

ACTIVITY-BASED COSTING AND MANAGEMENT: TOTAL QUALITY  
MANAGEMENT SOLUTION TO QUALITY COST SHORTCOMINGS  
OF THE TRADITIONAL COST ACCOUNTING SYSTEMS

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by

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## ABSTRACT

This thesis explores the knowledge and application of Activity-Based Costing and Management (ABC/M) as a Total Quality Management solution to the quality cost shortcoming of conventional cost accounting systems. The thesis proves to quality practitioners and decision makers that ABC/M approach is uniquely positioned as the most effective technique in defining true internal cost in cross functional processes by comparing and contrasting both the traditional Chart of Accounts and ABC/M methods. Awareness is also expanded through this study as to how Activity-Based Costing and Management is the quality solution. This is done using the concepts of Lean, Cost of Quality and forecasting and budgeting for key cost drivers and associated allocations in process cost control and improvement opportunities.

## CHAPTER 1

### INTRODUCTION

#### Background

Traditionally quality cost accounting has been based on allocating a subjective or calculated range of indirect expenses to direct costs. Due to the increase of indirect and overhead expenses in recent decades, the conventional costing method has become ineffective for quality practitioners and managers. To illustrate, one product or service line may require more resources or time than another. But because the cost of indirect costs are based on a fixed percentage of direct costs (i.e. labor and materials), the overhead expenses are misrepresented or recognized incorrectly to the final products or services. With the conventional means to cost accounting and cost of quality, it is very difficult to identify if such product or service is profitable and produced via quality processes or with less wastes (Wikipedia, 2008).

The concept of Activity-Based Costing and Management (ABC/M) was introduced in the U.S. initially in the manufacturing sector during 1970s and 1980s. Robin Cooper and Robert Kaplan brought the ABC/M concept to light and published the body of knowledge in Harvard Business Review in 1988. Cooper and Kaplan defined the ABC/M method as “an approach to solve the problems of traditional cost management systems;” that is, the conventional cost accounting systems are often unable to identify correctly the true costs of processes.

Consequently, management and quality professionals are unable to make sound decisions or make decisions based on the misrepresented data (Wikipedia, 2008).

On the other hand, Activity-Based Costing and Management approach objectively assigns costs based on the “cost and effect relationships.” The cost of activity is identified and allocated to each product or service if and only if the product or service utilizes the activity. The ABC body of knowledge initially focuses on manufacturing where technology and productivity improvement have reduced the direct costs and increased indirect and overhead expenses (Wikipedia, 2008).

#### Statement of the Problem

In today’s global competition, quality practitioners and management cannot bear the risk of making decisions based on inaccurate or incomplete data provided by the traditional accounting ledger systems. The traditional cost accounting system could not provide the level of details or true facts to quality costs.

Activity-Based Costing and Management (ABC/M) is the TQM solution to the quality cost shortcoming of the conventional cost accounting. The introduction and exposure of this modern approach to quality and accounting cost is necessary and applicable in both manufacturing products and service deliveries.



### Purpose of the Study

The thesis will guide the quality practitioners and decision makers through the unique, more effective approach in defining true costs in the cross-functional processes. This includes the review of the Activity-Based Costing and Management approach and its application within the Total Quality Management framework. Furthermore, ABC/M will be incorporated as the quality solution to conventional cost accounting system via the concepts of Lean, Cost of Quality and forecasting and budgeting. Through the study, the quality professionals and audiences can gain and will be able to expand their perspectives and roles in cost drivers and allocation for process cost control and improvement opportunities.

### Theoretical Bases and Organization

This thesis is comprised of the introduction of the Activity-Based and Management approach compared to the conventional cost accounting system. Both methods to cost will be discussed with samples and illustration of how direct, indirect and quality costs are collected, allocated, summarized and reported. The resulting deliverables from the general ledger systems and ABC/M will be interpreted side by side to determine the difference, effectiveness and proper uses.

In addition, the ABC/M methodology will be explored further in different areas and applications within Total Quality Management framework. This

includes the Activity-Based Cost Allocation via the Lean Theory, Cost of Quality and the process costing and budgeting for quality initiatives and improvement opportunities.

### Limitations of the Study

The study is limited to the study of both traditional and activity-based approaches to true costs, for management and quality professionals to measure process' effectiveness and make sound decisions within the company, organization or department. The review and any recommendation of the quality cost approach and system will not displace the conventional cost accounting method in any mean or capacity, as the general ledger system is the sole, standard tool and communication instrument widely accepted among companies.

### Definition of Terms

AACE stands for the Association for the Advancement of Cost Engineering. ACCE International is the largest, industry-independent professional society serving the entire spectrum of cost management professionals, including cost estimators, engineers, schedulers, project managers and project controls. ACCE International has over 5,500 members from 78 countries around the world. More details and information about AACE International can be obtained via [www.aacei.org](http://www.aacei.org).

Activity is an element of work to be performed to complete a project; it is a process or operation requiring time and associated resources.

Activity-Based Costing (ABC) is a Total Quality Management tool for cost and performance measurement of activities, resources, and cost object (i.e. products and services). ABC is also known as the “horizontal” or cross-functional cost view and can provide fact-based insight into the spending and profitability of products, services, customers, districts, distribution lines, and etc.

Activity-Based Management (ABM) is a Total Quality Management discipline for the management of process improvement activities to lower the cost within an organization. ABM includes such activities as cost driver analysis, performance measurement and process improvement opportunities.

Activity-Based Budgeting (ABB) is a TQM financial-planning tool with the identification of customer requirements in terms of volume of products or services for budgetary purposes. Together with ABC/M, ABB establishes a solid foundation for quality planning and budget reporting.

Appraisal Costs are expenses associated with such activities as measuring, evaluating or auditing products or services to ensure compliance to quality specifications and performance standards. The examples of appraisal costs include evaluation and assessment, inspection programs, and test and measurement activities.

Budgeting is a process to allocate resources into cost accounts or budgets against which actual cost expenditures will be tracked and measured.

Chart of Accounts is a systematic numeric method utilized to identify various categories of expenses. The method segregates incurred expenses into cost elements for accounting purposes.

Code of Accounts (see Chart of Accounts)

Cost is the amount measured in money in consideration of goods or services. Costs may include cash expended, liability incurred, and resources (i.e. time, human and capital). "Cost is one of the three fundamental attributes associated with performing an activity or the acquisition of an asset. There are (1) price (cost), (2) features (performance), and (3) availability (schedule)" (Postula, 2007).

Cost Accounting refers to the historical data recorded, classified, summarized and reported in term of disbursement and expenditures overtime. Classifying and summarizing costs are activities required to organize expenses per business or industry practices and "code of account."

Cost at Completion is a current, projected cost of what the final total expenses will be at the completion of a project or for an acquisition of an asset.

Cost Control refers to the activities and procedures to 1) track and monitor actual expenditures against progress of a project or operation; 2) identify and quantify any variance from approved budgets and 3) allow corrective action to be taken promptly, if necessary.

Cost Estimating is the collection of activities to predict the cost of required resources or quantity to create or deliver a tangible or intangible asset.

Cost Forecasting is very similar to cost estimating process. A key difference between cost forecast and cost estimate is that cost estimate is calculated for the future activities while the cost forecast is a prediction of the cost to or at completion of any outstanding cost elements required to create an asset.

Cost of Conformance is the cost of prevention and appraisal activities to meet pre-set standards or customers' requirements.

Cost of Good Sold refers to direct costs related to the production of goods or service delivery. The direct costs include materials and labors utilized to manufacturing products or deliver services. The cost of good sold appears on the company's income statement and can be subtracted from revenue to arrive at the gross margin.

Cost of Nonconformance is the cost of internal or external failures. Also, see External and Internal Failure Costs.

Cost of Quality (COQ) is the cost of an error-free process. It can be broken down into costs of conformance and non-conformance.

Cost to Completion is a current, projected cost of what the outstanding total expenses will be to the completion of a project or an acquisition of an asset.

Cost Trending is estimated based on the historical cost information collected from the actual experience over a predetermined duration. This cost trend information focuses on how budgets and expenditures will be impacted relative to the physical accomplishment or earned value.

Decision Support System (DSS) is defined as a computer-based system that assist the decision making or makers. It is an interactive and adaptable information system developed to support the solution and provides insights of non-structure and flexible management system.

Depreciation is a decline in capitalized asset value. It also refers to a form of capital investment recovery where an allowable amount of asset's value is charged to operations periodically.

Direct Costs are the expenses that are incurred solely to produce products or deliver services. That is, the direct cost can be identified with a final, particular product or service.

Enterprise Resource Planning (ERP) system is an integrated, single database system that supports the planning and performance and cost management of business resources (i.e. materials, employees and customers) as they are acquired and moved from one state to another. The ERP system is a modular software design allowing internal organizations to store and retrieve reliable information in real-time.

Error Free Costs are the "do-it-right-the-first-time" costs for such activities as planning, controlling, auditing, or correcting poor quality.

Essential Activities refer to either value-adding or nonvalue-adding tasks that are required to be performed in a process (or a collection of activities) to achieve a resulting value (product or service) that customers desired.

External Failure Costs are expenses from products or services failing to conform to pre-set standards or customers' needs. These costs occur after the product or service delivery to the customer. Examples of external failure costs include warranty expenses, liability claims, legal exposure, replacement costs, and complaint and lost of customer loyalty.

Fixed Costs are cost elements required in an acquisition of a tangible or intangible asset independently of the volume of work efforts or outputs. Examples of fixed costs include license or permit costs, use of capital equipment and one-time loyalty fees.

Indirect Costs are expenses required to support the process or the activity that can be associated directly with final products or services.

Internal Failure Costs are expenses due to products or services failing to conform to pre-set standards or customers' needs. These costs occur prior to the product or service delivery to the customer. Examples of internal failure costs are scrap, rework, unscheduled repairs and lost of productivity time.

Life-Cycle Costing (LCC) estimates a cost of acquiring, maintaining and disposing of an asset. LCC is the total cost of ownership, including all estimated expenses to design, develop, produce, construct, maintain, repair and dispose of such asset.

Overheads are costs or expenses incurred in the performing of an operation which cannot easily be identified directly with a product or service; that is, they

are historically allocated arbitrarily or subjectively based on a predetermined percentage of direct costs.

Nonessential Activity refers to either value-adding or nonvalue-adding tasks that are not required to be performed in a process (or a collection of activities) to achieve a resulting value (product or service) that customers desired.

Nonvalue-Adding Activity refers to either discretionary, required activity or task not at all necessary in a process, product or service delivery in the eyes of the end users or consumers.

Prevention Costs are expenses of necessary activities designed to prevent poor quality in manufacturing products or service deliveries. Examples of prevention costs are quality training, process design, preventive maintenance and quality audit.

Retained Earnings refers to a portion of net income retained by the company from year to year. These earnings are reported in the owner's or shareholder's equity section of the balance sheet.

Total Quality Management (TQM) is a management strategy and quality awareness in all manufacturing and service processes. TQM strives to create customer and employee satisfaction at lower real costs via abrupt and continuous quality, process improvement efforts. This management strategy involves the entire organization, supply chain and product live cycle to achieve a long-term success.



Value-Adding Activity refers to additional value creating tasks at a specific stage of production in the eyes of the end user or consumers. The value-adding activity can be essential or nonessential to the manufacturing or service delivery process.

Value Stream or Chain is defined as a collection of activities, typically consuming resources, where a product or service must pass through in order to gain resulting value that customers desire. Such activities may include value-adding, nonvalue-adding, essential or nonessential tasks as the result of, for example, the process design and development, the organization's vision, any current or future legislation and laws and community or environmental pressure.

Variable Costs are cost elements required in an acquisition of a tangible or intangible asset dependently of the volume of work efforts or outputs. Examples of variable costs include material and production labor costs, production utility expenses and volume-based royalty fees.

WIP stands for Work In Progress.

## CHAPTER 2

### REVIEW OF THE LITERATURE

The study is carried out in the context of existing published work relevant to both Total Quality Management and Cost Engineering bodies of knowledge. The following discussion references such literature studied, which encompasses the knowledge and findings associated to the focus of the thesis topic, via a thorough examination of Activity-Based Costing and Management (ABC/M) theory, its application and comparison to the conventional cost accounting system, and finally the overall recommendation of the research work.

The review of the literature will be discussed through related theoretical viewpoints with the initial emphasis on providing a knowledge foundation of the ABC/M tool under the Total Quality Management framework, relating to the evidence supporting the research background. Furthermore, the emphasis of the literature review will continue to show the studied materials relating to other similar quality areas or topics in addition to the investigation of other work in different view points. This review will also include professional publications of relating theoretical fundamentals, quality and cost experts' research discoveries, and sample case studies to support the focus of the claims of this study.

*Skills & Knowledge of Cost Engineering* lays the solid foundation of the cost elements and the concept of Activity-Based Costing and Management. The study of cost elements by Franklin D. Postula illustrates the basic understanding

of what makes up cost (i.e. resources in terms of material, labor and other overheads) and the use of cost elements to better understand how cost is collected, summarized and reported to arrive at or for the measurement and analysis of the total quality cost of a process for manufacturing and service industries (Postula, 2007).

In addition, the concept of Activity-Based Costing includes the investigation of the nature and associated comparison of cost allocation by both traditional cost accounting and the ABC/M systems. Moreover, the publication provides the necessary explanation on how cost drivers cause expenses to occur and how ABC/M can be utilized in such strategic areas as cost management, profit margin analysis, cost of quality and productivity and asset utilization. The scope of and observation of ABC/M use in local versus enterprise-wide is looked into to suggest that “the vast majority of ABC/M tool is applied to subsets of the organization for process improvement” (Cokins, 2007).

The review of the *Skills & Knowledge of Cost Engineering* provides the needed foundation earlier on in the study to ensure that the intended audiences, both novices and experts in areas of cost, gain better understanding of the topic and that they can follow the research on the same, general knowledge framework in terms of the cost engineering body of knowledge.

*The Management and Control of Quality* captures the concept and importance of quality cost through the Total Quality Management application of Activity-Based Costing and Management. It first illustrates the role of standard

accounting systems in every day business for both internal and external use. The authors, in addition, point out its lack of structure in supporting or to support the areas of cost-of-quality and efficiency and effectiveness of allocating expenses.

The concept of Activity-Based Costing is further defined in this book in respect to “the work (or activity) that consumes resources and delivers value in a business” (Evans & Lindsay, 2005). Moreover, the applications and the benefits of ABC/M are introduced as the tool and effort to better allocate costs, trace expenses to products or services, and measure the as-is processes for quality improvement opportunities.

The reference to *The Management and Control of Quality* provides the foundation necessary and a clear link of the ABC/M approach in the Total Quality Management framework. It also emphasizes the need for a costing method for decision makers and quality professionals that can close the gaps in the conventional accounting system.

“Why is Traditional Accounting Failing Quality Manager?” answers the question that activity-based costing is the solution to the conventional way of cost reporting. It bases the argument on the fact that today’s ledger systems support organizational accounting and reporting requirements but are not adequate for internal use or for process-based decision making. The article also reveals the flaws in the standard costing system as the system is incomplete and unprocessed, misallocates indirect or overhead costs, and is structurally deficient to allow decision makers to measure and analyze expenses (Cokins, 1999).

To illustrate his reasoning, Cokins provides side by side examples of how costs are captured, summarized and reported via the general ledger and ABC/M database formats. The general ledger system through organizational (or “vertical”) boundaries is discussed as it is inadequate and inappropriate for today’s cross-functional operations. The review of “Why is Traditional Accounting Failing Quality Managers?” proves that traditional accounting systems provide reports that make managers and quality practitioners happy or sad; however, the Activity-Based Costing methodology educates and makes them smarter by understating the true costs of processes, products or services.

“Measuring the Cost of Quality for Management” investigates the Cost of Quality (COQ) at operational and more strategic levels through the use of financial tools. The article first recognizes that companies often cannot easily quantify the magnitude of profits or losses from quality initiatives. This is due to the lack of fact-based data and reasonable estimates from the traditional accounting system, which are the basis of decision making and for spending prioritization (Cokins, 2006).

The recommended solution to the existing quantification ledger system is the Cost of Quality categorization via the Activity-Based Costing and Management approach. The author further communicates the applications and benefits of the said system in identifying the cost of COQ components: Conformance (i.e. prevention and appraisal activities) and nonconformance (i.e. internal and external failures). In addition, he points out in the article that the

“valid costing data will give the quality movement more legitimacy” (Cokins, 2006) as the fact-based financial measurement justifies quality investment and determines if goals of initiatives have been met or exceeded. To sum, the review of “Measuring the Cost of Quality for Management” provides supporting evidence in a different viewpoint and via the concept of Cost of Quality. It recognizes the value and need of fact-based data to gain insight into causes of problems and investment justification of quality projects.

Brian Muskell explains his unique view point in the “Solving the Standard Cost Problem” article that the standard costing approach was developed to meet the decision-making requirement in the mass production type organizations in the mid-20<sup>th</sup> century. The recent changes and transition from mass to lean manufacturing have turned out to be the essential route to remain competitive nationally and globally. In addition, the changes have made the conventional way to approach costing unsuitable and inadequate for lean initiatives.

As a result, Muskell suggests the different look at cost via the value-stream-based methodology; that is, the cost of a product (or service) will vary according to the labor, materials and assignable overhead costs to only activities in a value stream and an optimized flow of a process. The reporting of the “value stream profits” is also addressed in his finding as a simple, similar result of the cost accounting used to create the value stream costing. With the efforts to identify both cost and profit via the value stream, he points out that the value stream managers now can understand, measure and become accountable for

the expenses, efficiency and value produced by all value-added or essential, related activities in the process (Muskell, 2006).

“Continuous Improvement: An Activity-Based Model” appears to support a similar methodology to continuous improvement efforts by starting at the activity level. To illustrate, all activities in the value or supply chain can be classified in one of four categories (Agrawal, Rezaee & Pak, 2006):

- Value-adding and essential
- Value-adding but nonessential
- Nonvalue-adding but essential
- Nonvalue-adding and nonessential

The definition and hierarchy of each activity classification is explored in the article in detail for process managers and quality professionals. This includes the suggestion of ways to improve a process by eliminating nonvalue-adding activities (called wastes) and minimizing nonessential activities. The concept of associating cost to activities helps evaluate which activity should be focused as essential and creating value in the value stream. Therefore, the continuous process improvement initiatives can be carried out by the use and approach to product or service costing via the activity-based model.

“Planning and Budgeting for Quality: An Activity-Based Approach” suggests that quality professionals need the latest tools to provide necessary financial information so that well-informed decisions can be made without costly inefficiencies and as to remain competitive in today’s global marketplace. The

article strongly recommends the use of the activity-based approach to costing, including 1) budgeting and management techniques for capturing and allocating expenses; 2) measuring the performance of activities, resources and cost objects (i.e. products and services); and 3) planning volume of products or services for budgetary and resource management purposes. The authors further illustrates and supports their study with a six-step approach to activity-based management under the FastTrack ABM™, a best practice sample method to better understand the implementation of ABC/M.

“Adoption and Implementation of Activity-Based Costing: A Web-Based Survey” provides a web-based survey and concluding results regarding the current status of activity-based costing in areas of adoption and implementation. The study states the ABC costing approach has been implemented initially by large manufacturing companies. However, the survey study also reveals the rates of adopting activity-based costing are similar for both manufacturing and service firms. In addition, Roztocki and Schultz discovered that larger companies are more likely to adopt the ABC methodology and are benefited from the adoption more than smaller firms. This is because the larger companies tend to have a more diverse mix of products and services and have more specialized personnel who are familiar and knowledgeable with the ABC approach. As a result of the review of the article, it can be suggested that the Activity-Based Costing tool is very applicable to both manufacturing and service industries and sizes.



“Will Your ABC System Have What It Takes?” recognizes and points out the drawbacks of the ABC paradox. Moreover, the article suggests the ABC solutions be incorporated into the company’s Decision Supporting System (DSS) by not only collecting, recording and reporting information via ABC but also analyzing the data to help decision makers. This includes the ability to perform what-if scenarios, cost drivers and their impact or process improvement initiative return on investment assessment. Both Searcy and Roberts brought up tough questions that managers and quality practitioners must inquire for higher success and user-acceptance rates of ABC. This includes, for example, “Does the ABC system contain up-to-date information?”, “Does the ABC system have analytical tools available?” and “Is the ABC system user-friendly?” (Searcy & Roberts, 2007)

“Implementing Activity-Based Costing in the Banking Industry” recognizes that Activity-based costing is widely accepted as a superior approach for allocating overheads in both manufacturing and service industry. Major step-by-steps in banking industry is provided in their research as an example to support such claim. Additionally, the ABC implementation challenges and key successes are addressed in the article to help decision makers and management evaluated the level of effort required to implement such an untraditional costing system.

“Implementing Activity-Based Costing in An Enterprise Resource Planning System” states in recent years activity-based costing approach has been integrated into Enterprise Resource Planning (ERP) system, with the aim to

automate standard costing routines by categorizing and allocating direct and indirect costs via cost objects. Cost objects, such as products, services, projects, units, and customers, do consume resources and are used to collect costs. Activity-based costing via ERP system measures each activity by determining what it really consumes and charge the appropriate cost object. Therefore, total true costs can be identified, categorized and reported correctly and more seamlessly in measurement of profitability, performance, and quality. That is, ABC and ERP hand in hand can be utilized to increase profitability and eliminate non-value or non-productive work, improving operations and allowing sound decision be made more effectively and timely. (Lahikainen, Paranko & Seppanen, 2000).

## CHAPTER 3

### METHODOLOGY

Today's traditional cost accounting system supports enterprise-wide financial reporting and measures the health of the business. However, this conventional approach to cost is of somewhat little value to quality practitioners and decision makers in the areas of cost allocation in a value stream, cost of quality or poor quality in the enterprise, and forecasting or budgeting for quality.

The study will prove the Activity-Based Costing and Management is the quality tool and solution to quality cost shortcomings of the standard accounting work in the area of Total Quality Management. This includes the introduction to the concept of ABC/M, its significance in horizontal costing approach in the value stream, using ABC/M to identify and reduce Cost of Quality (COQ), and lastly budgeting and forecasting efforts via activity-based model.

This paper will introduce to quality professionals and decision makers a different approach to defining true costs in cross-functional processes. This includes the study and the application of the Activity-Based Costing and Management approach within the Total Quality Management framework in today's global competition. In addition, ABC/M will be proven as the quality solution to conventional cost accounting system via the concepts of Lean, Cost of Quality and forecasting and budgeting. The quality practitioners will gain an

expanded perspective to their roles in addressing cost drivers and allocation for process cost control and improvement opportunities.

## Introduction to Costs and Cost Accounting

### Cost and Classification Overview

Cost is one the three fundamental attributes (i.e. cost, features and availability) required to perform an activity or acquire an asset. It is also being used as a “yard stick” to measure and compare activities and assets (Postula, 2007). The need to know true costs of a process has been one of the challenging question among decision makers so as to solve problems as cost estimation, cost control, resource planning and process improvement opportunities.

Resources utilized in any process can be classified as material, labor and overhead. Additionally, they can be incurred and grouped into direct, indirect, fixed and variable costs as described below:

- Direct Costs are activity or material expenses that can be identified with a specific end product or service. Examples of direct costs of building a house include lumber and concrete (material), electrician and plumber (labor) and building permit fees (others).
- Indirect Costs are activity or material expenses that cannot be easily or feasibly identified with a specific end product or service. Examples of indirect cost of building a house include drop cloth and brushes (material), engineer and human resource personnel (labor), and power tools and electricity (other).
- Fixed Costs are cost elements incurred during manufacturing or service delivery independent of the volume of end products or service. Fixed costs can be classified as either direct or indirect expenses. Examples of fixed cost of building a house include permit fees (direct cost) and power tools (indirect cost).

- **Variable Costs** are cost elements incurred during manufacturing or service delivery dependent on the volume of end products or service. Variable costs can be classified as either direct or indirect expenses. Examples of variable cost of building a house include lumber (direct cost) and electricity (indirect cost).

### Cost Accounting Introduction

Cost accounting is defined as the historical data recorded, classified and summarized in term of disbursement and expenditures over time. The expense recording is a mechanical gathering of data in a routine process. Classifying and summarizing costs are activities to organize expenses per the business practices and “code of accounts.” The code of accounts is a systematic numeric method, also called a chart of accounts, utilized to categorized costs in various accounts such as assets, liabilities and equity (Postula, 2007). Table 1 below is a typical, sample chart of accounts used to classify and report recorded expenditures.

Table 1

#### *Sample Chart of Account*

<b>1000 Assets</b>	<b>3000 Equity</b>	<b>5000 (Continued)</b>
1100 Cash	3100 Capital Stock	5500 Taxes
1200 Receivable	3200 Retained Earnings	5600 Depreciation
1300 Inventory		5700 Interest
1400 Work In Progress	<b>4000 Revenues</b>	
1500 Equipment	4100 Sales	<b>6000 Construction WIP</b>
1600 Buildings	4200 Other Revenues	6100 Site Prep
1700 Land		6200 Constructed Work
	<b>5000 Expenses</b>	
<b>2000 Liabilities</b>	5100 Cost of Good Sold	<b>7000 Manufactured WIP</b>
2100 Account Payable	5200 Wages	7100 Direct Materials
2200 Accrued Liabilities	5300 Utilities	7200 Direct Labor
2300 Reserve	5400 Insurances	7300 Overhead

Classifying and reporting expenses in the code of account approach is a common, widely-accepted format; this categorization, however, does not provide the needed visibility of the true costs associated to a specific process nor it allow the necessary activities and resources to be estimated, managed and accounted for. To illustrate, all direct expenses and overheads are categorized in the code of account and rolled up to the department or company. The resources and associated costs cannot be segregated or assignable to activities required to manufacture specific products or deliver particular services.

Activity-Based Costing and Management is an alternate Total Quality Management tool of cost classification. With this ABC/M approach, resources and related costs are assigned to all activities required of a product or service. ABC/M summarizes costs in an understandable, logical format and more useful for managers and quality practitioners to make sounds, prompt decisions. Additionally, the alternative methodology can help identify profitable product or service lines and eliminate any non value-added activities, as follows (Cokins, 2007):

- Activities required to sustain the company and profitability
- Discretionary activities that can potentially be reduced or eliminated
- Activities ineffectively accomplished and can be redesigned
- Activities that are not required and must be eliminated immediately

## Activity-Based Costing and Management and Traditional Cost Accounting System

One of the important questions to be explored further in this section is how a traditional accounting system that has been widely utilized as the internal and external cost system is considered inadequate. In addition, why can the Activity-Based Costing and Management be a TQM solution of choice to quality cost shortcomings of the conventional costing accounting system? Few key claims shown below will answer the questions posted in details:

- Existing cost data is not useless; however, it appears incomplete or unprocessed for internal efficiency, profit or quality analysis and decision making process
- Traditional cost system denies decision makers the visibility of the true costs created along the end-to-end process
- Overheads are allocated inappropriately and frequently based on the labor or material expenses via the conventional costing approach

Managers have been posed with operational and cost questions at one time or another, if not continually. With the traditional cost reporting under the general ledger's Chart of Accounts, many of decision makers are not able to explain if their specific production or service areas of responsibilities are effective, productive or profitable. Tables 2 and 3 below provide insight into the problem at hand; that is, the expenses are allocated based on the Chart of Account established by the company's accounting department for both internal and external reporting. With the cost breakdown by the Chart of Accounts, the recipients (i.e. managers or quality practitioners) of the information can only tell the costs of labor, material and other.

Table 2

*Production Cost via Chart of Accounts View*

Pre-Mixed Powder Drink Packaging				
General Ledger				
Chart of Account	Plan	Actual	Variance	%
Labor	\$ 450,000.00	\$ 455,421.25	\$ (5,421.25)	52%
Material	\$ 250,000.00	\$ 252,113.77	\$ (2,113.77)	29%
Contract	\$ 110,000.00	\$ 112,110.01	\$ (2,110.01)	13%
Overhead (10% of Labor)	\$ 45,000.00	\$ 45,542.13	\$ (542.13)	5%
Internal Chargeback	\$ 5,000.00	\$ 4,412.55	\$ 587.45	1%
<b>Total</b>	<b>\$ 860,000.00</b>	<b>\$ 869,599.71</b>	<b>\$ (9,599.71)</b>	<b>100%</b>

Table 3

*Production Cost via Activity-Based View*

Pre-Mixed Powder Drink Packaging				
Activity-Based Costing				
Activity-Based Classification	Actual Total	Actual 10,000 Each		%
Preparation Stage	\$ 451,549.26	\$ 4.52		<b>52%</b>
Weight Batch Ingredients	\$ 301,425.01	\$ 3.01		35%
Mix Batch Ingredients	\$ 150,124.25	\$ 1.50		17%
Packaging Powder (Each/Box)	\$ 240,866.53	\$ 2.41		<b>28%</b>
Package Each Pouch	\$ 125,425.11	\$ 1.25		14%
Packing 24 Each per Box	\$ 115,441.42	\$ 1.15		13%
Misc and Admin Activites	\$ 177,183.92	\$ 1.77		<b>20%</b>
Quality Control Tasks	\$ 55,125.12	\$ 0.55		6%
Storage Activities	\$ 66,412.19	\$ 0.66		8%
Shipping and Handling	\$ 45,425.45	\$ 0.45		5%
Job and Safety Training	\$ 10,221.16	\$ 0.10		1%
<b>Total</b>	<b>\$ 869,599.71</b>	<b>\$ 8.70</b>	<b>\$ 8.70</b>	<b>100%</b>

In addition, the conventional approach to cost is considered a vertical, organizational or "transaction-centric" costing system. To illustrate, all expenses incurred are associated to the costs within the departments or cost centers. This method lacks the ability to report process costs across-functional, limiting managers the visibility of the true end-to-end costs of each process and system (Cokins, 2007). For example, the Pre-Mixed Powder Drink packing can be



viewed at department levels such as packing, quality control, shipping and handling. On the other hand, the end-to-end packaging process can be looked at via the “work-centric” ABC/M as collective efforts and resources to manufacture a final pre-mixed powder drink pouch.

Overhead assignment is not a simple task. Based on the traditional cost accounting methodology, overhead or indirect expenses are assigned to each product, service or process based on a percent of direct labor or material costs. This is not only misleading as each product, service or process consumes overheads at different rates, but also misguiding decision makers that certain product or service is profitable or not based on the pre-determined and distributed overheads to all processes, often equally.

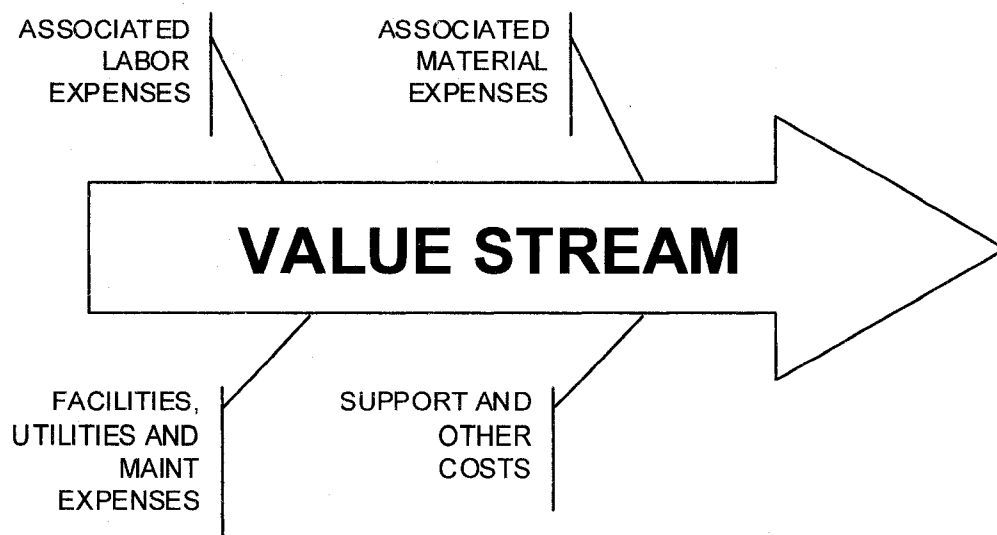
To sum, the conventional approach to cost accounting explains “what was spent, whereas the activity-based view describes, what it was spent for” (Cokins, 2007) and “unlike traditional accounting reports that make managers react to by being happy or sad, ABC/M data makes them smarter” (Cokins, 1999).

#### Activity-Based Cost Allocation and Lean Value Stream Map

The standard costing approach was developed in the mid-20<sup>th</sup> century to meet the decision-making requirement in the mass production type organizations. As manufacturing and service industries change from mass to lean production and due to the changes of the demands and the complexity of

the consumer goods, the conventional way to approach costing has become unsuited and inadequate for lean initiatives.

As a result, Muskell (2006) suggested a unique view of allocating expenses via the value-stream-based methodology; that is, the cost of a process will be composed of the labor, materials and assignable overhead expenses for solely activities in the value stream and the optimized flow of the process. Figure 1 below further illustrated graphically the stream of values and associated costs of required activities and materials to acquire assets or accomplish tasks.



*Figure 1. Value Stream Costing per Associated Activities*

The reporting of the “value stream profits” was also addressed in the similar manner. With the efforts to identify both cost and profit via the value stream and associated activities, the value stream managers now can

understand, measure and become accountable for the expenses, efficiency and value produced by all value-added or essential, related activities in the process.

Furthermore, unlike the traditional costing methodology, the Activity-Based and Lean production methodology can support continuous improvement efforts by a study of the activity classification and cost of activities residing in the value stream system. Per Agrawal, Rezaee and Pak (2006), each activity can be classified based on the following dimensions:

**Category A: Value-Adding and Essential** – This category identifies activities that not only add value or features that consumers desire in the final products or services, but they are also required tasks within the value stream to manufacture products or deliver services. An example of this category is weighting batch ingredients; this activity both adds the value to the final product and is also a required task to manufacture the pre-mixed powder drink package.

**Category B: Value-Adding but Nonessential** – This category identifies activities that add value or features that consumers desire in the final products or services; however, these tasks are not required within the value stream to manufacture products or deliver services. An example of this category is the mixing of batch ingredients; this activity adds the value to the final product, but is not a required task to manufacture the pre-mixed powder drink package. The value-adding but nonessential task may be eliminated through re-designing or re-engineering the products or process.

Category C: Nonvalue-adding but essential – This category identifies activities that do not add value or features that consumers desire in the final products or services; however, these tasks are required within the value stream to manufacture products or deliver services. Examples of this category are product or package labeling and quality control tasks; these activities do not add value to the final product, but are required tasks to manufacture the pre-mixed powder drink package. The nonvalue-adding but essential task should be controlled and minimized as much as possible through continuous process improvement efforts.

Category D: Nonvalue-adding and nonessential – This category identifies activities that do not add value or features that consumers desire in the final products or services nor are required within the value stream to manufacture products or deliver services. Examples of this category are certain storage or transport activities; these activities do not add value to the final product nor are they required tasks to manufacture the pre-mixed powder drink package. The nonvalue-adding and nonessential task should be eliminated immediately upon discovery.

Based on the understanding of the activity classification mentioned, the organization can improve its efficiency and assign or lower the costs associated to the value stream by mean of the “Activity-Based Model of Continuous Improvement.” The activity-based approach can focus the resources and facilitate production, quality or continuous improvement processes in areas that

need the most attention on and that can also provide an optimum return on the investment. To illustrate, the Activity-Based model recommends that the company must focus its efforts and resources to enhance activities in Category A Value-Adding and Essential. This includes efforts to increase value-adding and essential activities that will increase or enhance the value or features that consumers desire, and eventually affecting the bottom-line of the business. In addition, the said approach suggests that efforts and resources should also be channeled to move to or to eliminate activities in the category D Nonvalue-Adding and Nonessential as much as possible. The following Activity-Based Model of Continuous Improvement approach is further explained below in more details (Agrawal, Rezaee & Pak, 2006):

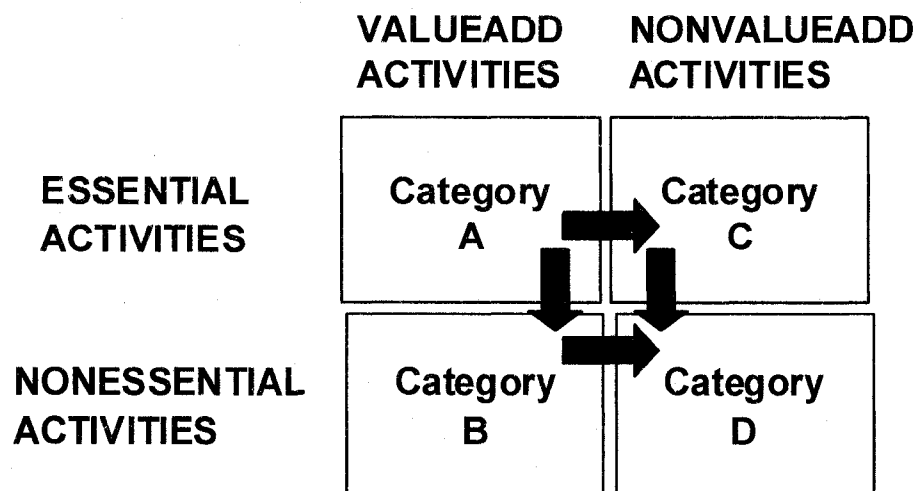


Figure 2. Activity-Based Model of Continuous Improvement

- Moving activities from category A to category B or C – Activities in category A must be reviewed, analyzed or reduced (if possible)

periodically. This can be achieved by means of product, service or process redesign, so that 1) the desired value or features can be built in, rather than added in, or 2) the redesign eliminates the need for certain necessary activities. With this improvement, the cost of each category A activity can be reduced as the activity is moved or eliminated from the value stream.

- Moving activities from category B to category D – Activities in category B must also be reviewed, analyzed or reduced (if possible) periodically. This can be achieved by means of product, service or process redesign so that the desired value or features can be built in, rather than added in. With this improvement, the cost of each category B activity can be reduced as the activity is moved or eliminated from the value stream.
- Moving activities from category C to category D – Activities in category C must also be reviewed, analyzed or reduced (if possible) periodically. This can be achieved by means of product, service or process redesign as the redesign eliminates the need for certain necessary activities. With this improvement, the cost of each category C activity can be reduced as the activity is moved or eliminated from the value stream.
- Eliminating activities in category D – Activities in this category must be eliminated immediately; the associated activity-based cost saving can then be recognized.

The Activity-Based model approach is a continuous, never-ending process to keep enhancing only the core activities, contributing to solely the costs of the value-adding and essential activities in the value stream.

#### Cost of Quality (COQ) via Activity-Based Costing Model

Cost of Quality (COQ) concept has been utilized in the quality initiatives as another approach to identify expenses associated to quality features or lack thereof. At the operational level, this quality term helps managers and quality professionals identify any waste, solve inefficiency issues and continuously

improve processes. At the organizational or company-wide level, COQ tool helps decision makers justify improvement or quality-related initiatives to increase profits, improve quality that meets or exceeds consumers' demands.

Unfortunately, many organizations suffer from the lack of adequate level of complete, fact-based financial data. This includes process costs in the terms of operation-related activities that managers and their employees can relate to and that affect the bottom-line profits of specific products or service deliveries. To illustrate, one main obstacle preventing management from understanding the true costs associated to each process is the lack of details on assignable overhead expenses to support the decision making process. This is due to the fact that many companies focus heavily on their external reporting and inappropriately utilize the traditional (external) cost accounting tool for internal, operational-level reporting (Cokins, 2006).

#### Why Traditional Accounting Fails Decision Makers

The question on "Why Traditional Accounting Fails" in identifying the Cost of Quality at the process or department level has been studied and address by costs experts and their statements below:

Today's general ledger and budgeted spending systems support department and stovepipe managerial philosophies, but not decision support ... Managers are increasingly being challenged to cost justify their spending proposals with more fact-based data and less on faith. Some quality managers are even being asked to justify their own existence and

value to their organization. The traditional accounting data is incomplete and structurally deficient to allow manager to measure and analyze.

Cokins, 1999).

Historically process management has always suffered from the lack of an obvious and reliable method of measurement that consistently indicates the level of resource consumption (expenses) by the business process at any given time – an indicator which always interest executive management and is easily understood. The bottom line is that most businesses have no clue about the costs of their processes or their processes' various outputs (Pall, 2000).

Activity based costing/activity based management (ABC/M) and activity based budgeting (ABB) holds great promise as a common sense solution to the faults and frustration of traditional accounting/budgeting methods ... Traditional budgets do not identify waste, ABB exposes non-value costs ... Traditional budgets focus on departmental costs, ABB also focuses on process cost. (Roberts, Muras & Paschall, 2000).

To sum, the traditional general ledger approach to cost can address the needs to measure and communicate the companywide financial health externally. The tool is designed and intended to collect, summarize and report transaction into specific company's Chart of Accounts. However, the cost information and structure (i.e. labor, material, contract and etc.) are incomplete and insufficient to



adequately measure or improve Cost of Quality and support the decision making process internally.

### Data Value and ABC/M System

Unlike the traditional cost accounting method, ABC/M can provide both management and employees the hidden, quality-related costs for performance and quality improvement. The following said costs that can be realized through the ABC/M effort include the following main categories (Cokins, 2006):

- Error free costs – These costs are expenses for activities contributing from doing it right the first time efforts.
- Cost of Quality (COQ) – The expenses that would disappear if there is no quality problems. This includes conformance and nonconformance costs. Conformance costs include expenses related to prevention and appraisal efforts to comply or exceed the customer requirement. Nonconformance costs include expense related to internal or external failures.

In addition, the Cost of Quality subcategories related to each process can be identified via the activity-based systems as shown in Figure 3 below.

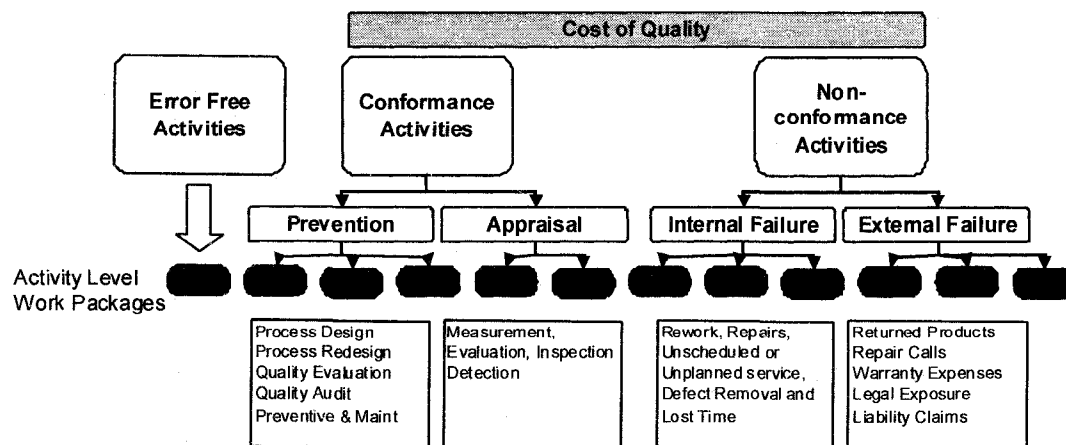


Figure 3. Cost of Quality Subcategories

The activity subcategory definitions are also provided below for additional clarifications:

- **Prevention costs** – This activity cost subcategory includes expenses resulting from efforts to prevent poor quality. Examples of such conformance activities include process design or redesign, quality evaluation and audit, and preventive maintenance work.
- **Appraisal costs** – This activity cost subcategory includes expenses associated to measurement, evaluation, inspection and detection efforts.
- **Internal failure costs** – This activity cost subcategory includes expenses resulting from products or services not conforming to manufacturing or end users' requirements prior to the delivery to the customers. Examples of such non-conformance activities include rework, repairs, unscheduled or unplanned maintenance, defect removal and lost time due to internal failures.
- **External failure costs** – This activity cost subcategory includes expenses resulting from products or services not conforming to manufacturing or end users' requirements after the delivery to the customers. Examples of such non-conformance activities include returned products, repair calls, warranty expenses, legal exposure, liability claims, and public safety issues.

#### Investment Justification in Continuous Improvement

A rule of thumb is that it is more expensive to correct quality issues as the product or service approaches consumers in a value chain. In other words, it is more cost effective to resolve any quality problems as early as possible in the manufacturing or service delivery process. To achieve that, fact-based, activity-level estimate and costing is required to justify the cost of quality and process improvement (Cokins, 2006).

For example, the proposed prevention expenses can be allocated and justified via the study of both the total Cost of Quality and Activity-Based costing, including the cost of being error free, the cost of conformance and the cost of non-conformance. Table 4 and Figures 4 – 5 below illustrate a simple cost justification exercise derived from the ABC/M method of collecting, summarizing and reporting costs in the COQ subcategories mentioned prior. This exercise can help justify the cost of the quality improvement initiative based on the order of magnitude of the \$13,000 cost saving per 1,000 units of production (or service delivery) by investing an estimated incremental capital expenditure of \$7,000 on the proposed preventive initiatives.

Table 4

*Quality Improvement Justification via COQ and ABC/M*

<b>Category</b>	<b>Before Unit Cost</b>	<b>Cumm Unit Cost</b>	<b>Saving Per Unit</b>	<b>Saving x 1000</b>
<b>Error Free</b>	\$50	\$55	-\$5	-\$5,000
<b>Prevention</b>	\$3	\$65	-\$7	-\$7,000
<b>Appraisal</b>	\$5	\$68	\$2	\$2,000
<b>Internal Failure</b>	\$15	\$73	\$10	\$10,000
<b>External Failure</b>	\$20	\$80	\$13	\$13,000
<b>Total</b>	<b>\$93</b>		<b>\$13</b>	<b>\$13,000</b>

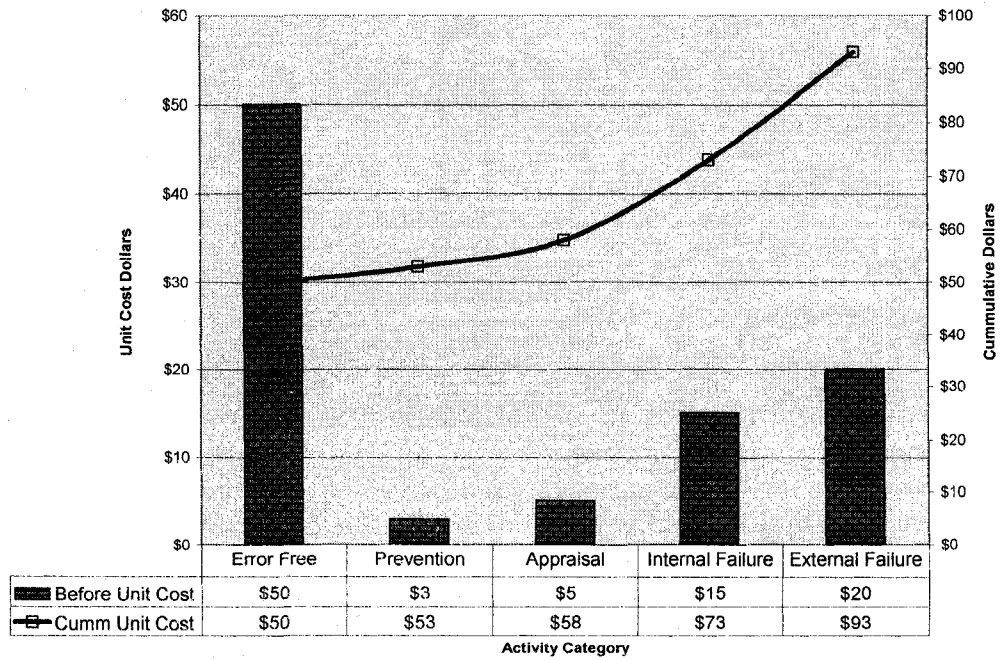


Figure 4. Before Unit Cost with COQ Total \$93 per Unit

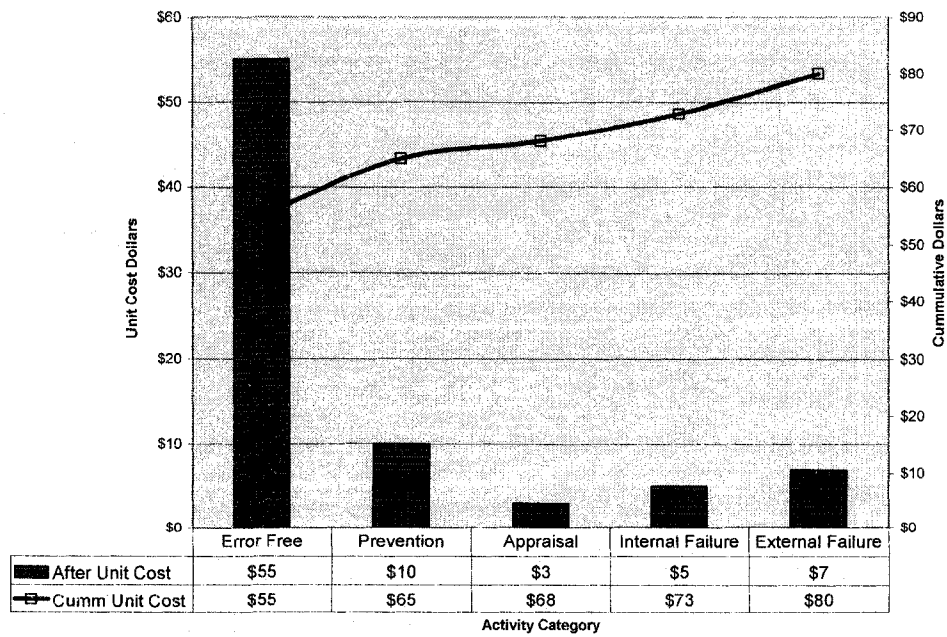


Figure 5. After Unit Cost with COQ Total \$80 per Unit

In summary, based on the cost information and classification in the ABC/M and COQ subcategories, the expenses can be measured adequately, and improved upon as needed. This includes 1) The fact-based cost data can gain management's attention and confidence for reliable business decisions and 2) Decision makers can assess the value of each process and how it contributes to the companywide performance (Cokins, 2006).

### Activity-Based Forecast and Budgeting in TQM

In the current global, competitive market, decision makers and quality professionals must rely on the latest tools and techniques to obtain, categorize, and report pertinent information so that informed decisions can be carried out. This is to ensure that the business is profitable and to avoid any costly and inefficient activities due to nonconformance (i.e. rework, defectives, product returns, warranty expenses, legal liability and damaged reputation).

As discussed in the prior section, conventional cost accounting and reporting does not provide detailed, work-centric cost information nor does it associate overhead allocations objectively. That costing approach becomes inefficient for arriving at the true cost of an existing or proposed process via the bottom up method. That is, the breakdown of each process, including labor, material and overhead requirement, can be identified, estimated and priced for decision-making process.

Therefore, in order to plan and budget effectively for value-adding, quality processes, management and quality professionals must understand the underlying specific essential activities required to manufacture products or delivery services. With such activities, the fact-based cost of the process can be determined by either industry standards or historical data collected via the Activity-Based Costing and Management.

In this section, the ABC/M will be studied focusing on the four most common methods of cost engineering and management. These are cost estimating, cost trending, cost forecasting and life cycle costing.

### Cost Estimating

Cost estimating predicts the cost of resources required to manufacture products or deliver services. The building blocks of the cost estimate include the following key components (Postula, 2007):

- A well defined scope – The scope of the estimate must be identified per the scope of work in the contract, from detailed engineering drawings of the products and the process maps.
- A cost element structure – The cost elements include any applicable direct costs, indirect costs, fixed costs and variable costs associated to each specific activity in the value streams or chain.
- Historical or industry cost data – The Activity-based cost data are collected from the experience or from the industry standard cost. It is important that the cost data represent similar activity and must be adjusted according based on the time, geographical locations, and different feature or value to represent the true, fact-based cost information.

For example, Table 5 below illustrates the cost estimation of the Pre-Mixed Power Drink packing at 10,000 units of production per month.

Table 5

*Monthly Production Cost via Activity-Based View*

Pre-Mixed Powder Drink Packaging							
Activity-Based Costing							
Activity-Based Classification	Actual Each		Actual 100,000/Month		%		
Preparation Stage	\$	4.52		\$ 451,549.26	52%		
Weight Batch Ingredients			\$	3.01	\$ 301,425.01	35%	
Mix Batch Ingredients			\$	1.50	\$ 150,124.25	17%	
Packaging Powder (Each/Box)	\$	2.41		\$ 240,866.53	28%		
Package Each Pouch			\$	1.25	\$ 125,425.11	14%	
Packing 24 Each per Box			\$	1.15	\$ 115,441.42	13%	
Misc and Admin Activites	\$	1.77		\$ 177,183.92	20%		
Quality Control Tasks			\$	0.55	\$ 55,125.12	6%	
Storage Activities			\$	0.66	\$ 66,412.19	8%	
Shipping and Handling			\$	0.45	\$ 45,425.45	5%	
Job and Safety Training			\$	0.10	\$ 10,221.16	1%	
Total	\$	8.70	\$	8.70	\$ 869,599.71	\$ 869,599.71	100%

The Activity-based breakdown assists decision makers and quality practitioners in identifying the true costs and assists with some of the resource planning tasks (i.e. labor, material and other) required for each activity in the manufacturing process, including the following:

- Adequately trained personals – Unlike the traditional cost accounting system, the ABC/M approach to an estimate can provide information that decision makers can utilize to prepare the levels and types of labor resources required according to a planned production volume.
- Level and type of material and inventory – The conventional cost system approach limits the visibility to the required level and type of material and inventory. As a result, the company is to maintain a higher level of inventory to prevent any out of stock, delay and work stoppage. The ABC/M data allows the company to reduce inventory cost by ordering the right, economic order quantity level and type of materials utilizing a just-in-time method.
- Adequate capital investment – Similar to both staffing and inventory issues, the existing general ledger and Chart of Accounts system cannot provide the company's and management any direction on the

specific, future capital investment, e.g. , where to expand and what equipment or tools to purchase. By collecting, summarizing and reporting cost data via the ABC/M method for estimating use, the company can plan its investment strategy to meet the production demand adequately and timely.

### Cost Trending

Cost trends are based on the historical cost information. The cost data building block in the cost estimating method can be impacted based on the study and the results of the cost trends. With the trend information, the estimating of the business process cost and required resources can be carried out in a more sound, precise, and accurate manner.

To show the limitation of the conventional cost accounting methodology, the Pre-Mixed Powder Drink Packaging sample is studied for the cost and trend of the union labor expenses. Assume that per the collective bargaining agreement, the compensation and benefits of union employees are expected to increase with an annual rate of 6%. This increase will impact certain job functions such as weighting and mixing batch ingredients, packaging the pouch and boxes, and shipping, handing and storage activities. Based on the Chart of Accounts, the incremental cost of labor can only be estimated based on the employee classification and at the companywide level. In order to identify the cost impact associated with the product or service level. This trend must be studied at the end-to-end process and activity level. To illustrate, the costs must be calculated and reported using the Activity-Based model. That is, the labor costs in the



preparation and packaging powder stages will be increased; however, the miscellaneous and administration labor expenses will not be impacted.

### Cost Forecasting

Cost forecasting activity is very similar to the cost estimation process. The difference is that the cost estimate is prepared for planning or future activities. Forecasts, on the other hand, are predictions of the cost to or at completion based on the cost elements in progress or outstanding (Postula, 2007).

The cost forecasting tasks require similar building blocks for the Estimate to Completion and Estimate at Completion, including the outstanding actual scope, remaining cost element structures and applicable cost data. Having said that, the cost forecast can be calculated more precisely and accurately via the Activity-Based Costing and Management because the outstanding scope or activities required can be easily identified or evaluated than the to-date (actual) expenditures against outstanding budgets provided by the traditional costing system.

### Life-Cycle Costing

Life-cycle costs (LCC) extend to include all expenses to maintain beyond the acquisition or production of the tangible or intangible assets up to the disposal of such assets. LCC expenses consist of the expenses to design, develop, produce, maintain and dispose of the assets. Similar to the cost estimating methods, these types of costs can be evaluated and calculated based on the similar building blocks that require specific details of the scope, both

during or after the acquisition phases. The cost element structures (i.e. direct, indirect, fixed or variable) and the cost data using the historical or industry standard can be more precisely and accurately derived from the Activity-Based Costing breakdown.

## CHAPTER 4

### RESULTS AND DISCUSSIONS

One of the most interesting discoveries of the study were the findings on the advantages, disadvantages and limitations of the traditional accounting costing system and the Activity-Based Costing/Management. It appears that both costing and reporting systems serve different purposes and can better serve different audiences. There is no one method of costing system that can be universally applied to meet the needs of each user.

To illustrate, the general ledger budgeting and reporting system has been a widely-accepted means of measuring and comparing the financial health of companies both internally and externally. However, there are some limitations of such an approach which can be supplemented with other accounting systems such as ABC/M, allowing quality professionals and decision makers to better understand the effectiveness, of the true costs and the profit margin of each product or service. This also includes the opportunity to use fact-based data to estimate, justify or budget for any future projects (product or service) or process improvement initiatives.

Moreover, the concept of local versus companywide Activity-Based Costing and Management has surfaced as the result of the study. Based on the research, it appears that a common misconception is the ABC/M approach must be implemented companywide. All business processes must undergo and apply

the ABC/M approach to their costs and budgeting structures. In reality, however, many organizations opt to implement the ABC/M concept internally or as subsets of the organization's process improvement initiatives rather than as a sole revenue and profit enhancement mechanism (Cokins, 2007). To illustrate, the ABC/M methodology can reveal the cost structure and assignment to decision makers and quality professionals. This is from the point of view of what function causes various outputs to happen and how much resource assumption incurred to create a tangible or intangible asset in the end-to-end, or horizontal, manufacturing or service delivery processes. To simply sum up this second discussion point, the activity-based model can be very scalable to fit the needs of the enterprise.

Per Roztockki and Schultz (2008), it is interesting to note that the rates of adopting the ABC/M model are very similar in both service and manufacturing industries. Moreover, larger organizations tend to adopt or implement the activity-based costing and management more often than smaller companies. This is possibly due to the fact that this approach is considered, or has proven to be, more beneficial in larger firms with more diverse, customized mixes of products or services and because larger organizations are more likely to have the specialized resources, systems and capital available for the ABC/M work.

Although the traditional cost accounting system appears inefficient and incomplete for decision makers and quality professionals, the ABC/M method is not a replacement for conventional costing practices. The existing general ledger

and Chart of Accounts system is the widely-accepted, universal language to measure, communicate and compare enterprises' financial health and wealth via financial statements (i.e. balance sheets, income statements, statement of retained earning and company's cash flow). The analysis and discussion of the ABC/M is found to be the supplemental, internal approach and system to support management and quality practitioners in the decision making process.

Cost accounting experts point out that the activity-based approach to cost appears to be a simple and straightforward concept and offers many benefits over the traditional costing counterpart. However, the evaluation, implementation and support of such an ABC/M system can take a great amount of effort and invested resources to ensure the process and system works and delivers the desired benefits (Searcy & Roberts, 2007). To illustrate, the implementation effort can include, for example, 1) the evaluation and upgrades of the existing process, infrastructure, and systems; 2) the evaluation and preparation for culture change, user readiness and training initiatives; and 3) the sustaining and life-cycle efforts to support the users and system after the system and process launch.

In recent years activity-based costing approach has been integrated into Enterprise Resource Planning (ERP) system by automating standard costing routines. This single database system categorizes and allocates direct and indirect costs via cost objects which consume resources and are used to collect and report costs. Activity-based costing via the ERP software (i.e. SAP or JDE) can measure each activity by determining what it really consumes and charge

the appropriate cost object(s) in real-time. Therefore, total true costs can be identified, categorized and reported correctly and more seamlessly, in support of profitability, performance, and quality measurement and improvement. That is, ABC-integrated ERP system is utilized to increase profitability and eliminate non-value or non-productive work. This integrated system helps managers and quality professionals improve operations and make sound decision more effectively and timely. (Lahikainen, Paranko & Seppanen, 2000).

## CHAPTER 5

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## Summary

The traditional general ledger and budgeting system has been the main costing tool to collect, summarize and report the cost of companies for decades. The use of this tool is not solely limited to the measurement, reporting and benchmarking among industries and enterprises but is also utilized within firms to act as a measuring stick to determine internal profitability, efficiency as well as for process improvement initiatives for products, services or processes. The resulting findings from the research, supporting evidence and experts in the field, recommend the use of such conventional tools be confined to external use. Additionally, the costing and reporting needs in the area of operations should be supplemented with another method called Activity-Based Costing and Management (ABC/M). This is due to the fact that the conventional approach to reporting cost is incomplete, unprocessed and not fact-based to support the decision-making process. Moreover, the ABC/M method can provide detailed costs and assignable overheads associated to activities in end-to-end processes. This supplement method allows the measurement of cost, performance and quality of activities. It also can help decision makers and quality professionals understand the true cost of quality and improve operations and cost structures by

increasing efficiency and eliminating non-value added or non-productive activities.

### Conclusions and Recommendations

Many accounting experts and cost engineers recognize that the ABC/M process and system is not a simple task and requires full understanding and adequate resources to prepare an organization for deployment and life cycle management. However, the same cost professionals agree that such a costing and budgeting system is far more beneficial than the existing general ledger and Chart of Accounts approach, especially at the operational level and for process improvement opportunity in the area of costs. Furthermore, it is important to note that Activity-Based Costing is a scalable quality tool that can supplement the shortcomings of the conventional method. Nevertheless, it is not for every company. The appropriate assessment and preparation for ABC/M is very crucial for the success (or lack thereof). To illustrate, the activity-based approach is appropriate to organizations that meeting following sample criteria (Witherite & Kim, 2006):

- Companies with significant indirect costs
- Companies with complex or customized products and services,
- Companies with losses on high-volume goods and profits on low-volume goods
- Internal department with disagreement over cost allocations.



ABC/M implementation challenges and any industry lessons-learned should also be studied prior to the deployment of the proposed system. This includes the biggest challenge in gaining buy-in and commitment from management, operational managers and team members. In addition, the approach and the deployment strategy should involve all levels of users as often and as soon as possible to reduce any resistance to change and to ensure that the initiative will not be viewed as another special, "sound good" program that results in uncertain benefits (Witherite & Kim, 2006). Lastly, the ABC/M approach should not be treated as solely a cost collecting and reporting system as it adds little value to the enterprise and internal operations. ABC/M should also be incorporated within any company's existing Decision-Support System (DDS) that assists the decision-makers with solutions and insight into the planning of costs. To illustrate, DDS expands the ABC/M horizon by incorporating tools and techniques to perform cost modeling and analysis, what-if scenarios and unstructured cost problems. With this totally integrated approach, the company can recognize the full potential and benefits of cost reporting and planning using the cost estimating, trending, forecasting, and live cycle costing activities.

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