

Are SMEs ready for ABC?

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Small-to-medium size enterprises (SME) are under increasing pressure to remain competitive in today's global economy. There are a number of strategies for smaller organizations to achieve world-class levels of cost savings, market response, and efficiency. These include embracing proven supply chain management (SCM) strategies and enhanced accounting systems. This article summarizes some of the challenges—managerial and technical—associated with transitioning to an activity-based costing (ABC) model. The primary objective of the article is to introduce the rationale and mechanics behind ABC and to explore the advantages of ABC vis-a-vis traditional accounting using a case study approach.

INTRODUCTION

Activity-based costing (ABC) was first introduced in the United States during the 1980s (Cooper, 1988). Instead of budgeting overhead using direct cost drivers, ABC splits overhead into activity cost drivers, leading to a more tangible assignment of costs. This recognition should allow for more effective budget planning and product/service pricing. Three basic differences between ABC and traditional cost accounting (TCA) are: 1) ABC is process-oriented while TCA is structure-oriented, 2) ABC uses drivers at various component levels whereas TCA generally uses an allocation procedure based on volume, and 3) ABC acknowledges that cost objects consume activities while TCA assumes that cost objects consume resources. As a result, with TCA the organization lacks the ability to evaluate the internal efficiency, quality and profitability per product or service line (Narong, 2009). Early adoption of ABC was slow because of the “newness” of the approach and the higher costs associated with implementing and maintaining the ABC system (Kaplan, 2004). Even today, over 20 years since ABC was first introduced, a majority of firms still employ traditional accounting methods (Fei, 2010; Maelah, 2007; Hughes S., 2003).

In small-to-medium size enterprises (SME) adoption of ABC has been even slower (Carenzo, 2010; Hughes, A., 2005). SMEs are constrained by capital, both human and financial, as they operate in a crowded and competitive marketplace. Furthermore, the infrastructure for manufacturing, distribution, information technology, and customer service is severely limited. The intrinsic nature of such companies is that they do not have economies of scale to be competitive from a cost point of view and seldom have access to the full range of information they need to operate at maximum efficiency. A deeper analysis of the situation indicates that the SMEs tend to be cash flow-strapped because of inventory in the supply chain—both outbound and inbound—and suffer from extended accounts receivables, often as a result of

retailers taking advantage of their small size (Hong, 2006). The economic burden of inventory in the supply chain is arguably the most severe hardship for an SME. The business system infrastructure required to trade with suppliers and customers is often a critical handicap. Another serious impediment is the access to retail shelf—very often, exorbitant fees called “slotting allowances” are a pre-requisite for presenting the product to the consumers. The challenges of forecasting demand and replenishment and achieving perfect orders and timely and accurate shipments cannot be overstated. Finally, the operating philosophy and practices of resource-constrained SMEs can be counter-productive for those aspiring to achieve global growth (Macpherson, 2005). Nevertheless, SMEs may take practical steps to implement desirable growth paths through management practices that utilize appropriate intra- and inter-organizational capabilities (Jin, 2007). More specifically, could ABC assist SMEs in enhancing efficiency and innovation through improved pricing and better planning? The results of a recent worldwide survey of manufacture and service companies suggest they can as revealed with the following insights (Stratton, 2009):

- ABC alleviates managers’ concerns regarding the accuracy of cost allocations, the cause-effect relationship between allocations and resources consumed, the timeliness of cost/profit information, and the capability to update systems.
- ABC provides greater support for financial, operational, and strategic decisions.
- ABC can be more effectively integrated into budget and planning processes.
- ABC better supports strategic product/customer emphasis decisions.

This paper is organized as follows: 1) a review of the relevant ABC literature; 2) an overview of the case; and 3) an analysis of the case in the form of a teaching note.

Beware of little expenses. A small leak will sink a great ship.

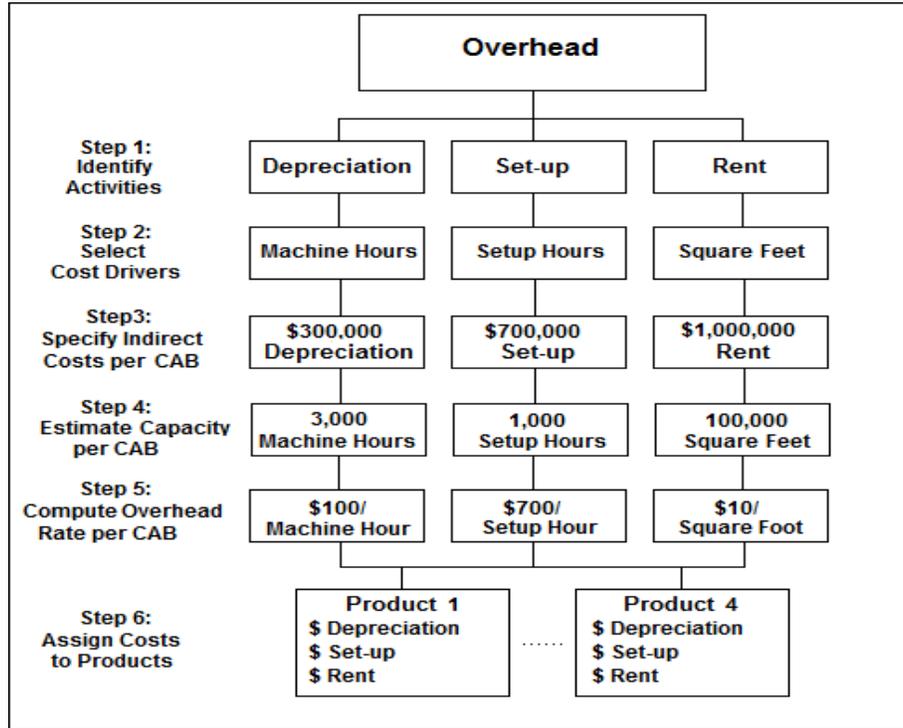
-Benjamin Franklin

LITERATURE REVIEW

Often referred to as smoothing, traditional costing allocates overhead costs evenly per direct labor hours or dollars. Unfortunately, direct costing can result in discrepancy between the budgeted overhead and the actual overhead used. For example, certain products require more maintenance or floor space. Traditional costing allocates overhead based on direct expenses without compensating for a product’s greater or lesser use of overhead costs. Activity-based costing allocates overhead to a product based on the actual amount of overhead used by that product. Whenever common resources are expended in different ways across products, a weighting mechanism is required for accurate allocation. ABC can be equally valuable in service industries. For example, the health care industry has diverse products and customers, resulting in cross-product, cross-customer subsidies. Often, personnel expenses represent the largest single component of non-interest expense.

The specifics of the ABC methodology involve the following six steps (Compton, 1996) : 1) Identify the cost activities, 2) Select the cost drivers (cost-allocation basis - CAB), 3) Specify the indirect costs per CAB, 4) Estimate capacity per cost driver, 5) Compute overhead rate per cost activity, and 6) Assign costs to products. These steps are highlighted in Figure 1. The numerical values included in Figure 1 are illustrative. The computed indirect expenses per product are then added to the direct expenses to yield total product costs.

**FIGURE 1
ABC PROCESS EXAMPLE**



Many firms that have adopted ABC have found it challenging to maintain the system (Carnes, 2010). This is due, in part, to changes in the processes, which require re-interviewing employees and re-estimating resource usage by activities and capacities. Many managers express concern regarding the degree of subjectivity involved in estimating an employees' proportion of time spent on each activity. For example, the number of hours estimated per product can vary considerably depending on the nature of the activity (e.g., regular packaging versus customizing packaging). Using the standard ABC approach, each variation in an activity is treated as a separate activity which greatly increases the complexity of the assignment process. Furthermore, managers have found it difficult to accurately define the capacity of the different activities as illustrated in step 4 of Figure 1. As a result of these challenges, a modified ABC approach called Time Driven ABC (TDABC) was introduced (Kaplan, 2007). The advantages of TDABC when compared to traditional ABC are lower processing costs, increased system flexibility, improved accuracy, and enhanced simplicity (Ayvez, 2011; Sherratt, 2005). Among other things, time equations supported by actual transaction data show objectively what employees have done instead of having to conduct ongoing employee surveys. Time equations are based on a multi-regression analysis where the target variable is the time needed to perform a specific activity and the predictor variables represent the variations to the standard time, which is characterized by the Y-intercept (Everaert, 2007). The regression model is expressed as follows:

$$Y(\text{time}) = \beta_0 + \beta_1 * X_1 + \dots + \beta_n * X_n$$

where:

Y(time) = the time to perform an activity (e.g., machine set-up)

β_0 = standard time to perform the basic activity (e.g., 10 minutes)

β_i = estimated time for an incremental activity (e.g., 5 minutes)

X_i = ith incremental activity (e.g., clean up)

Thus, one of the most important aspects of TDABC compared to ABC is the dynamic calculation of product/service activity times and system capacity (Gervais, 2010). TDABC offers the approximately 50 percent of the firms not employing ABC to reconsider. This is especially important to SBEs with their more limited resource base and margins for decision errors (Cardinaels, 2004). TDABC presents the manager with more meaningful cost and pricing information, which in turn can lead to improved profitability. TDABC also gives advantages to firms that have numerous suppliers and process sources and customers who require different services.

Nevertheless, the focus of many managers on the cost side rather than the benefits side of TDABC can lead them to conclude that the benefits of TDABC do not exceed the rather substantial cost of implementing and maintaining the system (Lawson, 2005). This general orientation is understandable since most publications on ABC have focused on the process of allocating overhead cost data and not delineating the specific financial benefits (Cardos, 2010). In that regard some of the specific benefits of TDABC that a SME would realize include (Hongren, 2011; Weygandt, 2010; Agndal, 2007, Hicks, 2002):

- Traditional accounting often results in under-costing (a product consumes a high level of resources, but is reported to have a low cost per unit) or over-costing (a product consumes a low level of resources, but is reported to have a high cost per unit). TDABC acts to minimize these problems.
- Traditional costing can result in “product-cost cross-subsidization,” which means that if a company under-costs one of its products, then it will over-cost at least one of its other products. Similarly, if a company over-costs one of its products it will under-cost at least one of its other products. TDABC acts to avoid these types of situations.
- TDABC facilitates the use of cost hierarchies, which categorizes costs into different cost pools on the basis of the different types of cost drivers, or cost-allocation bases, or different degrees of difficulty determining cost cause-and-effect relationships. TDABC commonly uses a cost hierarchy having four levels:
 - Output unit level costs which are the costs of activities performed on each individual unit of a product or service, e.g., the cost of energy to run a machine.
 - Batch-level costs which are costs of activities related to a group of units of a product or service, e.g., set-up costs.
 - Product-sustaining costs, e.g., product design.
 - Facility-sustaining costs, e.g., rent.
- TDABC is a major contributor to a company’s pricing activity. If a company is using traditional costing, as pointed out above, it may well be under-costing one or more products. This may easily result in these products being priced below cost. This, in turn, could result in a high volume of unit sales for these products leading the company to believe that it has a market leader in this area and to increase advertising, which will increase the sale of unprofitable products. Likewise the company may over-cost a product, which could result in the product being priced above the market, causing the company to lose sales of a profitable product.
- TDABC can encourage the company to optimize the design of a product. Suppose that a company implements TDABC and learns that it is under-costing a product. Suppose further that the market will not bear an increase in price. This set of circumstances could encourage the company to improve the design of the product to reduce its cost. Furthermore, suppose that the company concludes that the current product design is optimal. Using TDABC, the company could realize both lower material costs and improved manufacturing efficiencies.

THE CASE

The CFO at Rubrics Inc., a small size regional hardware manufacturing firm, has become aware of the ongoing imbalance between the products’ budgeted and actual costs. In a competitive environment, an

imbalance between pricing and costing can be expensive. The historical accounting approach has been to allocate overhead to products using a single direct cost driver, usually direct labor hours or direct labor dollars. This practice sometimes leads to inaccuracies since indirect costs are not incurred equally across products. For example, Rubrics' CFO forecasted \$1,000,000 in direct labor costs and \$2,000,000 in overhead last year, resulting in an overhead rate of 200 percent. For each dollar of direct labor charged, \$2.00 of overhead was allocated. The shortcoming of this costing method is that overhead costs fail to reflect varying manufacturing intensity between products.

The firm's management is under pressure from the board to expand marketing into the global economy via the Internet. As a result of the board's direction, the CFO is considering implementing ABC as a means for improving the cost assignment process, which in turn should make Rubrics more competitive on the global stage. He knows that the adoption rate of ABC in SME's like Rubrics has been slow in the past. Furthermore, the CFO also realizes that the ABC method is more complicated and costly than traditional TCA. The CFO's first step is to identify the activity cost drivers from which overhead rates are assigned per cost driver. The rates are estimated by dividing budgeted costs per driver by the anticipated resource requirements for each cost driver. For instance, rent could be allocated based on the square footage occupied by inventory in producing a given product or service. For example, the CFO at Rubrics Corporation estimates that next year's rental costs to be \$1,000,000 for their 100,000 square foot factory. The CFO can calculate the rental overhead rate by dividing \$1,000,000 by 100,000 resulting in an overhead rate of \$10 per square foot. After calculating the overhead rates for each activity driver (e.g., rent, depreciation, maintenance), the rates are applied to the individual requirements of each product. The objective of ABC is to align actual consumption with specific product/service costs. The ABC approach is normally associated with multiple products or services using shared and often common indirect resources as in the case at Rubrics Corporation. The CFO believes that a key benefit of ABC is that products requiring higher concentrations of overhead costs are revealed, allowing management to focus attention on opportunities for reducing those costs or to price products, more appropriately.

Despite the complexity, the CFO knows that the benefits of ABC to Rubrics can be significant. Some specific benefits include: 1) the ability to distinguish profitable from unprofitable products, 2) the opportunity to establish cost controls to eliminate unnecessary costs, and 3) the potential for improved product pricing. However, prior to implementing ABC, the CFO wishes to consider whether the cost savings from more accurate budget allocations are greater than the costs of implementing and maintaining the new system.

Rubrics Inc. produces four products: widgets, gadgets, smidgets, and smadgets. Table 1 summarizes the direct labor, overhead, and direct material costs associated with these products. Presently the aggregate overhead rate is 200 percent of direct labor.

TABLE 1
DIRECT LABOR, OVERHEAD AND DIRECT MATERIALS COSTS

Total direct labor	\$1,000,000
Total overhead	\$2,000,000
Overhead rate	200% of direct labor
Widgets direct labor	\$100,000
Gadgets direct labor	\$300,000
Smidgets direct labor	\$400,000
Smadgets direct labor	\$200,000
Widgets direct material	\$100,000
Gadgets direct material	\$200,000
Smidgets direct material	\$150,000
Smadgets direct material	\$250,000
Units built	1,000 of each product

The CFO has identified three main overhead cost drivers (depreciation, set-up and rent), which are highlighted in Table 2. Also presented are the associated total costs and quantity of CAB per cost driver. The CAB estimates were developed by the CFO after consulting with the production manager.

**TABLE 2
OVERHEAD COST DRIVERS**

Cost allocation bases	Total costs	Quantity of CAB
Depreciation	\$300,000	3,000 machine hours
Set-up	\$700,000	1,000 set-up hours
Rent	\$1,000,000	100,000 square feet

Table 3 shows the product resource requirements by cost driver. Notice, for example, that the set-up requirement for Widgets is 200 hours. These estimates were also developed with the assistance of the manufacturing staff. It was during this process that the CFO discovered for himself one of the major challenges associated with ABC, namely the ongoing requirement to obtain accurate estimates on actual resource usage by product.

**TABLE 3
PRODUCT RESOURCE REQUIREMENTS BY COST DRIVER**

Widgets	Gadgets	Smidgets	Smadgets
500 machine hours	900 machine hours	400 machine hours	1200 machine hours
200 set-up hours	300 set-up hours	100 set-up hours	400 set-up hours
20,000 square feet	30,000 square feet	10,000 square feet	40,000 square feet

The CFO wishes to more fully assess the benefits of the ABC strategy prior to finalizing his recommendations. Specifically, he has identified the following tasks that need to be completed.

1. Determine the overhead costs per product based on TCA.
2. Determine the total costs per product based on TCA
3. Determine using the ABC model:
 - a. The activity-based overhead rates per activity cost driver.
 - b. The overhead costs per activity cost driver for each product.
 - c. The total costs per product using the overhead costs developed from part b.
4. Identify which products are incorrectly priced using the TCA assuming that ABC more accurately allocated overhead. Characterize some of the difficulties that might result from incorrectly budgeted products.
5. Specify specific actions might be used to deal with the mispriced products.
6. Compare assigned costs per product under both methods. Why has activity-based costing changed the total costs assigned to each product?
7. Identify circumstances where TCA and ABC would likely yield similar or equal overhead costs.
8. Identify some of the issues and challenges associated with implementing and maintaining the ABC system at Rubrics.
9. Contrast the benefits and costs associated with ABC.

The CFO plans to present the findings of his analysis at the next board meeting. He wishes board approval to carry out the next step, which would be to obtain bids from several firms that specialize in implementing ABC for SMEs.

CONCLUSIONS

For SMEs to compete effectively in the global marketplace, the cost of a product/service should be reduced by increasing productivity or by enhancing product/service pricing or both. This is where ABC can help. There are many challenges associated with SMEs adopting ABC and that is why adoption rates lag behind larger firms. Some specific challenges include: 1) the cost of implementing and maintaining the system, 2) estimating the benefits associated with ABC (improved pricing and product planning), and 3) integrating the system into the overall management structure.

A basic question for SME managers is “When and under what conditions is the organization a candidate for ABC?” There are a number of factors that impact an organization’s ability to implement new technology including organizational readiness, financial impact, workflow productivity and overall business environment (Khazanchi, 2005). Adoption procedures now exist for helping facilitate a smooth transition to ABC for SMEs (Roztocki, 2004). Hopefully, these procedures and the case outlined in this paper will provide sufficient insights to motivate SME managers to take a second look at the opportunities that ABC offers.

*This article grew out of a teaching case first published by Ivey Publishing (9B10B011) in 2010.

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APPENDIX A - TEACHING NOTE

TEACHING OVERVIEW

The case is appropriate for basic or intermediate managerial accounting at the undergraduate or graduate levels. The case focuses on traditional and activity-based costing methods. Before assigning the case, students should already be familiar with traditional and ABC costing. The case is intended to reinforce the presentation of ABC in the classroom. Students should complete the case out of class and provide answers to the suggested questions. The assignment is best suited for groups of two to three students, but can also be completed individually. The first three questions can be completed using Excel. The estimated time to complete the case is between 2 and 3 hours.

Case Answers

Questions 1 and 2:

Students should calculate total costs per product by summing each product's direct labor and material costs and then adding the result to the product of direct labor and the overhead rate (200%).

TABLE 1
CALCULATING PRODUCT COSTS USING TRADITIONAL COSTING

Manufacturing Costs	Products			
	Widgets	Gadgets	Smidgets	Smadgets
Direct Labor	100,000	300,000	400,000	200,000
Direct Material	100,000	200,000	150,000	250,000
Overhead	200,000	600,000	800,000	400,000
Total Costs	\$400,000	\$1,100,000	\$1,350,000	\$850,000

Question 3a:

To determine activity-based costing, students should begin by calculating the activity-based overhead rates. Activity-based overhead rates are calculated by multiplying the estimated overhead costs per activity by the total units for each cost driver.

TABLE 2
ACTIVITY-BASED OVERHEAD RATES

Overhead Cost Driver	Estimated Overhead	/	Expected Cost Drivers / Activity	=	Activity-based Overhead Rates
Depreciation	300,000		3,000		100
Set-up	700,000		1,000		700
Rent	1,000,000		100,000		10

Question 3b:

To determine the total overhead costs per product, multiply the activity-based overhead rates by each product's expected use of the overhead costs drivers (e.g., Widgets: 500 machine hours * \$100/ machine hour = \$50,000).

TABLE 3
TOTAL OVERHEAD COSTS PER PRODUCT USING ABC

Overhead Cost Driver	Products			
	Widgets	Gadgets	Smidgets	Smadgets
Depreciation	50,000	90,000	40,000	120,000
Set-up	140,000	210,000	70,000	280,000
Rent	200,000	300,000	100,000	400,000
Total Overhead Costs	<u>\$390,000</u>	<u>\$600,000</u>	<u>\$210,000</u>	<u>\$800,000</u>

Question 3c:

Sum the direct costs with the total overhead costs calculated in question 3b.

TABLE 4
TOTAL COSTS PER PRODUCT USING ABC

Manufacturing Costs	Products			
	Widgets	Gadgets	Smidgets	Smadgets
Direct Labor	100,000	300,000	400,000	200,000
Direct Material	100,000	200,000	150,000	250,000
Overhead	390,000	600,000	210,000	800,000
Total Costs	<u>\$590,000</u>	<u>\$1,100,000</u>	<u>\$760,000</u>	<u>\$1,250,000</u>

Question 4:

Three of the four products were mispriced using TCA. Widgets and Smadgets were underpriced by \$190,000 and \$400,000, respectively. Smidgets were overpriced by \$590,000. Only Gadgets was priced correctly (TCA = \$1,100,000 versus ABC = \$1,100,000).

A number of managerial difficulties arise from incorrectly budgeting different product lines. Mispriced products lead to biased performance comparisons. Departments receiving excess budgets appear more efficient at reducing costs than the other manufacturing lines. The opposite is true for departments receiving too little funding. Traditional costing also assigns overhead costs without taking into account the varying overhead demands between departments. The result is that management has more difficulty assessing overhead costs that will reduce a department's overall costs.

Budgeting inaccuracy also reduces production capacity. Departments without proper funding might not have adequate funding to manufacture enough products to meet customer demands. The problem escalates if one product line is an input for another product. Furthermore, budgeting inaccuracy also reduces investment opportunities. More accurate budgeting will allow management to use resources more efficiently. Over budgeting a product may reduce the amount of resources available for other opportunities (e.g., marketing). Under budgeting products can prevent the firm from meeting customer demand.

Question 5:

The most logical approach is for the CFO to propose adopting the ABC model, *ceteris paribus*. Rubrics Corporation would realize \$400,000 in savings which could be used, in part, for implementing the ABC system. ABC costing would also more accurately assign budgets to the individual production lines and allow management to assess efficiency and investigate cost reducing alternatives.

Question 6:

The traditional costing method fails to consider varying overhead requirements between products. Traditional costing uses one overhead rate based on historical overhead expenses for the entire manufacturing process. A single overhead rate fails to capture differences in per unit overhead expenses, resulting in excessive budgeting for products with smaller per unit overhead expenses. Activity-based costing assigns overhead rates based on specific overhead cost pools. The method then assigns the rates to the unit requirements of these cost pools per product. The result is overhead expenses that reflect the differing overhead requirements for the individual product. The end result is total expenses that more accurately represent differences in per unit overhead expenses.

Question 7:

Activity-based costing was developed to help management more accurately budget separate manufacturing lines. The system has become increasingly popular as manufacturing processes grow increasingly sophisticated. However, ABC is more expensive to implement, requiring management to research the individual overhead requirements per product. Before pursuing ABC costing, management should assess whether traditional costing makes more sense. Traditional costing is equally effective under many circumstances, two possible circumstances are, but are not limited to: 1) Manufacturing companies with extremely low overhead costs. 2) Companies where direct labor costs have proven an effective cost driver of overhead expenses.

Question 8:

Some of the issues and challenges associated with ABC at Rubrics are similar to those faced by most small-to-medium size enterprises. These include:

- The design of the system requires specialized technical and cost personnel. The typical SME has a minimum of these personnel and traditionally they are extremely busy solving the problems of the day. Taking time to think out and plan the system requires dedicated time away from the day-to-day activities.
- The cost of the ABC design will hit the bottom line of the company. Any reduction in profit at an SME is looked upon with serious disfavor.
- Personnel at SMEs are traditionally comfortable with the attitude of “this is the way we have always done it.” Change, particularly a challenging change, does not come easily.
- A typical SME operates on a minimal technology budget. Implementing ABC requires front-end investments in both hardware and software.

Question 9:

The costs associated with ABC include:

- Technical and cost accounting personnel to design the system
- Cost accounting personnel to maintain the system
- Cost analysis personnel to interpret the output of the system
- Technical hardware and software necessary to operate the system
- The cost of running dual systems while the ABC system is subjected to trouble-shooting

The benefits associated with ABC include:

- Obtaining accurate data on which products are profitable and which are unprofitable

- Having solid cost numbers to incorporate into the pricing of each product
- Obtaining cost data that helps the company determine if the product design is optimal
- Obtaining cost data that helps the company analyze the material cost in each product
- Obtaining cost data that enables the company to improve production processes

In the final analysis, the major benefit of ABC is that it may well help the company stay in business. If the company is producing and selling products at a loss, and is unaware of this, it may soon be out of business.