



APPLICATION OF ACTIVITY BASED COSTING (ABC) ANDECONOMIC VALUE ADDED (EVA) AS AN INTEGRATED TECHNIQUE FOR PRODUCT PRICING

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Abstract

Product pricing can be made more accurate by integrating the concept of Activity based costing with Economic value added, which is a value based financial performance evaluation technique. The paper deals with various techniques of product pricing, giving primary focus to integrated ABC-EVA approach. The process begins with identification of capital cost, direct cost and overhead cost, which has been obtained from income statement and balance sheet, and proceeds with identification of the main activities and its cost drivers involved in the process of manufacturing. This information becomes the base in determining the capital charges, which rightly prices the product. The paper concludes with possible suggestions for appropriate decision making.

Keywords: *Activity based Costing (ABC), Economic Value added (EVA), Cost of capital, Rate of Return, capital charges, cost drivers.*

Introduction

The most important objective of the organization is to earn profit. Profit is the return on the amount of investment made by the organization. If the organization is not able to earn enough economic profit over a time, it is most important for the organization to allocate all the expenses whether it is direct or indirect. There are three elements of cost- material, labor and overheads. Direct expenses are those expenses which are directly related to manufacturing of product into final product or finished goods. It includes direct material cost and labor cost. Indirect expenses are those expenses which are indirectly related to manufacturing of product into final product or finished product. It includes overhead costs such as- production, marketing, research and development etc.

Now-a-days Activity based costing is the most popular technique adopted by the organization for allocation of overhead cost. Generally traditional method is adopted by the small enterprises as activity based costing involves huge cost. In traditional method of costing, a single absorption rate is determined to allocate various indirect costs. As a result, the product which has high profit margin gets adjusted with the product which has low profit margin. Hence, the profit determined is inaccurate and organization is not able to overcome the problems faced by the organization.

Activity based costing system first accumulates overhead cost for each activity of the organization and then allocate the cost of each activities whether production or services of that particular activity. The implementation of ABC has resulted in more efficient use of resources ultimately reduces the cost i.e. cost saving. Adopting ABC system not only involve cost saving but also help in determining accurate cost and origin of cost. ABC system focus on overhead cost and disregards capital cost i.e. it includes income statement of the company but ignores balance sheet of the company. By implementing ABC system many companies are able to allocate the various indirect costs accurately. As a result organizations are able to earn economic profit, ultimately fulfilling the long run objective of the organization.

Economic value added(EVA) measures company financial performance based on residual wealth, which is calculated by deducting capital cost from operating cost after adjusting taxes on the cash basis.

$$\text{EVA} = \text{Net operating profit after taxes} - \text{capital charge}$$

It helps company to identify problems and monitor to take corrective actions to resolve it. The term profit is not clear. It may be operating profit, net profit, gross profit, profit after tax etc. But EVA is economic profit and cover both operating cost and capital cost. It improves the corporate governance of the company, higher EVA implies higher bonus to the managers. It identifies the most economic project which independently monitors and executes the project.

Objectives

- To understand the ABC (Activity Based Costing) and EVA (Economic Value Added) techniques.
- To study about product pricing, using integrated ABC and EVA technique.



Literature Review

The concept of Activity based Costing has gained lot of attention in the recent times. ABC can be viewed as an “enabler” to support the development of cost-effective product designs and manufacturing processes (Adam S Maiga, 2003). Many researchers have tried to find out whether adoption of activity based system had any positive impact on the efficiency of the firm. For instance,(Christopher D Ittner, 2002) states that extensive ABC use is associated with higher quality levels and greater improvements in cycle time and quality and, is indirectly associated with manufacturing cost reduction through quality and cycle time improvement. However, ABC adoption and implementation rates are found to be very low. Most of the firms have their ABC adoption at infancy stage. Researchers suggest that tracing activities and their costs in an activity based costing will provide more useful information for decision-making than information generated by cost systems that track the costs of products and product lines, costs that are often-times replete with arbitrary allocations of joint overhead costs(Vollmers, December 1993). Many scholars refer the method of absorption costing to be an outdated method, which advocated for the adoption of Activity Based Costing. According to (Paperman, 1976), the product costs determined under absorption costing did not meet the needs of the new "scientific managers". During earlier period, direct costing was also criticized for its difficulty in differentiation of fixed costs and also for the difficulty in the breakdown of semi variable costs into fixed and variable components. The standard procedure for estimating a simple ABC model starts with identifying a collection of resources that perform a variety of activities.(Anderson, 2003). This becomes the basis for the entire cost allocation process. The process of Activity Based Costing is thus referred to be a better method of cost allocation and product pricing.

The concept of Economic Value Added has also been referred to as an important technique of evaluating financial performance. Intense studies have been done on the effectiveness of EVA. Many researchers have proved the effectiveness of the integrated concept of ABC-EVA. According to (Narczyz Roztockki, 2000) when production volume varies substantially, the Integrated ABC-and-EVA System is more effective in reducing distortions in product cost than a TCA (traditional cost accounting system) or standard ABC system.

Methodology

This article is a descriptive study. The theoretical analysis has been framed by review of various relevant articles, defining the detailed concept used in the paper for research. The company performance is evaluated using an integrated concept of EVA and ABC. The integrated concept helps the investor to analyze the minimum profit on the investment and in various decisions making related to investment. The most widely used concepts by investors to compute the amount of return on investment are-

1. Cost of capital
2. Capital asset-pricing model
3. Weighted average cost of capital
4. Current cost accounting method
5. Current purchasing power method

The cost of capital is the opportunity cost against the specific investment made by the investor considering the risk factors. The cost of capital is calculated considering both market risk and free risk. The *CoC* – which by nature represents an opportunity cost- includes both the cost of debt as well as that of equity which, even though it does not represent a monetary cost of production, must nevertheless be covered by revenue if the firm wants to create dividends and economic value for the shareholders (Kee, 1999).

Formula:

$$\text{Cost of Capital} = A * ROR$$

Where, A is amount of investment
RRR is rate of return

Capital asset pricing model gives the relationship between systematic risk and expected return of a particular asset on which investment is made. It helps in determining the time value of money which has direct relationship with expected rate of return. Risk premium is the difference between market risk and free risk, where Beta is the coefficient.

Formula:

$$\text{Cost of Capital, } r_e = r_f + \beta(r_m - r_f)$$

Where,

$(r_m - r_f)$ = the average risk
 r_f = risk free returns
 r_m = market risk

Weighted average cost of capital is computed by assigning weights to the different sources of capital, which is computed as;

$$WACC = (D/C) * i (1-t) + (E/C) * r_e$$

Where,
D is debt
C is Cost of Capital (Total of debt and equity)
E is equity
i is interest on debt
 r_e is cost of equity and
t = rate of tax

Current Cost Accounting Method

In this method, in order to remedy some of the historical costing, the historical cost of inventories and plant and machinery in both balance sheet and profit and loss account should be substituted by their current costs (Arora, 2017). For computing the current cost of inventories on a particular date, the amount the company would spend to replace the inventory on that date is the current cost amount.

Current Purchasing Power Method

This method provides for the company to prepare the financial statements on the basis of historical cost, provided, inflation accounts must be adjusted.

Apart from the above mentioned product pricing methods there are many other pricing methods. This paper focuses on Activity Based Costing and Economic Value Added.

The concept of Activity based Costing has emerged due to the deficiency faced by the companies in allocation of various overhead costs of different products using traditional methods of cost allocation. The integrated concept of ABC and EVA helps to identify two different activity costs i.e., capital charge and operating cost. The term capital charge defines the minimum amount of profit available to shareholders where as operating cost includes various costs based on the activities, which is termed as overhead costs.

Implementation and Analysis of Data

Process 1: Analysis of Financial Statement

This step aims to recognize the direct cost, capital cost and overhead cost of the company. Data has been acquired from income statement and balance sheet of the company. All the direct costs and overhead costs are estimated from the income statement whereas all the capital costs are estimated from the balance sheet of the company. Direct expenses in this income statement can be reflected in cost of goods sold, which are direct material and direct labor, that can be directly attributed to the products. Similarly, capital charges and overhead costs are also determined.

Figure 1: Income statement (amount in lakhs)

Income statement			
S. No	Account titles	Formulae	Amount
1	Net sales		5000
2	Cost of goods sold		2500
3	Gross margin	(1-2)	2500
4	Operating expenses		1500
5	Earnings before interest and taxes(EBIT)	(3-4)	1000
6	Interest expenses		200
7	Earnings before tax(EBT)	(5-6)	800
8	Income tax @40%	(7*40%)	320
9	Earnings after tax(EAT)	(7-8)	480

Figure 2: Balance sheet (amount in lakhs)

Balance sheet			
Assets	Amount	Liabilities	Amount
Current Assets		Current liabilities	
Cash	100	Accounts payable	300
Accounts receivable	120	Accrued expenses	200
Inventory	130	Short term debt	100
Sundry debtors	250		
Total current assets	600	Total current liabilities	600
Fixed assets		Long term liabilities	
Land	1500	Long term debt	1400
Building(net)	800	Total long term liabilities	1400
Equipment(net)	700	Owners equity	
Other long-term assets	400	Capital stock	
Total fixed assets	3400	Retained earnings	1600
		Total owners equity	400
			2000
		Total liabilities and owners equity	4000
Total assets	4000		

Process 2: Identification of Main Activities

The main activities that are responsible for the major resource consumption or are in charge of capital investments are identified. Being a manufacturing company, majority of its resources were consumed for activities like production management, administration, inventory management, administration, customer management and selling and distribution. These activities are identified and listed out. This process can be made more systematic by further splitting of the activities to more particular classes of activities.

Figure 3: Categories of activity and activities

Categories of activity	Activities
Production management	Materials issued to production, production schedule.
Inventory management	Inventory procurement schedule, inventory control.
Administration	Managing employees, managing business.
Selling and distribution	Display of final products, shipment of final products.
Customer management	Customers contacts, billing and collection of money.

Process 3: Determination of operating cost

Operating expenses for each activity involved in the manufacturing process are calculated. From the income statement, the total operating cost of the company was identified to be 15,00,000 which was traced and allocated to different activities , as done in a traditional activity based costing approach.

Figure 4: Statement of operating cost

Activities	Operating cost(amount in lakhs)
Materials issued in production	175
Production scheduling	120
Inventory procurement schedule	135
Inventory control	168
Managing employees	222
Managing business	75
Display of final products	95
Shipment of final products	215
Customers contact	155
Billing and collection of money	140
Total operating costs	1500

Process 4: Determination of Capital Charges Using ACD Approach

Activity Capital Dependence helps the business in determination of capital charge for each activity. It is difficult to calculate the reasonable rate of return (RRR). So, the Rate of Return is assumed to be 10%. The company's capital is determined by deducting all non interest bearing liabilities from total assets, where capital includes both debt and equity. Using ACD analysis, allocation of activities is based on the items of balance sheet, which computes capital charge for every activity.

Figure 5: Statement of computation of company's capital

Particulars	Amount (in lakhs)
Total assets (A)	4000
Less: Non-interest bearing current liabilities	
Accounts payable	300
Accrued expenses	200
Total (B)	500
Capital (A-B)	3500

Figure 6: Activity capital dependence (in lakhs)

Activities	Cash	Acc payable	Inventory	Sundry debtors	Land	Build-ing	Equip-ment	Other long term assets	Accounts payable	Accrued interest	Activity capital charge
Materials issued in production			0.2		0.1	0.1	0.7				74.6
Production scheduling					0.1	0.1	0.2				37.0
Inventory procurement	0.1	0.5	0.1		0.1	0.1			0.1		1.3
Inventory control			0.1		0.1	0.1					24.3
Managing employees	0.2				0.1	0.1				0.5	15.0
Managing business	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.4		0.5	44.5
Display of final products			0.1		0.1	0.1		0.3			36.3
Shipment of final products			0.3		0.1	0.1		0.3			38.9
Customers contact		0.1	0.1		0.1	0.1					25.5
Billing and collection of money	0.6	0.3		0.8	0.1	0.1					52.6
Total capital charge	10	12	13	25	150	80	70	40	-30	-20	350

Process 5: Cost Driver Selection

Cost drivers are the factors that are responsible for the cost. In this step, cost drivers for all the recognized activities are identified and tabulated. These cost drivers can be used as the basis for allocation of operating cost and capital charges for the products. The cost drivers responsible for operating cost are operating cost drivers and those cost drivers responsible for capital charges are capital cost drivers. Thus, using cost drivers, cost is easily allocated to the products.

Figure 7: Table showing various activities and cost drivers

Activities	Cost drivers
Materials issued in production	Material used in dollar value.
Production scheduling	No of setups, processing time.
Inventory procurement schedule	No of suppliers.
Inventory control	Use of storage capacity.
Managing employees	No of employees.
Managing business	Value of sales in dollar.
Display of final products	No of outlets.
Shipment of final products	No of order shipped.
Customers contact	No of customers.
Billing and collection of money	Value of credit sales in dollar.

Process 6: Calculation of Product Cost

The total cost is computed by combining operating cost and capital cost involved in the process of manufacturing the product. Two separate tabulations are made, where in the figure 4 shows the calculation of operating cost and figure 6 shows the calculation of capital cost of activities involved. In figure 9 product cost is allocated using ABC technique whereas in figure 10 product cost are allocated as per integrated ABC and EVA technique.

Figure 8: Table showing total cost (amount in lakhs)

Activities	Operating cost	Capital charges	Total cost
Materials issued in production	175	74.60	249.60
Production scheduling	120	37.00	157.00
Inventory procurement schedule	135	01.30	136.30
Inventory control	168	24.30	192.30
Managing employees	222	15.00	237.00
Managing business	75	44.50	119.50
Display of final products	95	36.30	131.30
Shipment of final products	215	38.90	253.90
Customers contact	155	25.50	180.50
Billing and collection of money	140	52.60	192.60
Total	1500	350.00	1850.00

Results

Under ABC technique, accurate operating cost is calculated for different products. As like EVA, it does not contribute to shareholders wealth nor identifies the product which is more economical in value. In the figure 9 mentioned below, clearly illustrates that product A and D are more profitable as compared to product B and C.

Figure 9: Calculation of product cost using ABC technique (amount in lakhs)

ABC technique					
Products	A	B	C	D	Total cost
Net sales	2000	1200	1000	800	5000
COGS	1100	700	500	200	2500
Operating expenses	500	400	300	300	1500
Interest expenses	80	40	40	40	200
Profit before tax	320	60	160	260	800
Income tax	128	24	64	104	320
Profit after tax	192	36	96	156	480

Under integrated ABC - EVA technique, which deals with both operating cost as well as capital cost helps in determination of product creating value. In the figure 10 mentioned below, clearly illustrates that product C is creating more value as compared to any other products (A, B, D).

Figure 10: Calculation of product cost using integrated ABC and EVA technique (amount in lakhs)

Integrated ABC and EVA technique					
Products	A	B	C	D	Total cost
Net sales	2000	1200	1000	800	5000
COGS	1100	700	500	200	2500
Operating expenses	500	400	300	300	1500
Operating income	400	100	200	300	1000
Income tax	128	32	64	96	320
Profit after tax	272	68	136	204	680
Capital charge	180	20	30	120	350
Profit after charge of capital	92	48	106	84	330

From above two figures, it is clear that how integrated ABC and EVA technique helps us to identify whether the amount of capital invested create value or not. In case of product C, the profit is highest but the capital is minimum compared to product A and B. Here product A has highest sales value but also has highest operating expenses, income tax and capital cost which reduces the profitability of the product. Therefore, company needs to increase manufacturing of product C to attract more value for shareholders wealth.

Conclusion

The concept of integrated ABC-and-EVA is helpful in understanding the importance of capital invested as a resource to the organization. Product pricing is more justifiable in this approach rather than in a traditional approach of product pricing. There can be chances of obtaining a distorted profitability figure in traditional costing since only profit after tax is considered whereas the integrated approach computes economic profit. It cannot be concluded that adoption of an integrated system of ABC and EVA alone would improve the business processes in the management, but it can provide with useful insights that would lead to improvement in the costing system.

The cost-benefit analysis of an integrated ABC- EVA approach is also positive since the benefits derived by the management after implementation of the integrated concept outweigh the cost of implementation of the approach. However, this approach would be successful only when the management is provided with up-to-date cost information which is relevant and reliable. This approach is more effective in identifying cost fluctuations and provides better cost estimates.

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