



## CHAPTER II

### THEORETICAL CONSIDERATION

#### 2.1 Introduction

*“Today’s management accounting information, driven by the procedures and cycle of the organization’s financial reporting system, is too late, too aggregated, and too distorted to be relevant for managers’ planning and control decisions.”*

*H. Thomas Johnson and Robert S. Kaplan*

(Source: Gary Cokins, 1996)

It is apparent that traditional costing systems actually hide problems and fail to identify opportunities for improvement as discussed in previous chapter. The underlying assumption of ABC is different from that of conventional costing. Conventional costing assumes that products drive cost directly. ABC, however, is more realistic. ABC assumes that activities drive cost and are driven by products or customers.

It is important to note that an ABC system does not replace traditional accounting system. Rather, it lies between general ledger and the end users, who apply cost data in decision making. The figure 2.1 illustrates that ABC serves as a translator that transforms cost data from general ledger into a new form of cost information, which can be used effectively in making product, channel, market, and customer-oriented decisions.

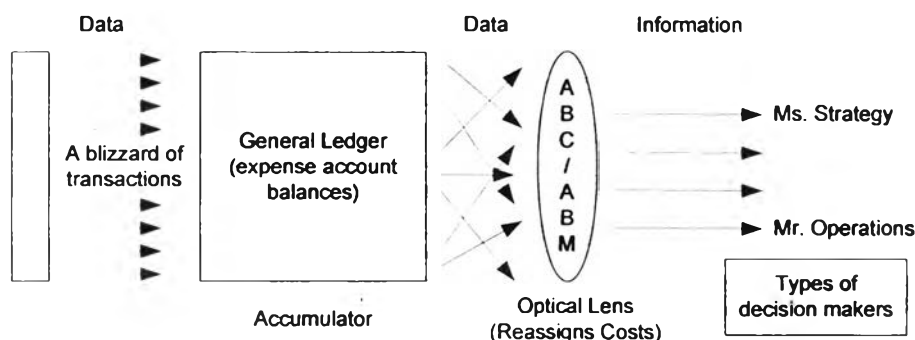


Figure 2.1 ABC/M does not replace the accounting system

(Source: Gary Cokins, 2000)

General ledger is transaction-centric. It is a good mechanism for collecting and accumulating transaction-intensive costs but not for converting costs into useful managerial information. ABC solves the general ledger's problem of unprocessed cost data. ABC is work-centric, which focuses on the work activities associated with operating a business. It supports process-based thinking that lead to smarter decision making.

## 2.2 ABC's FRAMEWORK

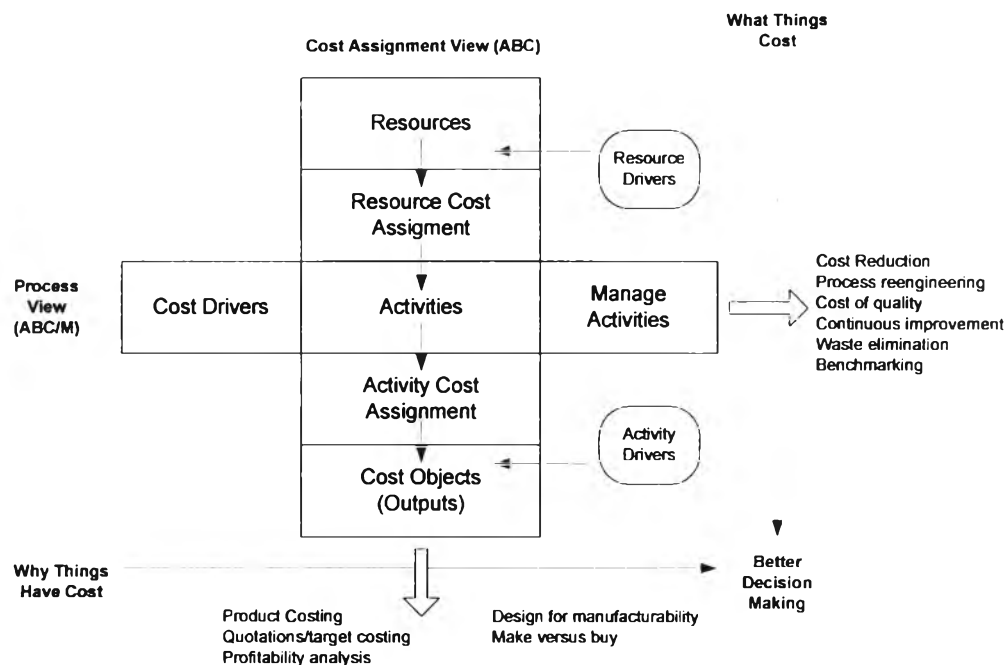


Figure 2.2 Activity-Based Cost Management Frameworks

(Source: Gary Cokins, 1996)

Figure 2.2 illustrates the popular diagram used to describe ABC/M framework. This diagram is called the ABC/M Cross. The diagram reveals that ABC has two dimensional views, The Vertical Cost Assignment View (ABC) and The Horizontal View (ABM).

### 2.2.1 The Vertical Cost Assignment View (ABC)

The cost assignment view explains what things cost and is called the cost object view. This view consists of three modules, which are resources, activities, and cost objects. This view represents the calculation of cost objects such as outputs, product

lines, service lines, or customers. It reveals how resources and activities relate to cost objects. The underlying assumption is that cost objects create the demand for activities, and activities, in turn, create the demand for resources. However, the demands create the flow of cost in opposite direction to the demand. Thus, cost is flown from the resources to the activities and then from the activities to the cost objects.

Cost flown from resources through cost objects is achieved by two cost assignment methods. The first is resource cost assignment. This method is assignment of resource costs to activities by using resource cost drivers as the mechanism to convey resource costs into the activity costs. The second is activity cost assignment. This method is assignment of activity costs to cost objects by using activity cost drivers as the mechanism to determine the quantity of performing activities required by cost objects.

### **2.2.2 The Horizontal Process View (ABM)**

In contrast to the vertical view, the horizontal view of ABC/M Cross explains why things cost, which provides insights into what causes costs to exist and how much processes cost. The horizontal process view represents business process view. A business process can be defined as two or more activities or a network of activities with a common purpose. Where activities belong to process, this view facilitates the calculation of the cost of business process. Activity costs are additive along the process and therefore can be accumulated into a total cost of performing the process. This ability is not available for traditional costing or general ledger.

The process view describes sequential of how individual activities relate to other work activities in a process, not to cost objects. How activity costs are initiated can be done by cost driver. The cost driver represents causal occurrence or event that causes the activity to exist and to utilize resources to accomplish some designated work. Performance measurement in terms of time, cost, and quality can then be established in order to monitor activity results and identify opportunities for improvement. In short, only ABC supports process-based thinking that leads to smarter decision making.

In summary, the vertical cost assignment view is very effective at capturing how the diversity of things, like different products or various customers, can be detected and

their costs reassigned by first measuring resources through their consuming activities and then into the form of final cost objects. In contrast, the horizontal view is very effective at displaying in cost terms the end-to-end alignment of activities of a business process. Since a process is defined as a sequence or network of two or more activities with a common purpose, a process' costs are additive regardless of an activity's defined level of detail. (Cokins, 1996)

### 2.3 ABC/ABM Implementation Roadmap

At first, it should clarify between ABC's implementation and installation. It is best to think of implementation as preparing for the project that brings about change whereas installation as setting up the software and the database interfaces. Remember that attempting ABC installation without first having success with the implementation is potentially unsuccessful. Figure 2.3 shows a simplified ABC/ABM implementation roadmap.

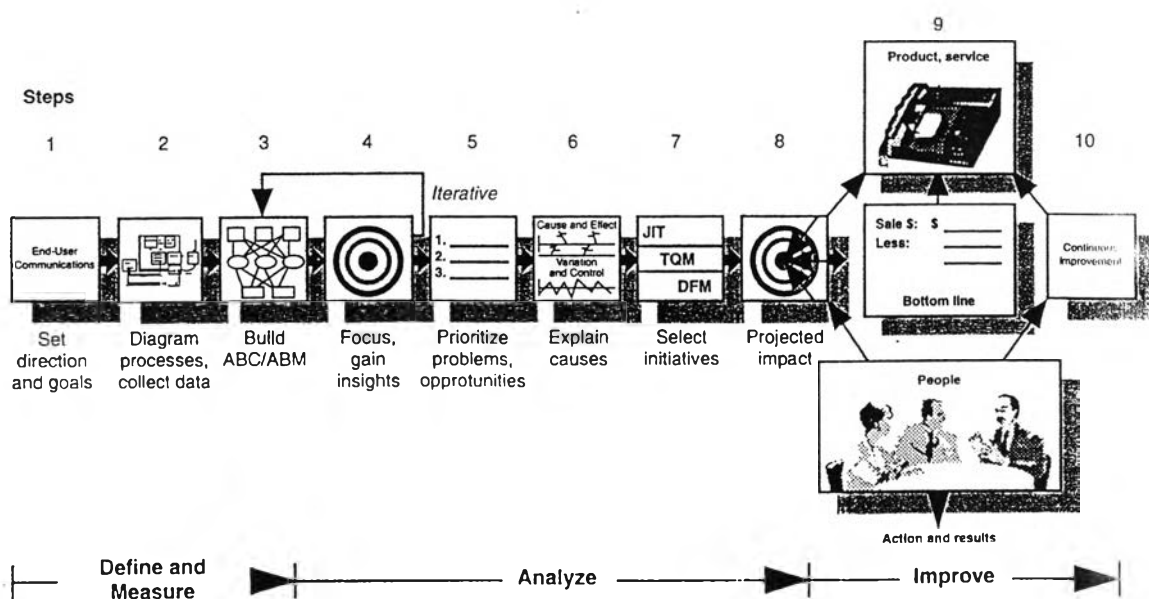


Figure 2.3 ABC/ABM Implementation Road Map

(Source: Gary Cokins, 1996)

Briefly, at the first step, the direction and goals must be set at the beginning and then communicated to key end-users. Making sure that they understand in what the objective is, why the company needs, and how ABC/ABM will make it better. In step 2, the business processes, activity model, at reasonable level of detail are created. The model can be created by using popular flowchart and process-mapping techniques. Be

careful about level of details, do not make it too summarized or too detailed. In step 3, activity dictionary or list are established by relying on activity model created from previous step. Resource cost information, for instances direct materials, indirect materials, direct labour, salary, electricity, etc., is collected by capturing from general ledger. Resource costs are assigned to activities and group them by business processes, and then activity costs combined as common groups called activity centres are further assigned into cost objects such as products and customers. Activities are scored by basing on impact ability, value-added content, etc.

In step 4, identifying the problems and opportunities for improvement and then concluding where to focus by considering what opportunities for improvement exist are performed. Those opportunities for improvement are prioritized in step 5. In step 6, popular diagnostic and analytical methods such as root cause analysis are approached to explain the causes for problems in the opportunity areas. Insights for alternative solution are clarified. In step 7, the opportunities are converted into actionable management by selecting specific improvement projects and initiatives, for instance JIT, TQM, etc., that provide solutions.

In step 8, the ABC/ABM data is used to test the potential financial impact of each project or initiative by quantifying the cost saving, cost avoidance, or revenue enhancement possibilities. Plans for changes in work flow and work content in the model are created. In step 9, making changes is performed by proceeding with altering product and service designs, changing people's attitudes, creating shared visions, restructuring work, reorganizing jobs, removing barriers, or altering the behaviour of suppliers or customers. Finally, in step 10, it is about evaluation whether an organization meets the goals of ABC/ABM implementation. If not, go back to one of the previous steps and refine.

Those 10 steps are an entire ABC/ABM implementation, not the installation. The entire ABC/ABM installation roadmap is actually in step 2 and 3. This will be discussed in next section.

## **2.4 ABC/ABM Installation Roadmap**

The installation roadmap consists of three major steps as follow.

### **2.4.1 Identifying Activities within Business Processes**

The first step of developing ABC is to identify activities within business process. Business process is comprised of two or more activities. A business process is defined as sequence or network of logically related work activities structured to provide outputs for customers. In this study, IDEF0 technique is approached to identify activities within business.

- **IDEF0 Technique**

IDEF0, International Definition, is a process mapping technique developed by the US Department of Defence. The following is the key features and objectives of IDEF0.

- It is a graphic al representation with strict rules on how the tool should be used.
- It enables a concise schematic of the system (or process) design and requirements.
- It should clearly communicate the system (or process) design and requirements.
- It enables a precise and detailed understanding of how the system (or process) works
- It enables a logical process of decomposition to be undertaken, providing a means to review the system.
- It enables the business processes to be modelled separately from organizational structures.

(Business and Operations Design WMG, 2003)

The model is constructed using five main components and is shown in figure 2.4.

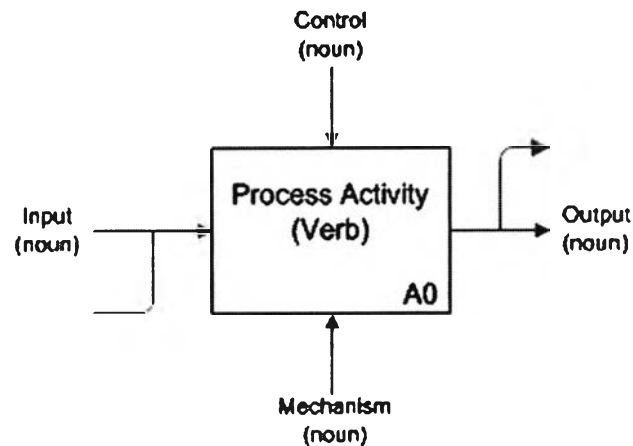


Figure 2.4 Activity Model Structure

- Activity Diagrams are the basic building blocks of the model. Each activity box or node represents a process or sub-process and has a written description in the Glossary. The rules for activity boxes and the four types of interfaces, Input, Control, Output and Mechanism (ICOMs) are represented in the diagram. The position of the arrows relative to the box will always determine the type of interface.

- The Context Diagram defines the process boundaries with its environment (scope) and purpose.

- The Node Index is a listing of all the activities or nodes in the IDEF0 model in outline order, which provides a written summary of the process hierarchy and a means of quickly locating specific activities.

- The Glossary provides text descriptions of all the activities and ICOMs in the model enabling text on the diagrams to be minimized to enhance clarity.

- For Exposition Only (FEO) Diagrams do not conform to the IDEF0 conventions but provide additional information that is felt important for specific process areas.

After identified, all activities are required to specify two keys information. Those are the type of activity and value-added content. Type of activity is a purpose that activities are served for or benefit to. Each activity will have its own purpose. Normally, type of activity is classified into product, customer, sustaining infrastructure and support. Note that, infrastructure sustaining activities is a group of activity does not directly contribute to product or customer value but organization. These activities are for instances “preparing required regulatory reports”, “create financial reports”, etc. The other key information is value-added content. Activities will be scored the degree of

value-added from 1 to 4 (high, medium, low, none). This key information facilitates managerial analysis and actions.

#### **2.4.2 Collecting Resource Costs**

The second step of developing ABC is to capture all relevant expenses that pertain to the selected model and processes. It means that the scope of cost data must be relevant to the scope of ABC implementation. In addition, time interval for capturing cost data must be clarified the start and stop date. Resource costs, for instances direct labour, direct and indirect material, salary, electricity and water, maintenance, tools & equipment, fringe benefits, etc., can be captured from general ledger or profit & loss account. This probably requires assistance from accounting staff to discover and trace the relevant expenses. However, resource costs captured may be too many and detailed. This does not facilitate performing cost assignment. Thus, they must be organized and group into appropriate form to encourage performing vertical cost assignment.

#### **2.4.3 Assigning Resource Costs to Activities (Resource cost assignments)**

After activities are identified and resource costs are organized, the next step is to perform the first step of vertical cost assignment called resource cost assignment. At this step, resource costs are assigned to activities (product, customer, infrastructure sustaining, and support activity). The assignment of these costs to activities can be done by 3 different methods.

- By direct charging, using existing measurements (e.g., charging repairs via a work order, metering fuel consumption, charging supply issues).
- By estimation (i.e., by questionnaire or surveying techniques).
- With arbitrary allocations; but these should clearly be resisted because they do not aid in better understanding or modeling the economics of the business.

(Source: Gary Cokins, 1996)

Figure 2.5 shows the first step of vertical cost assignment. Resource costs are traced to material, product activities, customer activities, infrastructure sustaining activities, and support activities. This assignment can be done by using resource cost drivers as the mechanism to convey resource costs to material and such work activities. In addition, there are activities consumed by other activities. Considering the support



activities, support activity costs are traced to other activities because they are not consumed by cost objects but other activities. The assignment of support activity costs to other activities can be done by using intermediate cost drivers as the mechanism.

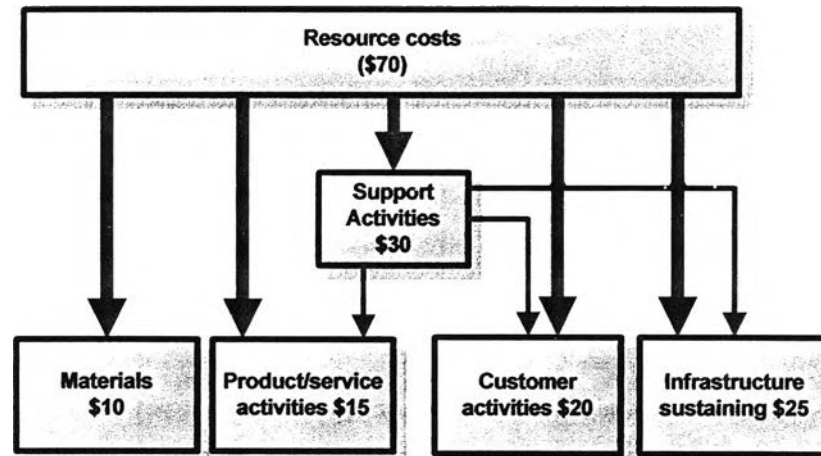


Figure 2.5 Assigning resource costs to activities

As figure, resource costs begin with \$70. It then reassigns to activities totaling to the \$70. It means that costs are net created or destroyed. Rather, they are assigned into appropriate locations.

#### 2.4.4 Assigning Activity Costs to Cost objects (Activity cost assignment)

The second step of performing vertical cost assignment called activity cost assignment is to assign activity costs to cost objects. The assignment can be done through activity cost driver. Activity cost drivers can be defined as any event that causes a change in the consumption of an activity by other activities, products, suppliers, or customers. However, determining each activity cost driver is tricky because it must be quantifiable and link each of the individual cost objects to the upstream activity or activities the cost object causes to exist. The following is the guidelines for selecting an activity cost driver.

- Avoid activity cost drivers for immaterial activity costs.
- Pick activity cost drivers that match the type of activity.
- Pick drivers that have a high correlation the actual consumption rate of its activity.

- Minimize the number of unique activity cost drivers because there will be diminishing returns in accuracy.
- Find activity drivers that encourage performance improvements.
- Pick activity drivers that are economical to measure, and avoid activity drivers that required new methods of measurement.

(Source: Gary Cokins, 1996)

Cost objects can be assigned to other cost objects for instance product costs object are assigned to customer cost objects as shown in figure 2.6. This assignment can be done by using cost objects driver. However, infrastructure sustaining activity costs are not caused by products or customer needs. The consumption of these costs cannot be logically traced to products and customers. If and when these costs are assigned to final cost objects, organizations that do so often refer to them as a management tax representing a cost of doing business apart from the products and service lines.

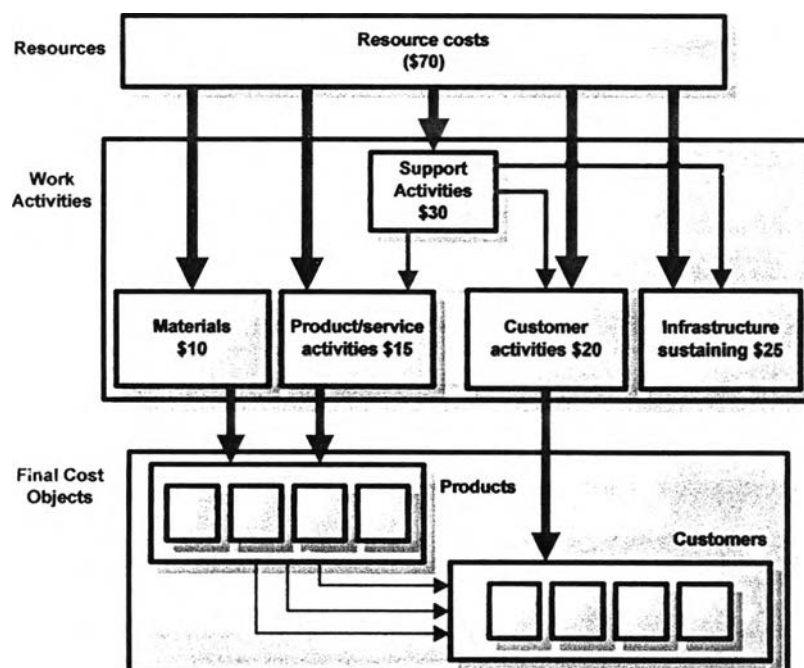


Figure 2.6 Cost assignment from resources to final cost objects

## 2.5 Activity Based Improvement

Using ABC data to improve a business is called Activity-Based Management (ABM). ABM is management analysis that brings the full benefits of ABC to an organization. In fact, ABC and ABM are made for each other. ABC supplies the

information needed to manage activities or business improvement. ABM uses this information in various analyses designed to yield this improvement.

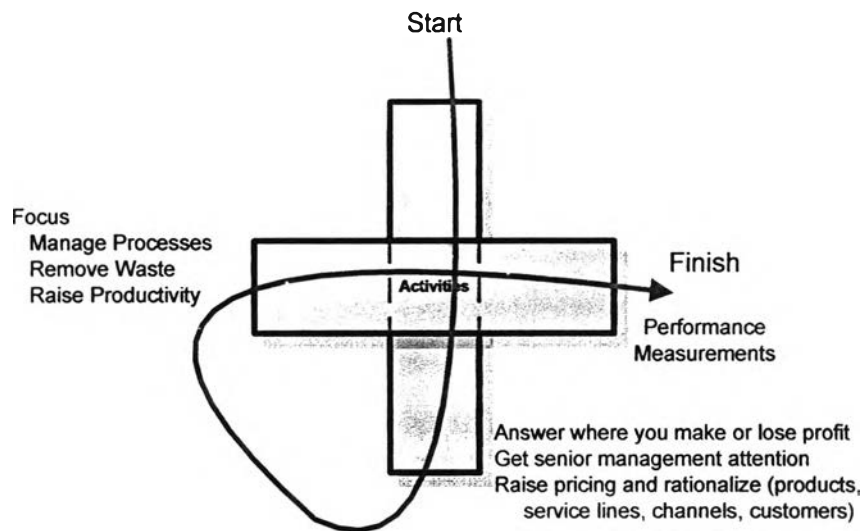


Figure 2.7 Time-Phasing ABC into ABM for a process view to manage

(Source: Gary Cokins, 2001)

Figure 2.7 indicates that organizations should first perform vertical cost assignment to discover how diversity and variation in products and customers relates to complexity and thus higher support costs. With that knowledge, they can next view the same activity cost in the context of the business process flowcharts.

### 2.5.1 Improving Activity Performance

Peter B.B. Turney stated that there are 3 steps to improving activity performance. The first step is to analyze activities to identify opportunities for improvement. Understanding why work is done, and how well it is done, is the key to eliminating waste. The following is the guidelines for analysis.

- Identify non-essential activities.
- Analyze significant activities.
- Compare activities to the best practices.
- Examine the links between activities.

The second step is to look for factors that cause waste (the cost drivers) and for ways to remove them. Understanding and managing cost drivers is critical success

factor for business improvement. Finally, the third step is to encourage and reinforce the right kind of improvement by measuring the important elements of performance. The reason is that activity and cost driver analysis is periodic. But activity performance goes on day-in and day-out. Performance measurement system is developed to ensure that on-going efforts focus on what matters to the organization.

### **2.5.2 Reducing Cost the Activity-Based Way**

Reducing cost the old-fashioned accounting way emphasizes on “managing by the numbers” while paying little attention to the underlying activities and customers who benefits. Many organizations attest to cutting costs by old-fashioned accounting way, but few achieve lasting savings. In some cases, costs have increased while employees complain about stress and increased work loads. In contrast, reducing cost by activity-based way, Peter B.B. Turney suggests that cost reduction is best achieved by changing the way activities are used or performed (managing the activities first), then redeploying the resources freed by the improvement. The following is the guidelines how to reduce cost the activity-based way.

- Reduce the time or effort required to perform an activity.
- Eliminate unnecessary activities.
- Select low-cost activities.
- Share activities where possible.
- Redeploy unused resources.

## **2.6 Literature Survey**

- **Sun Life Insurance**

The ABC system implemented within Sun Life Group Claims has helped to realize significant reductions in operational costs within the claims processing areas. The ability to compare the activities performed in different locations has allowed operations management to install best practices observed at each location throughout all the centres. The ABC information has acted as an important driver in implementing a measurement based management system, as well as helped realize concrete results. ABC has been a catalyst for change within Sun Life.

(Source: [http://www.focusmag.com/back\\_issues/issue\\_04/pages/bpbpte.htm](http://www.focusmag.com/back_issues/issue_04/pages/bpbpte.htm))

- **DETYA**

In 1998 DETYA commissioned Ernst & Young to survey Universities as to the adequacy of their costing information, to propose a costing methodology for higher education for discussion at a representative workshop and then to test an agreed methodology in three participating Universities. ABM costing methodology was proposed and trialed at Charles Sturt, Murdoch and RMIT in the areas of Faculty costs, Human Resources, and Facilities Management.

The study undertaken by RMIT focused on those costs associated with the use and maintenance of all property, buildings and grounds at the University. The scope and level of analysis were deliberately kept at a relatively high level, with only the major facility related activities being considered.

Being a preliminary study, some of the cost drivers used in the model are being progressively replaced as a continuous refinement of the model is undertaken and more appropriate drivers are identified. Given these assumptions, the preliminary results in this report should not be the basis for any management decision making and should only be considered within the context of a “pilot study”

An evaluation of the results of the project against the original objectives of the pilot study indicated that ABC can provide an effective cost management tool that can be readily applied and utilized within the higher education sector. In so far as investigating facility costs for a university, the methodology has given University managers a new perspective on these costs and has highlighted suspected areas that require further review the ABC methodology has quantified this cost for the first time.

The result of this pilot study support the use of ABC as an appropriate costing tool that can be applied to the operations of the university sector and provide university administrators with information to support their decision making. Subsequently the ABC Model is now used as part of the Occupancy Chargback and is also used in many other areas for improvements.

[http://www.tefma.com/infoservices/papers/2002\\_AAPPA\\_Brisbane/G\\_Bradley.pdf](http://www.tefma.com/infoservices/papers/2002_AAPPA_Brisbane/G_Bradley.pdf)

หอสมุดกลาง สำนักงานวิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

- **Fish and Wildlife Service**

Budget deficits and mandates such as the President's Management Agenda (PMA) have placed increasing pressure on government agencies, such as the FWS, to better understand, explain, and control its costs while improving performance. Like many federal organizations, FWS has found that its traditional information systems do not always provide a clear picture of the information FWS needs to support strategic decisions, operational improvements, and reengineering efforts—information FWS needs to stay productive and competitive.

Coordinating with various DOI initiatives, FWS leadership resolved this missing link between financial and operational information through its Activity-Based Cost Management (ABC/M) initiative. ABC/M provides greater insight into true operational costs and illuminates options to improve ways of doing business. Rather than report costs just by object class or division, ABC/M goes a step further by assigning resource types to work activities so they can be viewed from a process perspective. With ABC/M, operational and front-line managers no longer need an accounting degree or MBA to understand and manage costs effectively.

(<http://www.fws.gov/planning/ABC/introduction.html>)

- **Fleet and Industrial Supply Center (FISC)**

The Navy's FISC in Norfolk, VA is trying to increase efficiency in their operations and justify their budgetary requirements. Supporting the effort, CACI, an innovative solutions provider, helped define how costs flowed through their organization. First, CACI developed ABC models for two functional areas responsible for setting rates to charge customers, allowing FISC to capture all the costs involved in providing reimbursable services. This phase of the project helped FISC establish and justify more accurate rates.

Next, CACI moved forward enterprise-wide, constructing a high-level ABC model for all FISC processes and activities. The model focused on capturing how their costs, especially overhead, flowed from one department to another and eventually to the products and services. The ABC model was instrumental in helping FISC decide how to realign their organization along product lines, streamlining their entire operation. CACI

has since introduced its web-based tool, ABCAT, and we're developing a data warehouse to use with FISC's executive level decision support system.

[http://www.caci.com/business/systems/abc/abc\\_case\\_studies.shtml](http://www.caci.com/business/systems/abc/abc_case_studies.shtml))

- **Naval Warfare Assessment Station**

The Naval Warfare Assessment Station (NWAS), headquartered in Corona, California, manages the instrumentation for the Tactical Training Ranges for the United States Navy. Seven ranges are spread across the country in Arizona, Nevada, Virginia, North Carolina, South Carolina and Florida. The best known of these is the Navy combat pilot school, formerly known as "Top Gun", in Fallon, Nevada.

Faced with diminishing appropriations for training facilities and an increasingly competitive business development environment, NWAS conducted a one time activity-based costing (ABC) study to measure the true cost of operating and maintaining their range instrumentation. This information provided valuable insights into both their operating efficiencies and inefficiencies. The ABC data helped to strengthen their business development efforts and provided their customers with a better understanding of the cost of operating the range sites.

The ABC study proved the value of activity-based cost information and in 1999 NWAS decided to implement an Activity Based Management (ABM) system that could provide activity-based cost information on a continuous monthly basis without assistance from outside consultants. Since the models would be updated each month, it was very important that the process of updating the data be made as simple and fast as possible.

<http://www.leadsoftware.com/nwas.html>)

- **Initial Friswit**

At Initial Friswit the ABC/M solution found was built based on and around Activity Analyzer. Initial Friswit is a leading company specialized in renting and maintaining a broad range of linen and company garments, of material appropriate for sanitary rooms and special anti-dirt and anti-dust mats.

As many others, we also were confronted with the tension between the calculation of decision support and the management of the organization at Initial Friswit. Because of the coherence and uniformity in communication, we wished to start from an equal base for both objectives.

In this view it was more than obvious we chose for ABC and ABM. Performance objectives inspired on features of company activities such as cost, timeliness and quality are strongly motivating for the management. Activity-based cost calculation and profitability analysis give an input for short and long term decisions in the field of acquisition and retention of products, clients and specific orders.

(<http://www.leadsoftware.com/initial.html>)

- **VPK Packaging Group**

VPK Packaging is an integrated packaging manufacturer. The Group manufactures and distributes packages (corrugated cardboard, massive cardboard and cardboard cases), recycles paper and produces packaging paper. With 1750 employees and a group return of over 12 million Belgian francs, VPK is one of the top European Packaging Producers.

The group counts 15 companies, organized in business units. The Oudegem Papier division yearly recycles 300.000 tons old paper to qualitative paper for packages for the Belgian and European market. Next to the capital-intensive character (one paper machine costs around 2.5 million Belgian francs) in manufacturing paper, the vision of Oudegem Papier is central: low cost, high quality. This means on the one hand cost control (e.g. by scale effects) and on the other hand a service level as high as possible (e.g. logistics). Also the realization of synergies with group companies and customers became an important part in a competitive environment. This results in specific needs of the cost (price) system.

In June 1998 started the ABC project aiming at following objectives: specifying costs, calculation of the contribution of products and customers in rentability and a better support to the budgeting process. In an experimental phase of 6 months, the project group built a first model in Activity Analyzer. We were able to build an ABC model that charges the main parameters, which are so typical in paper production, in



calculating cost prices. The model aligns to the existing information systems (e.g. analytical accounting).

After the implementation of the first basic version was clear that the job was far from done. The module Business Analyzer (budgeting) and the Visio Toolbox (process modeling) will allow us to make optimal use of the advantages of ABM and ABB. Other future developments are implementing Activity Analyzer in other group companies and establishing the link between the results from the ABC model and the Executive Information System.

<http://www.leadsoftware.com/vpk.html>