Activity based costing journal article pdf

Nabil Bashir Al-Halabi, Omar Fareed Shaqqour The study explored the effect of activity-based costing (ABC) on performance efficiency in Jordanian manufacturing corporations. A questionnaire form was designed and distributed to a sample of 72 managers in 20 manufacturing companies, and data were collected and analyzed using EXCEL and SPSS packages. The results found that the implementation of ABC has a significant effect on resource management, performance efficiency, cost reduction and non-utilization capacity costs in Jordanian manufacturing corporations. The conclusion showed that ABC was able to differentiate between high and low volume products between different activities of the manufacturing company in Jordan. The research also concluded that the main difficulties were the differentiation between value-added and non-value-added activities, unclear strategies and incomplete information for decision-making processes, so whatever the lack of activity, there were more levels of cooperation among the members of the value chain (VC). The study recommended more application of the ABC in different corporations, as proved its effect on pricing decisions, cost reduction and competitive capacity of corporations in different markets. DOI: There is currently no reflight. Copyright (c) 2018 Accounting and Financial Research Denity and Financial ResearchISSN 1927-5986 (Printing) ISSN 1927-5994 (Online) Email: afr@sciedupress.comCopyright © Sciedu PressTo ensure you can receive messages from us, add the 'Sciedupress.com' domain to your 'safe list' email. If you don't receive emails in your 'inbox', check your 'bulk mail' or 'junk mail' folders. In the classroom, activity-based costing seems like a great way to manage a company's limited resources. But many managers who tried to implement ABC in their organizations on any significant scale abandoned the attempt in the face of rising costs and employee irritation. They should try again, because the new approach we set out on the following pages removes the difficulties traditionally associated with the implementation of ABC on a large scale, relying on informed management estimates and not on employee surveys. It also provides managers with a much more flexible cost model to capture the complexity of their operations. ABC hampered The roots of the problem with ABC are in the way people traditionally build ABC models. Suppose you are analyzing a customer service department that performs three activities: processing orders, handling queries, and performing credit checks. The department's total expenditure (the cost of personnel, management, IT, telecommunications and other reach US$ 560,000. The actual quarterly amounts (or estimated) of work in the three activities are 49,000 orders, 1,400 1,400 and 2,500 credit checks. To build a traditional ABC model for this department, you would survey employees to estimate the percentage of time they spend (or expect to spend) on the three activities, and then assign the department's resource expenses according to the average percentages you receive from the survey. Let's say employees report spending (or expect to spend) about 70% of their time on customer orders, 10% on queries or complaints, and 20% on credit checks. This implies, according to ABC, that each order consumes $8 of resource expenses, each $40 consultation, and each $44.80 credit check, as shown in the making ABC the Traditional Way exhibit. Armed with these values, known as cost-driver rates, managers can assign the costs of department resources to customers and products that use their services. Doing abc the traditional way this approach works well in the limited environment in which it was initially applied, typically a single department, plant or location. Difficulties arise, however, when you try to deploy this large-scale approach for continued use. In a brokerage operation of a large bank, abc's data collection process required 70,000 employees at more than 100 facilities to submit monthly reports of their time allocation. The company employed 14 people full-time just to manage data collection, processing and reporting. The demands of time and cost to create and maintain an ABC model on this scale is a major barrier to widespread adoption in most companies. Since the systems that are put into practice are updated infrequently (due to reinterview and re-overwriting costs), estimates of the process, product, and customer cost model soon become inaccurate. In addition, people waste their time arguing about the accuracy of cost-driver rates that are derived from individuals' subjective beliefs rather than addressing the shortcomings that the model reveals: inefficient processes, unprofitable products and customers, and overcapacity. ABC's traditional models also often fail to capture the complexity of actual operations. Consider the activity sending the order to the customer. Instead of assuming a constant cost per order shipped, a company may want to recognize cost differences when an order is shipped in a full truck, on a load load smaller than truck (LTL), using night express, or by a commercial carrier. In addition, the order can be entered in the system manually or electronically, and can be a standard or fast transaction. In order to allow for a significant variation in the resources required by the different transport arrangements, new activities should be to the model, thus expanding its complexity. As the activity dictionary expands—whether to reflect more details about activities or expand the scope of the model for the entire enterprise—the computer programs used to store and process data scale. Suppose a company has 150 activities in its ABC enterprise model, apply the costs in these activities to about 600,000 cost objects (products and customers), and run the model monthly for two years. This would require estimates of data, calculations, and storage of more than 2 billion items. Such expansion has caused ABC systems to exceed the ability of generic spreadsheet tools such as Microsoft Excel, and even many ABC software packages. Systems can take days to process data for a month. For example, ABC's automated model for Hendee Enterprises, a $12 million awning manufacturer, took three days to calculate the costs of its 40 departments, 150 activities, 10,000 orders, and 45,000 line items. These problems have become obvious to most ABC implementers. But a subtle and more serious problem arises from the interview and research process itself. When people estimate how much time they spend on a list of activities delivered to them, they invariably report percentages totaling 100. Few individuals report that a significant percentage of their time is idle or not. Therefore, cost-driver rates are calculated assuming that resources are working at full capacity. But as we all know, operations generally work considerably less than their capacity. This means that estimated cost-driver rates are generally very high. (Technically, they will be overestimated by the reciprocal percentage of capacity utilization percentage: With 80% utilization, rates are 25% very high; at 67% utilization, rates are 50% very high.) The New ABC The solution to the problems with abc is not to abandon the concept. ABC, after all, has helped many companies identify important opportunities to increase costs and profits by resetting relationships with unprofitable customers, process improvements on the shop floor, lower cost product designs, and streamlined product variety. Its potential on a larger scale represents a great opportunity for businesses. Fortunately, simplification is now possible through a time-driven APPROACH that we successfully help more than 100 client companies implement, including those described in this article. In the revised approach, managers directly estimate the resource demands imposed by each transaction, product, or customer, rather than assigning resource costs first to activities and then to products or customers. For each resource group, estimates of only two parameters are required: the cost per time of the resource capacity supply unit and the unit resource capacity consumption times products, services and customers. At the same time, the new approach provides more accurate cost-driver rates, allowing unit times to be estimated even for complex and specialized transactions. In the revised approach, managers directly directly the resource demands imposed by each transaction, product, or customer. Estimating the cost per unit capacity time. Instead of researching employees on how they spend their time, managers first directly estimate the practical capacity of the resources provided as a percentage of theoretical capacity. There are several ways to do this. As a general rule, you can simply assume that the full practical capacity is 80% to 85% of the full theoretical capacity. Therefore, if an employee or machine is available to work 40 hours a week, its practical capacity is 32 to 35 hours per week. Typically, managers meet a lower rate —say 80%— to people, allowing 20% of their time for breaks, arrival and departure, communication, and training. For machines, managers can differentiate 15% between theoretical and practical capacity to allow downtime due to maintenance, repair and scheduling fluctuations. A more systematic approach, perhaps, is to review past activity levels and identify the month with the highest number of requests handled without excessive delays, poor quality, overtime or stressed employees. Any approach you prefer, it is important not to be overly sensitive to small errors. The goal is to be roughly right, say within 5% to 10% of the actual number, rather than accurate. If the practical capacity estimation is grossly wrong, the time-driven ABC system execution process will reveal the error over time. Going back to our example, let's assume that customer service employs 28 representatives to do frontline work and that each puts in eight hours a day. In theory, therefore, each worker provides about 10,560 minutes per month or 31,680 minutes per quarter. The practical capacity at about 80% of the theoretical is therefore about 25,000 minutes per quarter per employee, or 700,000 minutes in total. Since we already know the cost of delivery capacity —the $560,000 in overhead costs—we can now calculate the cost per minute of delivery capacity ($0.80). The capacity of most resources is measured in terms of time availability, but abc's new approach can also recognize features whose capacity is measured in other units. For example, the capacity of a warehouse or vehicle would be measured by the space provided, while memory storage would be measured by megabytes provided. In these situations, the manager would calculate the cost of the resource per unit based on the appropriate capacity measure, such as cost per cubic meter or cost per megabyte. Estimating the unit times of the activities. Having calculated the time cost of the resource supply unit for business activities, managers then determine the time to perform one unit of each type of activity. These numbers can be obtained through interviews with employees or by direct observation. There is no need to conduct research, although in organizations, researching employees can help. It is important to note, however, that the question is not about the percentage of time an employee spends doing an activity (say, processing orders), but how long it takes to complete a unit of that activity (the time it takes to process an order). Again, accuracy is not critical; rough accuracy is sufficient. In the case of our example, let's assume that managers determine that it takes 8 minutes to process an order, 44 minutes to handle a query, and 50 minutes to perform a credit check. Deriving cost-driver rates. Cost-driver rates can now be calculated by multiplying the two input variables we just estimated. For our customer service department, we get cost-driver fees of $6.40 (8 multiplied by $0.80) for customer order processing, $35.20 (44 for $0.80) for query handling, and $40 ($50 for $0.80) for performing credit checks. Once you have calculated these standard rates, you can apply them in real time to assign costs to individual customers as transactions occur. Standard cost rates can also be used in discussions with customers about new business prices. Note that these rates are lower than those estimated using traditional ABC methods (see again the Exposure Making ABC the Traditional Way). The reason for this difference becomes obvious when we recalculate the quarterly cost of performing customer service activities. In the exposure The Impact of Practical Capacity, abc's time-driven analysis reveals that only 83% of the practical capacity (578,600 out of 700,000 minutes) of the resources provided during the quarter were used for productive work and therefore only about 83% of the total expenditure of US$ 560,000 was allocated to customers or products during this period. This takes care of the technical disadvantage of the traditional ABC systems we mentioned earlier—the fact that the employees surveyed respond as if their practical ability was always fully utilized. The Impact of Practical Capacity In the case of our customer service department, the traditional ABC survey produced a work distribution of 70%, 10% and 20% of the time of employees performing the three activities of the department. But while this distribution reflected how workers spent their productive time, the fact that their total productive time was significantly shorter than their 32-hour-a-week practical capacity was completely ignored. Calculating resource costs per unit of time forces the company to incorporate estimates of the practical capabilities of its resources, allowing ABC cost drivers to provide more signals the cost and underlying efficiency of their processes. Analysis and cost reports. Time-oriented ABC allows managers to report their costs on an ongoing basis, in order to reveal both the costs of a company's activities and as time spent with them. In the example of our customer service department, a time-driven ABC report would look like the ABC exhibit, the Time-Oriented Path. ABC, the Time-Driven Way Note that the report highlights the difference between the supplied capacity (quantity and cost) and the capacity used. Managers may review the cost of non-utilization capacity and consider actions to determine whether and how to reduce the costs of providing undiluted resources in subsequent periods; they can then monitor these actions over time. In some cases, the information may save companies that are considering expanding from making unnecessary new investments in capacity. For example, the vice president of operations at Lewis-Goetz, a Pittsburgh-based hose and belt manufacturer, saw from his ABC model that one of its factories was operating at only 27% capacity. Instead of trying to reduce the size of the plant, he decided to maintain the capacity of a large contract he hoped to win later that year, for which he would have created a new capacity. Updating the model. Managers can easily update their time-driven ABC models to reflect changes in operating conditions. To add more activities to a department, they don't have to reinterview staff; they can simply estimate the unit time required for each new activity. Managers can also easily update cost-driver rates. Two factors can cause these rates to change. First, changes in the prices of the resources provided affect the time-per-time cost of the supply unit. For example, if employees receive an 8% increase in compensation, the resource cost rate, in our example, increases from $0.80 per minute to $0.864 per minute. If new machines are replaced or added to a process, the resource cost rate is modified to reflect the change in operating expenses associated with the introduction of the new equipment. The second factor that can cause a change in the activity's cost-driver rate is a change in activity efficiency. Quality programs, continuous improvement efforts, reengineering, or introduction of new technologies can allow the same activity to be done in less time or with fewer resources. When permanent and sustainable improvements were made to a process, the ABC analyst recalculates unit time estimates (and therefore resource demands) to reflect process improvements. For example, if the customer service department receives a new database system, reps can perform a standard credit check in 20 minutes instead of 50 minutes. To accommodate the improvement, simply change the estimate of 20 minutes, and the new cost-driver fee automatically becomes $16 per credit check (below $40). Of course you have to add back the cost impact of buying the new database system by updating the unit's time-by-time cost estimate so that the final value can be more than $16. When you update the EVENT-based ABC model and not the calendar (once a quarter or annually), you have a much more accurate reflection of current conditions. Whenever analysts learn about a significant change in the costs of the resources provided or the practical capacity of these resources, or about a change in the resources needed to accomplish the activity, they update the cost of resources per unit of time, or resource cost rate, he estimates. And whenever they learn of a significant and permanent change in the efficiency with which an activity is performed, they update the unit's time estimate. Time equations to capture complexity So far, we have an important simplifying assumption that all orders or transactions of a given type are the same and require the same time to process. But time-driven ABC does not require this simplification. It can accommodate the complexity of real-world operations by incorporating time equations, a new feature that allows the model to reflect how order and activity characteristics cause processing times to vary. Time equations greatly simplify the estimation process and produce a much more accurate cost model than would be possible using traditional ABC techniques. The key view is that while transactions can easily get complicated, managers can often identify what makes them complicated. Variables that affect most of these activities can often be accurately specified and are typically already recorded in a company's information systems. To give an example, let's assume that a manager is looking at the process of packing a chemical for shipment. In this situation, the complexity stems from the potential need for special packaging and additional air demands as opposed to land transport. Let's say that if the chemical is already packaged to meet the standard requirements, it should take 0.5 minutes to prepare it for

shipment. If the item requires a new package, however, the manager estimates, either by experience or by making multiple observations, that it will take an additional 6.5 minutes to provide the new packaging. And if the item is shipped by air, he or she knows (or can quickly determine) that it will take about 2 minutes to place the package in an air-worthy container. This information allows the manager to estimate the time required for the packaging process: Packaging time = 0.5 + 6.5 [if special packaging is required] + 2.0 [if sent by air] Many ERP systems of many companies already store data in order, packaging, distribution method and other characteristics. This specific order and transaction data allows specific time demands to be order is quickly determined using a calculation like the one above. Thanks to this extension, abc's time-driven approach can capture the complexities of business much more than the traditional ABC system could, which might well have had to explain the different transaction times, treating each variant of the process as a distinct activity. Consider hunter corporation (not its real name), a large multinational distributor of scientific products, whose 27 facilities process more than one million orders per month to distribute up to 300,000 SKUs of different products to 25,000 customers. Its old ABC model required employees in its internal sales department (sellers who handle phone and Internet orders rather than dealing with customers in person) to estimate each month the percentage of their time they spend on three activities: customer setup, order entry, and order dispatch. With the time-driven approach, Hunter ABC's team of analysts was able to group the three activities into a single departmental process, called sales order entry. The team learned that it took about 5 minutes to enter the basic order information, plus 3 minutes for each item on the line, and another 10 minutes if the order had to be accelerated. If the customer were new, another 15 minutes would be required to configure the client on the company's computer system. Following the approach described above, the previous three-activity model was replaced by a single-time equation: Inside Sales Order Entry Process Volume = 5 + (3 × number of line items) + 15 [if new customer] + 10 [if accelerated order] This was simple to implement, since Hunter's ERP system has already tracked the number of line items for each order and included fields that identified whether it was a race order and whether the customer was a race order New. The model multiplied the estimated time of the sales process by departmental cost per minute to reach the processing cost of each order. Hunter could now get a more accurate and nuanced estimate of his costs in the unit, while simultaneously reducing the complexity of the data collection and analysis process. Hunter has since launched ABC on all of its operations. The results were dramatic: Hunter reduced the number of items tracked from 1,200 activities to 200 department processes. Managers can add complexity to the model by simply adding new elements to time equations, which puts less pressure on Hunter's accounting system than incorporating new activities. Cost estimates are now based on actual order characteristics and direct observations of processing times, not subjective estimates of where and how people spend their time. The new model is easier to validate. Hunter can reconcile the total process time—that is, the absolute total time spent on all tracked activities in a period — to other measures of resources provided, such as head counting. If the total process time is less than the time implied by the head count, for example, managers know that of their unit time estimates are too low or that people are not working for capacity. This validation is difficult with traditional ABC, which is based on estimated proportions of time spent and rarely incorporates idle or non-idle capacity time. Hunter's time-oriented ABC model requires only two people working two days a month to load, calculate, validate, and report the results, compared to the team of ten people and three weeks needed to maintain the previous model. Employees now spend time generating profits from the information instead of just updating and maintaining it. The type of deployment Hunter has performed is not difficult to achieve. Time-oriented ABC models can be easily applied and customized for other plants and companies within an industry because the processes they use are similar. Dave Deinzer, CEO of Denman & Davis and president of the North American Steel Alliance, commented: For the most part, we're all pretty much the same... cutting, sawing and finishing metal with the same equipment and procedures. You could probably apply the same time-driven ABC model to all of us. The chief information officer of another steel distributor, tW Metals, noted: We were able to launch our time-oriented ABC model for all 36 of our facilities in three months. ABC's time-driven ability to identify and report complex processes in a simple way also provides a powerful trading tool when it comes to dealing with clients. Wilson-Mohr, an industrial control company in Houston, worked as a subcontractor for engineering contractors (CEs) in building custom process control systems for refineries and chemical plants. Its time model revealed, for the first time, the high cost of engineering change orders issued by CES to replace parts or reconfigure the design. In the past, Wilson-Mohr charged an EC only for the planned material cost changes resulting from the change orders. Now, it can also clearly define the additional cost of sales, design, engineering, and manufacturing working time consumed when implementing change orders, which makes it easier to recover those costs by retrieving prices. (For a detailed example of how time-driven ABC helps companies manage customers, see the Strategic Change sidebar at Kemps LLC.) Kemps, based in Minneapolis, is a full-line dairy that produces milk, yogurt, sour cream, cottage cheese and ice cream products. Its customers are retailers and distributors as large as SuperValu and Target and as small as convenience stores. Kemps markets its products under its own portfolio of together with products sold through private brand contracts and copacking. Like most dairy products, Kemps was experiencing consolidation in his customer base. Decided to change from its old customer relationship strategy — willing to do what the customer customer a lower total cost strategy. The new approach clearly required an accurate understanding of the cost per product and customer that Jim Green, Kemp's CEO, would use to instill a low-cost total culture across the organization. As a critical component of the cost-and-take model, Kemps implemented a time-driven ABC system so that it could track the costs of exchanges in the production and packaging of all its products and the costs of harvesting, loading and delivering products to its diverse customer base. The model captured differences in how the company inserted customer orders (customer call, seller call, fax, trucker entry, EDI or Internet), how it packed orders (full stacks of six boxes, individual cases or partial break-pack boxes for small orders), how it delivered orders (commercial carriers or its own fleet, including route miles), and time spent by the driver at each customer location. The extra time for exchanges to clean allergens (such as nuts, eggs, soy or wheat) used in certain ice cream products can now be accurately attributed to these products. The model also captured the extra packaging costs for special promotions and customer-specific labels and promotions. The company soon learned that it was losing money with one of its customers, a network of high-end specialty stores, because of the low volume and high variety of products ordered and the small just-in-time deliveries that the network requested. Kemp's vice president of sales called the customer, explained the situation, and offered three options: accept a price increase and a minimum order size; eliminate your privatelabel ice cream, replacing it with the standard Kemp brand product that was already being produced in efficient and high volumes; or find another ice cream supplier. When the customer asked why Kemps was making the change, the vice president replied that after 25 years, Kemps only now understood its true manufacturing costs and the impact of specialized production on its margins. The customer accepted a 13% price increase, agreed to the elimination of two low-volume products and agreed to accept full, non-partial truck cargo orders, thereby eliminating internal storage fees for Kemps. The changes produced immediate benefits of $150,000 a year, turning this unprofitable customer into a profitable customer. Kemps also used its time-driven ABC model proactively to become the leading dairy supplier to a national customer. Kemps demonstrated that he could identify the specific costs of manufacturing, distribution and handling of orders associated with this customer's service based on the actual characteristics of the order: DSD (direct store delivery) or for distribution centers, gallon versus liter deliveries and volume and product mix. The time-driven ABC model facilitated an open and reliable relationship between supplier and customer who Kemps from his competitors. Kemps also became aware that some of its smaller convenience store customers were overordering and returning the product when the date code expired. To avoid the high cost of these discounts and returns, Kemps offered these retailers a 2% discount if they managed their own inventories without the return option. In this way, Kemps eliminated 95% of returns out of code, generating a net savings of $120,000 per year. The Bottom Line Over the past seven years, we and our colleagues at Acorn Systems have successfully helped more than 100 customers introduce time-driven ABC into their processes. Most reported substantial improvements in profitability that they attribute to the information generated by the new approach. Take the case of Banta Foods, a Midwest food distributor with revenues of $155 million from 17,000 SKUs and 5,000 customers. It operated with a net margin of about 1%. Historically, its profit drivers were increasing the number of orders placed per day, increasing aggregate revenues and controlling aggregate expenses. The ABC system, driven by Banta's weather, which was fully implemented within 16 weeks, revealed much more granularity in its expense structure, tying costs to products, orders, customers and territories. Managers learned that a $1,000 order, previously considered the smallest size to break, could be quite cost-effective or a loss depending on the distance to the customer, the location of the product in the warehouse, order size, delivery frequency, type of service, and customer credit rating—all of which were incorporated into algorithms into their new time-driven ABC system. Based on data from its ABC model, Banta instituted a minimum non-profit order size, reduced the inventory of unprofitable products, promoted sales of high-profit products, negotiated with customers both to reduce demand for high-cost services and to re-price them, and offered incentives to its sellers to increase its customers' net income. It was also renegotiated with suppliers to recover the cost of processing customer discounts. The general sales manager used the information to transform their sales representatives from order buyers to consultants, helping them create more profitable customers and territories for Banta. He reports: Sellers can now increase their gross profits by not simply adding points to their margin, but knowing which items to sell. By accurately designing the costs and profits of the proposed businesses, Banta was able to take on new businesses that increased revenues by 35% and generated immediate improvements in profits of 43%, with another 25% still to come from future opportunities. the profitable decisions exhibition at Banta Foods.) His performance led to the distinction of being appointed of the Year by the industry magazine, Institutional Distributor. Profitable decisions at Banta Foods Over the past 15 years, activity-based costing has allowed managers to see that not all revenue is a good revenue and not all customers are profitable customers. Unfortunately, the difficulties in implementing and maintaining traditional ABC systems prevented them from being adopted on any significant scale. ABC has overcome these difficulties by offering a transparent and scalable methodology that is easy to implement and update. It relies on existing databases to incorporate specific capabilities for specific orders, processes, vendors, and specific customers. Activity-based costing is no longer a complex and expensive implementation of financial systems; time-driven ABC innovation provides managers with meaningful information on costs and profitability quickly and inexpensively. A version of this article appeared in the November 2004 issue of the Harvard Business Review. Review.