

## **The only Correct Calculation Method in Cost Management: From Activity Based Costing Perspective**

**Miroslav Škoda<sup>1\*</sup>, Gabriela Sláviková<sup>1</sup> & Daniel Lajčín<sup>1</sup>**

<sup>1</sup> Dubnica Technology Institute, Dubnica nad Váhom, Slovak Republic

\*Correspondence: Miroslav Škoda, Dubnica Technology Institute, Sládkovičova 533/20, 018 41 Dubnica nad Váhom, Slovakia. Tel: 00 421 908 906 399; E-mail: [škoda@dti.sk](mailto:škoda@dti.sk)

DOI: 10.12735/jbm.v3i3p08

URL: <http://dx.doi.org/10.12735/jbm.v3i3p08>

### **Abstract**

In late 1980's National Association of Accountants had introduced Activity-based costing – a cost accounting technique which charges organization's indirect costs to the activities that cause the costs to be incurred and then distributes costs of activities to the products that cause the activities to be performed. Activity-based costing as a management tool has proved its relevance and found its proponents among academics and managers. Introduction of the time aspect into Activity-based costing proved that it is still attracting attention and undergoing development in order to become more accurate. The paramount goal of the implementation is to prove the increased effectiveness and superiority of cost management when using Activity-based costing. It will be achieved by allocation of overhead costs to products with the intention to determine unit costs. This process of allocation will increase the reliability of cost information and improve the information base for product decisions. Moreover, we expect that this approach will more or less alter the profit margin of individual products. This kind of information is very useful when evaluating price-related or keep/drop decisions.

**JEL Classifications:** M40, M41, M49

**Keywords:** ABC model, cost management, cost driver, implementation, overhead costs, direct costs, indirect costs

### **1. Importance of Management Cost Accounting**

Management accounting is defined as a system that is concerned with the provision of information to people within the organization to help them make better decisions and improve the efficiency and the effectiveness of existing operations (Drury, 2005). Management accounting as one of the subsystems of accounting was quite underdeveloped throughout the 20<sup>th</sup> century, but regained its position back in 1980's when professionals and academics started to criticize its lack of innovation and relevance of its methods in rapidly changing environment. One of the most important and pioneering title was the Johnson and Kaplan's book called *Relevance Lost: The Rise and Fall of Management accounting* published in 1987.

This underdevelopment can be attributed mainly to the demand for product cost information for external users and simple and inaccurate methods that were used for allocation of costs to products (Johnson & Kaplan, 1987). These product costs designed primarily for financial accounting purposes were then used in day-to-day decision making. Unlike financial and tax accounting, which serve to keep the organization in compliance with laws and regulations, an organization's

management accounting system can actually make or break an otherwise sound business (Hicks, 1992). This statement is supported by the following simple ranking of users of management information.

It is apparent that managers use the vast majority of cost information for decision making in day to day business. Shareholders, creditors and tax offices that belong to external users care most of the time about income that is derived from their shareholdings, ability to meet financial obligation, tax liabilities and receivables, respectively. Table 1 shows the users of cost information.

**Table 1.** Users of cost information

Use	User
Revenues and overall inventory valuation, costs of goods sold used for profit computation	External users
Compliance with GAAP	External users
Strategic planning	Management
Capital budgeting	Management
Operational planning	Management
Operational budgeting	Management
Process cost control	Management
Product pricing and profitability	Management
Product cost control	Management
Financial analysis	Management

**Source:** Hicks (2002).

Apart from the provision of information to managers, management accounting has also other functions. Namely, provision of relevant information for planning, control and performance measurement and allocation of costs between costs of goods sold and inventories for internal and external profit reporting and inventory valuation. Some authors exempt the allocation function from the definition of management accounting and define so called cost accounting that deals only with this issue.

Cost accounting is defined as a system that measures and reports information that relate to the organization acquiring and/or consuming resources. Furthermore, it provides information for management as well as financial accounting (Horngren, Datar, & Foster, 2003).

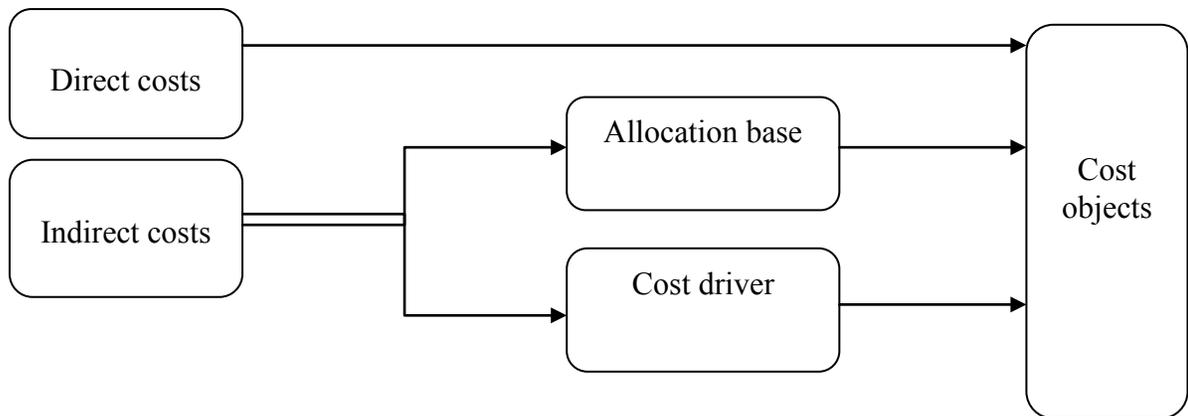
Cost accounting, from a different point of view, is also concerned with cost accumulation for inventory valuation to meet the requirements of external reporting and internal profit measurement, but on the other hand the distinction between management and cost accounting is extremely vague (Drury, 2005). For purposes of this thesis, we will prefer the aforementioned definition of management accounting comprising the allocation function.

There is a need to mention different types of costing systems and describe the basic terminology. There are 3 main costing systems differing in terms of methodology, accuracy and relevancy for decision making:

1. Direct costing system
2. Traditional absorption costing system
3. Activity-based costing system

Direct costing system is the simplest system in terms of cost assignment because it allocates only direct costs to cost object. It is obvious that the biggest disadvantage is that it does not allocate indirect costs (overheads). It is only a partial system useful for business with small or negligible share of overheads on total costs. This system would not work for businesses with high share of overheads because the process of assignment would be arbitrary and lead to faulty and misleading decisions.

Traditional absorption costing system and activity based costing system allocate indirect costs to cost object. The purpose of cost allocation technique is to find an indirect measure how to allocate indirect costs to cost object. This can be done using measures such as allocation base and cost driver. These are measures that establish some kind of consumption pattern among indirect cost and cost object. When the allocation base significantly captures the relationship between the indirect cost and the cost object then the term cause-and-effect allocation is used. In case that the allocation base is rather a weak measure then arbitrary allocation is the appropriate expression. An example of arbitrary allocation is the usage of direct labor costs/hours as an allocation base for allocating indirect costs to cost object. As direct labor costs/hours do not determine the amount of indirect costs incurred, this would likely lead to inaccurate allocation of indirect costs. Figure 1 describes the process of cost allocation and cost tracing.



**Source:** Drury (2005).

**Figure 1.** Process of cost allocation and cost tracing

The suitability of traditional absorption costing system may be questionable and managers may start to feel concerned whether it is the right moment to revise this kind of costing system. We picked up eight points set by Hicks (2002) that can serve as one out of approaches how to evaluate the costing system and discover the need for change:

- (1) Direct labor operations have been replaced with automated equipment since the costing system was lastly revised. This is a very crucial point because it reveals a considerable deficiency of the traditional costing system. When direct labor remains the allocation base for indirect costs it may distort the process of allocation of indirect costs to cost object because it no longer determines the relationship between consumption of resources and cost objects.
- (2) Indirect costs are becoming a much larger percentage of total costs or overhead rates have been increasing during recent years. Nowadays, manufacturing companies substitute labor with capital, mainly machinery, what in turn increases the importance of indirect costs. This proves that direct labor as a base for allocating indirect costs is irrelevant as it is substantially less than indirect costs and as it was mentioned in the first point there is no

direct relationship. That's why there is a need to revise this allocation base by finding a better cause and effect relationship.

- (3) All overhead is applied to cost object on the basis of direct labor costs/hours.
- (4) Only a few overhead application rates or only one plant-wide rate is in use. When the company fails to recognize that processes in the manufacturing process consist of different activities that consume different proportions of indirect costs, it will lead again to distortion of product costs. The main reason is that one plant-wide rate assumes that all processes are equal and can be justified only in case that company's products consume indirect costs in approximately the same proportions. This kind of assumption is rather unrealistic and that's why sufficient number of overhead rates should be used.
- (5) The organization appears to be competitive on one end of its product line, but not on the other end. Let's assume that a company manufactures products A and B. Product A is a high volume product B is a low volume product. If the company applied the aforementioned direct labor allocation base for overhead allocation then product A would be overpriced and costs of product B would be understated.
- (6) Operations exist that do not require the same number of operators. Let's assume that there are two crews staffed by 2 and 1 worker, respectively, and that cost of one working hour is the same. After using direct labor allocation base, product costs would be distorted. This kind of situation could happen in any organization with heavy machinery that is operated by varying number of workers.
- (7) Many operations are set up, started and then run with little or no human intervention. Operations that are automated and run irrespectively of direct labor intervention consume the largest part of indirect costs. If the distribution of indirect costs is based on direct labor allocation base then it will result in distortion of product costs.
- (8) Accounting personnel spend a great deal of time doing special studies to develop answers to fundamental questions. If special studies have to be conducted to determine the product/product line and customer profitability then the costing system is not able to provide relevant information for day-to-day decision making.

## **2. Rise of Activity Based Cost Accounting**

Activity based costing (ABC) assigns manufacturing overhead costs to products in a more logical manner than the traditional approach of simply allocating costs on the basis of machine hours. Activity based costing first assigns costs to the activities that are the real cause of the overhead. It then assigns the cost of those activities only to the products that are actually demanding the activities.

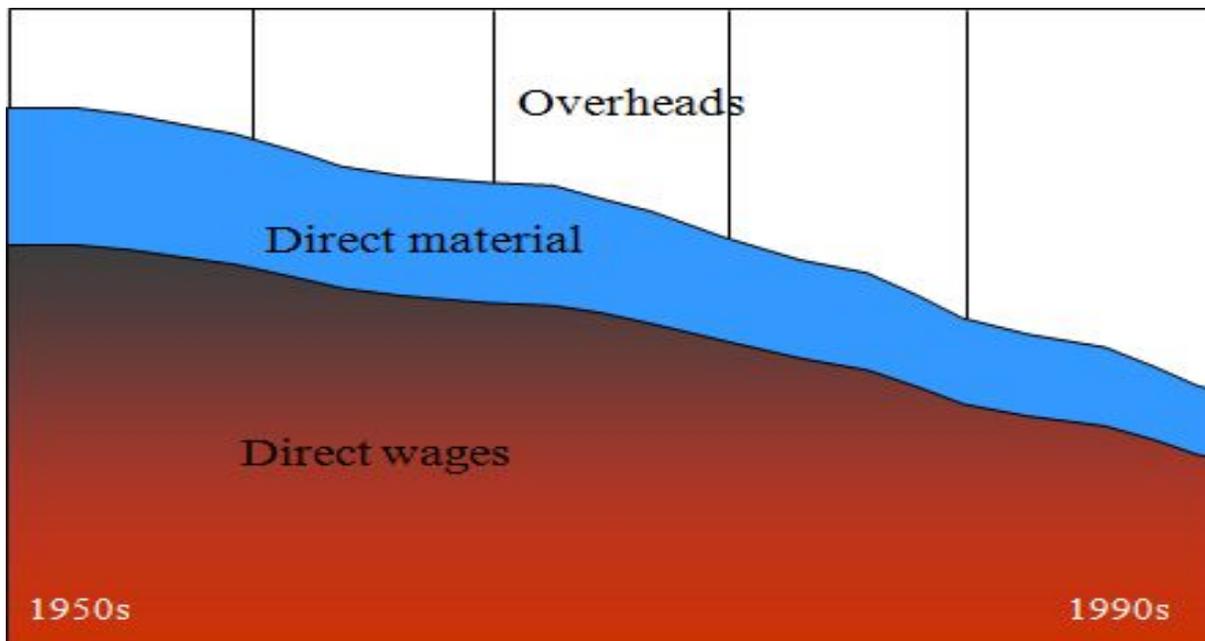
Let's discuss activity based costing by looking at two products manufactured by the same company. Product 124 is a low volume item which requires certain activities such as special engineering, additional testing, and many machine setups because it is ordered in small quantities. A similar product, Product 366, is a high volume product—running continuously—and requires little attention and no special activities. If this company used traditional costing, it might allocate or "spread" all of its overhead to products based on the number of machine hours. This will result in little overhead cost allocated to Product 124, because it did not have many machine hours. However, it did demand lots of engineering, testing, and setup activities. In contrast, Product 366 will be allocated an enormous amount of overhead (due to all those machine hours), but it demanded little overhead activity. The result will be a miscalculation of each product's true cost of

manufacturing overhead. Activity based costing will overcome this shortcoming by assigning overhead on more than the one activity, running the machine.

Activity based costing recognizes that the special engineering, special testing, machine setups, and others are activities that cause costs—they cause the company to consume resources. Under ABC, the company will calculate the cost of the resources used in each of these activities. Next, the cost of each of these activities will be assigned only to the products that demanded the activities. In our example, Product 124 will be assigned some of the company's costs of special engineering, special testing, and machine setup. Other products that use any of these activities will also be assigned some of their costs. Product 366 will not be assigned any cost of special engineering or special testing, and it will be assigned only a small amount of machine setup.

Activity based costing has grown in importance in recent decades because (1) manufacturing overhead costs have increased significantly, (2) the manufacturing overhead costs no longer correlate with the productive machine hours or direct labor hours, (3) the diversity of products and the diversity in customers' demands have grown, and (4) some products are produced in large batches, while others are produced in small batches.

It is important to raise the following question in the beginning: What gave rise to activity based costing? Figure 2 provides a figurative answer.



Source: Cokins (2002).

**Figure 2.** Change in the structure of costs after 1950's

Recall that during the 2<sup>nd</sup> half of the 20<sup>th</sup> century overheads gained on importance because of their mounting share on the product's total costs. Before this moment direct labor represented a substantial cost item and it was believed that direct labor costs and overhead costs were very strongly correlated. Over the years as a percentage of total costs, direct labor and direct material costs were shrinking due to technological advancements and the strong correlation between direct labor and overhead costs became implausible. In other words, product's total costs were significantly distorted, if using the outdated assumption of traditional costing system. Furthermore, business conditions changed dramatically as companies were no longer producing few products in massive volumes. Most companies produce and sell large variety of products that consume different

amounts of overheads. This indicates that only little space is left to major simplifications concerning the determination of product's total costs.

Moreover, information and communication technology overcame the barriers of data gathering long ago, thus facilitating the rise of a more sophisticated costing system called activity-based costing. It is very important to accentuate that traditional costing system provides inappropriate data for decision making. Afterwards, when managers and other employees are provided with reports with accounting data in them, they use that data regardless of its validity. On the other hand, existing data are not necessarily bad as much as they are somewhat distorted, incomplete and unprocessed. Figure 3 gives an example of approach to costs from chart of account view and also from activity based view.

Chart of account view				Activity based view	
Claim processing department				Claim processing department	
	Actual	Plan	Favorable/ unfavorable		
Salaries	621.400	600.000	-21.400	Receive claims	31,500
Depreciation	161.200	150.000	-11.200	Analyze claims	166,000
Supplies	58.000	60.000	2.000	Handle claims	32,500
Other services	43.900	40.000	-3.900	Prepare documents for legal department	101,500
Rent	30.000	30.000	—	Resolve law suit	119,000
Total	914.500	880.000	-34.500	Make copies	145,500
				Write correspondence	77,100
				Attend training	158,000
				Total	914,500

Source: Cokins (2002).

Figure 3. General ledger and ABC data

The chart of accounts view provides information that is summarized in a monthly report of single responsibility center (claim processing department). Manager is not able to estimate the amount of controllable costs as well as has no insight into the content of work of employees from this point of view. Biggest disadvantage is that manager sees costs reported as lump sums. Activity-based costing resolves this problem by focusing on activities, that's why general ledger account balances are converted into activity costs. This new, converted ABC cost data can be used in making product, market or customer-oriented decisions.

Another difference is that activity based costing uses verbs and nouns in the so called Bill of Activities to denote individual activities. This wording gives certain flexibility because managers gain new insights into the work of employees and activities can be favorably impacted, changed, improved or eliminated.

To be further critical about chart of accounts, it represents accounting policy of the company and it serves more as a command and control tool. Managers are able to control the overspending of budget target and impose tighter budget restrictions if needed. Apparently, activity-based costing is superior to traditional costing system, but it does not replace the traditional accounting system. It restates the same data and adds operating relationships to more effectively support decision making.

Activity-based costing is not an accounting system, although it uses past information. Some opponents may criticize the relevance of past costs. But the opposite is true. The analysis of past costs and profits reveal inefficiencies and repeatable causes of defects that cause some activities are unexpectedly costly and why specific products and customers are profitable while others are unprofitable. These conditions, if repeated, are likely to cause the same inefficiencies today or in the future. This means that knowledge of past inefficiencies can be an incentive to corrective actions towards efficiency.

Activity-based costing is an economic model designed to inform management about economics of its past, current and future operations. This is the reason why ABC cannot be referred to as accounting model because its utilization is not limited to past financial information. Budgeted, forecasted or even targeted expenses or quantity data can be the input for this model. This enables to predict the activity expenses and activity driver information to obtain estimated spending for future activities and resources. Used in this way, ABC becomes a powerful tool for budgeting future expenses. Using forecasted activity expenses, presuming efficient operations, ABC can be used as a target costing mechanism. Budgeted information can also be helpful in eliminating inefficient, non-value adding activities from operations.

ABC model based on current and forecasted information can reveal whether patterns of past will persist in current or future periods. Today the margin for error is slimmer. Companies cannot make as many mistakes as in the past and remain competitive at the same time. Price quotations, capital investment decisions, product mix, technology choices, outsourcing and make versus buy decision today all require keeping a closer look at. As more competitors understand better the cause and effect connection that drive costs and are fine tuning their processes and prices, the resulting price squeeze resulting from intense competition is making life for businesses much more difficult relative to the past. Knowing the real product costs, customer related costs and profitability is becoming vital. With ABC, companies can identify where to remove waste, low value adding costs and unused capacity plus understand what drives their costs.

### **3. ABC Cross**

ABC Cross was originally designed to provide image for ABC by capturing both the process and cost view of the company. This was done as simply as possible but the simplified ABC Cross does not capture the real value of cost accounting that emerged after 1980's (Euske & Vercio, 2007). The classical as well as the enhanced ABC Cross, which displays better the interaction of process and costing is going to be presented.

Original ABC Cross, called also CAM-I Cross (developed by Consortium for Advanced Management – International), was designed for two purposes. The first was to display the relationship among process and cost. The second was to design a graphic so that ABC teams could use it when selling the ABC concept to top management. Owing to the intended simplicity, designers did not include the whole input-transformation-output process and related resource flows. This means that if the original model is not used for the intended purposes, it can be a step backwards for the company. Inappropriate use of the model leads to large variety of cost accounting methods. Too much variability in measurement of customer and product processes drives cost up, drives quality down and results in frustrated users of data (Euske & Vercio, 2007).

Explanation of the original ABC Cross is that products consume activities and in turn activities consume resources. Horizontal axis shows why costs are generated. Vertical axis depicts the flow of resources to products through activities but it can be misleading. When resources are on the top of this model, it may create an impression of resources driving products. It is useful to put products on

the top of the diagram with the idea of products driving the need for activities that consume resources. This provides a more meaningful approach (see figure 4).



**Source:** Euske and Vercio (2007).

**Figure 4.** Original ABC Cross

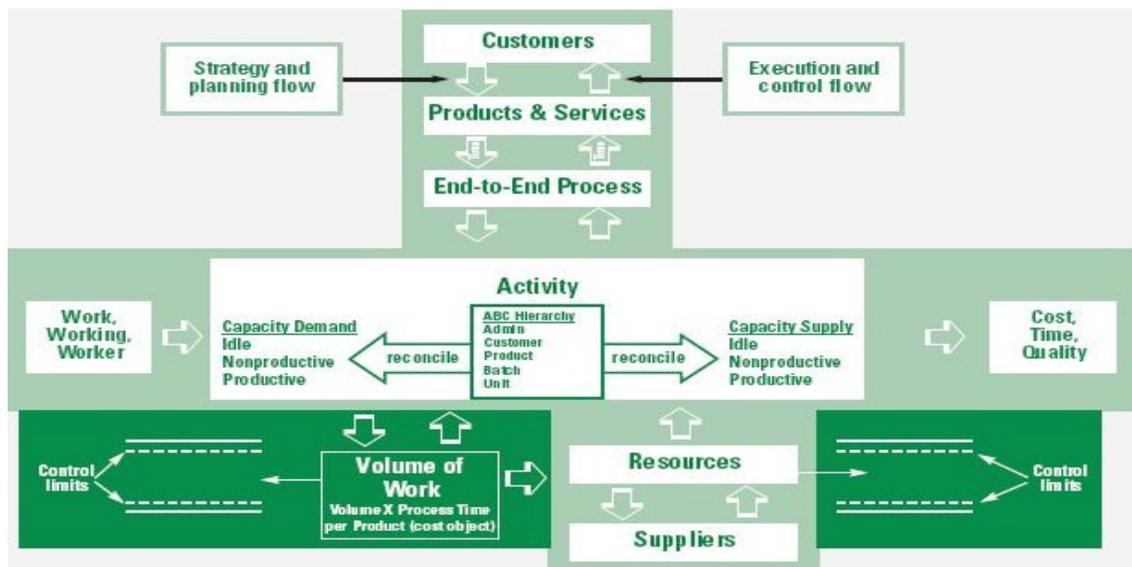
Next statement gives the best explanation for the next modification. It says that the organization's purpose is to create and maintain profitable customer (Drucker, 1995). Majority of revenues originate from customers and therefore they are the most legitimate profit centers. If the customer satisfaction fails to produce sufficient amount of revenues, all other goals pertaining to shareholders, employees and wide public will not probably be achieved. Adding supplier as a crucial element in the process of delivering the product or service to customer will create a simplified value chain from customer to supplier.

As stated previously, customer related decisions are one of the most important decisions. Strategy and planning decisions (regarding customers) work their way through to suppliers. These decisions, flowing to supplier, relate to balancing of capacity and resource demand and supply. Decisions, flowing back to customers, focus on the supply side of balancing capacity and resource demand and supply. Capacity related decisions are mostly undertaken in the process of acquiring and delivering the product or service to the customer. This includes the execution and control of management processes. Moreover, products and services should not be looked at only as tangible products but also other features important for customer should be taken into consideration e.g. response, channel time. If the paramount goal of the company is to respond to customer's requirements, so called end to end process should be introduced for further explanation. A process can be identified as end to end process if it starts and ends with the customer.

End to end processes are of great importance because they include support and enabling processes (e.g. finance services, human resource services, technology services, supply chain management and business sustaining) that would otherwise pose major barrier for product delivery. The most important contributions of cost measurement systems are providing relevant cost data to the management and providing that data sorted by driver (unit, batch, product, customer, idle). Providing cost data by driver requires it to be based on data used to manage capacity and resource demand and supply. Capacity measurement includes measurement of resources, activities and end to end processes at idle, nonproductive and productive level.

ABC hierarchy of activity drivers is very important because it minimizes the distortion of product costs. Recognizing the impact of costs driven by units of product, the number and type of batch requirements, the product itself, the customer, and the organization's administration is probably one of the most important contributions Robin Cooper has made to management accounting. Unit level activities are performed each time a product is manufactured. Cost drivers such as labor hours, machine hours and quantity of material processed are also used by traditional cost accounting. Batch level activities such as machine set up, processing a purchase order, production scheduling are performed each time a batch of products is produced. Traditional accounting treats them as fixed costs. Product/customer sustaining activities such as maintaining and updating product specification and the provided support are enabling the production and sale of individual products. Facility sustaining activities that support the facility's general manufacturing process and are unlikely to change (general administrative staff, plant management, property costs) are treated by ABC as irrelevant for decision making and unavoidable costs and should not be assigned to products.

If the ABC cross does not present the hierarchy of these activities and their cost drivers, ABC teams will remain focused on the unit level. Furthermore, such ABC teams will add unit level activities and drivers to cost measurement system and the result will not be materially different from traditional unit based cost measurement system. Furthermore, to use the original definition of cost driver as anything that drives costs is very simplistic. Three requirements for productivity management –work, working and worker are better source of cost drivers and managing them in the appropriate order results in better process improvement (Euske & Vercio, 2007). The process begins with the identification of products and services sold to customers. It further continues with process design determined to deliver that particular product or service at desired quality, cost and time. If we want to balance the demand for and supply of capacity, we need to establish a common driver. Time fits this requirement because it ensures interconnection of staffing and capacity requirements. Companies that have a very complicated and differentiated manufacturing process, using time is the best way how to reduce cost subsidies of high volume products and customers to low volume products and customers. The time that will be demanded for activities will be included in the work standards. The supply of time to fulfill production requirements will be available in staffing or capacity data and will include time unavailable for work (meetings, trainings, idle time). It is shown in figure 5.



Source: Euske and Vercio (2007).

**Figure 5.** ABC Cross after several modifications

A model without control is not a model. That's why comparing actual to standard figure is very useful. Therefore control systems should be introduced to monitor monthly volumes and related process time and resources compared to values computed by ABC. The ABC version of control systems is the ABC spending and volume variance analysis. Control systems, if constructed correctly, can assist the ABC teams to do the following: avoid chasing normal month to month variation, identify variances that require investigation and provide early warning signs that the ABC cost used in decisions may need an update in the near future (Euske & Vercio, 2007).

## 5. Discussion

In conclusion, the paramount goal, to prove the increased effectiveness and superiority of cost management when using Activity-based costing, is regarded as accomplished. The application part proved the superiority of activity-based costing system over traditional absorption costing system. The demonstration of distinctions among unit costs calculated by the traditional costing system and activity-based costing system was also accomplished. Moreover, a shift in the profitability of chosen products was pointed out. This shift showed that the information provided by the traditional allocation lacked reliability and led to arbitrary product related decisions.

Customer profitability analysis under ABC model shows that not every customer is a good customer and not all revenue is good revenue. Moreover, it emphasized the necessity of cautious approach to incurrence of customer-specific expenses. It also confirms the validity of the statement that customer specific expenses can have a very negative influence on the sales profitability, if not managed properly. In addition, the structure of ABC model offered a different vantage point on the costliness of individual positions and proved that gross salary is not the ultimate factor to be considered. IT equipment, telecom expenses, position specific assets and other costs related thereto etc. changed the ranking of the costliness of individual position.

Finally, there is a need to point out that activity-based costing system is not a single shot costing system which requires only regular update of cost drivers and activities when implemented. Changes in the employee's estimations of the percentage of work fund dedicated to activities, acquisition/divestiture of equipment together with changes in incurrence of other overhead costs have to be recorded so that the costing system is not a step backwards for the company.

Further issue that should be tackled in the foreseeable future is the cost of unused capacity that the conventional activity-based costing does not take into consideration. If management of the companies perceives this fact as a barrier hindering the quality of provided information then activity-based costing should be regarded as the option that overcomes this deficiency.

## References

- [1] Cokins, G. (2002). *Activity based costing: Optional or required?* New Orleans: AACE International Transactions.
- [2] Drucker, P. F. (1995). *Managing in a time of great change*. New York: Truman Talley Books/Dutton.
- [3] Drury, C. (2005). *Management accounting for business decision* (3rd ed.). New Hampshire: Thomson Learning.
- [4] Euske, K. J., & Vercio A. (2007). Enhancing the ABC cross. *Management Accounting Quarterly*. 8(4), 48-61.
- [5] Hicks, D. T. (1992). *Activity-based costing for small and mid-sized businesses: An implementation guide*. New York: Wiley.

- [6] Hicks, D.T. (2002). *Activity-based costing: Making it work for small and mid - sized companies* (2nd ed.). New York: Wiley.
- [7] Horngren, C. T., Datar, S. M., & Foster, G. (2003). *Cost accounting: A managerial emphasis* (11th ed.). Delhi: India Pearson Education.
- [8] Johnson, H. T., & Kaplan, R. S. (1987). *Relevance lost: The rise and fall of management accounting*. Boston: Harvard Business School Press.

### **Copyrights**

Copyright for this article is retained by the authors, with first publication rights granted to the journal. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license.

