Cost-System Redesign at a Medium-Sized Company: Getting the Right Numbers to Drive Improvements in Business Performance

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Activity-based costing allowed a manufacturer to make business process changes that helped improve cash flow, product and channel profitability, and the company's competitive position.

Many businesses today are pursuing a growth strategy. Typically, small- to medium-sized enterprises must fund growth internally, which, in turn, is a function of the company's ability to generate positive cash flows. A domestic electronic consumer products manufacturer, referred to in this article as XYZ, was experiencing cash-flow difficulties and unprofitable growth, so it responded by implementing a simple activity-based costing (ABC) system. This cost system redesign allowed XYZ to estimate return on sales (ROS) and return on investment (ROI) results for both product lines and customers. In short, the ABC system provided the owners with strategies for pursuing profitable growth.

We will look at how ABC improved XYZ's pricing and product decisions and spurred business process improvements, all of which allowed the company to become more competitive. To help accountants and managers who otherwise might hesitate to engage in a cost-system redesign project, we also discuss ABC implementation issues likely faced by small- to medium-sized manufacturers.

Background

Founded in 1999, XYZ Corporation caught the Internet wave squarely by offering domestically produced, value-based consumer electronics products directly to

the end user through the company's website. The company separates its products into six families:

- Product family A consists of purchased accessories.
- Product family T items have textured finishes and can be purchased locally in small-lot quantities. All other finish types must be purchased in ocean-container quantities.
- Product family V comprises items with a vinyl finish.
- Product family W includes premium wood-finished items.
- Product family U is uniquely designed and exclusively manufactured items.
- Product family S items represent complete assemblies, which XYZ purchases from foreign manufacturers.

Annual sales for all products amount to approximately $9 million. Currently, the company ships all orders from a single U.S. manufacturing facility. XYZ sells products directly to domestic customers, but foreign customers purchase items through an exclusive dealer network. The company has three owners and 16 employees, most of whom work at home in various parts of the country.

Since XYZ's founding, the company's competitive advantage has been low overhead costs and high customer service—a combination that equates to high value in the customer's mind. XYZ's primary competitors include low-cost Internet direct distributors that purchase complete products from foreign manufacturers and high-end product manufacturers that distribute merchandise via specialty retail shops. Technical innovations and new product offerings principally fuel growth in the industry in which XYZ competes.

During each of its first five years, the company experienced significant sales growth. The first three years saw 40% sales volume and revenue growth per year followed by 20% growth in each of the next two years. Sales volume and total revenues are still increasing, although cash flow is becoming a problem for the company. Shrinking dividend payouts and slowing payment cycles to suppliers suggested that the proverbial "edge of the cliff" for this company was fast approaching![1]

Growth in sales revenues is a desired outcome for most businesses, as it is with XYZ, but growth in sales without sufficient cash to fuel expansion may actually be counterproductive. This could occur, for example, when growth is fueled by new product offerings that do not recover their full costs. In short, cash flow and working capital, not sales revenue or sales volume, are the lifeblood of a business.[2]

Continued success for XYZ was therefore being jeopardized by the lack of sufficient cash flow. Understandably, the owners wanted to know the causes of the deteriorating situation, so they put together a cross-functional team consisting of the chief financial officer, plant manager,[3] and director of engineering to investigate the situation. After considerable deliberations, the team identified the following problem areas:

- Poor inventory management,
- Lack of control of overhead (i.e., manufacturing support) costs, and
- Inefficient business processes (for example, disorganized inventory information).

Problem Specification—A Deeper Look

For virtually any manufacturer, proper inventory management ensures the availability of the right items at the right time and in the right place. This, in turn, supports organizational objectives of customer service, productivity, profit, and return on investment (ROI). There are, however, both out-of-pocket and opportunity costs associated with inventory holdings. For example, inventory ties up capital, uses storage space, requires handling, deteriorates, becomes obsolete, incurs property taxes, requires insurance, and sometimes is lost or stolen.[4] For XYZ, increased inventory holdings to accommodate anticipated sales increases were straining cash flow. Further, inventory levels increased at XYZ when the company was pursuing a growth strategy of product-line diversity. Realized sales increases, however, were not sufficient to offset the increased investment in inventory for the company, which, consequently, was robbing the company of much-needed liquid assets.

In addition, XYZ was experiencing increased spending on capacity-related (i.e., short-term fixed) costs and manufacturing support costs (e.g., supply-chain management). XYZ's humble beginning is probably similar

to that of many start-up manufacturers. Batch quantities for the company were initially small, labor content was high, and overhead was relatively low. As the company matured and sales increased, labor content decreased because of greater returns to scale, learning-curve effects, and investments in an improved infrastructure.[5] With increases in sales volume and a changing sales mix that XYZ was experiencing, support costs were escalating. Capacity-related costs as well were increasing disproportionably to increases in sales. Indirect labor costs, capital expenditures (e.g., tooling costs), and factory overhead costs were all increasing faster than sales revenue. XYZ had always excelled at delivering and supporting a superior product. As such, cost control was never an area of focus for the company, but now it was becoming a strategic issue. In short, support costs for XYZ were escalating rapidly, overrunning profits and draining cash.

Increased inventory holdings and excessive overhead spending combined to reduce the company's net cash flow. Determining which inventory items to reduce and which overhead costs to focus on, however, was unclear to the owner-managers. The necessary cost-control tools and supporting business processes were not in place at XYZ to guide these decisions, so the cross-functional team ultimately decided to critically examine the company's accounting system.

Cost-system Refinement

XYZ had been using a traditional cost system that was fairly rudimentary. In fact, the view of the owners was that the cost system was necessary only for compiling data for income-tax purposes and periodically for preparing financial reports (e.g., to support a bank loan request). As a result, the company had done no budgeting or forecasting to track and control costs. Thus, XYZ's existing cost system could not capture the underlying economics of the company's production function and, therefore, could not assist the company in responding to the deteriorating situation in which it found itself. The plant manager had just completed an MBA course in management accounting and was intrigued by the prospect of introducing a rudimentary activity-based costing system at XYZ. This was the primary proposal that the three-person team dealt with over an ensuing six-month period.

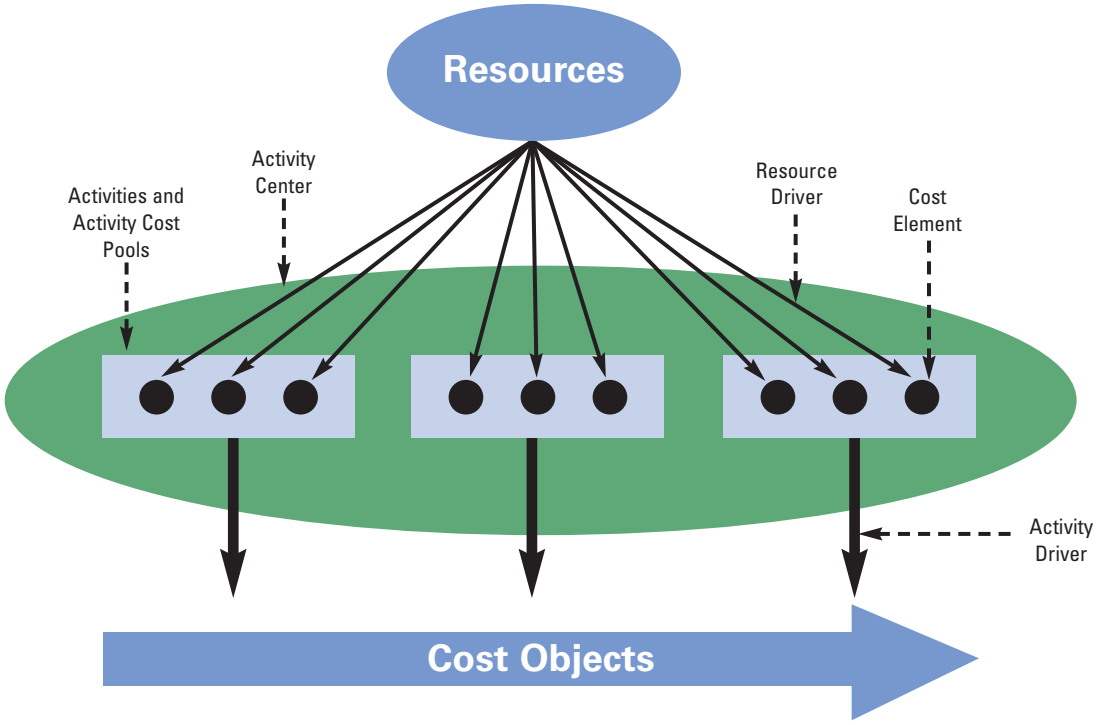
Companies use ABC systems to improve product and/or customer costing principally because such systems provide better (i.e., more accurate) estimates of the resource demands (or resource consumption) of an organization's outputs, its customers, and its distribution channels. The plant manager at XYZ thought that useful insights for improving cash flow and profitability might be possible if the company had a better handle on the resource demands of its various product offerings and distribution choices. Such insights, the team hoped, would enable the company to respond to the strategic challenges it was facing.

Further, the plant manager read an article in the Fall 2005 issue of *Management Accounting Quarterly*, "Product Line and Customer ROI: The Next Generation of ABC," which introduced him to using ABC data to evaluate product- and customer-level ROI.[6] The article asserts that ABC concepts can be extended to encompass the allocation of assets to activities. Just as resources under ABC are assigned to activities (e.g., production setups) for costing purposes, assets can similarly be assigned to activities. Once the level of assets associated with a given activity is determined, it is possible to assign assets to customers and products in the same fashion that ABC assigns costs to products and customers. Thus, the plant manager at XYZ wondered whether the company could use a simple ABC system to guide strategic decisions such as those related to product mix, product selling price, overhead cost control, and business process improvement.

ABC Elements

Figure 1 illustrates the general elements of an ABC system: resources, activities, resource drivers, cost objects, and activity cost drivers. Resources are devoted to the performance of activities; they are the sources of cost.[7] Examples of resources would be direct material, direct labor, office support staff, professional salaries, office space, and advertising costs. At XYZ—and common to many accounting systems we observe today—most resource costs are gathered in functional or descriptive accounts. Thus, XYZ's general ledger (the source of resource expenditures) was ultimately redesigned to accommodate the proposed ABC system. For example,

Figure 1: ELEMENTS IN A TYPICAL ABC SYSTEM



Source: Peter B.B. Turney, *Common cents: how to succeed with activity-based costing and activity-based management,* rev. ed., McGraw-Hill, New York, N.Y., 2005, p. 95.

marketing, accounting, customer service, engineering, assembly, and plant management were designated as resources for the ABC model. Resources that are not functional areas at XYZ include facilities and materials.

Activities are units of work performed by the organization's resources. Typical activities ABC captures include things such as creating a customer order, processing returns, creating invoices, and handling materials. In an ABC system, activities typically are organized in a master list called an Activity Dictionary. Table 1 is a portion of the Activity Dictionary XYZ developed. This example includes the major activities performed by the customer-service resource and the corresponding cost-level hierarchy for each identified activity. The cost-level hierarchy is a framework for classifying activities according to the level at which costs are incurred. Unit-level, batch-level, product sustaining, and business sustaining are activity levels in conventional ABC implementations.

Related activities are grouped in activity cost centers, which at XYZ include order processing, inventory, warehousing, engineering and marketing, assembly, customer service, and accounting. These activity centers parallel XYZ's organization chart. The activity cost center's purpose is to organize activities in a meaningful way and, ultimately, to facilitate business process improvements and strategic cost management. For instance, the order-processing activity cost center in Figure 2 groups activities specific to the customer order-entry process at XYZ.

Resource drivers assign costs from descriptive accounts contained in an organization's existing cost system to activities. Resource drivers link resources and activities and are chosen to approximate the resources activities use. For example, in Figure 2, customer service and accounting resource costs are traced

Table 1: EXCERPT FROM XYZ'S ACTIVITY DICTIONARY

Activity	Resource	Cost Hierarchy
Advertise Products	Customer Service	Product Sustaining
Ship Product	Customer Service	Unit Level
Answer Product Information Question	Customer Service	Product Sustaining
Support Post Sales	Customer Service	Product Sustaining
Process Warranty Claims	Customer Service	Unit Level
Maintain Shopping Cart	Customer Service	Business Sustaining
Enter and Monitor Orders	Customer Service	Unit Level
Create Priority List	Customer Service	Batch Level
Create Invoices	Customer Service	Unit Level
Process Credit Cards	Customer Service	Unit Level

to five order-processing activities. Most resource driver amounts are based on estimates of the effort expended on each activity. XYZ used interviews and questionnaires to generate these estimates. Other resources, such as materials, are assigned to activities using more exact information. Pinpoint accuracy is not required for ABC systems, particularly for initial system development and for a small- to medium-sized company such as XYZ.

The *cost object* is the final point to which costs are assigned and is the reason work is performed. For example, it can be a product, a service, a customer or

Figure 2: ORDER-PROCESSING ACTIVITY COST CENTER AT XYZ

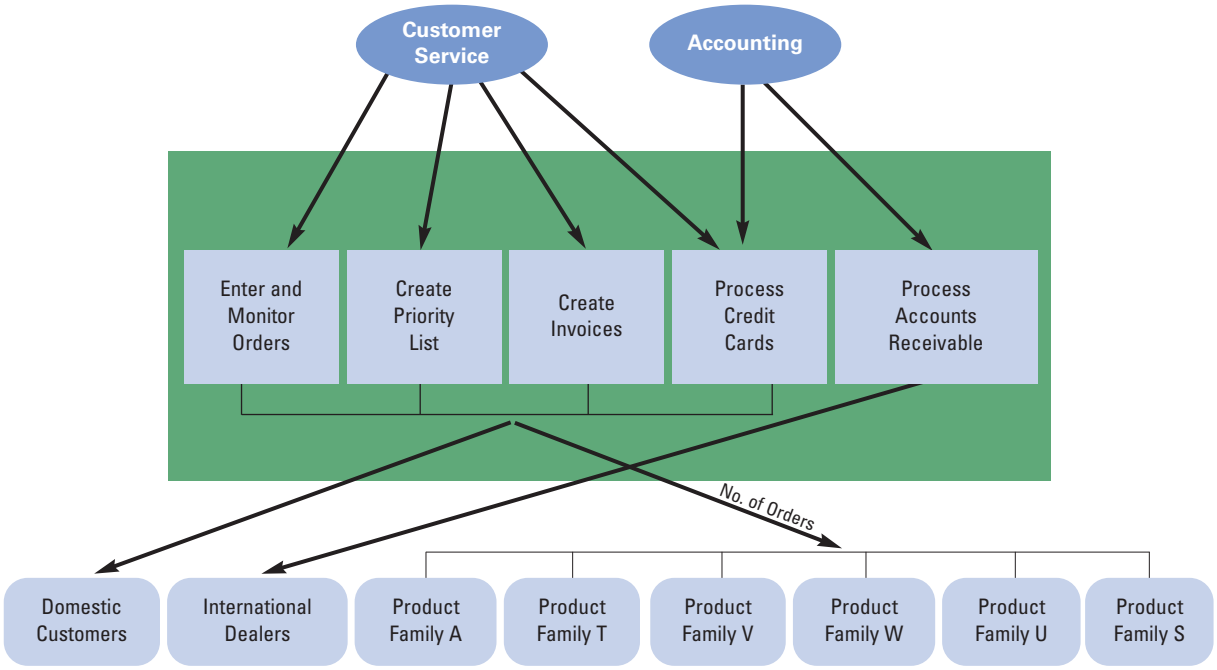
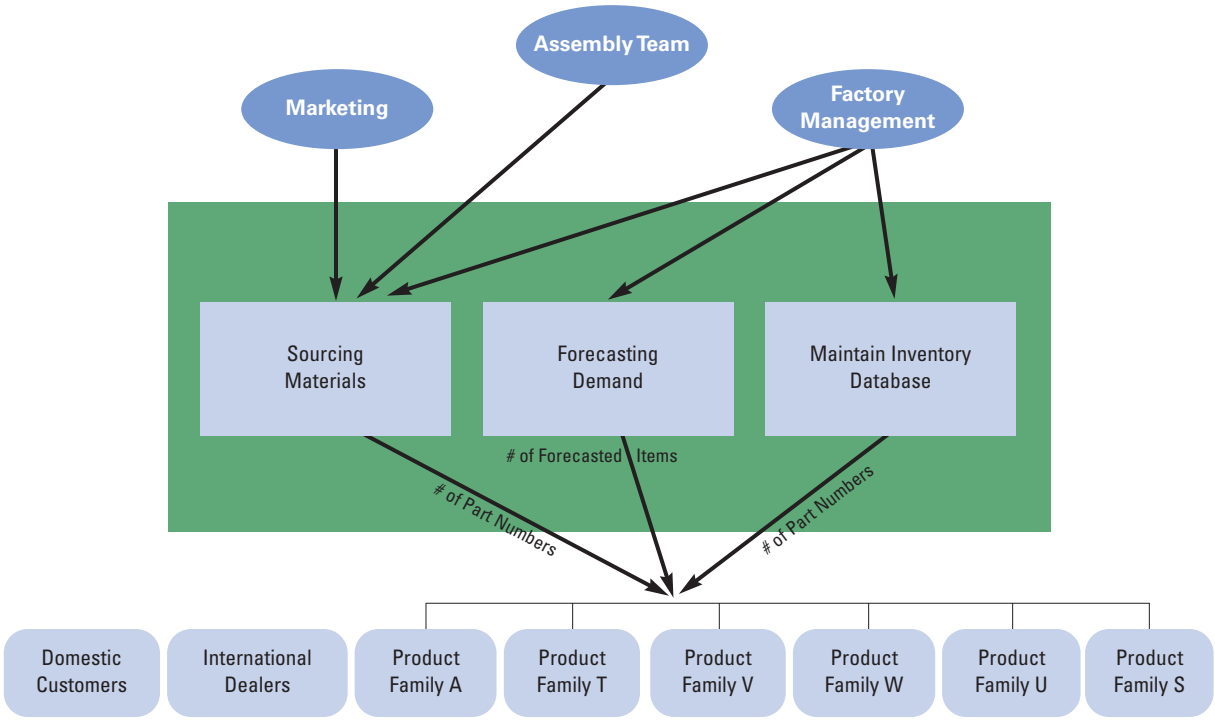


Figure 3: INVENTORY-MANAGEMENT COST CENTER

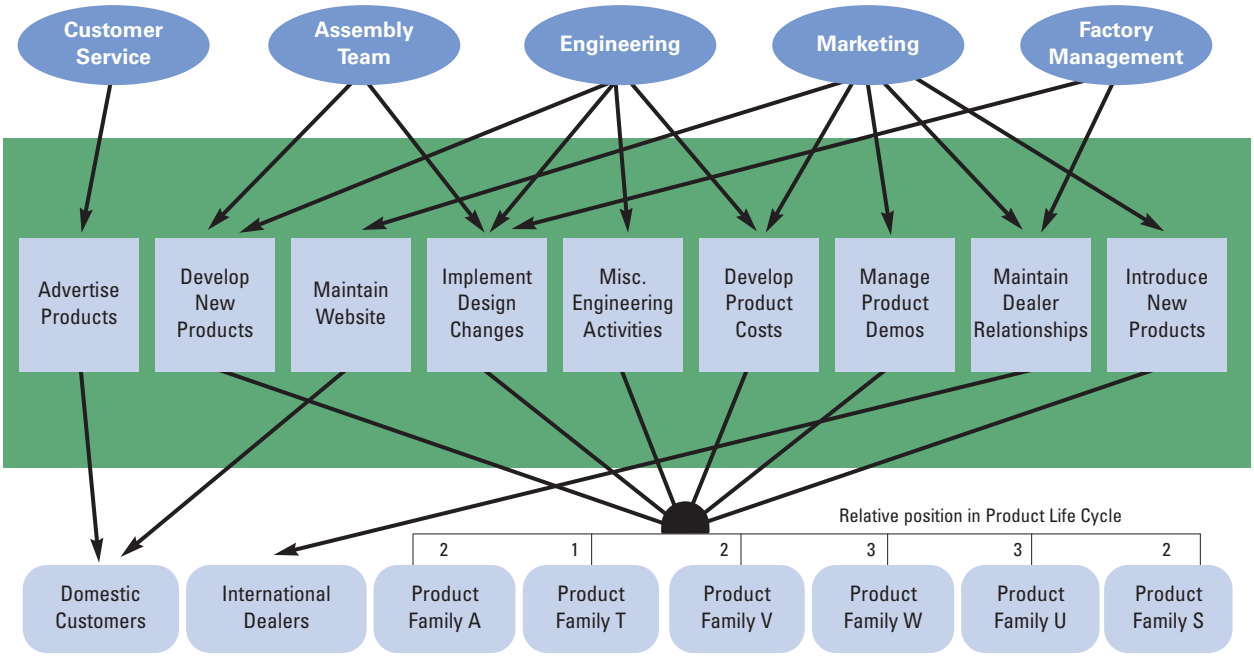


customer group, or a distribution channel. Cost objects can also vary in detail depending on the ABC system's purpose and the organization's nature. For XYZ's initial ABC model, the cost objects consist of the aforementioned six product families and two distribution channels. The product families and distribution channels are distinct because of differences in resource requirements.

Activity cost drivers assign the costs of activities to cost objects by measuring the level of activity consumption by each cost object. In conventional ABC systems, there are three basic types of activity drivers.[8] *Transaction* drivers count the frequency of an activity and are the least expensive cost driver. Transaction drivers, however, may be the least accurate drivers because they assume the same quantity of resources is required every time an activity is performed. For example, the activity "number of admissions" is a possible transaction driver for all hospital-related support costs associated with the admissions/discharge process. Each admission/discharge is counted as a single activity, and this information is readily obtainable from admission records. Figure 3 shows the inventory-management cost center for XYZ. All activity drivers in Figure 3 are transaction activity drivers.

Duration drivers represent the amount of activity performed. Duration drivers are used in an ABC system when significant variation exists in the amount of activity required for different outputs. For example, in a hospital setting a logical duration driver for routine care ("room and board") costs would be number of patient-days; in a manufacturing setting, a duration driver regarding setup activity would be number of setup hours. Figure 4 contains a representation of the marketing and engineering cost center for XYZ in which a duration driver was used in a unique way. To assign engineering and marketing activity costs at XYZ, the product family's position in the product life cycle was used. The product life cycle was split into four stages: introduction, growth, maturity, and decline. Each prod-

Figure 4: ENGINEERING AND MARKETING ACTIVITY COST CENTER



uct family was allotted the appropriate numerical value based on its stage in the product life cycle. Subsequently, engineering and marketing costs were assigned to product families based on their comparative product life-cycle position. The product life-cycle duration driver was used because a transaction driver or traditional duration driver for marketing and engineering, such as number of engineering change notices, was not available. Going forward, XYZ will need to determine if the additional accuracy that comes from using a transaction driver such as number of engineering change notices is worth the additional information-collection costs that would be involved.

Intensity drivers charge directly for the resources used each time an activity is performed and are generally the most accurate activity cost drivers. They also are the most expensive to implement. In a manufacturing setting, an intensity driver for setup activity might be direct-cost tracing for labor. For XYZ, engineering activity costs (see Figure 4) could be assigned more accurately if logs were used to track an individual's time worked on each product family (A, T, W, etc.).

Benefits from the Initial ABC Implementation

Although still in its nascent stage, the ABC system at XYZ has yielded a number of financial and process-related benefits.

Financial (Profit-Loss) Effects

The company used initial ABC data to construct a *pro forma* profit and loss (P&L) statement by product family and distribution channel (see Table 2). The ABC model was used to assign revenue, manufacturing costs, and operating expenses across product families. Prior to the ABC system, XYZ was unable to generate financial information to this level of detail. Based on the information in Table 2, several recommendations emerged for improving cash flow and for maximizing ROI across cost objects.

Table 2: PROFIT AND LOSS (P&L) STATEMENT BY PRODUCT FAMILY AND DISTRIBUTION CHANEL

	Product Family						Distribution Channel	
	A	T	V	W	U	S	Direct	Dealers
Sales	$23,901	$100,435	$138,557	$136,094	$117,560	$60,762	$462,108	$115,201
COGS	$24,181	$66,256	$81,347	$72,798	$62,765	$30,618	$261,265	$76,670
Gross Profit	($281)	$34,179	$57,210	$63,295	$54,794	$30,145	$200,842	$38,530
Operating Expenses	$5,676	$18,375	$31,056	$21,370	$16,729	$17,415	$100,808	$10,338
Operating Income	($5,956)	$15,803	$26,155	$41,926	$38,065	$12,730	$100,034	$28,192
Return on Sales (ROS)	(24.92%)	15.74%	18.88%	30.81%	32.38%	20.95%	21.65%	24.47%
Total Inventory	$27,540	$106,266	$186,440	$229,380	$92,091	$121,242	$568,488	$194,471
Return on Inventory	(21.63%)	14.87%	14.03%	18.28%	41.33%	10.50%	17.60%	14.50%

Use of Common Components: A recently released study concludes that automakers can increase profitability by using common components across platforms.[9] The study reports that Toyota saves an estimated $1,000 per vehicle over five years by using common components. The decision team at XYZ reviewed product configurations and estimated that the company could reduce inventory investments by approximately $132,000 by emphasizing a common-component strategy in product family T, product family V, and the foreign distribution channel. For example, product families T and V use unique electrical components that can be replaced by electrical components used by other product families. In addition, most foreign dealers require their electrical components to accept 220v power input. These components can be eliminated by adding a voltage selection switch to the domestic 110v electrical component equivalent. Table 3 shows the expected results of the proposed changes. With the ABC model, XYZ is able to reveal the positive financial effects of using common components.

Product-Mix Decisions: When products and customers are served from the same constrained asset, which for XYZ is dollars of working capital, it is necessary to

Table 3: PROJECTED PROFIT AND LOSS (P&L) STATEMENTS REGARDING COMMON COMPONENTS RECOMMENDATION

BEFORE ABC:

	Cost Objects		
	(T) Textured	(V) Vinyl	(F) Dealers
Total Income	$100,435	$138,557	$115,201
Net Operating Income	$15,803	$26,155	$28,192
Return on Sales	15.74%	18.88%	24.47%
Total Inventory	$106,266	$186,440	$194,471
Return on Inventory	14.87%	14.03%	14.50%

AFTER ABC:

	Cost Objects		
	(T) Textured	(V) Vinyl	(F) Dealers
Total Income	$100,435	$138,557	$115,201
Net Operating Income	$15,257	$24,255	$28,192
Return on Sales	15.19%	17.51%	24.47%
Total Inventory	$65,266	$163,440	$126,753
Return on Inventory	23.38%	14.84%	22.24%

Table 4: PROJECTED PROFIT AND LOSS (P&L) STATEMENTS REGARDING SELECTED OFF-COLOR PRODUCTS

BEFORE ABC:

	Cost Objects		
	(V) Vinyl	(W) Wood	(S) Purch. Comp.
Total Income	$138,557	$136,094	$60,762
Net Operating Income	$26,155	$41,926	$12,730
Return on Sales	18.88%	30.81%	20.95%
Total Inventory	$186,440	$229,380	$121,242
Return on Inventory	14.03%	18.28%	10.50%

AFTER ABC:

	Cost Objects		
	(V) Vinyl	(W) Wood	(S) Purch. Comp.
Total Income	$138,557	$136,094	$60,762
Net Operating Income	$26,155	$41,926	$12,730
Return on Sales	18.88%	30.81%	20.95%
Total Inventory	$168,440	$212,380	$81,242
Return on Inventory	15.53%	19.74%	15.67%

determine the appropriate product mix that will maximize profits subject to the constraint. Based on its review of profitability figures for all product families and products (see Table 2), the decision team recommended eliminating some product options. That is, from a profitability perspective, sometimes "less is more." Conventional accounting systems can obscure the cost of product-line complexity and product proliferation—costs that ABC systems attempt to uncover.

For product family W, the walnut-finished products were eliminated because of weak sales globally. That recommendation was easy to explain because walnut-finished products made up only 2% of the wood-finished products sold while accounting for an estimated 10% of the inventory investment in the product family. The other product-mix recommendation of eliminating off-color finishes from product family V was more difficult to justify. For product family V, off-color products account for 20% of sales. On the surface, it's hard to walk away from that amount of sales until you realize that, because of minimum-order quantity requirements from the supplier, one-third (i.e., $40,000) of the company's inventory investment in the product family is tied up in off-color products. Table 4 shows the estimated financial effect of eliminating off-color inventory at XYZ.[10] The lesson here is straightforward: With cash-flow constraints, it may be necessary to eliminate products that sell and that have good profit margins but that tie up too much cash in inventory. This insight is a direct result of the estimated cost data provided by the new ABC system.

The last recommendation from the team was surprising. Product family U comprises the first products designed and manufactured by XYZ. Products in this line are unique in the marketplace but are "long in the tooth." Because product family U's sales were shrinking in comparison to total sales, it was assumed that these products were at the end of their life cycle. On the contrary, based on ABC data, product family U had the highest ROS and ROI. It was, in effect, XYZ's cash cow. As such, the team recommended that XYZ do everything possible to increase sales, including expanding markets, reintroducing products with improved aesthetics, and initiating a complete redesign of the product line. Increasing sales in product family U would not decrease absolute inventory levels, but it would increase overall ROS and ROI.

Because of the cash-flow issues, the decision team's main focus was reducing inventory to increase cash flow and product-level ROI. Recommendations focusing on using common components and eliminating poor-performing products account for an estimated inventory reduction of $172,000. Other recommendations, including renegotiating minimum-order quantities on purchased components, accounted for an additional esti-

mated inventory reduction of $35,000. The expected result of all recommendations combined is an estimated inventory reduction of $207,000 and a 37% increase in overall ROI.

Process-Related Improvements

As illustrated previously, organizations typically implement ABC-type systems to realize improved financial performance (based on improved pricing decisions, better product-mix decisions, improved cost control, etc.). ABC implementations, however, can provide additional benefits in the form of improved business processes. In the case of XYZ, process improvements in the accounting and inventory control systems were attributed to the ABC implementation.

The starting point for establishing the flow of costs in an ABC system is the general ledger.[11] As noted earlier, the general ledger at XYZ was reconfigured to accommodate the ABC implementation. Redundant and related accounts (e.g., various factory overhead accounts) were combined to reduce the number of required calculations, and singular income and cost-of-goods-sold accounts were disaggregated by product-family level. For example, the overall sales revenue account associated with the old accounting system was split into multiple sales revenue accounts, one for each product family. Similarly, selected expense accounts (e.g., fringe benefits) were subdivided to obtain resource costs easily.[12] All these changes represented improvements to the company's accounting system and were related directly to the ABC implementation.

Another significant process change attributed to the ABC implementation was the institution of spending budgets. An ABC system is able to attribute costs to specific products or product families, but spending budgets are better equipped to manage costs. XYZ had been aware of the need to implement spending controls, but it lacked motivation. With a better understanding of ROS and ROI because of the ABC implementation, XYZ was now in a position to employ spending budgets to improve profitability.

The time and effort required to create the ABC model made it evident that considerable changes to the management information system (MIS) at XYZ would be required to make the costing process efficient and accurate. Problems with the existing MIS came primarily from information silos that existed throughout the company, making information gathering difficult.[13] Sales revenues, manufacturing costs, and operating expenses were all maintained in separate systems. No cost information could be shared or reconciled electronically.

To eliminate the information silos and implement the new costing system effectively, the inventory control and order-shipping processes at XYZ were incorporated into the existing accounting information system. All inventory control functions are now performed in QuickBooks Enterprise Solutions.[14] This integration process allows revenue information and manufacturing costs to be related to shipments, which extends the ABC information related to product families and distribution channels. In addition, all costing information now resides in one database.

Lessons Learned

"Work is infinite; time is finite. Therefore, you must manage your time, not your work."[15] Managing time for an ABC implementation means managing the access, flow, and level of information. In this section, we offer some recommendations based on the ABC implementation experience at XYZ.

When possible, reorganize the general ledger and income statement to accommodate ABC. The reorganization of the financial information allows easy accessibility to data. Integrating vital information systems controls the flow of information and automates many of the required calculations needed to develop the ABC model, thereby reducing the amount of time required to generate cost data. In addition, system integration improves data accuracy and the ability to replicate the information-generation process. Finally, when implementing an ABC model, it is important to embrace the concept of "good enough" when determining the required fineness of the data and for getting the ABC project off the ground. As General George S. Patton said, "A good plan, violently executed now, is better than a perfect plan next week."

Another overriding lesson is that an organization's structure and financial status influence the duration and effectiveness of its ABC implementation. Many internal

factors, including corporate culture, available information systems, and current financial performance, have a bearing on the ability of the ABC model to influence the organization's decision-making process. XYZ's decision-making process had been primarily subjective in nature, with little financial analysis. Thus, considerable time was required to educate the decision team and board members on ABC, P&L statements, and ROI. Inefficient business processes at XYZ, information silos, and lack of information were obstacles that had to be overcome as part of the ABC model-creation process.

Finally, the most important lesson was that significant change does not occur without crisis. Or as Louis V. Gerstner, former chairman of IBM, put it: "No organization is going to change in a fundamental way unless it believes there's real pain staying the way we are." XYZ was open to the recommendations from the decision team because the company found itself in the midst of a crisis. Developing solutions before problems reach crisis proportions is most prudent, although the message may not be fully received.

Benefits of Cost-system Redesign

ABC systems are not meant solely for large companies. Small- to medium-sized companies, such as XYZ, can benefit from data provided by an ABC model. In the present case, the ABC information motivated business process changes (e.g., in accounting), reduced product complexity for several product lines (e.g., moving to the use of common components), and influenced changes in the company's product mix (e.g., by highlighting underperforming products). Collectively, these changes helped improve cash flow, product and channel profitability, and the organization's competitive position. ■

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Endnotes

1 Dividend payouts are made to the owners and select employees on a quarterly basis.
2 Suzanne Caplan, *Streetwise Finance & Accounting: How to Keep Your Books and Manage Your Finances without an MBA, CPA, or Ph.D.*, Adams Media Corporation, Avon, Mass., 2000.
3 One of the coauthors of this article.
4 Lee J. Krajewski, *Operations Management: Strategy and Analysis*, 6th ed., Pearson Education, Inc., Upper Saddle River, N.J., 2002.
5 Thus, the start-up of XYZ was probably similar to that of Apple Computer or Dell: Assembly began in someone's garage, one product at a time, progressing to a multi-stage factory producing batches of products.
6 Kevin Devine, Tom Lammert, and Priscilla O'Clock, "Product Line and Customer ROI: The Next Generation of ABC," *Management Accounting Quarterly*, Fall 2005, pp. 1-11.
7 Peter B. B. Turney, *Common cents: how to succeed with activity-based costing and activity-based management*, rev. ed., McGraw-Hill, New York, N.Y., 2005, p. 94.
8 Anthony A. Atkinson, Robert S. Kaplan, and S. Mark Young, *Management Accounting*, 4th ed., Prentice Hall, Upper Saddle River, N.J., 2004.
9 http://oesa.org/publications/articledetail.php?articleId=5142 (accessed September 13, 2007).
10 XYZ believed that few to no sales would be lost by eliminating off colors because competitors do not offer multiple color choices in this product category.
11 Turney, *op. cit.*, pp. 268-269.
12 *Ibid.*, pp. 270-271.
13 An "information silo" is a management system incapable of reciprocal operation with other, related management systems. For instance, order information, initially captured in the Internet shopping cart, must be rekeyed into the inventory control system to determine the build schedule for the assembly department.
14 Accounting software for small businesses from Intuit.
15 Kenneth Atchity, *A Writer's Time: Making the Time to Write*, rev. ed., W.W. Norton and Company, Inc., New York, N.Y., 1995.