
WHITE PAPER II

The ABCs of
Activity-Based Cost Accounting
For A Distribution Business

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The ABCs of ACTIVITY-BASED COST ACCOUNTING FOR A DISTRIBUTION BUSINESS

By

Roger K. Harvey, D.B.A.

As management warriors in today's competitive jungle, we constantly scan the economic horizon for profit building opportunities. Warriors from technology industries have limitless opportunities to develop new products. Retail warriors turn narrower and more focused product categories into new retail formats. Service, catalog, and Internet companies constantly define innovative ways to become "customer intimate." Even manufacturing warriors, emerging from the carnage of downsizing, are seeking new growth markets. Profit building opportunities in these industries abound.

Where are profit opportunities in the wholesale-distribution industry? What profit-enhancing opportunities are available to distributor warriors operating in the middle of the value chain? Are the opportunities with new products? Are the opportunities with new formats? Are the opportunities with new customers? For even the entrepreneurial distributor, the horizon is not glowing with opportunities for "new." But all distributors have unlimited opportunities for "existing"—for building profitability by doing what they do now but doing it more efficiently. All distributor warriors have opportunities to achieve operational excellence.

Activity-Based Costing is a "new" strategic cost and profitability management tool that can provide distributor warriors with information on "existing" products, customers, and operations. Traditionally, distributors have either *sold* their way to profitability (via growth strategies) or *saved* their way to profitability (via lean and mean strategies). Activity-Based Costing (ABC)—a methodology for gathering cost data—and Activity-Based Management (ABM)—the practice of using ABC data to manage a process-based organization—are new tools for distributors to *inform* their way to profitability.

ABC AND ABM DEFINED

An accountant's definition of ABC is presented in Exhibit I and a visual definition is presented in Exhibit II. Using simple terms, ABC is a set of guidelines for gathering data on your costs of doing business: costs to serve your customers, costs to purchase, carry, and sell your vendors' products and services, and your costs to engage in various "activities" (e.g., ordering products, receiving products, selling products, delivering products, etc.). Unlike traditional cost accounting approaches, which had application mainly in manufacturing industries, ABC methodology is ideally suited for wholesale distribution companies and for the distribution function in manufacturing companies.

EXHIBIT I ACCOUNTING TERMS

DEFINITION

Activity Based Costing (ABC) is a cost management approach that links resource consumption to activities that a company performs, and then assigns those activities and their associated costs to customers or product lines.

TERMS

RESOURCES: People, equipment & technology, space, supplies, capital as measured by hours, units, or dollars.

FUNCTIONS: Broad areas of related activities carried-out by a group of people with common responsibility. *Examples:* delivery, warehouse handling, outside sales, inside sales.

ACTIVITIES: A verb-noun description of what a department or function does. Multiple activities occur within functions and processes. *Examples:* deliver product, put-away product, make sales calls, take orders, attend meetings, receive training

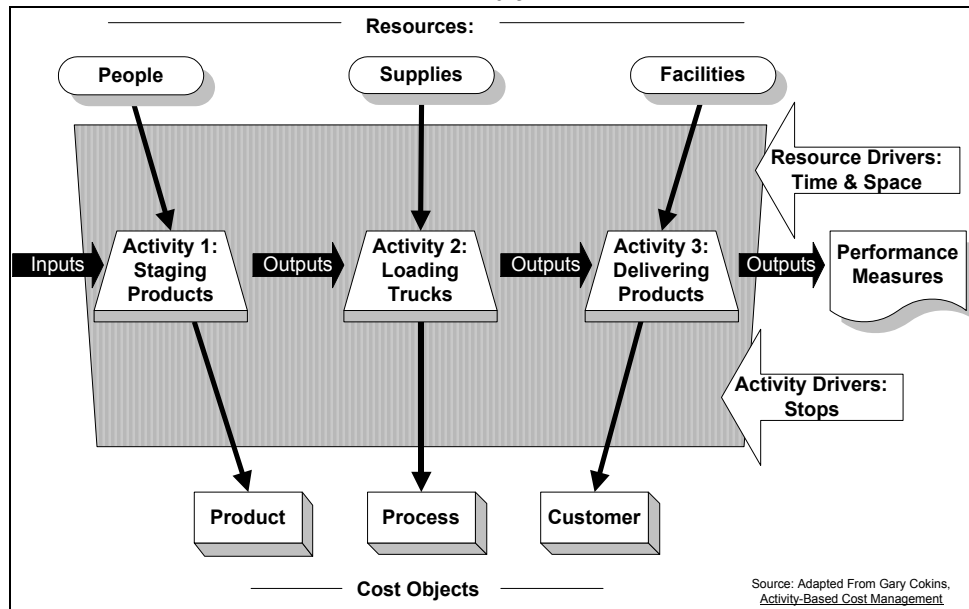
TASKS: Tasks are the steps necessary to perform an activity. An activity is *'what'* a department does. A task is *'how'* a department does it. *Examples:* load truck, fuel truck, drive to destination, unload truck, wait for check-in.

PROCESS: A collection of related activities operating under a set of procedures to accomplish a specific objective. Processes typically cut-across traditional functional lines to link together activities. *Examples:* processing a customer order, fulfillment, vendor order processing.

COST DRIVER: A factor that influences cost and may even cause costs. Activity cost drivers recognize the proportionate discharge of each activity cost into its cost objects such as customers or products. *Examples:* delivery cost is influenced by the number of stops, warehouse handling cost is influenced by number of pieces or and/or the cubic feet of pieces.

COST OBJECT: The entity that uses the activity. *Examples:* a customer, a product, a service, a product-line, and a vendor.

Exhibit II



ABC starts by redefining the way you look at your distribution business. ABC defines your purchasing, handling, storage, selling, delivery, and administrative functions in terms of “activities” and “processes.” A typical activity in many distribution businesses is making a delivery. Activities “consume” resources—people, technology, equipment, supplies and money, and incur the costs associated with the resources they consume. These activity costs, which are assembled in “activity cost pools” (e.g., Delivery Cost Pool), tend to increase or be driven by higher levels of certain activities (e.g., number of deliveries, number of miles driven, amount of time spent at a stop). The activities that drive-up the costs in an activity pool are called “cost drivers.” The number of delivered orders is an example of a cost driver for the Delivery Cost Pool. Other examples are: number of vendor invoices driving the Purchasing Cost Pool, number of lines picked driving the Warehouse Handling Cost Pool, number of cubic feet driving the Warehouse Storage Cost Pool, number/duration of sales call driving the Selling Cost Pool, and number of orders driving the Business Management Cost Pool.

ABC accounting links together activities with a common purpose into “processes,” such as the processes of selling products and services, order taking and fulfillment, obtaining products, and managing inventories and deliveries. A typical process cuts across several traditional distributor functions. For example, the process “order taking and fulfillment” involves activities within the inside sales, warehouse, and delivery functions.

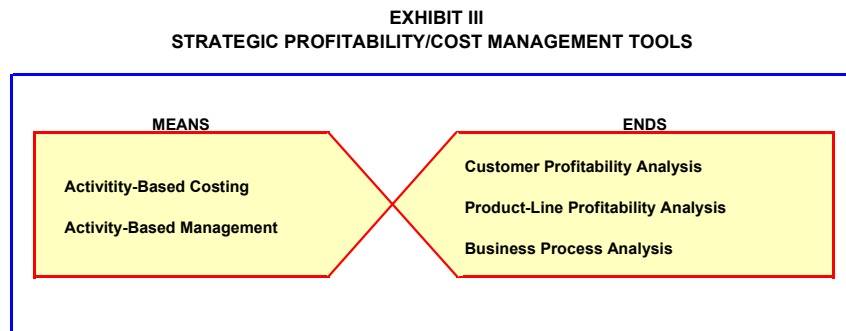
Once the costs and activity drivers have been measured for activities and processes, the question arises: “What do we do with the information?” This is where ABM enters the picture—in a very simple way. ABM uses the ABC information on processes, activities, cost drivers, and cost pools to manage your business. ABM is not dramatically different from the way you currently manage; it simply offers you a new way of viewing your distribution business (as processes, activities, and cost drivers) and offers new

sources of information (costs to process, costs to carry, costs to sell, costs to ...etc.). You manage in the same way you always have—plan, organize, motivate, and control, but you do so with a new focus and new information.

ABC and ABM will be combined in this article with the acronym ABC/M. As a newly defined ABC warrior in your organization, how do you use this newfound perspective and cost information?

WHY ABC/M?

Exhibit III shows ABC/M as the “means” of strategic cost and profitability management because it provides the focus and information needed to do the “ends”—Customer Profitability Analysis, Product-Line Profitability Analysis, and Business Process Analysis (a.k.a. Process Engineering) or any combination of these three purposes.



With ABC data, distributors correctly assign costs to customers and vendors based on the activity units they consume (e.g., number of deliveries, number of orders place with customer service, number of orders placed with EDI, number of special orders, dollars of inventory and receivables carrying cost, etc.). Costs-to-serve are assigned below the gross profit line to determine the contribution and direct profit by customer and/or product-line. Costs are assigned based on the resources consumed by a specific customer, customer group, product-line, and/or vendor.

ABC/M may also be used to do Business Process Analysis. Here, more of the “M” than the “C” is involved in applying ABC/M. Business Process Analysis (a.k.a. activity analysis, process engineering, or business re-engineering) has its roots in manufacturing, where product and paper-handling tasks are grouped into activities, and activities are grouped into processes. Flow-charts document the tasks, activities, and processes. Classification schemes identify value-added and non-value activities and/or as primary and secondary activities. Cost data are gathered by activity (hence the name Activity-Based Cost accounting) rather than by general ledger accounts. Process costs, cycle times, and quality are measured and benchmarked.

Business Process Analysis may be internally firm-focused or channel-focused. When internally focused, the goal of ABM is to remove excess costs and inefficiencies from processes as well as reduce cycle times, improve service levels, and raise quality levels

within the firm. When processes and activities are studied up and down the distribution channel (e.g., manufacturer \leftrightarrow wholesale-distributor \leftrightarrow end user), the name given to Business Process Analysis is Value Chain Analysis, Efficient Consumer Response, or Channel Cost Analysis. In this venue, the purpose of Business Process Analysis is to increase the efficiency of the whole channel by cutting out redundant activities and costs. The channel interfaces become the target of the analysis rather than internal activities of the firm, although cutting out channel interface activities usually results in reducing internal firm costs.

Business Process Analysis is the point where ABC/M becomes a strategic cost management tool. Process cost reduction, cycle time, service level, and quality become “ends” in themselves; costs may or may not be assigned to customers, product-lines, or vendors for the purpose of profitability analysis. Your strategic initiatives will determine which one or combination of “ends” motivate undertaking ABC/M.

ABC/M DOES CUSTOMER PROFITABILITY ANALYSIS CORRECTLY

ABC/M’s approach to customer and product-line profitability analysis differs from those of many software vendors. Software vendors frequently define customer and product-line profitability as sales or gross profit listed by customer and product-line. This, of course, is not customer or vendor *bottom-line* profitability— it is customer or vendor *gross* profitability. ABC/M provides the data needed to generate a P&L statement for each of your customers or product-lines, and with this information, to calculate ROI-type performance measures by customer, customer group, product-line, and vendor. It takes you to the *bottom-line* of customer and product-line profitability—a point impossible to reach with legacy financial accounting systems—systems designed as corporate level financial reporting systems.

ABC/M’s methodology also differs markedly from what some distributors mistakenly calculate as bottom-line profitability. The practice of taking all operating expenses or functional expenses as they appear on a Profit and Loss (P&L) Statement, dividing them by the number of orders or by Net Sales, and then allocating expenses to a customer or vendor—based on the number of their orders or on their percentage of sales—leads to incorrect and inaccurate bottom-line profitability calculations. Calculating customer and product-line profitability by averaging or by percent-of-sales leads to misstating the true profitability and to incorrect decisions on who are profitable and unprofitable customers and vendors.

Total operating expenses—with their direct and overhead components—are simply not driven by number of orders, lines, or any other single measure of activity. Very few operating expenses are driven by the dollar volume of sales. When percentage of sales is used to allocate operating expenses, customers who buy higher dollar value products or who are simply bigger customers are allocated a greater proportion of expenses. That means that the customer who buys a case of Crosse pens receives a higher cost-to-serve allocation than the customer who buys the same number of Bic pens. Or it means the customer who buys \$1,000 dollars worth of product cross-docked on a skid receives the same cost allocation as the customer who buys \$1,000 worth of “eaches.”

ABC/M assigns costs correctly. It places expenses in activity cost pools based resources used by the activity (e.g., drivers' time, square feet of loading dock area, operations manager scheduling deliveries, truck maintenance expenses, safety training expenses, etc. □ Delivery Activity Cost Pool), defines one or more activity drivers (e.g., number of deliveries, number of miles), determines the per unit activity cost (cost per drop, cost per mile), and assigns each customer a Delivery Cost based on his/her number of deliveries and/or number of miles from shipping point.

**EXHIBIT IV
QUESTIONS ANSWERED WITH CPA**

MACRO-QUESTIONS

- √ Who are my best customers in terms of contribution, direct profit, and ROI-based customer performance measures? Who are my worst customers?
- √ What are the C-Scores of my customers based on a customer scoring model that my company defines? How do my customers rank in terms of their C-Scores?
- √ For each salesperson in my organization, who are their high performing customers? Who are poor performing customers?

MICRO-QUESTIONS

- √ What is the contribution, direct profit, and ROI of a specific customer or customer group? What specific costs-to-serve drivers are causing a particular customer to be profitable or unprofitable?
- √ What if we change cost driving activities associated with a specific customer or customer group? If we make these "what-if" changes, what will be the new contribution, direct profit, and ROI for the customer or customer group?
- √ For each salesperson's poor customers, what changes can be communicated to a customer that will make the account more profitable... more profitable for the company and the customer?

When ABC/M is combined with a PC-spreadsheet program or customer/product-line profitability software, you can pinpoint unprofitable customers and product-lines, negotiate with customers and suppliers using hard number rather than gut feelings, and unbundle and correctly price value-added services. ABC/M at this point becomes an effective strategic profitability management tool for the wholesale distributor. Exhibit IV lists macro-questions about all customers in your database and micro-questions about each customer in your database.

CASE EXAMPLE

Reliable Inc. is a hypothetical material handling distributor carrying a limited number of specialized product lines. The majority of equipment sold is stocked and sold out of the warehouse, some is sold direct from the manufacturer to the customer, and the remainder is special ordered. Special order equipment is typically cross-docked but it does require added paper work and vendor interface because special order lines are not normally carried by Reliable. To keep the illustration simple, the company carries no parts, only equipment.

Reliable's CEO is interested to doing ABC accounting as part of the company's strategic cost and profitability initiative. Reliable's initial application of ABC will be for customer profitability analysis. Later, after identifying activity costs, the Company plans to re-engineer those activities involving the highest costs. Since the handling characteristics of all Reliable's equipment lines are the same, the handling cost for all products will be treated equally. If Reliable carried both equipment and parts, or if the handling characteristics of different equipment lines were different, product categories and their different handling costs would be identified and assigned to customers.

As her first attempt at defining processes and activities, Reliable's CFO decided to define activities along the lines of the Company's functional organization structure: purchasing, warehouse operations, sales, customer service, delivery, and office and administrative. Activity cost pools were defined along these functional lines and resource costs were assigned to the various activity cost pools based on how resources were consumed by these activities.

Table I shows how the Delivery Activity Cost Pool was defined. It is beyond the scope of this article to show how the other activity cost pools were calculated, but similar resource usage units (e.g., time, square feet, dollars) were used to map general ledger dollars into activity cost pools. To the extent it was possible to trace office and administrative expenses to particular activities, they were assigned to activity pools based on the applicable resource usage unit.

TABLE I					
DELIVERY ACTIVITY COST POOL					
RESOURCES				DELIVERY	
	Resource Driver	Total Resource Units	Total Resource \$'s	Resource Driver Units	Dollars
Labor	FTE's	10	\$500,000	2	\$100,000
Facilities	Sq. Ft.	1000	\$10,000	100	\$1,000
Maintenance	Outsource	Dollars	\$5,000	Direct	\$5,000
Equipment	Est. Hours	10000	\$100,000	5000	\$50,000
Fuel	Gallons	10000	\$10,000	9000	\$9,000
Total			<u>\$625,000</u>		<u>\$165,000</u>
No. of Deliveries					16,500
Cost per Delivery					\$10.00

Next, a “cost driver” or “activity unit” was defined for each pool. These are shown in Table II. Like a resource usage driver that is used to trace resource costs to activities, a cost driver is used to trace activity costs to individual customers or customer groups. Cost drivers should be chosen because the activity cost that they represent tends to increase when they increase. In the case of the Delivery Activity Cost Pool, number of deliveries (stops) was identified as the delivery activity’s primary cost driver or activity unit. (Distance was not used because all Reliable’s customers were located in the same geographical area.) As is true with many cost drivers or activity units, number of deliveries is also the “output” of the activity. This means it can be combined with “input” units and the resulting productivity measure can benchmarked against company or industry norms (Deliveries per Driver, Deliveries per Working Day).

Finally, the total number of activity units for each activity was measured. Reliable’s existing I/S was able to provide counts of SKUs, number of items sold during the period, sales commissions, phone orders, EDI orders, regular orders, special orders, and number of lines. The existing I/S was not able to provide counts on the number of deliveries and the cubic feet of products stored in and sold out of the warehouse. A separate tracking system was setup for total deliveries and number of deliveries made to each customer. A summer intern student was given a laptop computer containing a list of Reliable’s products, a measuring tape, and assigned to the warehouse to estimate the cubic feet occupied by each product. Data from Reliable’s mainframe, the PC-delivery database, and the laptop were entered into an ABC software package to perform the calculations reported in Table II.

TABLE II		
PROCESSES, ACTIVITY DRIVERS, & COST PER ACTIVITY UNIT		
Process	Activity Driver	Activity Cost Per Unit
Purchasing	# of SKUs	\$1.00 per SKU
Handling	# of Whse. Items Processed During the Period	\$1.00 per Item
Storage	Cubic Feet of Whse. Space	\$1.00 per SKU
Sales:		
Sales Commissions	Commission Rate (%)	20% of G.P.
Other Selling Expenses	# of Sales Calls	\$25 per Call
Customer Service:		
Phone Orders	# of Lines	\$.50 per Line
EDI Placed Orders	# of Orders	\$.05 per Order
Delivery	# of Deliveries	\$10 per Delivery
Capital Cost on A/R	Cost of Capital (%)	20% of A/R

The total counts of activity units were used to calculate the “average cost per activity unit” for each activity as shown in Table II. The “cost per activity unit” (e.g., cost per delivery) is, in a sense, static and only needs to be re-calculated when costs change. The cost per delivery, for example, may not significantly change for two or three years. The “cost per activity units” are parameters in an ABC system.

What does change is the number of activity units consumed by each customer from period to period. An ABC system, if it has the I/S capabilities, must track the number of activity units by customer in order to assign activity costs to a customer. For example, the number of deliveries made to each of Reliable’s customers must be tracked on an on-going basis. Activity units by customer are the variables in an ABC system because they change over time. If the computer-based ABC system doesn’t have dynamic tracking capabilities or doesn’t have individual customer/product-line calculating capabilities, then computer-based customer/product-line (CPA) software must be used. Value Associates’ *CPA for Windows* software package was used to calculate the Customer Profit & Loss (P&L) statements shown in Exhibits V-A and V-B.

Exhibit V-A and Exhibit V-B show how the General Ledger (G/L) accounting data (sales and gross profit) come together with the ABC accounting data (cost per activity unit times number of units consumed by the customer) to produce a Customer P & L Statement.

**EXHIBIT V-A
CUSTOMER A
P & L Statement
For Year Ending 12/31/19XX**

Item	Total	Data Source
Net Sales:		
Warehouse Sales	\$ 80,000	
Direct Sales	15,000	
Special Orders	5,000	
Total Net Sales	\$ 100,000	Computer System
Gross Profit:		
Warehouse Sales	\$ 16,000	
Direct Sales	1,500	
Special Orders	1,200	
Total Gross Profit	\$ 18,700	Computer System
Direct Expenses:		
Purchasing	\$ 100	# of SKU's purchased by customer times \$/SKU = 100 x \$1.00
Handling	5,000	# of Whse. Items purchased by customer times \$/Item = 5,000 x \$1.00
Storage	1,000	ft. ³ of Whse. Items purchased by customer times \$/ft. ³ = 10,000 x \$.10
Sales:		
Sales Commissions	3,740	Commission rate times Gross Profit = 20% x \$18,700
Other Selling Expenses	1,500	# of sales calls times \$/Call = 60 x \$25
Customer Service:		
Phone Orders	350	# of lines written for customer times \$/Line = 750 x \$.50
EDI Placed Orders	-	# of EDI orders placed by customer times \$/EDI Orders = 0 x .05
Delivery	2,800	# of Delivered Orders to customer times \$/Drop 280 x \$10
Capital Cost on A/R	2,192	Capital Cost % times customer's Avg Acct. Rec 20% x \$10,958
Total Direct Expenses	\$ 16,682	Calculated
Contribution	\$ 2,018	Calculated
Business Management Expense:		
Office & Administrative	2,250	# of Regular Orders times \$/Reg Order plus # of Special Orders times Special Order Chg = 250 x \$1.00 + 500 x \$4.00
New Customer Development	-	Not Assigned to Current Customers
Direct Customer Profit	\$ (232)	Calculated

**EXHIBIT V-B
CUSTOMER B
P & L Statement
For Year Ending 12/31/19XX**

Item	Total	Data Source
Net Sales:		
Warehouse Sales	\$ 80,000	
Direct Sales	15,000	
Special Orders	5,000	
Total Net Sales	\$ 100,000	Computer System
Gross Profit:		
Warehouse Sales	\$ 16,000	
Direct Sales	1,500	
Special Orders	1,200	
Total Gross Profit	\$ 18,700	Computer System
Direct Expenses:		
Purchasing	\$ 100	# of SKU's purchased by customer times \$/SKU = 100 x \$1.00
Handling	5,000	# of Whse. Items purchased by customer times \$/Item = 5,000 x \$1.00
Storage	1,000	ft. ³ of Whse. Items purchased by customer times \$/ft. ³ = 10,000 x \$.10
Sales:		
Sales Commissions	3,740	Commission rate times Gross Profit = 20% x \$18,700
Other Selling Expenses	100	# of sales calls times \$/Call = 4 x \$25
Customer Service:		
Phone Orders	-	# of lines written for customer times \$/Line = 750 x \$.50
EDI Placed Orders	35	# of EDI orders placed by customer times \$/EDI Orders = 750 x .05
Delivery	500	# of Delivered Orders to customer times \$/Drop 50 x \$10
Capital Cost on A/R	548	Capital Cost % times customer's Avg Acct. Rec 20% x \$2,740
Total Direct Expenses	\$ 11,023	Calculated
Contribution	\$ 7,677	Calculated
Business Management Expense:		
Office & Administrative	750	# of Regular Orders times \$/Reg Order plus # of Special Orders times Special Order Chg = 750 x \$1.00 + 0 x \$4.00
New Customer Development	-	Not Assigned to Current Customers
Direct Customer Profit	\$ 6,927	Calculated

Just as the basic transaction documents behind the G/L accounting data are the customer's invoices for the period, the basic transaction documents behind the ABC system are "activity invoices." An activity invoice shows the number of activity units consumed by the customer (e.g., number of deliveries), the cost per activity unit (e.g., cost per delivery), and the cost extension (e.g., total delivery cost assigned to the customer). For Customer A in Exhibit V-A, the delivery cost line on its activity invoice shows 280 deliveries for the period at \$10 per delivery for a total delivery cost of \$2,800.

Customers A and B were selected from Reliable's customer database because they had exactly the same sales and gross profit but dramatically different contributions and profits. The reader is challenged to determine why Customer B is a winner and why Customer A is a loser. More importantly, what could Customer B's salesperson do to make Customer B a profitable customer?

COMPUTER SOFTWARE SOLUTIONS

Because most mainframe accounting software packages are financial accounting packages, they do not provide ABC capabilities. Deciding on what supplementary computer software to use depends the "ends" you define for your ABC/M system.

If your purpose is Business Process Analysis, then considering purchasing one of the ABC software solutions on the market. A sample of those packages is listed in Exhibit VI. Most packages were designed for manufacturing, so as a distributor, you may have to work closely with the ABC vendor in adapting the software's structure to your distribution business.

<p style="text-align: center;">EXHIBIT VI SOFTWARE VENDORS</p> <p style="text-align: center;">ABC SOFTWARE</p> <p><i>Quick ABC</i> published by Acorn Systems, Inc., Houston Texas. 713-963-9000.</p> <p><i>CMS-PC</i> published by Tom Pryor, ICMS, Arlington Texas. 817-633-2873.</p> <p><i>EasyABC Plus</i> published by ABC Technologies Inc., Beaverton Oregon. 503-626-4895.</p> <p style="text-align: center;">CPA SOFTWARE</p> <p><i>CPA for Windows</i> published by Roger Harvey, Value Associates Ltd., Carbondale Colorado. 970-704-1444.</p>
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If your purpose is customer or product-line profitability analysis, then an ABC software solution may or may not suit your needs. Because all ABC packages were

originally designed for manufacturers doing product costing, some are difficult to use for customer profitability analysis. The question is whether or not you wish to generate individual customer and/or individual product-line P & L Statements and performance measures to evaluate individual customers and vendors. Even if individual customer and product-line analysis is possible with the ABC package, the question remains: “Does the ABC solution provide the graphical, querying (i.e., inquiry), and reporting capabilities necessary to comprehensively evaluate your customers?” Most ABC software solutions provide the framework for Business Process Analysis but few of the packages provide both the data base and presentation capabilities for *individual* customer and product-line profitability analysis.

If ABC software fails to provide comprehensive customer and product-line analysis, then you may need to adopt customer/product-line profitability analysis (CPA) software. This may be mainframe or PC-based software. Before considering PC-based software, check with your mainframe software vendor for *bottom-line* CPA software, that is, software capable of generating individual customer/product-line P & L Statements. If you can do *bottom-line* and comprehensive CPA on your mainframe, you eliminate the effort and hassle of linking a PC-based CPA program with your mainframe customer databases. If a mainframe CPA software solution is not available to you, then consider a PC-based software package such as *CPA for Windows* available from Value Associates, Ltd. PC-based software solutions burden you with transmitting data files from your mainframe to a PC or PC-network, but give a custom-designed solution for customer and product-line profitability analysis.

WHERE TO GO FROM HERE

This article will end on answering the question of *how* to implement ABC/M in a company? The solution is not simple. It involves weighing benefits and costs. Implementing a small piece of ABC into most distribution businesses requires a major commitment of resources: time, talent, technology, and money. In an industry where the opportunities for profit building strategies are limited, you—as a distributor warrior—may be tempted to rush into ABC/M, especially since the potential cost and profit benefits are so great. But figure the implementation “costs” to justify the “ends.”

This question and other implementation issues are addressed in a White Paper entitled *Implementing Activity-Based Cost Accounting, Customer Profitability, and Product-Line Analysis in a Distribution Business*, available from the author. Readers interested in various implementation paths to the ABC/M “ends” discussed in this article are invited to contact Value Associates @ Voice 970-963-1444; Fax 970-704-9740; or e-mail rharvey_2@yahoo.com for a free copy of the White Paper.