

Extension Economics Report

EER 214

APRIL 2004

Is Activity Based Costing a Blockbuster?

Wilder N. Ferreira

**Department of Applied Economics
and Statistics
Clemson University
Clemson, South Carolina, 29634**

The Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, sex, religion, national origin or handicap and is an equal opportunity employer.

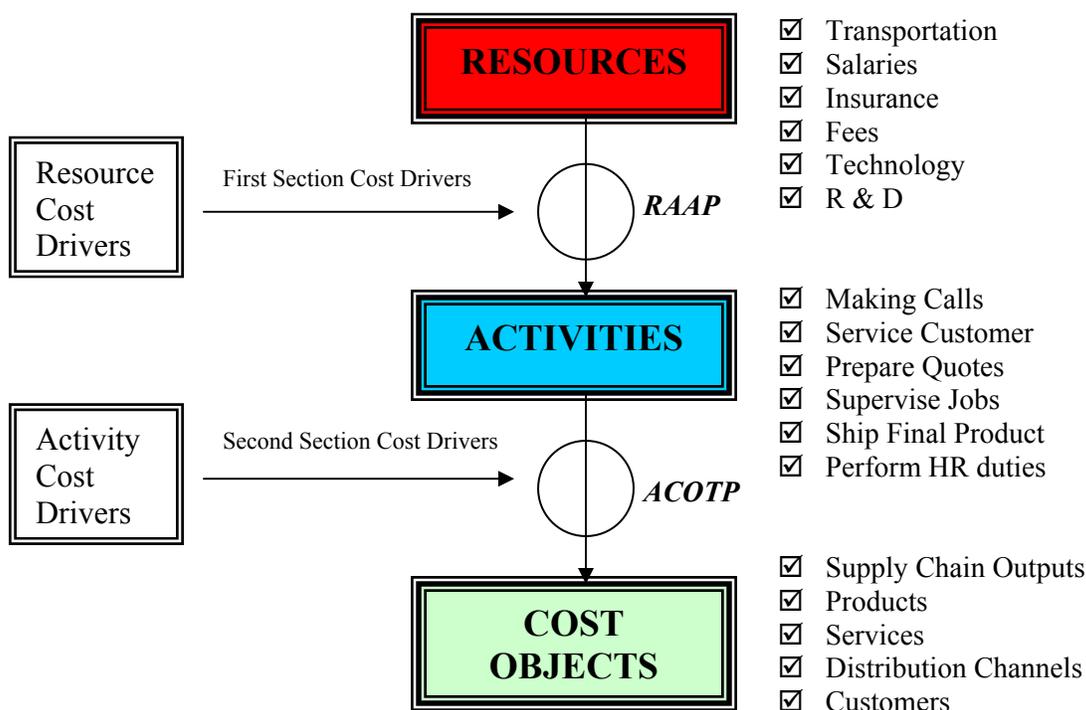
Clemson University cooperating with United States Department of Agriculture, Extension Service, Clemson, S.C., issued in Furtherance of Cooperative Extension Work in Agriculture and Home Economics. Acts of May 8 and June 1914.

Is Activity Based Costing a Blockbuster?

By Wilder Ferreira

Activity Based Costing (ABC) has been utilized by many organizations over the last 20 years with a great deal of success, even though only 20% have reported higher profits as a result of it. It is a system composed of two critical pieces that work independently. Its two section assignment procedure allows all the overhead expenses, also referred to as *Resources*, to be compiled into a number of business transactions and processes, also known as *Activities*, which are consumed by customers, products, services, distribution channels, and supply chain outputs, also denoted by *Cost Objects*. Since the majority of U.S. firms have been facing a sharp increase on their operating expenses, forced to adopt cost leadership strategy due to harsh global competition, and surrounded by efficiency improvement techniques, such as Six Sigma, Lean Manufacturing, and Business Reengineering, ABC systems turned out to be “the most significant cost discovery technique in the market today that is able to address process changes and capacity evaluation within any business enterprise in the world.”

Why two sections for assigning overhead costs to cost objects? Interestingly, some cost management textbooks do not provide students with the idea of interrelating the activities performed by resources with the total dollar amount resources spend while performing those activities. An **Activity** is the function performed by means of a **Resource** when producing, utilizing, or serving a **Cost Object**. Companies must deal with the resource-activity assignment process (RAAP) thoughtfully, without passing over the first section cost driver or resource cost driver, if they plan on obtaining a thorough evaluation of its current capacity and potential capacity changes. The second section cost driver or activity cost driver, which relates to the activity-cost-object tracing process (ACOTP), is notoriously the stage which does provide significant inputs for process and reengineering improvement. Since non-financial information performance measures are critical management tools for decision making, it stands to reason that a full knowledge of activity volumes and consumption rates, through the detection of meaningful cost drivers at the two sections, is indispensable for the development of comprehensive cost reduction and profitability enhancement programs.



In today's economy, resources change hands very rapidly and companies must be able to address cost differences in a timely manner if they long for sustainable market leadership. Favorable cycle time, quality, cost and flexibility may well be in jeopardy if key performance measures cannot be regularly evaluated. ABC must be put into place to address activity performance changes in separate functional areas within the company such as manufacturing, marketing, financing, and administration. It is imperative that consumption of firm's resources be evaluated across all these areas in order to help identify the causes of wasted capacity, lost throughput, inflated cycle and lead times, poor supply chain performance, impaired sales progress, poor pricing strategy, poor strategic planning decisions, inadequate financial resources, and inefficient corporate governance measures.

Up to this point, we have identified the need for ABC analysis and its implementation. However, the key to a successful undertaking of an activity-based costing application within a firm is to have a clear-cut assessment of the benefits of capturing this type of information to the decision making process. Some companies do not take advantage of gathering information on activity levels and utilization because functional areas are not fully synchronized with regards to planning objectives, formulating strategic and tactical strategies, determining alternatives to cost sharing, evaluating performance, and measuring the organization resource allocation. To stay focus on detecting a coherent pool of activities within functional areas, confrontational levels must be reduced to zero during the implementation of an ABC system. Thus, it is essential that top management be in charge of ABC implementations in order to emphasize its relationship with the firm's strategic plan. There is also a need for a "no manager left behind" type of policy.

Must the ABC system be integrated with the firm's financial system to be successful? A number of firms have utilized integrated activity-based cost management systems which are fed by traditional cost accounting packages or ERP packages in order for them to produce a second view of profitability levels and cost structure. The view of an integrated system is mistakenly addressed by corporations that do not focus on picturing the details of resource consumption. The investment on a module for ABC is extremely high and these systems do not depict the changes that occur on activities consumed by products, customers, and services. They offer the same information repetitively. To take advantage of an ABC approach, it is imperative that a standalone application be implemented to account for conflicts that exist within the company and between functional areas. It is also important to keep track of activity levels during the year, while company's management team implements alternatives for process improvement and cost reduction. An independent service provider or consulting firm is imperative for an unbiased diagnostic on cost information at broadly spaced periods, usually four to six months.

Below, we give an example of how traditional cost accounting approaches exhibit a different representation of product cost assignment compared to activity-based costing.

Total Cost = Direct Costs (Labor, Material) + Overhead Costs

- Overhead Cost = \$100,000 
- Direct Labor (DL) Cost = \$2 / unit
- Direct Material (DM) Cost = \$5 / unit
- Product A Demand or Sales = 5,000 units
- Product B Demand or Sales = 5,000 units
- Product A Sales Price = \$15 / unit
- Product B Sales Price = \$18 / unit
- Product A Direct Labor Hours = 2 hours
- Product B Direct Labor Hours = 3 hours
- Total Direct Labor Hours = (2*5,000) + (3*5,000) = (25,000)¹

Traditional Cost Accounting

➤ Volume-Based Measures

1. Sales Value at Split-off Method

Item	Price * Units	Total	Total / Total Sales	(%)
A	\$15 * 5,000 =	\$75,000	\$75,000 / (\$165,000) =	0.45
B	\$18 * 5,000 =	\$90,000	\$90,000 / (\$165,000) =	0.55

Item	Overhead * (%)	Total Cost	Total / Demand	Unit Cost
A	\$100,000 * 0.45 =	\$45,000	\$45,000 / (5,000) =	\$9 / unit
B	\$100,000 * 0.55 =	\$55,000	\$55,000 / (5,000) =	\$11 / unit

Item	Price	DL + DM + Unit Cost	Total Cost	Profit/Loss
A	\$15	\$2 + \$5 + \$9 =	\$16	\$1.00
B	\$18	\$2 + \$5 + \$11 =	\$18	\$0.00

2. Physical-Measure Method

Item	Demand / Total Demand	(%)
A	5,000 / 10,000 =	0.50
B	5,000 / 10,000 =	0.50

Item	Overhead * (%)	Total Cost	Total / Demand	Unit Cost
A	\$100,000 * 0.50 =	\$50,000	\$50,000 / (5,000) =	\$10 / unit
B	\$100,000 * 0.50 =	\$50,000	\$50,000 / (5,000) =	\$10 / unit

Item	Price	DL + DM + Unit Cost	Total Cost	Profit/Loss
A	\$15	\$2 + \$5 + \$10 =	\$17	\$2.00
B	\$18	\$2 + \$5 + \$10 =	\$17	\$1.00

3. Direct-Labor Hour Method

Cost per Hour: $\$100,000 / (25,000)^1 = \4 per hour

Item	DL Hours * Cost per Hour	Unit Cost
A	2 * \$4 =	\$8 / unit
B	3 * \$4 =	\$12 / unit

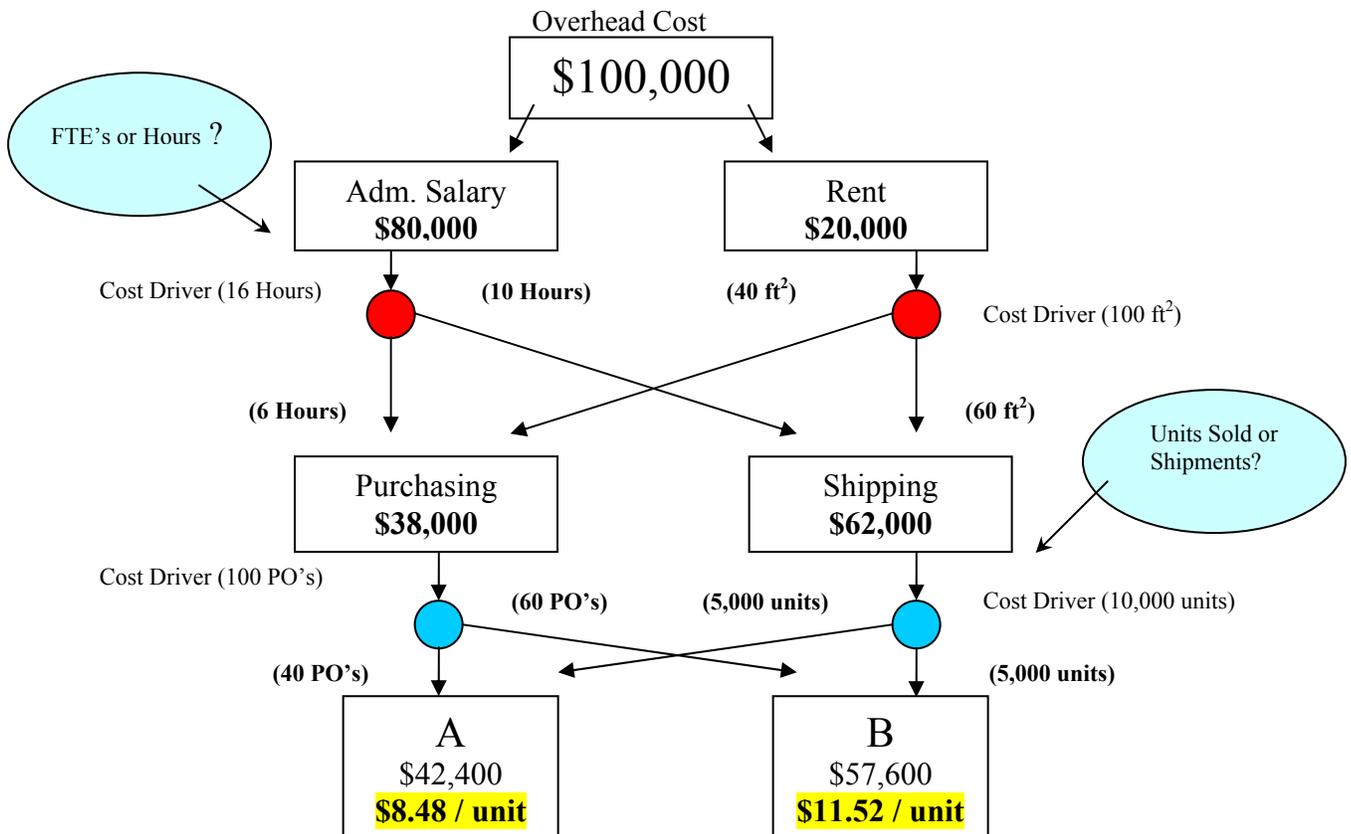
Item	Price	DL + DM + Unit Cost	Total Cost	Profit/Loss
A	\$15	\$2 + \$5 + \$8 =	\$15	\$0.00
B	\$18	\$2 + \$5 + \$12 =	\$19	\$1.00

Traditional cost accounting offers three major volume-based measures for overhead cost allocation: sales value at split-off, physical-measure, and direct-labor hour. The first method seeks to allocate overhead costs based on total sales distribution so as to charge more the products that sell more in dollar amounts. The second pays more attention to units sold or demanded, charging more the products with higher sales volume as opposed to sales amount. The third approach goes straight into the number of direct labor hours, in which the products that require more hours to be produced are charged for most of the overhead costs.

But, what is wrong with that? There is nothing wrong with knowing the bottom line only, but traditional cost accounting does not provide any information on resource utilization, in addition to the fact that the results differ considerably from using one method or the other. Look at the numbers from the previous example. Product B offers three distinct results, ranging from negative to positive profit levels. If we were to increment sales of product B from 5,000 to 6,000 units, increasing overhead costs proportionately, we would have found three unmatched results from the calculations of the three described methods. In reality, they cannot be employed by management when seeking to improve company's operations. On the contrary, activity-based cost allocation method decomposes the resource costs, included in the general ledger, to activities based on their use. Regarding the use of these overhead resources, cost drivers are selected to estimate the consumption of these resources by the cost objects. As a result, senior management is capable of identifying value added and non-value added activities by measuring the total cost of each activity and the driver quantities produced by each activity in order to understand whether products, services, channels, and customers are bringing in some profits or are wasting time and company's resources.

The graph below depicts an Activity Based Cost flowchart using the same overhead cost of \$100,000. As you can see, the overhead expense has been divided into two key resources: administrative salaries and rent. We chose to take on the number of hours spent on the two major activities, purchasing and shipping, as the resource cost driver for administrative salaries. Office space was utilized as the resource cost driver for rent. The total amounts assigned to the purchasing and shipping activities were \$38,000 and \$62,000, respectively. The number of Purchase Orders (PO's) served as the activity cost driver for purchasing and the number of units sold as the activity driver for shipping. Total overhead costs traced to products A and B by the two activities totaled \$42,400 and \$57,600, respectively.

Activity Based Cost



Resource Expenses

Expense Category	Cost Driver	Resource Cost (RC)
Adm. Salary	Time (16 hours)	\$80,000
Rent	Space (100 ft ²)	\$20,000

Activity Pool

Activity	Resource Driver (RD)	% RD	RC * (% RD)	Activity Cost
Purchasing	6 hours (Adm. Salary)	6/16 = 0.375	\$80,000 * 0.375 =	\$30,000
	40 ft ² (Rent)	40/100 = 0.40	\$20,000 * 0.40 =	\$8,000
Shipping	10 hours (Adm. Salary)	10/16 = 0.625	\$80,000 * 0.625 =	\$50,000
	60 ft ² (Rent)	60/100 = 0.60	\$20,000 * 0.60 =	\$12,000

Activity Costs

Activity	Cost Driver	Activity Cost (AC)
Purchasing	# of purchase orders (100)	\$38,000
Shipping	# units sold (10,000)	\$62,000

Cost Objects

Products	Activity Drivers	% AD	AC * (%AD)	Cost
A	30 PO's (Purchasing)	30/100 = 0.30	\$38,000 * 0.3 =	\$11,400
	5,000 units (Shipping)	5,000/10,000 = 0.50	\$62,000 * 0.5 =	\$31,000
B	70 P.O. (Purchasing)	70/100 = 0.70	\$38,000 * 0.7 =	\$26,600
	5,000 units (Shipping)	5,000/10,000 = 0.50	\$62,000 * 0.5 =	\$31,000

Product Costs

Products	Product Cost (PC)	PC / Units Sold	Unit Cost
A	\$42,400	\$42,400 / 5,000 =	\$8.48 / unit
B	\$57,600	\$57,600 / 5,000 =	\$11.52 / unit

Unit	Price	DL + DM + Unit Cost	Total Cost	Profit/Loss
A	\$15	\$2 + \$5 + \$8.48 =	\$15.48	\$0.48
B	\$18	\$2 + \$5 + \$11.52 =	\$18.52	\$0.52

It is essential that we pause to make a note on these results. The cost drivers to be selected cannot be chosen arbitrarily because they can tell a whole different story at the end of the show. On the contrary, it must be selected in light of the needs of the organization and focused on the primary non-financial performance measures adopted by the senior management team. The activity-based approach indicates that both products are not operating profitably (**\$0.48** and **\$0.52**), as opposed to the results shown by the traditional cost accounting methods. By examining the ABC results, we identified an opportunity for improvement on the purchasing activity performance which was traced to product B, indicating that more *purchase orders* have been released compared to product A. Also, the cost driver for the shipping activity could be replaced by *number of shipments* because some products consume more logistics resources than others do. As a result, ABC data revealed the ability to assist us in identifying cost reduction opportunities in the two major activity centers. The table below depicts the final figures of this cost analysis.

Summary Table

Products	Split-off	Physical-Measure	D.L. Hour	ABC
A				
Price	\$15	\$15	\$15	\$15
- Overhead	\$9	\$10	\$8	\$8.48
- Direct Cost	\$7	\$7	\$7	\$7
= Profit/Loss	\$1	\$2	\$0	\$0.48
B				
Price	\$18	\$18	\$18	\$18
- Overhead	\$11	\$10	\$12	\$11.52
- Direct Cost	\$7	\$7	\$7	\$7
= Profit/Loss	\$0	\$1	\$1	\$0.52

Why Activity Based Cost ?

- Traditional Cost Accounting methods are poor for process improvement
- Operating expenses are increasingly costly to organizations
- More accurate information about capacity and processes
- Reengineering projects may base their process improvement study on ABC
- More representation of resource expenses into products, customers, and logistics
- Helps focus on cost leadership

When to Use ABC Management ?

- Tough competition
- Supply chain/logistics composed of diverse business partners
- High overhead costs, 20% or more, or when exceed labor costs
- Diverse product line: volume, complexity, process design, lead time ...
- Slight change in pricing strategy generates a great impact on profitability

Benefits

- Improved mix of product lines (product line rationalization)
- Improved pricing strategies
- Recognition of non-value added activities for further elimination
- Reevaluation of firm's capacity and improved customer service
- More accurate information on existing and alternative processes
- Opportunities for cost reduction and higher profits

Not only does activity-based costing provide insight into product cost performance, as depicted in the given example, but also provides greater insight into customer profitability, supplier performance, supply chain performance and costing, and capacity analysis. It provides a considerable amount of non-financial performance measures which, in conjunction with activity-based budgeting approach, support the implementation of Activity-Based Management (ABM), which is an excellent management tool utilized by managers to make sound strategic decisions based on activity information and corporate capacity. Without doubt, ABC and ABM are the today's best approaches to support companies that are seeking improved performance on their business operations.

References

- Bernard La Londe and James Ginter, The Ohio State University's Supply Chain Management Research Group, "A Summary of Activity-Based Costing Best Practices" Columbus, OH, April, 1999.
- Narczyz Roztocki and Others, "A Procedure for Smooth Implementation of Activity Based Costing in Small Companies," *Proceedings of the 1999 American Society of Engineering Management (ASEM) National Conference*, Virginia Beach, VA, October, 1999.
- Wallace Hopp and Mark Spearman, *Factory Physics*, 2nd Edition, Irwin-McGraw-Hill, 2000, pp. 200-210.
- Charles Horngren, George Foster and Srikant Datar, *Cost Accounting - A Managerial Emphasis*, 10th Edition, Prentice Hall, 1999, pp. 136-155, 341-342, 536-546.

About the Author

Wilder Ferreira is an economist at Clemson University. He received a B.S. in Economics from Catholic University of Goiás in 1993 and a B.S. in Computer Science from Federal University of Goiás in 1994, both in Brazil. He obtained an M.S. degree in Agricultural Economics at Auburn University in 1999 and an M.S. degree in Applied Economics at Clemson University in 2003. His research focus is in the area of Supply Chain Management, Activity Based Costing, Production Economics, Farm Management, Agribusiness Management, Strategic Management, Operations Research, and Decision Support Systems. He is a member of IIE and Decision Sciences Institute. Currently he is a Ph.D. student at Clemson University. He is also an Adjunct Professor at Southern Wesleyan University.