A MODEL SUGGESTION FOR ACTIVITY BASED COSTING IN THE ERP SYSTEM

Selim Yuksel Pazarceviren, Prof., Cost Management Consultant
Ugur Ozsuer, MA, PhD Student
Istanbul Commerce University / Turkey

Abstract

Activity Based Costing (ABC), hase been developed as a result of the necessity that companies have been required to focus on the cost basis more closely to be able to survive and be successful in today's competition environment. Since overhead costs are traditionally exempted from the cost analysis, they have been treated as expenses for the period. As a result of the increase in these fixed costs, it has become more important to assign overhead costs to products via a logical model. We aim to illustrate a case for an activity center to explain our model. Our model has been used in many organizations in Turkey and its success has been proved for years. We classified costs in four categories as resource costs on the basis of the volume of activities, resource costs on the basis of activity level, resource costs independent from the volume of activities, and direct resource cost. This approach lets us manage costs of activities according to their characteristics.

Keywords: Activity Based Costing, Enterprise Resource Planning, Advanced Reporting, cost assignment.

Introduction

Companies have been trying to reduce their costs to gain more profit with different costing and budgeting techniques. Companies need faster, more qualified, more efficient and sustainable technologies in order to compete around the world. However technology is not only enough part for companies to compete with each other around the global world. Companies need to take decision to operate their business in a very short time and information should be very quick, true and accessible. Overhead costs are very important to identify real production cost such as rental, depreciation, maintenance, research and development, sales expenses. In addition companies have been trying to reduce their variable costs in order to more efficient and more profitable. We built a new model under Activity Based

Costing (ABC) method. We developed our model under ABC method to be able to reduce cost of the activities not only reach full commercial cost of products at different activity levels but also reduce in full commercial cost of products variable costs.

There is no any system as conventional costing systems production costs determination of variable and fixed production cost in the competitive periods. It determines via utilizing product variable and fixed costs database out of the system. Product variable costs do not reflect reality on a level with industrial cost which is limited with narrow scope direct raw material, labour costs, externally received benefit (Electricity, LNG) costs due to the insensitive determination. Product variable costs due to the determination results of lower than their actual level they detemined their contribution margin higher than their actual level. Sales cause significant loss of profits and damages, in market prices on a level with full unit cost and below the level, higher contribution margins from the actual level determined by product based on contribution margin of the competition period. Due to the subjective measures is distributed to products and methods sales and marketing and administration costs do not reflect reality of full commercial cost. As a result of the cost distributions they may seem according to one type of measurement profitable, by another measurement harmful. Consequently using of traditional costing system sourced cost datas load important risks as providing failure of competitive advantage, losing of market and customer and losses. Providing of basic condition of sensitive and accurate costing in the competitive period. Using the activity based costing (ABC) system that can make sensitive and accurate costing to present a great importance in the competitive period.

1. The Basic Concepts of the Activity Based Costing (ABC)

a. Resource Concept

The resource concept to be defined as in the activitiy based costing system (ABC) consumed for products and operations assets such as material, machine, building, labour cost, externally received meintenance and repair services, electricity energy, compressed steam.

b. Activity Concept

Activity concept is formed from a lot lower activity declaratory business process. For instance it is formed from lower activities such as accounting activity is business process and book keeping and issuing of ledger records, issuing of dispatch note, submission of goverment declarations. Activities of activity based costing (ABC) is divided into three main groups such as activities for products and on a level with plant activities (Top managment, factory managment, human resources

managment, IT, quality assurance, process development activities) and customer activities.

c. Product Intended Activities Concept

Product development activities (Product design engineering activities, research and development activities) extending the pre-production to sales in process, activites for products (Production, forwarding, materail preparation, accounting, sales activities).

d. Cost Driver

When the number of activities increases, the number of cost driver is also increases. One of the main points of activity-based costing system to decompose the conventional costing system is the concept of cost drivers. While in ABC different cost drivers for each activity are used, in the conventional system it is used a single distribution key. This causes to produce erroneous report of the conventional cost system.

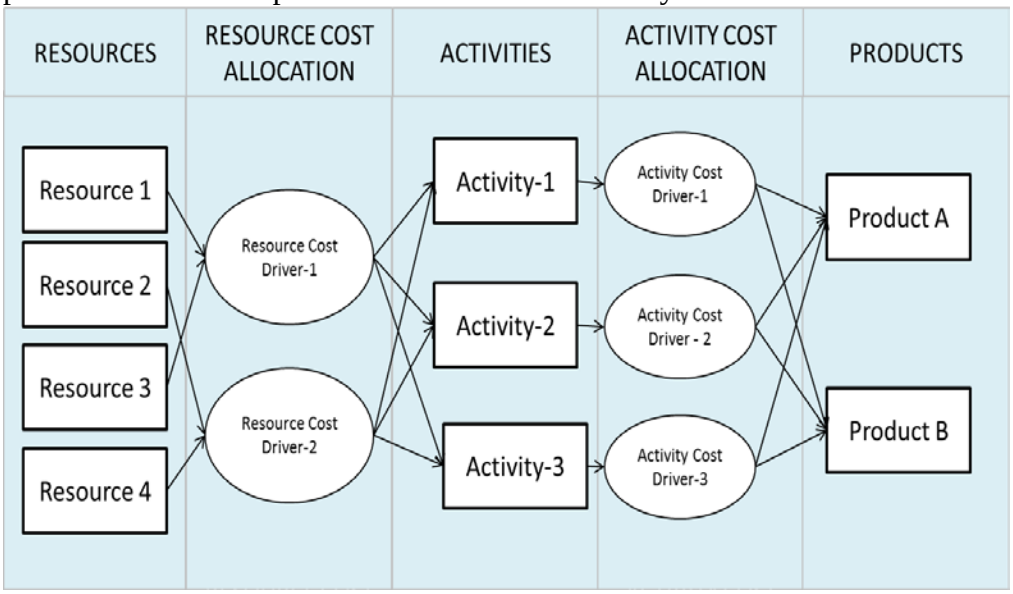

Figure 1. Cost Drivers in ABC (Pazarceviren, S. Y., & Şahin, N. K. (2013)

There are two different cost drivers in activity based costing system. One of them is used for carrying resource costs to activities and the other one is used for carrying activity costs to the products (Pazarceviren & Celayir, 2013).

e. Activity Unit / Unit Concept

It defines with machinery, bench, assembly line, work stations, product cells in the activity based costing (ABC) system.

f. Costing the Right Coverage

Source cost covers certainly consumption of resources in the cost carrier cost. Product variable and fixed costs, activity costs, source costs

which they produced inside within the true scope and determining of on a level with commerical cost.

g. Costing of Goal Accuracy

Resources which consumed for products, cost of activities of consumption type (product unit per party, as periodically) as admissible to determine of variable or fixed cost.

h. Sensitive Costing

Consumed source volume for product, consumed product operation, activity and activity unit, via using the method of unit basis engineering techniques, making sensitive and accurate measurements and determination of using different route machines(activity units).

i. Condition of Accurate Measurement for Costing

Determination of resource consumption volumes the consumption of resources on the basis of measurements and with engineering measurement methods if it is possible with measuring device.

j. Method Accuracy of Condition In Costing

On the basis of consumed resource costs for activities presence of activities, assigning of activity costs on the basis of consumed activity to product costs.

k. Measuring of Compliance Requirement In Costing

Determination of activity consumptions the relationship between the activities of the products as the basis of measurement that reflects the best. Budgeting on the basis of measurements that will be best express the activity capacity. Establishment of product activity relationshps on the basis of lower activity if possible, made an activity costs on the basis of cost operating cost pool.

l. Estimation Accuracy Condition in Costing

Accurate estimating of product manufacturing volumes and activity capacities.

m. Consumptions Per Unit as Direct Products

Resources such as, material, labour, electricty, water, sales bonus, from production to sales, as all activites be analysed and be covered without exception for variable cost of goods. Basic principles of product variable costs on a level with commercial cost and sensitive determination:

- To determine a product (As products different quality level) how many it consumes, pinpointing as all activity units for its product as product variable costs according to different activity unit(Machine, bench, assembly station line) consumption.

  Basic principles of accurate determination of product variable costs:
- To determine resources consumption volume, resources consumption measurement and engineering measurement method.

- A basis of determination of resources prices, future resource prices for future prices, current source prices for actual productions.

2. Basic Principles of Production Fixed Costs On a Level With Commercial Cost and Sensitive Determinations

- To cover consumed resources(The use of just for one production – machines, warehouses depreciations, product responsible salaries, sales persons salaries) costs as periodically just for one product as of all activities inside product direct fixed costs.
- Remain outside as periodically consumed direct fixed costs(Machine, bench depreciations) for activity units inside of the activity costs. Containing of activity unit direct fixed resource costs, on the basis of capacity consumption inside of the products fixed costs.
- To cover consumed resouces costs(Quality control unit employee salaries establised for customer, device depreciation) for activities carried out intended for customer, inside of the customers costs and just assignment of regarding the customers work orders scope manufactured products fixed costs.
- To cover as periodically consumed resource costs (Employee, device, area depreciation) for resource productions (water, electricity) at the corporation inside of the productions fixed costs.
- To base determination of activity costs of resource costs (Materials, employee, fixed assets, device depreciations, rental, insurance, consultation) as consumed periodically and to cover as a basis products activity consumption of activity costs inside of the fixed cost.
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3. Basic Principles of Accurate Determination of Product Fixed Costs

To monitor products, activities, customers, manufactured resources of inside of the corporation, as periodically, direct consumed resources consumption volumes and costs in the accounting recording systems as resource type, consumed activity center and consumed cost carrier (Product, activity, customer operation, manufactured resource inside of the corporation) and this relationship layout determined via budgeting(Thus it is ensured resource costs related with cost carriers direct fixed cost). Apart from this method, it might determine resource costs, standard consumption volumes of resources a basis with their prices.

Activity consumption is determined activity capacity and products activity request analyze reflected measurements. Executed activities determine (Production planning, material preparation, paint chemical

cuisine, production and quality control) on a level with party as consumption measurement getting as a basis production parties, basis that labour and machine usage, per product unit activity consumption measurement (Machine, direct labour hours, meter, kg) in the per product unit manufacturing activities. Product development and design regarding the activities consumption measurements are product volume measurements. Corporate executed over activities are determined such as management activities, human resources activities, activities consumption measurement not on the basis of product activitiy relatonship, these activities are determined intended for product activities relationship. Products activity consumptions are monitored, on the basis of these activity consumptions and per product unit consumptions are budgeted or direct products per product unit standard consumption volumes are found.

Activity capacities are budgeted on the basis of products budgeted production volumes and product per unit activity consumption volumes (budgeted or standard). Activity measurement per activity cost assignment ratios are found on the basis of budgeted activity costs and budgeted activity capacity. Activity costs products activity consumptions and on the basis of budgeted activity cost ratios with products activity consumptions are included product indirect fixed costs are included.

4. A Model Suggestion

Activity based Costing (ABC) has been the most popular costing method and provides the most accurate way for allocation of overheads. However, when overheads are treated the same way, there might be some inconsistence in the management of resources even though the costs assigned to products or services are exactly the right (Pazarceviren & Şahin, 2013).

We have developed a sub-approach for activity based costing classifying the overhead under four different categories:

1. Resource costs on the basis of the volume of activities,
2. Resource costs on the basis of activity level,
3. Resource costs independent from the volume of activities,
4. Direct resource cost,

We have been using ABC method for most of the companies that we consult with an ERP (Enterprise resource planning) program designed by Professor Selim Yuksel Pazarceviren[1]and we have seen the success of the method in practice.

[1] Professor at Istanbul Commerce University and Cost Management Consultant

Figure 1: (ABC) Activity Based Costing Operating System in the ERP (Enterprise Resurce Planning)

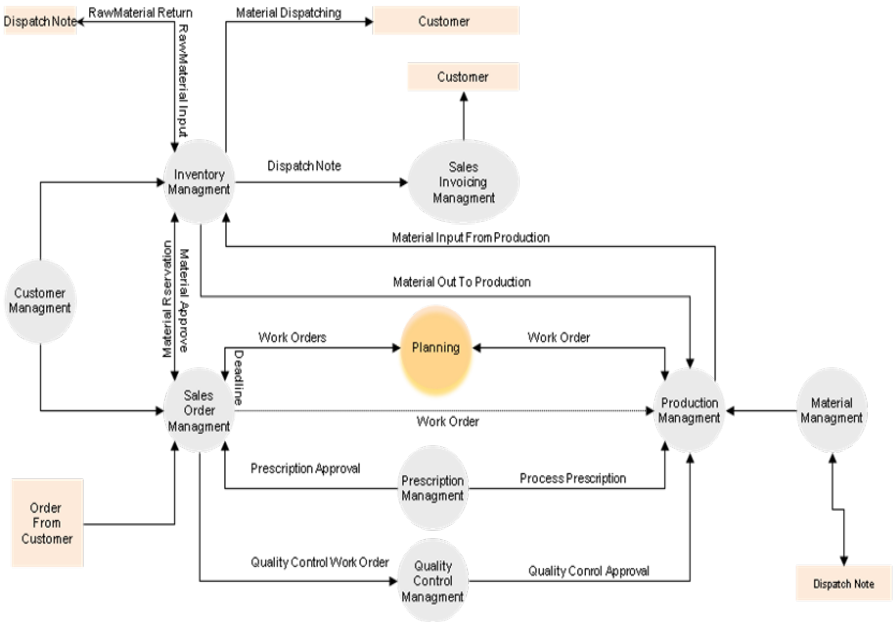

Figure 2: Activity Based Direct Costing(ABC) Cost Flow Chart

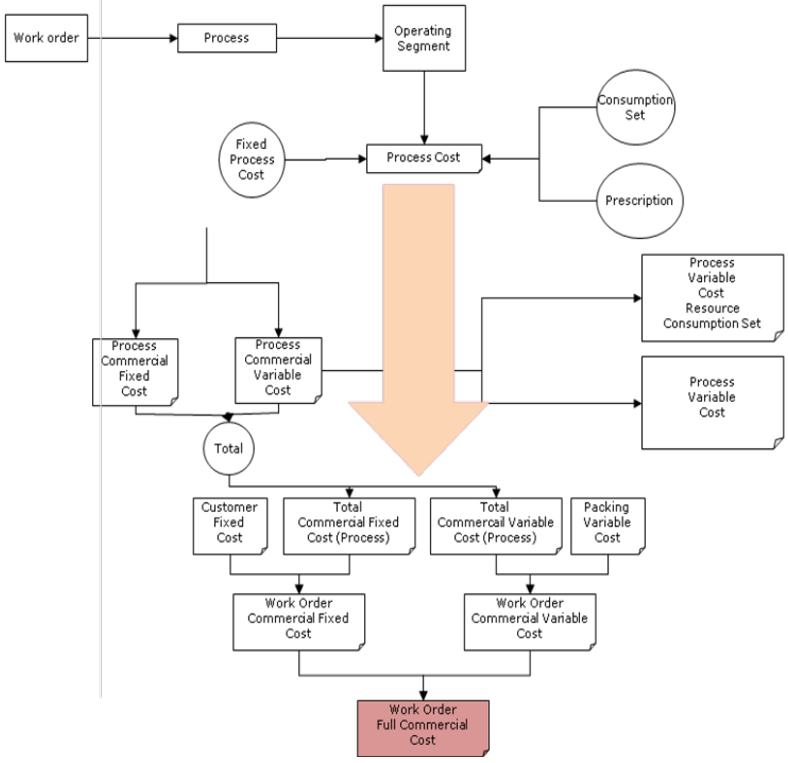

Figure 3: Activity Based Direct Costing(ABC) / Fixed Costing System

Budgeting of Direct Fixed Costs

		Process and Activities Direct Consumed Resource Costs Budget						
Resources	Total Budgeted Costs	Internal Resource Production	Preparation Processes	Main Processes	Activities (Shipment, Planning...)			
0-Material Resource Cost								
...								
...								
1-Labor Resource Cost								
...								
...								
2-Employees Resource Cost								
...								
...								
3-Service Cost								
...								
...								
4-Miscellaneous Resource Cost								
...								
...								
5-Tax / Duties								
...								
6-Depreciation								
...								
TOTAL								

Figure 4: Activity Based Costing(ABC) / Fixed Costing System

Finding of Value of Fixed Costs Budget Process

		Processes						
Activities	Total Budget Cost	Process 1	Process 2	Process 2	.....	Process 1	Process 2	.....
Merchandise								
Material Warehouse								
Prescription Process								
Lab 1								
Lab 2								
Prodution Planning								
....								
Inspection								
Forwarding								
Sales								
Accounting								
....								
Process Assignment Budget Activity Cost								
Process Direct Consumption Resource Cost								
Total Budget Process Fixed Cost								
Budget Process Volume								
Process Fixed Cost Per Kg								

Figure 5: Calculated Costs and Data Resources

5. Activity Based Costing ERP Based Tables

Table 1.Front Cost Simulation Report

Simulation Code	**ABC 1**	**Material Code**	**X**	**Special Process**		**Simulation Date**	**01.06.2015**	**Cost Date**	**30.03.2015**
Customer Name	**ABC**	**Material Name**	**Y**	**Route Code**	**120**	**Simulation Volume**	**10**	**Exchange Rate Date**	**30.03.2015**
Order Code		**Quality Code**	**1000**	**Material Type**		**Package**		**Daily Exchange Rate**	**1**

Item Code	Item Name	Department Code	Departman Name	Prescription Code	Version	Program Type	Duration	Fixed Cost	Variable Cost		Total Cost
1.200	Material Preparation	100	Machine 1		0	Type 1	120	$2.000,00	$500,00	$2.200,00	$2.500,00
	Prescription	Water	Electricity	Steam	Gas		Steam	Depreciation	Meintenance	Budget	
	0	0	1.230	0	0		0	$0,00	$0,00	$3.200,00	$0,00
1.300	Process 1	200	Machine 2			Type 2	140	$3.000,00	$600,00		$3.600,00
	Prescription	Water	Electricity	Steam	Gas		Steam	Depreciation	Meintenance	Budget	
	0	0	1.320	0	0		0	$0,00	$0,00	$1.444.500,00	
							Total	**$5.000,00**	**$1.100,00**		**$6.100,00**

Unit Cost:	**$610,00**

Table 2.Work Order Based Actual Cost Report

Work Order Code	**123**	**Material Code**	**X**	**Special Process**		**Work Order Date**	**23.02.2015**	**Cost Date**	**30.03.2015**
Customer Name	**ABC**	**Material Name**	**Y**	**Route Code**	**22**	**Work Order Volume**	**12**	**Exchange Rate Date**	**30.03.2015**
Order Code	**AB1**	**Quality Code**	**200**	**Material Type**		**Package**		**Daily Exchange Rate**	**1**

Item Code	Item Name	Department Code	Departman Name	Prescription Code	Version	Program Type	Duration	Fixed Cost	Variable Cost		Total Cost
12	Material Preparation	N100	Machine 1		0	Type 1	60	$1.550,00		$0,00	$1.550,00
	Prescription	Water	Electricity	Air			Steam	Depreciation	Meintenance	Budget	
	0	0	0	0	0		0	$0,00	$0,00	$1.650,00	$0,00
13	Process 1	N200	Machine 2			Type 2	70	$2.250,00	$125,00		$2.375,00
	Prescription	Water	Electricity	Air			Steam	Depreciation	Meintenance	Budget	
	0	0	1.200	0	0		0,000	$0,00	$0,00	$2.500,00	
							Total	**$3.800,00**	**$125,00**		**$3.925,00**

Unit Cost:	**$327,08**

Table 3.Work Order Based Standard Cost Report

Work Order Code	**201**	**Material Code**	**X**	**Special Process**		**Work Order Date**	**23.02.2015**	**Cost Date**	**30.03.2015**
Customer Name	**ABC**	**Material Name**	**Y**	**Route Code**	**30**	**Work Order Volume**	**20**	**Exchange Rate Date**	**30.03.2015**
Order Code	**AB 23**	**Quality Code**	**300**	**Material Type**		**Package**		**Daily Exchange Rate**	**1**

Item Code	Item Name	Department Code	Department Name	Prescription Code	Version	Program Type	Duration	Fixed Cost	Variable Cost		Total Cost
102	Material Prepatation	P200	Machine 1		0	Type 1	120	$1.250,00	$355,00	$0,00	$1.605,00
	Prescription	Water	Electricity	Air		Lpg	Steam	Depreciation	Meintenance	Budget	
	0	0	3.400	0	0	0	0	$0,00	$0,00	$1.750,00	$0,00
203	Process 1	M300	Machine 2			Type 2	105	$1.450,00	$265,00		$1.715,00
	Prescription	Water	Electricity	Air		Lpg	Steam	Depreciation	Meintenance	Budget	
	0	0	2.500	0	0	0	0,000	$0,00	$0,00	$1.610,00	
							Total	**$2.700,00**	**$620,00**		**$3.320,00**

Unit Cost:	**$166,00**

Table 4.Production Based Income Statement

Item		Total Sales Amount	Total Variable Cost	Total Contribution Margin	Total Fixed Cost	Profit	Total Sales Volume	Average Sales	Average Unit Cost	Average Variable Cost	Average Fixed Cost
1.100	**Actual**	$15.000,00	$10.000,00	$5.000,00	$3.000,00	$2.000,00	50	$300,00	$260,00	$200,00	$60,00
Item A	**Standard**		$10.850,00	$5.500,00	$3.350,00	$2.150,00			$284,00	$217,00	$67,00
2.200	**Difference**		-$850,00	-$500,00	-$350,00	-$150,00			-$24,00	-$17,00	-$7,00
Item B	**Actual**	$29.000,00	$22.000,00	$7.000,00	$6.000,00	$1.000,00	40	$725,00	$700,00	$550,00	$150,00
	Standard		$23.000,00	$8.000,00	$4.500,00	$3.500,00			$687,50	$575,00	$112,50
	Difference		-$1.000,00	-$1.000,00	$1.500,00	-$2.500,00			$12,50	-$25,00	$37,50
Total	**Actual**	**$44.000,00**	**$32.000,00**	**$12.000,00**	**$9.000,00**	**$3.000,00**	**90**	**$1.025,00**	**$960,00**	**$750,00**	**$210,00**
	Standard		**$33.850,00**	**$13.500,00**	**$7.850,00**	**$5.650,00**	**0**	**$0,00**	**$971,50**	**$792,00**	**$179,50**
	Difference		**-$1.850,00**	**-$1.500,00**	**$1.150,00**	**-$2.650,00**	**0**	**$0,00**	**-$11,50**	**-$42,00**	**$30,50**

Table 5.Customer Production Based Income Statement

Item Code:	**150**	**Item Name:**	**Item C**			
Customer Name	**Sales Amount**	**Sales Volume (Kg)**	**Fixed Cost**	**Variable Cost**	**Total Cost**	**Profit**
ABC	**150.000**	10.150	25.000	45.000	70.000	80.000
XYZ	**255.000**	24.000	32.000	75.000	107.000	148.000
Group Total	**405.000**	**34.150**	**57.000**	**120.000**	**177.000**	**228.000**
GHK	**755.000**	18.000	85.000	210.000	295.000	460.000
TXW	**236.000**	19.000	110.000	120.000	230.000	6.000
Outsource Total	**77.748.076.414**	**37.000**	**195.000**	**330.000**	**525.000**	**466.000**

Table 6.Actual / Standard Duration and Cost Comparison Report

Customer Name	**ABC**	**Work Order Number**	**1100**	**Color Code**	**Exchange Rate Date**	**31.03.2015**		
Order Code	**AB 10**	**Work Order Date**	**01.01.2015**	**Item Type**	**Exchange Rate Code**			
Order Date	**31.03.2015**	**Volume**	**1150**		**Exchange Rate Amount**	**0**		
Deadline Date	**10.04.2015**	**Quality Code**	**4150**					
				Actual		**Standard**		
Item Code	**Item Name**	**Actual Duration**	**Standard Duration**	**Variable Cost**	**Fixed Cost**	**Variable Cost**	**Fixed Cost**	**Difference**
11	**Item A**	110	87	0	0	0	0	23
35	**Item B**	0	0	0	0	0	0	0

6. Case Study

We aimed to illustrate use of our approach in a company case to show the entire process of activity based costing. We simplified the illustration as much as possible for both academicians and business professional to apply the model in their studies or working processes. We defined following steps in our models to illustrate the entire process:

1. Front Cost Simulation,
2. Work Order Based Actual Cost,
3. Work Order Based Standard Cost,
4. Production Based Income Statement,
5. Customer Production Based Income Statement,
6. Actual / Standard Duration and Cost Comparison.

Conclusion

Activity based costing (ABC) method ensures to companies to manage their cost with better style. It shows companies to define their resources with more details by the activity. Thus it gives companies better, more accurate and more flexible data to reach companies activity results. Resources are very important for companies activities especially “overhead” term is very important element in order to reach full commercial cost beyond the production cost. Thus activities are very important part inside of full commercial cost. In the past companies have focused on just production cost however they have omitted overheads due to the production cost logic. Full commercial cost ensure to companies to see big picture regarding all activities at companies. Thus it gives competition benefit between companies and it is a best solution.

We reach through ABC technique not only the manufacturing cost but also full commercial costs of products as well as the costs of activities in a more realistic way. By using our method, managers are able to reach more

efficient cost management system via reducing variable costs. Thus it will ensure companies more competitive environment.

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