

ACTIVITY BASED COSTING AND ACTIVITY BASED MANAGEMENT

The Same Thing in a Different Guise?

By Yoram Eden and Boaz Ronen

Introduction

Managerial accounting has undergone a veritable renaissance since the mid-1980s, particularly thanks to the pioneering work of Professor Robert Kaplan and his colleagues (Kaplan, 1984). The high point of this process of innovation was the presentation by Kaplan and Cooper of the Activity Based Costing method (hereafter, ABC) in the late 1980s.

The ABC method won immediate acclaim in industrial as well as service organizations, and the professional literature followed with dozens of reports of its successful implementation. The many books that appeared described the method and its underlying principles, as well as the benefit of applying it in various sectors of the economy. Notable among the more recent publications are Judith Baker's 1998 book describing the implementation of the method in the healthcare system, and Raili M. Pollanen's 1996 book on Activity Based Management (ABM). In the course of these developments, the method has been upgraded from a costing method designed to improve costing of organization's operational activities. ABC appeared to be the right answer to the problem of the obsolescence of traditional costing the distinct advantages reported by those using the method are the following:

1. ABC costing creates reliable data that managers at all levels of the organization are prepared to use for decision making and performance evaluation.
2. ABC transfer prices can be instituted in a decentralized organization. Kaplan, Weiss and Deshe (1997) reported a successful implementation of ABC transfer prices at the Teva pharmaceutical firm in Israel that led to a dramatic diminishing of the disputes between the managers of the marketing and the production departments once they recognized and accepted the logic of working on the basis of ABC transfer prices.
3. ABC reveals the cost of complexity arising from the range of products and variations in the structure and composition of operating costs. In many organizations the indirect costs constitute the major part of the operating costs and ABC is designed to address not only the better allocation of these costs but also, and more importantly, to lead to a better understanding of the factors creating them (the cost drivers). In this sense ABC appears to be a necessary condition for effective management.
4. Furthermore, traditional costing does not address the problem of non-production costs such as those associated with marketing and distribution. This is so because according to accepted accounting principles they are not part of the product cost. ABC and ABM deal with these costs too.¹
5. ABC and ABM (hereafter, ABC/M) are relevant not only to industrial enterprises but also to a broad range of service organizations. Thus reports have been made of ABC implementations in, for example, the banking system (Sephton and Ward, 1990), a telecommunications firm (Hobdy, Thomson, and Sharman, 1994), healthcare systems (Baker, 1998) and public government organizations (Kline, 2000).

The ABC/M approach has the backing of most of the leading Israeli consulting firms, including those with affiliations to the Big 5 accounting firms. These firms have developed software programs that are specially designed to interface and integrate with the organization's information systems and facilitate the ABC/M implementation (Innes, 1999). However, despite the broad-based acceptance of the ABC/M method in the professional literature and the support it is receiving from the leading consulting firms, its success has been limited in the extreme. Surveys conducted in the USA, the UK and Australia show that less than 15% of firms apply the ABC/M method. Research shows that the majority of the firms that did apply the method subsequently abandoned it; the figures show that only 10% of the US firms continue to use it (Smith, 2000; Kennedy and Bull, 2000).

What happened in fact was that firms started out by implementing the ABC/M method only partially and experimentally, as a sort of pilot study, sometimes even at a separate production facility. The firms reported that the experiment had been a success, but did not apply the method to the entire organization, and in the end abandoned it altogether.

Based on a comprehensive survey of more than 200 articles on the subject of ABC/M (some of which are referenced here) and on their personal experience in installing decision-support systems in dozens of firms in Israel and abroad, the authors believe that failure in applying the ABC/M method can be attributed to a cognitive dissonance prevailing among the firm's managers. Finding that their

main decision support tool, the costing system, was creating unreliable data, they found themselves agreeing with the criticism of the traditional costing system voiced by Johnson and Kaplan (1987) and Goldratt (1986, 1990). However, in the absence of a reasonable alternative approved by the

financial accounting system to replace the failed traditional costing system, they could do little to relieve their frustration and cognitive dissonance.

This was fertile ground for the new ABC/M discipline. Suddenly the manager found himself able to explain to himself, to his board of directors and to his subordinates that he was doing something to remedy the situation. He was running a pilot implementation of a new approach that had been recognized in academic circles and had received positive feedback from the professional community.

The ERP (Enterprise Resource Planning) information systems seem to be the new contender posing a threat to the ABC/M method. However, we believe that the reason for abandoning the ABC/M method is its structural problems rather than a preference for the ERP approach, particularly since there is no necessary contradiction between the two methods (Shaw, 1998).

The purpose of the discussion in this paper is therefore to give a critical presentation and demonstration of the principles of the ABC/M method. We will try to understand not only the aim of the method and its advantages, but also the limitations that led to its being abandoned by most of the firms that implemented it.

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Table 1: Activity Pools and Cost Drivers

No.	Activity Pools	Cost Drivers	% of Total Cost
1	Senior management salaries; Marketing and sales promotion; Consulting and legal expenses	Number of product lines	28%
2	Accounting Sales force	Number of rows in the dispatch document	31%
3	Warehouse rent; warehouse employees' salaries (partial); Costs of vehicles and transportation to customers	Physical volume sold	32%
4	Warehouse salaries (supplementary)	Physical volume of inventory	6%
5	Financing expenses	Cost of inventory	3%

Principles of the ABC/M Method

Stages of Implementation

The first lesson of the ABC/M method is that costs cannot be managed but activities can, activities being the exploitation of time and resources for the purpose of producing throughput. This means that there is a principal difference in the point of departure of the traditional costing system and the ABM/C system. The point of departure of the traditional costing system is the cost, the emphasis in this system being the collection and "appropriate" classification of the costs and their allocation to products in a simple and straightforward manner. By contrast, the point of departure of the ABC/M system is the product and the business process involved in its production and marketing.

The ABC implementation consists of four main stages:

Managerial stages

1. Identification and mapping of the activities. Every organization has hundreds of thousands of activities, in the logistics array, in the managerial accounting array and in the production and development processes.

2. Definition of the cost drivers, that is, the variables that explain the costs. For example the number of suppliers and the number of orders can explain the costs of the purchasing department; the range of products, the SKUs (stock keeping units), and the number of points of sale and distribution can be the cost drivers of the distribution system. In the first stage, the dozens of cost drivers initially listed has to be reduced. The implementing firms have an average of about 10 costs drivers.

Accounting stages

3. Accumulating costs into activity pools with a common denominator.
4. Allocating costs from the activity pools to the products on the basis of resource consumption (activities).

The first two stages, identifying activities and defining cost drivers, are critical to the success of an implementation. They should be analyzed at the senior management level, rather than at the financial accounting level, since the analysis necessitates a broad view of the organization's business processes, and the benefits it can produce extend well beyond improvement in the cost reporting system.

	A	B	C	D
Direct cost (raw materials and subcontractors)	\$110	\$110	\$330	\$330
Volume of throughput	Low	High	Low	High
Volume of throughput in units per month	10	100	10	100
Direct work and machine hours	5	50	15	150
Number of production lots to be manufactured	1	3	1	3
Market selling price	\$175	\$135	\$500	\$400

	A	B	C	D
Direct cost in \$	<u>110</u>	<u>110</u>	<u>330</u>	<u>330</u>
Direct hours	0.50	0.50	1.50	1.50
Loading standard per hour	<u>45.11</u>	<u>45.11</u>	<u>45.11</u>	<u>45.11</u>
Indirect cost	<u>22.56</u>	<u>22.56</u>	<u>67.67</u>	<u>67.67</u>
Total cost per unit	132.56	132.56	397.67	397.67
Selling price	<u>175.00</u>	<u>135.00</u>	<u>500.00</u>	<u>400.00</u>
Gross profit in \$	42.44	2.44	102.32	2.33
% gross profit	24.55	1.81	20.46	0.58

	A	B	C	D	Total
Sales (\$)	1,750	13,500	5,000	40,000	60,250
Cost of sales	<u>1,326</u>	<u>13,256</u>	<u>3,977</u>	<u>39,767</u>	<u>58,326</u>
Gross profit	424	244	1,023	233	1,924
Contribution to turnover	2.90%	22.41%	8.30%	66.39%	100.00%
Contribution to profit	22.07%	12.68%	53.19%	12.06%	100.00%

Activity Based Costing and Activity Based Management

Table 5: Definition of the Activity Pools and Cost Drivers

Activity Pool	Activity	Cost in \$
The departmental level	Machine maintenance	3,300
	Direct manpower management	2,220
	Raw materials management	264
Total		<u>5,764</u>
The lot level	Set-up costs	960
	Planning and allocating materials	1,200
Total		<u>2,160</u>
The product level	Writing specifications	1,000
	Licensing	300
	Product service and support	700
Total		2,000
Total indirect costs		9,924

Table 6: Loading of Indirect Costs by the ABC Method

	Product A	Product B	Product C	Product D
At the departmental level				
Direct work hours (dwh) per month	5	50	15	150
Rate (1)	<u>\$26.20/dwh</u>	<u>\$26.20/dwh</u>	<u>\$26.20/dwh</u>	<u>\$26.20/dwh</u>
Loading	\$131	\$1,310	\$393	\$3,930
At the lot level				
Number of set-ups	1	3	1	3
Rate (2)	<u>\$270</u>	<u>\$270</u>	<u>\$270</u>	<u>\$270</u>
Loading	270	810	270	810
At the product level				
Rate (3)	500	500	500	500
Total indirect costs	901	100	15	150
Number of units	10	100	15	150
Indirect costs per unit	90.1	26.20	116.3	52.40

Often with the aid of external consultants, many organizations set up an implementation team of five or six senior employees that occupies itself in the first stage with mapping the organization and defining cost drivers, and in the second stage with constructing the costing system. Experience shows that setting up an ABC system, even with an off-the-shelf software application, can take several months.

Table 1 summarizes the cost pools and activity cost drivers determined during the ABC implementation at a large import, marketing and distribution firm in Israel. The implementation team, with the help of an external consultant, defined five activity pools.

The preliminary analysis showed that it is the number of product categories that in fact dictates the level of the advertising and senior management salaries costs. The cost of the customer orders system (at both the accounting level and the operations level) is determined primarily by the number of items in each order (this data item is expressed in the number of rows in the dispatch certificate). The cost of warehousing and transportation to customers is determined mainly by the volume sold.

The implementation elicited two immediate operative conclusions:

1. The analysis helped the firm's management to determine quantitative criteria (in terms of sales turnover and Gross profit) to justify making and developing categories of new products.
2. The analysis indicted an apparent non-feasibility of continuing sales to dozens of customers in the private retail market.

Structuring expenses hierarchically

Mapping the costs and defining the cost drivers enable us to classify the indirect costs

hierarchically. The classification is determined by the cost drivers.

1. Indirect costs defined at the departmental level (pure variable indirect costs): auxiliary materials, fuel and energy.
2. Indirect costs defined at the lot level: set-up, allocating materials and preparing production kits, quality control (if it is conducted at the end of production of each lot).
3. Indirect costs defined at the product level: preparing a technical specification, licensing, product service and support.
4. Indirect costs defined at the production process level: mainly engineering and planning costs.
5. Indirect costs defined at the firm level (overheads). As these cost drivers are not related to production there is no economic justification for allocating them to the products.

A numerical example of a firm manufacturing four products will serve to examine the significance of the hierarchical cost structure.² The relevant data on product **A**, **B**, **C**, and **D** are presented in Table 2.

The indirect production costs not *yet allocated* to the products amount to \$9,924 per month.

It should be noted that Products A and B are the cheaper ones and their direct production costs are one-third of the direct production costs of Products C and D. Products B and D are produced in large quantities — 10 times the volumes of Products A and C.

The traditional approach is to allocate the indirect costs to products according to volume produced: direct work hours (or machine hours). For the sake of simplicity, in our example we assume that the number of direct work hours per month ($150+15+50+5=220$) is equivalent to the number of machine hours.

	Product A	Product B	Product C	Product D
Direct cost (\$)	110.0	110.0	330.0	330.0
Indirect cost (\$)	<u>90.1</u>	<u>26.2</u>	<u>116.3</u>	<u>52.4</u>
Total cost (\$)	200.1	136.2	446.3	382.4
Selling price	<u>175.0</u>	<u>135.0</u>	<u>500.0</u>	<u>400.0</u>
Profit (loss) per unit (\$)	(25.1)	(1.20)	53.7	17.60

	Product A	Product B	Product C	Product D	Total
Sales (\$)	1,750	13,500	5,000	40,000	60,250
Cost of sales	2,002	13,620	4,464	38,240	58,326
Gross profit (loss)	(252)	(120)	536	1,760	1,924
Contribution to turnover	2.90%	22.41%	8.30%	66.39%	100.00%
Contribution to profit	(13.10%)	(6.24%)	27.85%	91.5%	100.00%

Product	Product Characteristics		Traditional Costing		ABC Costing	
			Per unit cost	Total profit (loss)	Per unit cost	Total profit (loss)
A	Low	Low	132.56	42.44	200.10	(25.10)
B	Low	High	132.56	2.44	136.20	(1.20)
C	High	Low	397.67	102.32	446.30	53.70
D	High	High	397.67	2.32	382.40	17.60

Thus, allocation on the basis of direct work hours and allocation on the basis of machine hours will give the same results. If we divide the total indirect costs per month by the number of work hours we obtain a loading rate of \$45.11 per direct work hour ($9,924/220=44.11$).

The next stage is to load the indirect costs onto each of the products according to a predetermined loading standard, to obtain the cost and profit per unit data, as shown in Table 3.

The data in Table 3 show that the firm's two profitable products are A and C, whereas the total profit margins from manufacturing Products B and D are very low. However, as shown in Table 4, Products A and B constitute only 11% of the firm's total sales volume. Sales of Product D alone account for two-thirds of the total sales volume but contribute only 12% to the firm's profit.

The conclusion that seems to emerge is that the firm should concentrate on manufacturing the apparently more profitable Products A and C at the expense of Products B and D, which make a negligible contribution to total profit. We can also rationalize that it is difficult to profit in the competitive market for the leading products; it is precisely in the products manufactured in small volumes that the firm has a comparative advantage and higher profit margins. Are these conclusions correct or are they merely a costing/accounting illusion?

To give a more educated answer to this question we have first to analyze the activities that create the indirect costs and their cost drivers. Table 5 gives an analysis of the costs and their cost drivers according to the ABC hierarchical structure.

Next, we allocate the indirect costs from the activity pools to the products according to the following three loading bases.

	Departmental Level	Lot Level	Product Level
	(1)	(2)	(3)
Total costs in the pool	5,764	2,160	2,000
Cost driver basis	220 hours	8 lots	4 products
Allocation rate	\$26.20/direct work hour*	\$270/lot	\$500/product

Table 6 details the loading calculation for each of the products according to the loading rates given above.

We now repeat the calculation of the gross profit and total profit from the sales of each of the products.

As shown in Figure 8, in the case under discussion applying the ABC method leads to results that are entirely different to those obtained under the traditional costing analysis.

Product A is the focus of losses to the firm, and Product D, which under traditional costing obtained such a poor forecast, is found to contribute some 90% to the firm's total profit. Table 9 gives a comparative summary of the example, demonstrating the differences between traditional costing and ABC costing.

The results are impressive, particularly the differences between the two costing methods, but they should come as no surprise to the average reader. As far back as 1892, the British economist Hopkinson pointed out that allocating indirect costs (both fixed and variable) according to a single volume variable, as though they were all variables, was likely to lead to serious distortions. Hopkinson suggested the double-tariff method of allocation (the fixed and the variable), designed to relate an expense to the factor that created it.³

The ABC method is, in our opinion, a refinement of the double-tariff method. Its main contribution is that it does away with the dichotomous classification of traditional costing into fixed costs and variable costs. By defining the hierarchical structure of the cost drivers, the ABC method suggests a good way of allocating those costs which under traditional costing are classified as *semi-variable* or *semi-fixed*.

Nevertheless, it should be noted that in our example we assumed continuity, that is, a univalent linear relationship between volume of activity and cost at all levels. The firms that actually implemented the ABC method reported "noise" caused by lack of continuity (lumpiness) in the relationship between volume of costs to cost driver.

Another problem inherent in our example is that we ignored the possible existence of joint costs and inputs. This omission technically enables a breakdown of the profit/loss statement to the product level. However, when there are joint inputs, again it is not possible to use the cost data (or the profit) obtained for each product separately and in isolation from the rest of the products. Moreover, in this example we ignored the question of the capacity and utilization of the organization's resources: we have to distinguish between a product manufactured using a resource that constitutes a bottleneck and one manufactured using resources with excess capacity.

Experience indeed shows that applying ABC leads to results that are different from those of traditional costing, sometimes even extremely different. Usually, traditional costing leads to an underestimation of the cost of products characterized by low direct costs, products manufactured in small one-time lots. At the same time, traditional costing inflates the cost of the lead products – those manufactured in large volumes and those with a relatively high direct cost, such as Product D in the example

presented above. In general, it may be claimed that the greater the complexity of manufacturing a given product the greater the degree to which traditional costing underestimates the cost to be attributed to that product. Amongst other things, the degree of manufacturing complexity reflects the number of items in the bill of materials, the technology intensity, and the number of set-ups.

The professional literature contains many reports of data similar to those contained in Table 9. Merz and Hardy (1993) reported an ABC implementation in a Hewlett-Packard (HP) enterprise, in which they compared the costs of 57 products obtained under the traditional costing method used by the enterprise with the costs of the same products obtained under the ABC method. The results appear in Table 10.

The figures in Table 10 show a significant difference of more than 20% between the two costing methods for 77% of the products.

From ABC Costing to Activity Based Management (ABM)

The ABM system is conceptualized as being based on feedback between the organization's management facets and accounting facets. First is the management stage of mapping the enterprise and analyzing the business processes. Then comes the accounting stage of collecting costs into the activity pools and allocating them to products. However, the allocation process is not to be viewed as a final objective but rather an intermediate one. Next, another managerial stage has to be carried out: management has to analyze the results obtained, to identify the enterprise's weak points, with the aim of improving processes and reducing costs.

Difference	Number of Products
Under traditional costing (in comparison to ABC)	
More than 100%	1
50%-100%	5
20%-50%	6
5%-20%	23
Under ABC costing (in comparison to traditional costing)	
5%-20%	9
A relatively small difference (less than 5% in each direction)	13
Total	57
*Source: C.M. Merz and A. Hardy, "ABC Puts Accountants on Design Team at HP," <i>Management Accounting</i> , September 1993, pp. 22-27.	

In our numerical example the cost of each set-up is \$270. We cannot assume that it is enough to simply load this cost appropriately on all the products. The managers have to consider the question of why the set-up cost is so high. Perhaps it is possible to introduce improvements to the production processes that will substantially reduce this cost.

The ABM system demonstrates the need for focusing and the ability to increase profits not by increasing the volume activity but rather by reducing it. This is true for both the product mix and the customer mix. Giving up on customers and products with a low financial activity volume can lead to a substantial diminishing of indirect costs. The saving thus achieved is likely to be very much greater than the loss of revenues resulting from this focusing process.

Critical Evaluation

The same thing in a different guise?

The accounting/costing treatment of indirect costs is based on the two-stage allocation principle. In the first stage, the costs of the service departments are totaled and allocated from the service departments to the production departments. In the second stage

they are allocated from the production departments to the each of the products.

ABC costing improves the traditional two-stage allocation in the following ways.

1. Instead of totaling the costs for service departments that reflect the functional structure of the enterprise, under ABC costing the indirect costs are assigned to activity pools that reflect the main business processes and cross the boundaries of the enterprise's functional departments.
2. The activity pools also collect costs that under accepted accounting principles are classified as selling and administrative costs. Traditional accounting does not treat these costs at all, as they are not part of the cost of the product according to accepted accounting principles.
3. ABC costing gives expression to the hierarchical structure of the variable costs.

We can therefore expect that ABC costing will better express the manner in which the enterprise's resources are utilized in producing the various products. However, it must be remembered that every process of allocation involves a large measure of arbitrary discretion. The emphasis in the ABC/M

system must be on the managerial facets. The danger is that in the absence of sufficient managerial attention, the system will degenerate into one of embellished traditional absorption costing (Piper and Walley, 1991).

Strategic costing rather than decision costing

Many managers expected that investing heavily in ABC would yield data that would help them in their ongoing management decision making: decisions on sending jobs to subcontractors, decisions on the desirability of accepting certain orders. However, it turns out that ABC data cannot be used as a basis for making ongoing managerial decisions. At the end of the day, it was found that the main objective of an ABC system is to focus managerial attention on the way in which resources are utilized, rather than to provide costs relevant to decision making (Cooper, 1990).

However, when we examine the strategy level, it emerges that the policy makers do not need data at the level of detail provided by the ABC system. It is the middle managers who need a high level of detail for ongoing decision making. But then the system was never intended to provide decision-making data. It is precisely here that we find the explanation for the ABC/M system disappointing most of the firms that applied it and the reason for their abandoning it. The ABC system increases the amount of data that need to be supplied to the enterprise's information system. The people who are supposed to take care of providing the ongoing data to the system are the middle managers. However, when they realize that in any case they cannot make use of the system for their ongoing decision making, they lose all motivation to take care of providing the system with reliable data in an ongoing manner (Smith, 2000).

The ABC/M system cannot normally support the decision-making process on the central issues with which middle management has to cope: decisions on the product mix, price setting, the profitability of continuing production of a given product or of continuing

to operate a given production line. These decisions need to be made from a global perspective of all the organization's resources.

The question is whether there is any justification in investing in a complex system such as the ABC/M that needs to be maintained and updated on a daily basis, simply in order to support strategic decisions that are taken once or twice a year. Our cumulative experience in many firms indicates that in most cases when making important strategic decisions the managers had no faith in the available data of the costing systems and demanded that an additional focused material examination be carried out.

The main lessons were internalized

In our opinion, the main lessons of the ABC/M system were internalized in most of the firms, even when the ABC system was abandoned. The need to focus and the need to cut down the cost of complexity in production are well understood today to most managers, even when they do not have the backing of data from a complex costing system. It should be noted that this study shows that organizations with a bureaucratic culture are more likely to implement the ABC system but are not always open to learning the obvious managerial lessons that it has to offer. Non-bureaucratic organizations have a better grasp of the main benefits of implementing the method but they tend to abandon it more quickly.

Notes

1. For conclusions drawn from the application of ABC to the distribution system of Kraft, the international food giant, see for example Atkinson *et al.* (1997:269).
2. Based on Cooper (1990)A, Eden and Ronen (1992, 1994).
3. For a more detailed discussion of the double-tariff method of debiting, see for example Goldshmidt (1990, ch. 3).

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