

The Integrated Activity-Based Costing and Economic Value Added System for the Service Sector

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Abstract

This paper examines the implementation of the Integrated Activity-Based Costing and Economic Value Added System in the service sector. This system is intended for use by those service companies for which the traditional costing system is not adequate. Motivations for tracing overhead cost as well as capital cost, using the integrated system, are discussed. Resulting improvements in the reliability of product cost information are illustrated through the example of a consulting firm which moved from intuitive cost estimation to reliable cost analysis. Finally, the impact of this integrated system on the service sector's decision-making process and long-term business performance is discussed.

Keywords

Activity-Based Costing, Consulting Companies, Costing System, E-Commerce, Economic Value Added, Service Companies

1. Introduction

The quality of an organization's cost information is highly related to overall business performance (Dearden, 1963). In general, the more reliable the cost information provided by a costing system, the better the managerial decision-making and the stronger the company's business performance.

Activity-Based Costing (ABC), a costing system which is more reliable than traditional cost accounting, has been implemented in manufacturing companies for more than a decade (Cooper, 1988a; Cooper, 1988b; Cooper, 1989b; Cooper, 1989a; Roztocki, Valenzuela, Porter, Monk, & Needy, 1999). In many cases, the ABC implementation has contributed substantially to a more efficient use of overhead resources, and therefore, has led to an impressive cost savings (Cooper & Kaplan, 1991).

In recent years, many managers from service companies (such as banks, health care organizations, telecommunications firms, railways and power generating facilities) impressed by the ABC-lead cost reductions, started to implement this system in their organizations (Mays & Sweeney, 1994; Lambert & Whitworth, 1996; Krupnicki & Tyson, 1997). For many companies in the service sector, the ABC system is still work in

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progress, with managers attempting to implement the system as a replacement for traditional cost accounting.

ABC, which is able to reliably trace overhead expenses, disregards capital cost, however. In other words, ABC only focuses on data included in a company's income statement, and fully disregards the balance sheet (Roztocki & Needy, 1999b). In order to obtain complete (and therefore reliable) cost information, some authors proposed integrating the ABC system with the Economic Value Added (Hubbell, 1996a; Hubbell, 1996b; Roztocki & Needy, 1998; Roztocki & Needy, 1999c; Cooper & Slagmulder, 1999). In this integrated costing and performance-measure system, known as the Integrated ABC-and-EVA System, the ABC component is used to trace overhead cost, (derived from the income statement) while the Economic Value Added element is used to estimate capital cost (derived from the balance sheet). Despite the fact that the Integrated ABC-and-EVA System has already been successfully implemented in a number of small manufacturing companies (Roztocki, 2000), published reports about its implementation in the service industry (according to the author's knowledge) do not exist.

Many service companies, similar to manufacturing companies in their experience of high overhead and high capital cost, have costs which are left untraced or are allocated arbitrarily. The resulting distortions may provide misleading information to the management and may lead to poor decision-making. Therefore, it can be concluded that the Integrated ABC-and-EVA System will also be a very efficient managerial tool for the service sector, as it has the ability to account for overhead and capital cost.

The main contribution of this paper is, therefore, to adapt the Integrated ABC-and-EVA System implementation methodology, originally developed for manufacturing companies (Roztocki & Needy, 1999c), to the specific needs of the service sector. In addition, this paper's intention is to present the system's usefulness for service sector companies with regard to strategic pricing, cost control, and improvement in cost structure.

2. Methodology

The Integrated ABC-and-EVA System implementation is performed in seven major steps. Steps 1 through 5 of the adapted implementation procedure are very similar to the common ABC implementation procedure. The main objective of steps 1 through 5 is to trace overhead cost. Steps 6 and 7 are adapted from the Economic Value Added implementation. The main objective of these steps is to trace capital cost.

Step 1: Review financial statements

The objective of this step is to identify the company's direct costs, overhead costs, and capital costs. This information can be obtained from the company's profit/loss (P&L) statement and balance sheet. The P&L statement is used to identify direct costs and to estimate overhead costs, while the balance sheet is used to estimate capital costs (Roztocki & Needy, 1999c).

Step 2: Identify main activities

During this step, the main activities that consume overhead resources, such as preparing bids or billing customers, are identified. A flowchart of the company's business process

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(which starts, for example, with customer inquiry, and ends with final payment) is a very helpful tool in systematically identifying the activities (Roztocki, Valenzuela, Porter, Monk, & Needy, 1999).

Perhaps, system implementation is best undertaken with the inclusion of relatively few major business activities. Then, as needed, the ABC system can be refined by splitting these activities into more specific categories or introducing additional activities to the analysis (Cooper, 1989a).

Step 3: Determine overhead cost for each activity

After the main activities are identified, the cost of each should be calculated. To properly trace overhead costs to activities, tools such as “first stage” cost drivers and cost pools, or Expense-Activity-Dependence (EAD) matrixes can be used (Roztocki, Valenzuela, Porter, Monk, & Needy, 1999).

Step 4: Select operating cost drivers

Once the overhead cost of each activity is determined, these costs are then traced to cost objects, such as services, processes or customers. Operating cost drivers, also called “second stage” cost drivers, are commonly used to perform this task (Roztocki, Valenzuela, Porter, Monk, & Needy, 1999).

When selecting cost drivers, factors such as the accessibility of data required by a particular cost driver and the degree of correlation between the consumption of the activity and the cost object, should be considered (Cooper, 1989b).

Step 5: Calculate operating costs for cost objects

Once cost drivers are selected, operating costs are traced to the cost objects. Operating cost drivers or Activity-Product-Dependence (APD) matrixes are helpful in tracing costs from activities to cost objects (Roztocki, Valenzuela, Porter, Monk, & Needy, 1999).

Step 6: Calculate capital charges for cost objects

The main objective of this step is to trace capital costs to the appropriate cost objects. First, the capital demand of each cost object is determined. Then, an appropriate Capital Cost Rate (CCR) for use of this capital is estimated. Finally, based on the capital demand and CCR, a capital charge for each cost object is calculated (Roztocki & Needy, 1999b; Roztocki, 2000).

Step 7: Calculate Economic Value Added for cost objects

The Economic Value Added of each cost object is calculated by subtracting its total costs (direct, operating, and capital costs) from its revenues (Roztocki & Needy, 1999a; Roztocki & Needy, 1999c). If the Economic Value Added is positive for a given cost object, we can assume that this cost object is creating shareholders’ wealth. If this value is negative, we can assume that this cost object is destroying shareholders’ wealth.

In the following section, the steps of the Integrated ABC-and-EVA System implementation are discussed in greater detail.

3. Illustration

Dot-Com Consulting Inc.

Dot-Com Consulting Inc. (whose name has been changed to protect anonymity) is a small, specialized consulting firm which introduces traditional “brick-and-mortar” companies to e-business and supports existing e-businesses. “Old Economy” clients usually come to the consulting firm seeking e-commerce as an additional distribution

channel, whereas existing e-businesses generally seek assistance in marketing, business plan development and financial planning. Dot-Com Consulting customers are scattered around the country, and the company employs, on average, six to seven consultants, who often travel long distances to the customers.

Dot-Com Consulting was very interested in implementing the Integrated ABC-and-EVA System because it was experiencing relatively high overhead expenses. Half of the total expenses (rent, administrative salaries, hardware and software maintenance) could be classified as overhead. On the other hand, the main part of the company's direct expenses was consultant compensation. Therefore, the company was interested in using ABC to better track their high overhead.

Dot-Com Consulting Inc. was interested in performing the ABC-and-EVA cost analysis for their primary clients, in order to assure that all customers were creating economic value and to determine if the established consulting fee were appropriate. Until the ABC-and-EVA cost analysis, Dot-Com Consulting Inc. was typically billing its customers at \$2,000.00 a day for each consultant. In addition to this daily fee, the customer was billed for consultants' travel expenses, such as transportation, meals, and accommodations. These travel expenses were highly dependent on the customer's location and often varied significantly. Dot-Com Consulting tried to keep these expenses as cost-efficient as possible, in deference to their customers, by staying within the boundaries of what was judged as reasonable and customary.

The fee of \$2,000.00 per day was chosen, somewhat arbitrarily, by Dot-Com Consulting's management. This fee, which was widely accepted by Dot-Com Consulting's customers, was the product of intuition and educated-guessing, rather than cost analysis. However, Dot-Com Consulting's management felt that for some of the customers, a lower or higher rate was more appropriate, because of their differences in consumption of overhead or capital resources. In many cases, the overhead and capital consumption was not proportional to the direct consulting hours. Therefore, a cost analysis was expected to lead to a more judicial pricing policy, and eventually, to higher profits.

System Implementation

The first step toward implementation of the Integrated ABC-and-EVA System was to analyze Dot-Com Consulting's financial statements. We used the income statement to trace overhead cost, while the balance sheet was used to estimate capital cost. Table 1 presents Dot-Com Consulting's income statement for a recent fiscal year. (In the following tables, all accounting numbers were simplified to focus the reader's attention on the methodology, rather than the accounting details.)

Table 1. Dot-Com Consulting's Income Statement

Revenues	\$2,200,000.00
Cost of goods sold	\$800,000.00
Selling, general, and administrative expenses	\$1,000,000.00
Earnings before interest and taxes	\$400,000.00
Interest expenses	\$0.00
Income before tax	\$400,000.00
Income tax (35%)	\$140,000.00
Net Income	\$260,000.00

Table 2 presents Dot-Com Consulting's balance sheet.

Table 2. Dot-Com Consulting's Balance Sheet

ASSETS		LIABILITIES	
Current assets		Current liabilities	
Cash	\$140,000.00	Accounts payable	\$80,000.00
Receivables	\$820,000.00	Accrued expenses	\$50,000.00
Inventory	\$0.00	Short-term debt	\$0.00
Other current assets	\$30,000.00	Total current liabilities	\$130,000.00
Total current assets	\$990,000.00		
		Long-term liabilities	
Fixed assets		Long-term debt	\$0.00
Property, land	\$0.00	Total long-term liabilities	\$0.00
Equipment	\$80,000.00		
Other fixed assets	\$60,000.00	Owners' equity	
Total fixed assets	\$140,000.00	Common stock	\$500,000.00
		Retained earnings	\$500,000.00
		Total owner's equity	\$1,000,000.00
TOTAL ASSETS	\$1,130,000.00	TOTAL LIABILITIES AND OWNERS' EQUITY	\$1,130,000.00

All expenses included in the income statement were divided into direct and overhead expenses. Expenses which could be directly traced to a client were defined as "direct." For example, expenditures for airline tickets used by consultants travelling to a particular customer could be assigned to that customer, and were therefore classified as "direct." In contrast, expenditures, such as rent, administration, or hardware and software maintenance, were classified as "overhead expenses" and traced using the ABC approach. The overhead expenses are summarized in Table 3.

Table 3. Dot-Com Consulting's Overhead Expenses

Expense Category	Cost
Rent	\$250,000.00
Utilities	\$25,000.00
Administration	\$300,000.00
Office expenses	\$30,000.00
Fees for professional literature and databases	\$140,000.00
Sales and marketing	\$10,000.00
Hardware maintenance	\$60,000.00
Software maintenance	\$80,000.00
Depreciation	\$40,000.00
Employee training	\$45,000.00
Miscellaneous	\$20,000.00
Total	\$1,000,000.00

Capital is defined as all money invested in a company (Stewart, 1991; Roztockki & Needy, 1999a). Dot-Com Consulting's capital was estimated using an operating approach. To estimate capital, non-interest-bearing liabilities (Accounts payable and Accrued expenses) were subtracted from the company's total assets. Table 4 summarizes the calculation using the operating approach.

Table 4. Dot-Com Consulting's Capital

Cash	140,000.00
Receivables	+\$820,000.00
Inventory	\$0.00
Other current assets	+30,000.00
Property, land	+\$0.00
Equipment	+\$80,000.00
Other fixed assets	+\$60,000.00
Accounts payable	-\$80,000.00
Accrued expenses	-\$50,000.00
Capital	\$1,000,000.00

In Step 2, Dot-Com Consulting's main activities, which consumed overhead resources and caused the expenses shown in Table 3, were identified. The main focus of this analysis was to find which activities demanded the most overhead resources. The compensation of consultants was not the focus of this analysis, since their compensation, as well as their travel expenses, could be traced directly to a particular customer. These expenses were therefore regarded as direct costs. Overall, 17 main business activities were identified. The identified activities are shown in Table 5.

Table 5. Activity Categories and Activity

Activity Category	Activities
Customer Management	Contact customers to insure satisfaction with projects in progress
	Attend to professional business development
	Serve customers (Respond to customer wishes and complaints)
	Develop initial estimates of project times and costs (Prepare bids)
	Prepare project invoices
	Collect money
Project Planning	Prepare project time and cost estimates
	Assign consultants and develop schedules for projects
Project Management	Coordinate and supervise projects in progress
	Make consultants' travel arrangements
	Co-ordinate and support consultants
	Manage Accounts payable
	Evaluate completed projects
Enterprise Management and Development	Perform human resource duties
	Represent business
	Perform administrative duties
	Perform market research and develop strategic plans

In Step 3, the cost of each activity was traced. To estimate the cost of each activity, tools such as cost pools or Expense-Activity-Dependence (EAD) matrixes were applied (Roztocki, Valenzuela, Porter, Monk, & Needy, 1999). Table 6 displays the overhead cost for each activity.

Table 6. Operating Cost for each Activity

Activity	Activity Cost
Contact customers to insure satisfaction with projects in progress	\$30,000.00
Attend to professional business development	\$100,000.00
Serve customers (Respond to customer wishes and complaints)	\$70,000.00
Develop initial estimates of project times and costs (Prepare bids)	\$30,000.00
Prepare project invoices	\$20,000.00
Collect money	\$45,000.00
Prepare project time and cost estimates	\$105,000.00
Assign consultants and develop schedules for projects	\$95,000.00
Coordinate and supervise projects in progress	\$110,000.00
Make consultants' travel arrangements	\$30,000.00
Co-ordinate and support consultants	\$50,000.00
Manage Accounts payable	\$25,000.00
Evaluate completed projects	\$60,000.00
Perform human resource duties	\$40,000.00
Represent business	\$35,000.00
Perform administrative duties	\$40,000.00
Perform market research and develop strategic plans	\$30,000.00
Total	\$1,000,000.00

In Step 4, operating cost drivers were selected. We chose to select cost drivers which were highly correlated to activity consumption by cost objects, and for which the necessary data was relatively easy to obtain. Table 7 shows these operating cost drivers.

Table 7. Operating Cost Drivers

Activity	Cost Driver
Contact customers to insure satisfaction with projects in progress	Number of phone minutes
Attend to professional business development	Number of hours
Serve customers (Respond to customer wishes and complaints)	Number of hours
Develop initial estimates of project times and costs (Prepare bids)	Number of bids
Prepare project invoices	Number of invoices
Collect money	Number of overdue invoices
Prepare project time and cost estimates	Number of hours
Assign consultants and develop schedules for projects	Number of hours
Coordinate and supervise projects in progress	Number of hours
Make consultants travel arrangements	Number of business trips
Co-ordinate and support consultants	Number of direct consulting hours
Manage Accounts payable	Number of transactions
Evaluate completed projects	Number of hours
Perform human resource duties	Number of direct consulting hours
Represent business	Number of direct consulting hours
Perform administrative duties	Number of direct consulting hours
Perform market research and develop strategic plans	Number of direct consulting hours

In Step 5, using operating cost drivers, we traced overhead to cost objects. (As previously mentioned, in the case of Dot-Com Consulting, cost objects were the company's customers.) Table 8 depicts these operating costs.

Table 8. Overhead Cost for Company's Customers

Customer	Overhead Cost
1	\$300,000.00
2	\$200,000.00
3	\$150,000.00
4	\$100,000.00
Remaining Customers	\$250,000.00
Total	\$1,000,000.00

In Step 6, capital charges applicable to Dot-Com Consulting's customers (cost objects) were calculated. A Product-Capital Dependence (PCD) matrix, which relates the cost object to capital usage, was used to systematically trace capital cost to Dot-Com Consulting's customers (Roztocki & Needy, 1999b). For Dot-Com Consulting, we

estimated an overall Capital Cost Rate (*CCR*) of 20 percent. The relatively high *CCR* was attributed to Dot-Com Consulting’s relatively high business risk. The company had almost no significant assets and most money was “trapped” in the category of Receivables. This means that in the case of liquidation, Dot-Com Consulting’s investors would probably lose their holdings. Table 9 presents calculated the capital charges.

Table 9. Capital Charges for Main Customers

Customer	Capital Cost After Tax
1	\$57,500.00
2	\$40,000.00
3	\$75,000.00
4	\$5,000.00
Remaining Customers	\$22,500.00
Total	\$200,000.00

Finally, in Step 7, the Economic Value Added was calculated for Dot-Com Consulting customers. The Earnings before Interest and Taxes (EBIT) for each customer was calculated by subtracting direct costs (mainly consultants’ compensation and travel expenses) and ABC-traced overhead costs from revenues, as shown in Table 10.

Table 10. EBIT for Company’s Customers

Customer	Revenues	Direct Cost	Overhead Cost	EBIT
1	\$650,000.00	\$200,000.00	\$300,000.00	\$150,000.00
2	\$450,000.00	\$150,000.00	\$200,000.00	\$100,000.00
3	\$550,000.00	\$300,000.00	\$150,000.00	\$100,000.00
4	\$150,000.00	\$50,000.00	\$100,000.00	\$0.00
Remaining	\$400,000.00	\$100,000.00	\$250,000.00	\$50,000.00
Total	\$2,200,000.00	\$800,000.00	\$1,000,000.00	\$400,000.00

Next, the Economic Value Added for each customer was calculated by subtracting corporate taxes and capital charges from EBIT. Table 11 summarizes the results.

Table 11. Economic Value Added for Company's Customers

Customer	EBIT	Tax (35%)	Capital Charge	Economic Value Added
1	\$150,000.00	\$52,500.00	\$57,500.00	\$40,000.00
2	\$100,000.00	\$35,000.00	\$40,000.00	\$25,000.00
3	\$100,000.00	\$35,000.00	\$75,000.00	-\$10,000.00
4	\$0.00	\$0.00	\$5000.00	-\$5,000.00
Remaining	\$50,000.00	\$17,500.00	\$22,500.00	\$10,000.00
Total	\$400,00.00	\$140,000.00	\$200,000.00	\$60,000.00

The ABC-and-EVA analysis provided valuable information for Dot-Com Consulting's management. Customers 1 and 2 were shown to create Economic Value. Therefore, the daily fee of \$2000.00 per consultant per day was able to recover all costs associated with serving them. On the other hand, customers 3 and 4 were shown to destroy shareholders wealth. The total costs from these two customers were higher than the total revenues they generated.

There are many options which Dot-Com Consulting's management considered. One was to increase the daily consulting fee for "unprofitable" customers. Another, was to try to use the company's capital more efficiently, in order to reduce capital charges. Relatively high capital charges made customer 3 unprofitable. Since the relatively high capital investments were in the category of Receivables, additional incentives for customers to pay promptly would reduce capital usage, and therefore, capital charges. Another solution might have been to use overhead resources more efficiently. For example, the overhead cost for consultants' business travel arrangements might have been reduced through the assistance of outside travel agencies.

4. Conclusions

The previous illustration shows that the Integrated ABC-and-EVA System is useful not only to manufacturing companies, but also to companies from the service sector. Companies experiencing high overhead and high capital cost will benefit most from implementing and using the integrated system. The ABC component of this integrated system will help the companies to trace overhead cost, while the Economic Value Added component will help them trace capital cost.

In addition, the Integrated ABC-and-EVA System is highly useful in tracing overall product cost, especially in cases where cost objects are highly dissimilar. A high level of dissimilarity is common in service sector companies. For example, a consulting company may have one group of customers who pays promptly, while the second group is consistently behind. In such a case, the "late" customers demand additional overhead activities from the company (writing additional bills and letters) and additional capital investments for uncollected Receivables.

The integrated system is also able to accurately determine service costs, as well as product cost. Knowing the cost for providing their services allows management to act more decisively and price their services accordingly. In many cases, this system will even modify managerial behavior and focus their attention on the improvements which have

the highest potential impact on business performance. Overall, the Integrated ABC-and-EVA System is an highly innovative tool which will help service companies to achieve better business performance.

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