this article only provides two DBC scenarios, a practitioner can also apply DBC to any other cost object, such as services and supplier. These two scenarios should illustrate that DBC is less information-intensive than ABC and can provide cost assignments close to those of the more information-complex ABC.

## IMPLICATIONS

Based on prior research, DBC has the potential to be more accurate than ABC in multiproduct companies that exhibit economies of scope, nonlinear production technology, and nonconstant returns to scale.<sup>21</sup> A company can use the cycle time to facilitate efficiency and cost reduction. The more efficient the production process, the sooner the product is out to the customer. An efficient production process also entails less resource waste and, thus, is less costly. For customer costing, if the company processes sales orders, warranty claims, and billing more efficiently, then the company will achieve cost reduction since it wastes less time, which means customers are more likely to be satisfied and, thus, revenues will not decline.

A practitioner, however, must not fall into the trap of focusing too much on the cycle time at the expense of

**Table 3: Illustration of Customer Costing Using Activity-Based and Duration-Based Costing**

**Panel A, Consumption Amounts of Activity Drivers (Time):**

	Ordering	Billing	Service	Minutes
Customer1	200	144	253	597
Customer2	172	89	225	486
Customer3	146	125	86	357
Customer4	260	151	285	696
	778	509	849	2,136

**Panel B, Stage 2 of ABC:**

Activity Consumption Ratios (Rounded from Panel A)				
	Ordering	Billing	Service	Customer Cost
Customer1	0.26	0.28	0.30	\$3,290
Customer2	0.22	0.17	0.26	\$2,705
Customer3	0.19	0.25	0.10	\$2,055
Customer4	0.33	0.30	0.34	\$3,950
Activity Cost	\$7,000	\$1,500	\$3,500	\$12,000

**Panel C: Duration-Based Costing:**

	Number of Orders	Order Cycle Time	Total Minutes	Cost per Minute	Customer Cost
Customer1	20	29.85	597	\$5.62	\$3,353.93
Customer2	40	12.15	486		\$2,730.34
Customer3	10	35.70	357		\$2,005.62
Customer4	20	34.80	696		\$3,910.11
			2,136		\$12,000.00

<b>Total Cost</b>	\$12,000	
<b>Total Minutes</b>	2,136	(Note: 2,136 is the same as that in Panel A)
<b>Cost per Minute</b>	\$5.62	(rounded)

	DBC Cost	ABC Cost	% Difference Between DBC and ABC
Customer1	\$3,353.93	\$3,290	1.94%
Customer2	\$2,730.34	\$2,705	0.94%
Customer3	\$2,005.62	\$2,055	-2.40%
Customer4	\$3,910.11	\$3,950	-1.01%
	\$12,000.00	\$12,000	

quality. Though it is a good starting point, the cycle time should not be the only measure of an efficient production process. For instance, a company should have measures that evaluate employees' competence because incompetent employees may work inefficiently, causing the cycle time to increase. A lack of

competence can also decrease the cycle time if employees are not being thorough. Furthermore, the cycle time does not drive fixed costs, which can include equipment leases, supervisor salaries, etc. A practitioner can use a different measure to reduce any unnecessary fixed costs.

Activity-based management (ABM) can be tied to DBC since activity selection, reduction, sharing, and elimination will affect the production cycle time. Tying ABM to DBC will ensure that the company does not rely solely on DBC information for all decision-making tasks because some costs are affected by other factors in addition to the product cycle time. A company would not need to identify all individual activities to perform ABM because it may be sufficient for management to identify only the major activities, which can include pooled activities, and monitor them.

### AN ALTERNATIVE COSTING METHOD

This article not only summarizes the main concepts of DBC, but it also provides two scenarios comparing ABC with DBC.<sup>22</sup> Because DBC calls for less information, it is less costly to implement, maintain, and update than ABC. Since the cycle time is a summary measure of the ABC Stage 2 duration drivers, inefficiencies in those duration drivers may affect the cycle time. Once management notices that the cycle time is not at the right level for a certain product line, it can investigate the cause of the inefficiency by evaluating particular activities within the production process.

DBC is an alternative costing method that can facilitate decision making without the unnecessary and costly information overload that occurs in ABC. It has the potential to be equal to ABC or, in cases of nonconstant returns to scale, outperform ABC. Before implementing any costing method, however, practitioners need to evaluate the nature of their companies to ensure it satisfies the information needs for decision making. DBC's simplicity and its ability for practitioners to tie it to activity-based management may be attractive to companies. ■

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### ENDNOTES

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- 18 Any resemblance of these illustrations to a real-life company is purely coincidental. Note that in the scenarios, ABC and DBC are discussed by illustration. Refer to Figure 1 for the theoretical ABC and DBC models.
- 19 The simulations in Anne-Marie Lelkes and Donald Deis (2013) contained 20 resources, 16 activities, and 10 product lines, much greater than this illustration. For the purposes of this article, it is better to show smaller illustrations to avoid a cumbersome reading experience.
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