Chapter 2

Theoretical Consideration

2.1 Activity Based Costing

Activity Based Costing or ABC is an essential part of the functional process improvement and reengineering effort since it captures quantified cost and time data and translates this into decision information. ABC measures process and activities performance, determines the cost of business process outputs, and identifies opportunities to improve process efficiency and effectiveness. Qualitative evaluation and determination alone is totally inadequate as what is cheaper and faster. It is the integration to these two dimensions that is the critical decision support element of total process. In other words, ABC is the mechanism to integrate these two views.

ABC is a technique to quantitatively measure the cost and performance of activities, resources, and cost objects, including when appropriate, overhead. It also captures organizational costs for the factors of production and administrative expenses and applies then to the defined activity structure. Although the method may be as rigorous as a definite mathematical distribution but ABC is a process of simplifying and clarifying decision.

Therefore ABC is a process of simplification, not complication and is a powerful tool for measuring business performance, determining the cost of business process outputs and as a means of identifying opportunities to improve business process efficiency.

2.1.1 The use of ABC

ABC provides analysis information for consideration and evaluation of the process of the organization activity model. It is a specifically intended to further the accomplishment of the objectives of the functional process improvement, which are to:

- Reconfigure the current organization into an activity structure.
- Select an "as-is" process flow for review and improvement.
- Make radical changes to develop a "to-be" process flow dramatic improvements in performance

ABC functions in this process and enhances the analysis of selected opportunities and alternatives by gathering and interpreting existing organizational costs and translating the cost data into the activity structure. It also provides a meaningful appraisal of the identified activity cost along several dimensions.

2.1.2 ABC Methodology

The Department of Defense (DoD) of US (1995) stated the methodology of ABC has five steps as follows:

1. Analyse activities

The first major step "Analyze Activities" in the ABC process is preparatory. It must be decided how large the activities scope will cover. Besides that, it must also determine whether a given activity is value or non-value added, primary or secondary which means whether that activity support the organization's mission or support the primary activities and required or discretionary which means whether that the activities are those that are always performed or need to be allowed by operating management.

The name, "Activity Based Accounting", implies that the managerial cost data cannot be applied until the activities are defined for the organization model or the selected portion of the organization under review by the project team. The creation of the activity model is not traditionally considered as an integral part of the activity accounting structure, but cost allocation cannot take place with it, hence it is the first step, and therefore, necessary knowledge to the activity account.

The Activity Model

An activity model is a tool to assist in understanding and defining the organization since it realigns the resources and managerial effort along the real functions of the organization rather than the structure of the organization elements. The basic modeling techniques for functional process improvement are IDEFO for process modeling. While for the business rule or data modeling uses IDEF1X as the basic techniques.

Analyzed Activity

The first step defined in the ABC process is the activity "Analyzed Activity". An activity which is identified in a process flow or activity model represents all of the effort that it takes to perform the identified task by subdividing into subordinate activities, which will enhance detailed understanding and further define the work done to complete this task.

The activity interacts with other activities in the process flow and activity model by processing inputs (materials or information) from other activities or outside the organization and has output (products or information) which other activities or the ultimate customer uses. While outputs are produced using resources (mechanism) within designated restrictions (controls and standards).

Restated, "*An activity is the transformation of inputs into outputs performed by mechanisms under the constraints set by controls.*"

Developing the Activity Model

In developing the activity model, the project team usually possesses subject area knowledge of the organization or project area to be analyzed model which normally does not include accountant unless that individual is otherwise a member of the project team. Through interviews with other subject matter experts within the organization and from other available relevant materials, such as existing documents or results of previous Total Quality Management/Total Quality Leadership (TQM/TQL) project, the team's knowledge is augmented and validated.

Usually an accountant is not needed in the project area but it would be more efficient if he/she can participate as an observer or non-voting participant from the very beginning since it allows a full understanding of the model and many of the assumptions, which were used in its construction. In the later stages of ABC when costs and costs drivers are under development for each of the activities, the innate understanding becomes very critical because it provides opportunities to ask for

more complete definitions of terms and activities at the time they are created and serve as another set of eyes for the project team.

The Scope of the Activity Model

After deciding to undertake a business or functional process review, the next step would be to decide to what extent the organization will be affected since it is extremely critical to the ultimate success or failure and credibility of the ABC allocation. The application of costs to the activity model from the current organizational structure accounting system will be more uncomplicated and supportable if the activity model as a portion of the organization becomes more comprehensive.

A narrowly defined project may make the allocation of costs nearly impossible or at least far more creative. However it is easier to reapply total costs when the entire organization is involved due to the accounting systems that capture and assign resource costs to the total organization structure. The total costs are a closed system when the whole organization is included which allows increased control to ensure total allocation. On the other hand, it is more difficult to allocate overhead costs for the total organization, when only a portion of the organization is under review.

A full organization or "enterprise" model is the best approach when there is time and capability within the team. Several particular advantages include:

- All missions and objectives of the organization are considered for inclusion. Since there is a restricted definition of the project or a misunderstanding by the project team members, major components are not accidentally overlooked.

- The total model easily interfaces external inputs and outputs. Smaller projects often mistake the source of their inputs and do not detect a direct link to an external customer when the borders of the model are arbitrarily restricted.

- An all-inclusive model allows total participation of the organization's members. There is much to be gained and learned from simple but properly constructed activity models, even when a team is not working on the particular section. This will contribute to acceptance in the later stages of a major reengineering effort.

- A single organization activity model allows for more than one project team to be in operation at the same time without each constructing

different perceptions of the organization. The single model serves to keep all individual initiatives to be targeted into a coordinated plan.

- The model can serve as a guide for future projects, even if other teams will not to be operation. The completed and validated model will act as a set of guideposts for future initiatives and projects without duplication of the previous effort.

If there is a total enterprise model from which to capture and assign costs, the entire ABC process becomes much easier for the activity accountant. In the later stages of the process, it will be clearly seen that overhead is the most difficult portions of cost to capture and distribute and it would become even more difficult when there is no basis for allocating costs (from the total organization's accounting system) into a partial model. Many of these inefficiencies in the existing accounting system can be overcome if an all encompassing strategy is in place for identifying and allocating from the total closed system.

2. Gather Cost Data

The second major activity of the ABC process is "gather cost" which usually performed concurrently with the activity analysis step that result in reducing the

programmer's total elapsed time. Gathering cost is capture all relevant expenses that pertain to the selected model and processes which may cover capturing, constructing or synthesizing the correct cost figures to support the costing of the activities.

Scope of Cost Data

The scope of the activity model and processing under review will help defining the scope of the data required. For the partial model, it will be all direct costs for the selected activities plus some portion of the total overhead costs. It is important to apply professional judgment when selecting the data and the source to be used.

Objective

Start from the lowest possible structural layer, the costs should be gathered and allocated within the organization since having all of the costs as the lowest level greatly facilitates translation from the organization to the activity model. Costs are usually allocated based on interviews with managers on the function and estimates become more reliable when managers are closer to the actual work. Therefore the objective is to align cost data at the lowest organizational element that will lead to less difficulty later when allocating costs in the activity model.

Credibility of the Cost Data

Usually cost data is not perfect for ABC analysis and distribution. Traditional accounting systems are just not adequate and available cost data will have to be adjusted for change, corrected for undocumented element costs, or combined with different types of data from alternate sources which added complexity to the process.

It is crucial to remember that the resultant cost of activity model is not a "true" cost throughout the activity accounting process, rather it is a "representative" cost drawn from existing information. ABC costs serve as a basis for comparison and fairly represent the best approximate cost that can be determined. Therefore the data is credible for comparative analysis. Besides that, it must borne in mind that the costs assigned to activities and processes are the best professional estimates available and are intended to support comparative analysis.

Timing

There are two basic points relating to timing of the data collection process that need to be considered:

- When to begin data collection: The gathering of the actual organization costs can begin as soon as the scope of the activity model is determined.

- Amount of time that will be appropriate and sufficient for data collection: The best time frame to look for an appropriate and sufficient amount of data is the first previous full fiscal year and, when possible, the two previous full fiscal years.

Sources

The major source of cost data would be the accounting records, but they are not the only source as there are lots of meaningful information available throughout the organization including:

Accounting Records: There are various types of accounting records such as organizational accounting, budgetary accounting and traditional cost accounting.

Organizational Accounting: The organizational element accounting system will have direct costs associated with organizational elements. Overhead costs typically will be assigned to a single element within the organization for control and payment that could be more than one element. For indirect costs, it must undergo two

translations, which are organizational structure and the organizational structure to activity model.

Budgetary Records: ABC can be used in the place of accounting direct costs. The indirect cost normally will be budgeted to a single location rather than divided.

Cost Accounting: The traditional cost accounting system will yield an abundance of usable data for example, the greatest benefit will be that indirect costs will be identified separately and are available for distribution into either cost centers or organizational elements.

Budgetary records: There will be budgetary records maintained separately from the accounting systems.

Miscellaneous Records and Reports: Organization will have various records and reports from past actions and initiatives that may be kept in the record workflow, specific costs or the usage of major pieces of equipment.

Categories

For the activity model, there are multiple categories of costs that must be captured and identified. The objective of categorizing is to obtain the best set of comparative and meaningful data available from existing data sources. The major categories of costs will be identified below:

Labor: Personnel cost is the most significant variable expense of the organization which may be as much as 60-80% of the total organization costs. There are two data components of the labor force to be determined, number of employees and cost of labor. There are several factors to be taken into consideration when gathering the cost of labor as illustrated below:

- Salaries and Hourly Wages: The basic salary of yearly wages is the largest cost of the labor force. The actual amount of salaries from the accounting system is usually the best source. If for any reason this is skewed or cannot be subdivided, a standard payroll rate by grade and classification for the actual employee strength may be used.

- Pay Increases: This represents the best known cost for the period under consideration.

- Fringe Benefits: Fringe benefits are normally calculated as a percentage of the basic labor cost.

- Overtime: Overtime must be analyzed before it is used in the calculation. Overtime spent for emergencies and one-time events should not be included, since this will overstate the true cost of continuing operations.

- Vacancies: Unfilled positions of the past normally should not be taken into consideration since their will always be some position in the organization that is unencumbered.

Supplies: This kind of costs for supplies is normally easy to find, as it is one of the categories that management typically tries to keep under control. The only difficulty may be that the amounts are not divided down to the lowest level of the organization.

Rental Equipment: This kind of expense is a variable expense that can be readily eliminated with organizational changes. If more than one element makes primary use of equipment, it will be allocated based on use.

Direct Materials: These kinds of materials are used in the direct production of output and there are assigned to the organizational element that adds them to the process. These costs are simple to calculate but should not be confused with supplies.

Facilities: Depreciation could be the type of cost of facilities that are distributed since represents the cost of using the facility. However for the maintenance cost of running the facilities are usually captured in overhead expenses.

Overhead Expenses: These types of cost include such as utilities, maintenance, security and so on. They must be identified for applicability and a relationship. Since many of the accounting system used tend to consolidate these costs or pay them

centrally, there are often problems with defining and documenting separate amounts by type.

3. Tracing Costs to Activities

"Trace Costs to Activities" combines the first step "Analyze Activities" with the second step "Gather Costs." It brings together the results of analyzing activities with the gathered organizational inputs and costs and then produces total input cost for each activity. Despite it is a difficult mathematical formula but this meshing and allocation procedure will require the full measure of analytical skill and experience from the team members since they represent the best selection costs, decide the procedural priorities, and track appropriate organizational costs to every activity. Each activity will convert inputs that are the resulting costs that represented resources into outputs.

General Data Flow

The general flow of cost data from the organization to the activities is done as a series of distributions, redistributions and allocation. Each organizational element costs that were identified must now be divided to the pertinent portions of the organization

and then allocated to the activity model. The entire flow can be broken into the following six phases below:

Phase 1 – Identify organization costs

By using various sources from within the organization, all the costs were identified and documented. This entire phase was accomplished in the second activity step, "Gather Costs."

Phase 2 – Distribute organizational cost to the organization structure

The identified costs were divided up into the existing organization structure which is already accomplished in the second activity step, "Gather Costs"

Phase 3 – Identify categories of organizational elements

Usually in each organizational, its element serve one of three functions: managerial, or operational. Assignment or reassignment of cost depends on which category is selected which would allow distribution rules to be applied and costs reassigned to areas where ultimately they will be allocated in the activity. Each function will be described as below:

- **Managerial:** These elements serve as the leadership and coordination of the organization. The contribution of the management personnel along with their small support staff does not go directly to the organization's output so it must be distributed to the operational elements that do. In addition, operational and support elements also have managerial personnel within their elements.

- **Support:** This element does not contribute directly to the output but it performs important services that benefit the entire operation. These functions are important in order to simple internal operation, which consist of elements such as: payroll, accounting, automatic data processing, and so on. Therefore, costs for these internal requirements must be redistributed to the operational elements that they support.

- **Operational:** This element consists of ones that do the work of the organization and contribute directly to the outputs which are usually referred to as the first-line or production at the lowest level of division on the organization chart.

Phase 4 – Select the appropriate level of representative costs

A critical decision must be made to select an appropriate tier of costs in the stage of allocation process. This decision defines the level of effort, which will be made to capture and identify the organizational costs. Each tier includes a progressively greater percentage of the total costs, which are;

- Direct cost: Direct costs are the first tier that has an apparent relationship to the organizational element plus the allocated managerial costs. It does not include support costs and organizational overhead.
- Incremental costs: All of the costs of the first tier plus the support costs of the organization become the second tier. This represents a larger portion of the total costs and a truer representation of the actual costs, which include over ninety-five percent of the total organizational costs.
- Full costs: A full cost which is the third tier includes all of the organization's costs which are direct, managerial, support, and general overhead. It has the capability of producing the approximate full cost of the output and all of the activities, which is also misleading that this can be easily accomplished and still be a representative cost. This is the concept that would be employed to establish and maintain a fully functional activity-based

accounting system rather than to capture costs for a project. Therefore, it is rarely used and is not recommended for functional process reengineering projects.

Phase 5 – Redistribute organization costs to operational elements

For the cost distribution decision, some rationale will be selected which represents the relationship between the cost and the elements where the work is performed. The selected factor will be used to divide the pertinent cost and distribute the parts to the remaining organizational elements.

Phase 6 – Allocate final distribution costs to the activity model

There is no direct objective relationship between the activity model and the organization structure that can be observed or measured since the division of the final organization costs to the activity model is more of a subjective procedure. Therefore, the final distribution relies upon the judgment and knowledge of the operational element.

4. Establish Output Measures

"Establish Output Measures", changes the focus from the macro-view to the detailed level – the activity. This step calculate the activity unit cost which each activity may have multiple output but only one output will be identified as the primary activity output. Up until this point, all effort has been aimed at interpreting existing structure and cost data into the newly created activity model. Now it is time to examine the components of the activity and see how these pieces of information will be used as a source of improvement in the evaluation analysis.

Usually, while converting inputs to outputs, activities always consume resources. On the other hand, from the organization view, outputs consume activities during their creation. Therefore, the matter at this point is how to measure the consumption of the activities that go into the outputs by considering two points:

- How much of the cost of an activity is used for a unit of output?
- How much time, actual and elapsed does it takes for one unit of output?

Direct answer of how many, how much, and how fast information needs of management and the ABC project team are served by activity or output which is ABC device. Since these output-activity relationships drive the cost of the activity during the

creation of the output, they are also known as output drivers. Output measures display cost and time relationships of the individual activity and its output. Using these measures allows the cost and time requirements of output to be calculated and evaluated on an individual and comparative scale.

Creating the Output Measure

Within a single activity model of any design, there will be a multitude of different types of output measures in order to form some sort of procedural control to ensure consistency and utility. Therefore, the determination of an activity output measure is an iterative process that must be repeated for each individual activity within the model. A standard approach is required to guarantee the compatibility of the process in order to ensure consistency from activity to activity. The following five-step approach is effective in extracting the key factors required:

Step 1 – Analyze Activity Output and Performance

This first step is a complete review of what the activity does and what it produces. The results will be information that can answer the following questions:

- What the activity output is
- How long it takes to produce the output

Step 2 – Select the Output Measures

By using the analytical information from step, a decision on picking the output measure will be required. An ideal output measure is easy to understand, relatively simple to objective measure, available from existing information sources, and directly related to the activity's output. It should also be economical and pragmatic.

Step 3 – Determine the Activity Output Costs Per Unit of Output

In this step, it uses the amount of output measure that was selected in step 2 and the total cost of the activity that was calculated in previous parts of the ABC process. This is a mathematical calculation.

Step 4 – Determine the Time Requirements

Information was gathered on the amount of time required to create one unit of output during the analysis in step 1. This data should have been captured and recorded in two parts: the first part is the amount of actual time, and the second part is the total elapsed time to complete one unit of output including all of the normal time delays.

Step 5 – Document the Output Measures

For the validation of the reengineering project, every step taken and decision made should be documented. The documentation for output measures should include at a minimum:

- The identification of the activity
- The output-definition and measurement criteria
- Procedures used to determine cost per unit of output
- Actual and elapsed time measures – how they were measured and validated
- Any special information or considerations – additional data that may be important to an evaluation

5. Analyze Costs Data

This is the final step that uses the calculated activity unit costs and bills of activity to identify candidate improvements to the business processes. "Analyze Costs" is the culmination of all measurements and calculations that have occurred. As mentioned before, in this stage, the activity model and process flows, in conjunction

with its cost and time measurements, will be reviewed and analyzed in depth to determine the candidates for improvement that are the hallmark of the functional process review methodology. This step is relatively open-ended with undefined specifics, but will yield results equal in proportion to the amount of effort applied.

Identification of Change Opportunities

The identification process begins when the activity model is constructed. The objective of the Functional Process Improvement methodology is improving the processes and activities. There is no set pattern or procedure for finding or discovering change opportunities therefore it is an entirely creative process.

In selecting possible change opportunities, there are two basic areas available for review. The first is the activity model and the second is the process flow. The ABC process has collected and stratified several bits of information about the activities in the activity model, which can now be applied to both. Below is a list of the characteristics, which are now available for review.

The Activity Model

- Total cost of the activity - The sum of all mechanisms employed within the activity to produce output.

- Cost driver – The measure of activity output which quantifies what is produced.

- Elapsed time – The total amount of time it takes to produce one unit of output to include all normal delays.

- Cycle time – The actual time it takes to produce one unit of output not including any normal delays.

The Process Flow

- Total cost of the activity – The sum of all mechanism employed which the activity to produce output.

- Cost driver – The measure of activity output which quantified what is produced.

- Elapsed time - The total amount of time it takes to produce one unit of output to include all normal delays.

- Cycle time - The actual time it takes to produces one unit of output not to including any normal delays.

The Process Flow

- Total cost of the process – The sum of all activities employed to complete the process.
- Cost of output - The sum of the entire cost driver determined costs applied tom the output as it passes through the activities.
- Total elapsed time of the process – The sum of elapsed times of the activities in the process flow.
- Total cycle time of the process – The sum of the actual times of the activities in the process flow.

Tools for Review Process

- Pareto Analysis
- Benchmarking
- Best Practices
- Value Added Analysis
- Comparative Analysis
- Cost Benefit Analysis
- Economic Analysis

- Functional Economic Analysis (FEA)
- Structured Approach to Analysis Costs
- The Bottom Line

2.2 Activity Modeling

IDEF or integrated definition methods are a structured approach to enterprise modeling and analysis. They are used to perform modeling activities in support of enterprise integration.

The original IDEF methods were developed for the purpose of enhancing communication among people who needed to decide how their existing systems were to be integrated which was the result of the U.S. Airforce Program for Integrated Computer Aided Manufacturing (ICAM). The aim of the ICAM program was to increase manufacturing productivity through the systematic application of computer technology.

There are six variants of the IDEF methodology, which were defined for specific purpose as following.

IDEF0 - The Function Modeling Method. It is designed to allow the description of a system's functions through the process of function decomposition and categorization of the relations between functions.

IDEF1 - Information Modeling Method. It is designed to allow the description of the information that an organization deems important to manage to accomplish its objectives.

IDEF3 - Process Flow & Object State Description Capture Method. It is developed to support the structuring of descriptions of the user view of the system.

IDEF5 - Ontology Description Capture Method. It is developed to serve bas a method for fact collection and knowledge acquisition.

IDEF1X - Data Modeling Design Method. It is developed to assist in the design of semantic data model.

IDEF4 - Object – Oriented Design Method. It is developed to address the need for a design method to assist in the production of quality designs for object-oriented implementations.

IDEF0

IIDEF0 is one of the most widely known tools for functional modeling. It is a top-down hierarchical method, which provides a description of functions and processes in manufacturing.

IDEF0 models are made up of three district components, which are diagrams, text and glossary all crosses-referenced to each other. Each diagram represents

activities in a pictorial form and is the most important element of any IDEF0 model. The codes that are used for graphical representation are ICOM (input, control, output and mechanism) and each diagram can be decomposed indefinitely, depending on the level of detail intended. For each diagram, there is supporting texts, designed not repeat information presented in the diagram but rather to annotate and elucidate. Then, a glossary is provided to ensure that terminology used is meaningful across functional and organizational boundaries. The typical figure of IDEF0 is shown in Figure 2-1.

As IDEF0 is a top-down approach, it is a appropriate tool for the visualization of complex systems and so provides a structured representation of the functions, information and objects which are interrelated in a manufacturing system.

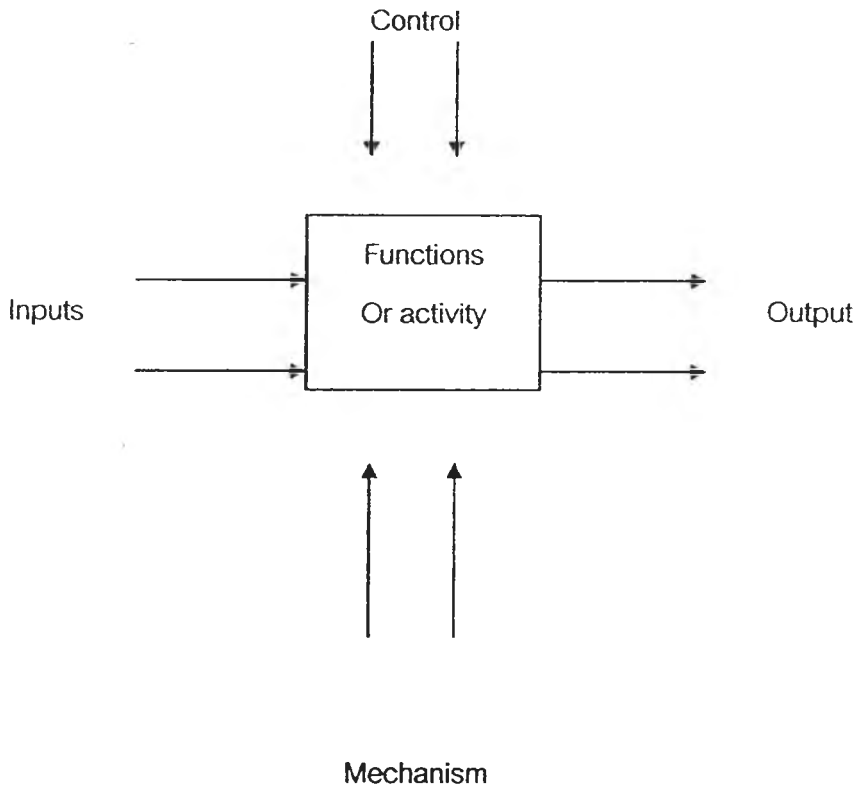

FIGURE 2-1: Typical IDEF0 model

IDEF0 model

Inputs and controls are objects or data required performing an activity as following

- Controls trigger an activity or modify an activities behavior represents by an arrow enter the box from the topside.
- Inputs are objects or data that are transformed by the activity represent by an arrow enter the box from the left-hand side.

- All activities must have at least one control arrow but may not necessarily have an input arrow.

Objects and data resulting from an activity are outputs and are represented by an arrow leaving the right-hand side of the box. The mechanism by which an activity is performed, is represented by an arrow enter at the bottom of the box.

Determining Activity Costs Using IDEF0

As mention in the beginning of this chapter, there are five major steps that must be performed as a part of ABC. These steps are generally performed by the core team; a small group of people working full time on the program which take can anywhere form a few days to a few weeks.

The diagram below illustrates the five steps in the node tree, as shown in Figure 2-2.

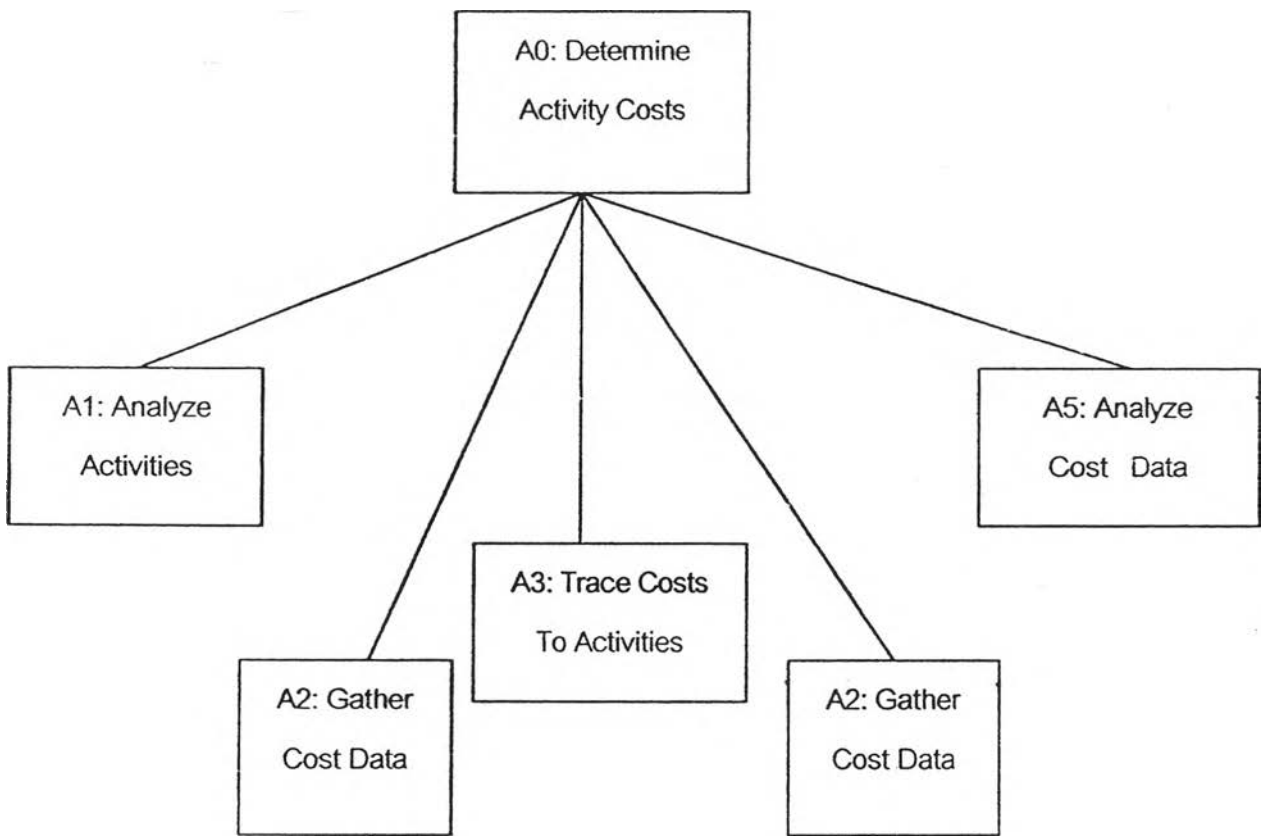

Figure 2-2: Node tree of determine activity costs (Sources: www.c3i.osd.mil)

Refining IDEF0 Activities for use in ABC

An IDEF0 activity is in a refined state for use in ABC analysis when:

- It acts on at least one input or one initiating or triggering control
- It consumes the resources, or factors or production, supplied by at lease

one input or one mechanism

- It produces at lease one output therefore when an activity produces more than one output, only one output must be declared as primary activity output with all others being byproducts.

- When selecting the primary activity output, it will be the output whose variability is most directly proportional to the variability of its factors or production.

- The primary activity output is measurable and each unit of output has equal intensity. That is to say for any given time period each unit consumes from its cost pool the same amount of cost in the same proportional to cost elements.

Literature Survey

Since this study is involved in the creating activity and switching the traditional costing system to an activity base costing. Additional to the study, the further requirement is to develop to Activity Base Management. Therefore the literatures use to construct in this study are:

Edward J. Bloch, Kung H. Chen, Thomas W. Lin. [1] Cost Management 1999

This book describes the environment of the contemporary business environment and introduces the strategic role of cost management and how to develop strategic. This book explains the linking of cost management to the development of 10 new management techniques such as total quality management (TQM), target costing, benchmarking, continuous improvement, activity-based management, reengineering, the theory of constraints, mass customization, target costing, life cycle costing, and the balanced scorecard. Under the competitive strategy framework of Michael Porter's the company can generate their strategy of cost leader, focus, differentiation, and penetration including the identification and measurement of critical success factors.

Addition to this book, the basic cost concepts, cost drivers and the relation to four management functions: A) strategic management, B) planning and decision making, C)

preparation of financial reports, D) management and operational control which cost management will apply to each functions. Due to this emphasis on cost management, the Activity-Based Costing and Management is more effectively integrated to the actual cost of operations, cost estimation, cost volume profit, and decision making.

The activity- based costing is a costing approach that assigns costs to products or service based on their consumption of the resources caused by activities. ABC helps firms reduce distortions cause by the traditional costing system and obtains more accurate product costs. Meanwhile activity-based management (ABM) focuses on managing activities to promote business efficiency and effectiveness and to increase not only the value received by customers but also the firm's profit.

Don R. Hansen, Maryanne M. Mowen, [2] Management Accounting 1997

This book describes the fundamental management accounting through the scenario of the real world cases related to the management accounting in order to develop the decision-making skills. This book introduces a new management accounting concepts on its history, role and direction of management accounting. The basic cost concepts consist of cost assignment (Direct Tracing, Driver Tracing, and Allocation), product and service costs, external financial statements, activity drivers and cost behavior and traditional and

contemporary management accounting system. After the basic cost concepts, this book provides activity cost behavior and the resource usage model. This book also compares traditional costing system approach and activity-based costing. The activity-based costing is the new approach of costing system, which break through the limitations of the traditional cost accounting system. The activity based cost system produces more accurate product costs and could apply with JIT environment. Addition to the approach of costing systems each type of businesses have some different on costing methods, process costing or job order costing, the selection are depended on their working environment. The other part of this book provides the planning and controls perspective. The standard costing, quality cost and performance measurements are the fundamental element of the approach. And the last parts of this book are the managerial view consists of the variable and segment costing, cost volume and profit analysis.

Steve Player, Roberto Lancerda, [3] Activity-Based-Management 2000

This book provides the basic concepts of activity-based management and case studies from around the world to illustrate how ABM is efficiently work. ABM comes from Activity-Based Management, which is subsequently defined by CAM-I (The Consortium for Advanced Manufacturing-International) as a discipline that focuses on the

management of activities as the route to improving the value received by customers and the profit achieved by providing this value. ABM includes cost driver analysis, activity analysis, and performance measurement, drawing on ABC as its major source of data. On the others hands Activity-Based Costing (ABC) is defined as a methodology that measures the cost and performance of activities, resources, and cost objects. Specifically, resources are assigned to activities based upon consumption rates and activities are assigned to cost objects. ABC recognizes the causal relationship of cost drivers to activities.

From the implementation of ABM by the team of Arthur Andersen in 14 different organizations in 7 countries, the teams describe the implementation method, the tools and technique used on the implementing processes also with the software solution configurations for those organizations. The case studies of ABM approach are as follows:

- **Identifying the cost of services and determining customer profitability using Activity-Based Management;** Banco Real, Brazil.
- **Telecommunications- facing the challenges of Competition with Activity-Based Costing;** CTBC Telecom Brazil.
- **Achieving Strategic and Operational Excellence with Activity-Based Costing;** Multibras Electrodomesticos, Brazil.

- **Modeling for Answers with Activity-Based Costing;** Alcan Smelters and Chemical, Canada.
- **Making the Right Decisions with Activity-Based Management;** American Seating, Michigan.
- **Uncovering Opportunities to improve the business with Activity-Based Costing/Management;** Tampa Electric Company, Florida.
- **AND ETC.**

Suwat Mahasuveerachai, [4] Standard Production Cost Revision in the Refractory Industry using Activity-Based Costing 1997

This thesis is to improve the Standard Production Costing in Refractory Business to be more accurate by using Activity-Based Costing (ABC). ABC is a cost management system, which focuses on the activities related to the production output. The expenses are charged as cost for each activity, and then combined into cost of each product.

This study analyze the existing costing system that consist of Fix and Variable cost. which includes Direct Raw material and Variable Overhead Cost. From the analyze this study found that the variable overhead cost and fix overhead cost have a significant variance resulted from inappropriate Cost Driver and Cost allocation method. The research identified 126 activities from the production and among them 93 activities

related to 21 different products of the plant. The next step is to select **cost driver**, both of resource and activity drivers. Direct trace is selected as **resource drivers** retrieved from high accuracy accounting system. Selected **activity drivers** that are used for allocation of activities into Cost Objects include transaction drivers, duration driver and Bath-Based driver. After that the product's bills of activities are made and Activity Cost and Activity Rate are calculated to generate production cost of the different products from the different processes.

The production cost generated from ABC is different from the traditional system. Production cost from this research is higher in 14 products and lower in 7 products. The different of the production cost of two systems occurred from the Variable Overhead Cost and Fixed Overhead Cost which are generated from ABC are more precisely than the traditional system.

J. Innes & F. Mitchell [5] Activity Based Cost Management: A case Study of Development and Implementation 1993

This book analyzes and describes the 'in-house' develop Activity Based Costing project in plant. The objective of develop is to investigate the useful and flexibility of such a system like ABC following with their impact and utility within an organization. The project emphasizes on the steps and information used on development of ABC in any

plants. The subject plant of this book had, at that time of commencing the development phase, established ABC development as an important part of their drive to invigorate their cost management processes. From the difficulties of implementing phases of ABC, the benefits for manager and accountant are as the following respects:

- Non financial data on activities led to the implementation of cost reducing and efficiency increasing work-flow changes;
- Activity costs provided a novel perspective on cost directing managerial attention, in a prioritized manner, to cost control issues;
- Cost driver rates permitted a solution to be found to a particular anomaly in costing i.e. customer order costs;
- A focus on cost per machine was established as a basis for maintenance cost analysis;
- By directing the ABC concept at costing the performance of suppliers it was considered that cost accounting would provide information to support the broader managerial policies of 'TQM' and 'JIT'.

Michael D. Woods [6] Total Quality Accounting 1994

This book describes the relation between Cost Account and TQM also with the

integration of them. The development is from traditional costing system to activity base cost by following activity of TQM. This book represents the linkage of strategic to management cost accounting and the value change in activity.