EXTENT OF APPLICABILITY OF ACTIVITY BASED COST SYSTEM: APPLIED STUDY ON MANUFACTURING COMPANIES IN ALLAHABAD

THESIS

SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE Of

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SUBMITTED BY

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ALLAHABAD-211007, UTTAR PRADESH, INDIA
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Shaban. E. A. Salem.
Ph.D. Research Scholar
DECLARATION

I hereby declare that the research entitled “Extent of applicability of Activity Based Cost System Applied study on manufacturing companies in Allahabad” has been entirely conducted by me. The present work is completely original to the best of my knowledge and has not been submitted before for the award of any other degree, Diploma Associateship, Fellowship or other similar title of this and any other university.

Shaban. E. A. Salem.
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ABSTRACT

Significant changes have occurred in the modern business environment and intensive use of automation and technology has resulted in massive change in the structure of production costs. As a corollary emergence arose for a new system of costs accounting to meet and keep pace with these developments. Among the modern systems of cost accounting is Activity Based Costing which is popularly known as ABC system. This system tries to address the problem of allocating indirect industrial costs which is considered the mother of problems in cost accounting, where traditional cost accounting system is unable to solve it fully.

This study aims at achieving the following objectives:

1- To study the conceptual framework of ABC System in order to interpret and explain the importance of ABC system and to draw a comparison between the traditional costing system and ABC system.
2- Identify the extent of prevalence of the application of ABC system in industrial companies.
3- Recognize the benefits of implementing the ABC system from the point of view of these companies.
4- Determine the difficulties that hinder the application of ABC system in companies.

To achieve these objectives, the study has been divided into two sections: theoretical aspect and practical aspect.

The theoretical aspect consists of three chapters; the first chapter addresses the introduction of study, conceptual framework for traditional costs systems and conceptual framework for activities based cost system. The second chapter reviews the researches and available literature on activity based cost system. While the third chapter deals with the research methodology.
The other part of the study, that is the practical aspect, involves field study conducted on the basis of a questionnaire that had been designed to elicit information. The questionnaire was designed with two set of questions in order to explore the views of industrial companies in relation to the ABC system.

A total of 22 questionnaires were distributed to the study sample. The sample of the study includes the manufacturing companies of Allahabad city. Out of the 22 questionnaires distributed, 18 have been completed and collected and the responses rate is in the range of 81.82%. Statistical analyses of data using SPSS revealed the following main results:

1- Activity based cost system can be considered as an alternative to traditional way for indirect costs accounting.
2- The underlying philosophy of activity based cost system is products consume the activities and activities consume the resources.
3- Out of the population 38.9% of companies surveyed applied activity based cost system in calculating the cost of the product.
4- All the companies surveyed believe that activity based cost system has various benefits, such as more accurate calculation of the cost in comparison to traditional costing, enhance the costs control and help in taking sound administrative decisions.
5- All the companies surveyed believe that there are difficulties hindering the application of activity based cost system in these companies, such as division of business in clear and specific activities, lack of required qualifications and professional incapability in implementation of the system and high cost of the system application.

On light of the foregoing results, the researcher recommends that there is a need to pay attention to the following:

1- The companies should gradually start introducing activity based cost system in its cost system.
2- There is a necessity of convincing the administration of these companies with the importance and benefits of activity based cost system
3- Companies must overcome all difficulties impeding the application of the activity based cost system.
4- The companies must organize training programs for accountants from both practical and professional. These companies must adopt the use of computer in processing all their operations.

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Chapter I
Introduction
The world has witnessed a great technical and technological development by the late of the last century. This has led to the transformation of the production systems from the human systems to the mechanical systems and further to the automatic systems, resulting in the complicated production processes and increase in the contribution of the indirect industrial costs in the global production costs of the commodity. It has been observed that in most of industries this percentage of indirect costs exceeds 40% (Nasr, Rasheed, 1997).

In the backdrop of these developments, the traditional costs systems faced severe criticism, particularly in the field of allocating and distributing the indirect industrial costs of the products. As a result of this criticism the accountants gave immense importance to the necessity of developing specific costs systems in respect to the allocation of resources in order to suit the aspirations of the administration in having precise costs information and their role in decision making. The recent developments in the costs systems have given rise to a methodology in allocating the indirect costs that fulfills the needs of administration in terms of better information in comparison to the traditional system. This new methodology of measuring costs is known as ‘Activity Based Cost’, and abbreviated as ‘ABC’.

The philosophy of this system is based on the premise that activities consume resources, and hence they are driving cost and not the products. Since products consume the activities, different costs are attributed for defined activities, then allocate these activities on the products according to need of each product from these activities (Ahmed, Shahata, 2006).

Garsso suggests that Cooper and Kaplan has presented the ABC system project as an alternative to be more suitable to the allocation of indirect costs on the products than the traditional system, and as regard to the cost determination ABC retained a great concern in the accounting as well as in the administrative milieus, since it represents an important tool in determining the product costs and in reporting it correctly, and it avoids the points of lacks and critics to which is subject the traditional system of costs within the changes and technologies prevailing currently in the establishment environment (Qasem, 2002).

Anandarjan and Joseph and Raffish defined ABC system to be an accounting system processing all the information pertaining with the financial and operating performance through tracing the main activities and duties carried out with the establishment
towards the final product or service. The tracing is done by dividing the indirect costs
to multiple cost pools and using a set of cost drivers to trace arrival these costs to the
products or services, hence giving rise to causality relation between the activities and
the consumption of the economic resources. Furthermore Hughes and Gjerde define
ABC system to start from relying on determining the activities used in the production
and distribution of products and services, and thereafter the costs are calculated
(Maher, Khalil, 2009).

ABC system helps in taking many decisions carefully such as the decisions regarding
pricing, purchasing or manufacturing, and the classification of clients as per their
profitability and determining marketing regions with high or low profitability, and other
decision that affect the competitive position of the company. This system assists the
establishment also in the field of planning and costs control.

Accordingly, this research is an attempt from the researcher to highlight the ABC
system from the theoretical point of view, and also to conduct an applied study on
industrial companies.

1-1- Conceptual Framework for Traditional Cost Systems.

The evolution which characterizes our contemporary world in various fields of
economy and service has resulted in establishing major industries and produce
diversified products in proportion to the technical progress in means of different
production and independence of the science of costs and emergence of its great
importance in providing detailed and immediate information to the management of
these enterprises to help them plan with maximum efficiency possible

World is presently facing significant developments in methods, policies and
production systems, which have a significant impact on the nature of systems cost
accounting to keep pace with these developments in terms of enabling the
administration to focus its concerns on the most effective products and activities,
which affect in increasing profits and also helping managers to take sound decisions
in the areas of product design, pricing, marketing, encourage developments on an
ongoing basis and the decisions of add and exclusion products, which increases the
competitiveness of industrial companies and their market share.
The administration of various enterprises attached high hopes on cost systems to identify and measure the cost and control it in order to reduce wasteful and loss, so these enterprises can provide high quality products and withstand the competition with the lowest possible cost and achieve adequate return, which can push it to continuation and development. This system offers strong foundations, rules and tools which can help to achieve the goals and objectives desired in service of economic activity, whether at the enterprise level or at national level as a whole.

This Chapter highlights traditional costs system in terms of concept, objectives and functions, different classifications of costs, concept of the direct and indirect costs and criticisms of traditional system.

1-1-1 Concept of Cost Accounting.

Economic development and technological improvement has resulted in an increase in the scale of business operation. These factors have given rise to specialized branches of accounting such as Financial Accounting, Cost Accounting, Management Accounting and Social Responsibility Accounting. These branches are as given below (Singhvi, et al, 2006):

![Fig. 1.1 Branches of Accounting.]

Compared with financial accounting, cost accounting is a relatively recent development. Modern cost accounting developed only during the nineteen century. In fact, cost accounting started as a branch of financial accounting, but it is now regarded as an accounting system in its own right. The vital importance that cost accounting has acquired in modern age is because of the increasing complexity of modern industry (Arora, 2013).
Cost accounting has primarily developed to meet the needs of management because modern management needs much more detailed information than those supplied by financial accounting.

Cost accounting an approach to evaluating the overall costs those are associated with conducting business. Generally based on standard accounting practices, cost accounting is one of the tools that managers utilize to determine what type and how much expenses is involved with maintaining the current business model. At the same time the principles of cost accounting can also be utilized to project changes to these costs in the event that specific changes are implemented (Sumit, 2012).

If we are going to define cost accounting we must recognize the beginning that there are different definitions and variety like any other social science. Where defined by The Institute of Cost and works Accountants (ICWA), London since more than a quarter of a century as follows (Majdi Omarah, et al 1992):

The process of accounting for cost from the point at which expenditure is incurred or committed to the establishment of its ultimate relationship with cost center and cost units. In its widest usage it embraces the preparation of statistical data, the application of cost control methods and the ascertainment of the profitability of activities carried out or planned.

It is defined as ‘the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability’. It includes the presentation of information derived for the purpose of managerial decision making (Majdi Omarah, et al 1992). It has also been defined as ‘Cost accounting is that branch of accounting information system which records, measures, and reports, information about costs.’ (Khan and Jain, 2006).

Whatever the definitions, they often assert that:

1- Cost accounting is science governed by a set of theories, principles and specialized procedures and rules.

2- This science has specific topic specialized to follow-up elements of expenditures and cost.
3 - Cost Accounting means to achieve specific goals and objectives.

4 - In order achieve desired goals of cost accounting it must perform a group of functions which lead to the achievement of these goals in an optimal manner.

1-1-2- Objectives and Functions of Cost Accounting.

1-1-2-1- Objectives of Cost Accounting.

The information needs of management and cost accounting objectives are closely related. The main objectives of cost accounting are:

1- Actual cost Computation and Calculation.

2- Cost Control.

3- Decision rationalization and Policies.

In addition to main goals there are other sub-goals which will be discussed during talking about the main objectives.

1- Cost Computation.

Some call it Objective Costing to express the techniques and processes of ascertaining costs after they have been incurred, while others call it Cost finding.

This objective is the first and oldest objectives sought by cost accounting to be achieved. The objective of determining the cost of products is of prime importance in cost accounting. The total product cost and cost per unit of product are important in making inventory valuation, deciding price of the product, and managerial decision-making. Product costing covers the entire cycle of accumulating manufacturing and other costs and subsequently assigning them to work-in-progress and finished goods (Jawahar Lal, 2009).

In addition, objective of measuring the cost also means seeking to determine the cost of the various activities within the facility from industrial processes or internal stages of production or cost of internal services or the cost of orders operating as a whole etc.
It could also be argued that the pursuit to achieve this objective in the same time help to achieve many of the following sub-scorder (Majdi Omarah, et al 1992):

1- To contribute in determining the sale price of product unit or activity.

2- This objective helps in determining the amount of production and sales which achieve the best possible profits.

3- To contribute in cost control by comparing the actual cost and standard cost of cost unit.

4- Assistance in study cost trends by comparing the total cost of product unit over several different accounting periods.

5- Help financial accountant in preparation of financial statements and evaluate inventory of completed units and products under operating.

2- Cost Control.

Cost accounting aims at improving profitability by controlling costs. Cost control can be defined as a set of procedures and methods which enable management of the enterprise to verify that the process of expenditure are going according to limits and pre-planned targets.

The accountant has exceeded this narrow confines of the traditional concept of control and became an accountant now depends on what is known as the Standard Costs or Estimated or Budgeted Costs, they called Predetermined Costs, it costs which is computed in advance of expected production on the basis of specification of all the factors affection cost, then compare with the actual costs for purpose of identification and analysis of deviations and knowledge of causes and take appropriate corrective measures (Majdi Omarah, et al 1992).

The management control over business operation aims to establish balance between actual and budgeted performances. A properly designed cost accounting system includes the following steps in the control process (Jawahar Lal, 2009):

1- Comparing actual business performances with budgets and standards.
2- Analyzing the variance between budget and standard and actual by causes, and management responsibility so that corrective action may be taken.

3- Providing managers with data and reports about their individual performances and performance of subordinates.

On the other hand, the evolution of control concept led to the need to achieve two types of control:

1- Corrective control: It is made after incurring an expenditure and comparing the actual costs with predetermined costs, and identification and analysis of deviations then procedures are taken to ensure that it is not repeated in the future.

2- Preventive control: It is the most important in terms of its ability to avoid the mistakes and commitment with predetermined costs and do not exceed the actual costs, preventive control represent contemporary trend of the concept of control.

3- Decision Rationalization and Policies.

An important purpose of the cost accounting system is to provide data and special analysis for short- and long-run decisions of non-recurring. Appropriate cost information must be accumulated to make a wide variety of short- and long-run decisions.

The following are the objectives of cost information developed in cost accounting (Henke and Spoede, 1991):

1- As a basis for valuing manufactured inventories and cost of goods sold in externally presented financial reports.

2- In controlling operations through the evaluation of operating results and the placement of responsibilities for the uses of organizational resources on the shoulders of specifically identifiable persons within the organization.

3- In planning operation through the establishment of cost and budgetary goals.

4- In making day-to-day operation decisions (a part of controlling operations).
As for the planning, cost accounting provides serious contribution through what it is doing to determine the costs required to achieve specific goals and provide data for preparation of planning budgets which reflect policies of administration.

1-1-2-2- Functions of Cost Accounting.

Following functions are set to achieve cost accounting desired goals: (Majdi Omarah, et al 1992):

1- Recordative Function.

It is interested in recording process of events and cost data through relying on documents in the enterprise in an orderly manner in the proper books of costs, whether they are independent or attached with the financial books.

2- Analytical Function.

Analyzing data and information of costs through the foundations and principles as a prelude to draw conclusions, it shall examine each element of the costs and determine its nature, type and its behavior and then is classified to a suitable set of costs sets.

It logically that identifies the objective or purpose of the analysis process in order to facilitate the link between steps of analysis and what lead these steps to results. Cost accounting use mathematical and statistical methods used in operations research in addition to the accounting methods.

3- Controlling Function.

Control in cost accounting is an objective as well as a function at the same time. It is an objective because it tries to subdue cost behavior for planned pattern to reduce cost to the minimum whenever possible. It is also a function because it shows a set of steps and methods to be implemented to achieve this objective.

4- Interpretive and Informative Function.

The accountant here formulate the results of his work during the recording, analysis and control in form informs the administration of the company what happened and
provides a scientific explanation for the meaning of these events and their significance.

This function describes the results of work of accountant at the level of all previous functions. It is supposed to have been preparing reports and statements to reflect the level of accountant’s achievement at the recording, analysis and at control. The timing of the submission of these reports should be according to the needs of the management, in order to help the management in making rational decisions and follow-up the activity to determine the remedies if necessary.

1-1-3- Meaning of Costs and their Classification.

1-1-3-1- Meaning of Cost.

The term “cost” does not have a definite meaning and its scope is extremely broad and general. It is, therefore not easy to define or explain this term in clear terms. Cost accountants, economists and other develop the concept of cost according to their needs because one complete description of “cost” that suits all situations is not possible.

According to Oxford Dictionary, cost means ‘the price paid for something’. Some other definitions of cost are given below (Arora, 2013):

1- Cost is the amount of expenditure (actual national) incurred or attributable to a given thing. ICMA, London.

2- A cost is the value of economic resources used as a result of producing or doing the things costed. WM Harper.

3- Cost is a measurement, in monetary terms, of the amount of resources used for the purpose of producing of goods or rendering of services. ICWA of India.

Dinabandhu, (2008) defines the term “cost” as ‘sacrifice of factors of production in the process of generation of want removing economic benefit measurable in monetary term as the unit of measurement’.
One of general definition of cost as given is ‘Cost is a foregoing or a sacrifice measured in monetary term incurred or potentially to be incurred to achieve a specific purpose’(Pandey, 2005). Three basic features inherent in this definition are:

1- *Sacrifice*: Cost is the measurement of foregoing or a sacrifice, the foregoing or sacrifice is represented by a current or future decrease in cash or other assets (resources) or an increase in current or future liabilities.

2- *Money Value*: The uses of resources are measured monetary term, resources that constitute the elements of cost are materials, labor, service and other services, these resources are expressed in different units. Money is a common denominator permitting the measurement of all resources in term of a single unit, rupees, dollars or sterling, etc.

3- *Stated Objective*: Since a foregoing or a sacrifice is made to secure some specific benefit, cost should be measured in context of the stated objective.

**Cost vs. Expense and Loss.**

Often the term “cost” and “expense” are used interchangeably, but cost should be distinguished from expense and loss.

**Expense** is defined as an expired cost resulting from a productive usage of an asset. It is that cost which has been applied against revenue of a particular accounting period in accordance with the principle of matching costs to revenue.

In other words, an expense is that portion of the revenue earning potential of an asset which has been consumed in the generation of revenue. Unexpired part of the cost is recorded as an asset in the balance sheet; such an unexpired cost is converted into an expense when it expires while helping to earn revenue.

**Loss** is defined as reduction in a firm’s equity, other than from withdrawals of capital for which no compensating value has been received. A loss is an expired cost resulting from the decline in the service potential of an asset that generated no benefit to the firm.
It can express the relationship between these terms in the following figure (Arora, 2013).

Fig 1.2 Relation of Cost, Expense and Loss.

1-1-3-2- Classification of Costs.

The achievement of the objectives of cost accounting requires that cost should be ascertained, classified and grouped. Cost classification may be defined as the process of grouping costs according to their common characteristics.

There are many objectives of cost classification depending on the requirements of management. However, the following objectives are considered very useful and significant (Jawahar Lal, 2009):

1- Determining product costs for stock valuation and profit measurement.

2- Planning.

3- Decision making.

4- Control.
Institute of Cost and works Accountants (ICWA) has identified the intended classification process (Majdi Omarah, et al 1992):

1- The process of grouping cost according to their common characteristics.

2- A series of specified groups according to which costs are classified.

As defined by the American Accountants Association (A.A.A) as:

Definition element (cost element), systematic collection of similar elements according to their common characteristics.

The most important different cost classifications are as follows:

1-1-3-2-1- The Primary Classification of Costs.

The term “primary classification” refers to the basic physical characteristic of the cost, it also called Natural Classification of Costs. In manufacturing concern, generally, the following costs are incurred:

1- Materials cost.

2- Labour cost.

3- Services cost.

1- **Materials cost**: Materials are physical commodities that enter into the making of a product, these are sometimes called stores or raw materials. The term materials used in the cost accounting is not restricted to natural resources only, the finished product of one firm can be a raw material for another and the materials include the following items (Majdi Omarah, et al 1992):

- Raw Materials.
- Fuel.
- Gas.
- Motive Power.
- Spare Parts.
- Maintenance Instruments.
- Consumable Materials.
- Remains.
- Packing Materials.
- Office Supplies.
- Printing and Drawing Supplies.
- Books
- Newspapers and Periodicals.
- Medicine and Medical Supplies.
- Water.
- Dutiable Materials (Goods).

Everything that is spent for the purpose of acquiring these items is considered part of the materials cost whether these materials intervene in the production process or help to complete the production process or help to complete the sales process or help the administration to achieve its functions.

2- **Labour cost**: Defined as the cost of remuneration (wages, salaries, commissions, bonuses, etc.) of the employees of an undertaking. It includes:

- Cash Wages.
- Benefits.
- Social Insurance.

According to this division, the concept of the cost labour is not limited on cash wages granted to the company's employees, but includes in addition to any cash or in-kind burdens borne by the company for use of the labor force, whether mental or human muscle, such as: Overtime Wages, Bonuses, Premiums, Allowances. In addition, any other advantages in kind, such as: Food, Clothing, Housing, Treatment, and any insurance borne by the company on behalf of employees, such as insurance against work-related injuries, anti-aging or unemployment etc.

The Company borne by these costs in order what the workers have presented in various work sites, whether sites of production or production services or other services departments in the company.

3- **Services cost**: It includes any cost and expenditure other than materials and labour cost incurred on a specific product or job. Such special necessary expenses can be
identified with product or job and are charged to the product as a part of the prime cost. Examples of services cost (Majdi Omarah, et al, 1992):

- Depreciation of assets and rents.
- Maintenance expenses.
- Research and testing expenses.
- Publishing and advertising expenses.
- Interests and insurances expense.
- Storage expenses in the stores of others.
- Transportation expenses through third parties.
- Mail expenses, telephone and telegraph.
- Heating expenses, cooling and electricity.

The division of the costs into three elements and find out how much each element represents will help to identify the element which needs special attention of administration, where management attention to the dominant element in the costs of the company leads to achieve the greatest possible saving in the expenditures.

**1-1-3-2-2- Functional classification of Costs.**

Functional classification of cost refers to how the cost was used (production, administrative or selling). A functional classification implies that the business performs many functions for which costs are incurred. In measuring net income, expenses are usually classified by function and grouped under the following headings (Jawahar Lal, 2009):

1- Production Cost.

2- Selling and Distribution Cost.

3- Administrative Cost.

1- **Production Cost:** Production cost is defined as the cost of the sequence of operation which begins with supplying materials, labour and services and ends with primary packing of the product, as it is also known Manufacturing cost (Majdi Omarah, et al, 1992).
It is the cost of operating a production department in which manual and machine operating are performed directly upon any part of product manufactured. This includes the cost material, labour and expenses, primary packing expenses and all overhead expenses pertaining to production (Rajasekaran, et al, 2011).

Three terms commonly used in describing manufacturing costs are (Charles, et al, 2013):

a- Direct Material Costs are the acquisition costs of all materials that eventual become part of the cost object (work in process and then finished goods) and can be traced to the cost object in an economically feasible way. Acquisition costs of direct materials include freight-in (inward delivery) charges, sales taxes, and custom duties. Examples of direct material costs are steel and tires used to make the cars and the computer chips used to make cellular phones etc.

b- Direct Manufacturing Labour costs include the compensation of all manufacturing labour that can be traced to the cost object (work in process and then finished goods) in an economically feasible way. Examples include wages and fringe benefits paid to machine operators and assembly-line workers who convert direct materials purchased to finished goods.

c- Indirect Manufacturing Costs are all manufacturing costs that are related to the cost object (work in process and then finished goods) but cannot be traced to that cost object in an economically feasible way. Examples include supplies, indirect materials such as lubricants, indirect manufacturing labour such as plant maintenance and cleaning labour, plant rent, plant insurance property taxes on the plant, plant depreciation, and the compensation of plant managers. This cost category is also referred to as manufacturing overhead costs or factory overhead costs.

2- Selling and Distribution Cost: Selling overhead can be defined as cost of seeking to create and stimulate demand and of securing orders.

Distribution overhead can be defined as cost of sequence of operations which begin with making the packed product available for delivery and end with making the re-conditioned returned empty package, if any, available for re-use. Distribution overhead also includes the cost of transportation of the products to center of local
storages and where the goods are sold on the basis of sale or return. It implies cost of delivering the products to the customers and the cost of receiving them back in case where the customer returns the products (Vijayakumar, 2010).

Selling and distribution overhead when taken together, means all the expenses incurred on certain functions like, selling advertising, transporting warehousing etc. usually, selling and distribution expenses are incurred after the completion of the production and hence, they are sometimes referred to as After Production costs, some examples of selling overheads are given as under (Vijayakumar, 2010):

a- Indirect Materials: such as sales office printing and stationary, advertising materials, catalogues, price list and packing materials.

b- Indirect Labour: Such as salaries of salesmen, commission to salesmen, salaries to delivery staff, sales manager, sales and distribution, clerical staff, wages paid to drivers of delivery vehicles, etc.

c- Indirect Expenses: Such as advertising in newspapers, radio, rents, rates, taxes, insurance of sales office building, warehouse and showrooms, cost of after sales services, depreciation of delivery vehicles, running expenses of delivery vehicles etc.

3- Administrative Cost: the cost of formulating the policy, directing the organization, and controlling the operations of an undertaking, which is not related directly to a production, selling, distribution, research or development activity or function (Majdi Omarah, et al, 1992).

These include indirect labour, and indirect expenses which are incurred in administration of the organization. The following can be listed as examples of administrative expenses:

a- Indirect Materials: Such as printing and stationery.

b- Indirect Wages: Such as salaries of clerical staff, officers and executives in various administrative departments.
c- Indirect Expenses: Such as rent rates, taxes, insurance of office building, office lighting, depreciation and repairs of office building and office equipment, audit fees, director’s fees, etc.

The classification of costs on this basis helps to achieve the following objectives (Majdi Omarah, et al, 1992):

1- Measure the cost of the activity which is divided into production costs, distribution costs and administrative costs.

2- Determine the cost of complete production and production under operating during the period and the end of period.

3- Help in controlling the cost elements by linking them to specific activities units or responsibility in company.

4- Performance evaluation in various company activities.

5- Help measuring profits and business results.

1-1-3-2-3- Classification of Costs in their relation to Cost unit.

A cost unit is defined by CIMA, London as a unit of product or service in relation to which cost are ascertained. According to Institute of Cost Accounting of India (ICAI), cost unit is a form of measurement of value of production or service, this unit is generally adopted on the basis of convenience and practice in the industry concerned. All sorts of cost units are adopted, the criterion for adoption being the applicability of particular cost unit to the circumstance under consideration, cost unit can be of tow types as mentioned below (Arora, 2013):

a- Units of production, e.g., a ream of paper, a tone of steel, a meter of cable, etc.

b- Units of services, e.g., passenger miles, cinema seats, consulting hours, etc.

In order to be considered a cost unit which is appropriate to the nature of the company, it is supposed to have the following (Majdi Omarah, et al, 1992):

1- Differentiating a cost unit to be identified easily.
2- Usability as a unit of quantitative measure of the production.

3- Ease of linking costs elements with it.

4- Homogeneity and stability of a cost unit during a specific period of time.

Under this classification, costs are broadly divided into:

1- Direct Cost.

2- Indirect Cost.

The distinction between direct cost and indirect cost does not depend only on the diligence and estimate of accountant, but also depends on the scientific bases of the following (Majdi Omarah, et al, 1992):

a- Physical Qualification.

b- Financial Allocation.

c- Responsibility of Expenditure.

d- Relative Benefit.

1- **Direct Costs**: these are those costs which can be easily and conveniently identified with a unit of product or other cost object (Arora, 2013). Direct costs are those that are allocated to the cost object (Bhattacharyya, 2004).

Direct costs are the costs which can be conveniently associated wholly with a particular unit of final product, such direct costs are traced as the cost of commodity to which they relate, the question of their apportionment among several commodities does not usually arise, expenditure incurred on raw materials, labour employed and other expenses, which are exclusively incurred for production of a particular article are the items of direct costs (Vijayakumar, 2010).

Direct costs can be further classified into following three elements (Majdi Omarah, et al, 1992):

a- Direct Materials cost: which can be identified with, and allocated to cost centers or cost units.
b- Direct Labour cost: which can be identified with, and allocated to cost centers or cost units.

c- Direct Expenses: which can be identified with, and allocated to cost centers or cost units.

**2- Indirect Cost:** these are general costs that are incurred for the benefit of a number of cost units, process or department. These costs cannot be easily and conveniently identified with a unit of product or order cost object. Indirect costs are those that are not allocated but equitably apportioned or absorbed by the cost object (Bhattacharyya, 2004).

Indirect costs or overhead expenses are the expenses incurred for business as a whole (*i.e.* for the production of several commodities or the completion of several contracts simultaneously). Each of them has, therefore, to be apportioned among all the commodities to which it relates on some reasonable basis (Vijayakumar, 2010).

Costs are not traced or identified directly with a cost unit for one of the following three reasons (Arora, 2013):

a- It is impossible to do so; *e.g.*, rent of building, etc.

b- It is not convenient or feasible to do so; *e.g.*, nails used in furniture, sewing thread, etc.

c- Management chooses not to be so; *i.e.*, many companies classify certain items of cost as indirect because it is customary in the industry to do so; *e.g.*, carriage inward may be traced as an indirect expenses (Alternatively, it may be traced as a part of the cost of materials purchased ).

Indirect costs can be further classified into following three elements (Majdi Omarah, et al, 1992):

a- Indirect Materials Cost: which cannot be allocated but which can be apportioned to, or absorbed by cost centers or cost units.

b- Indirect Labour Cost: which cannot be allocated but which can be apportioned to, or absorbed by, cost centers or cost units.
c- Indirect Expenses: which cannot be allocated but which can be apportioned to, or absorbed by, cost centers or cost units.

The following chart gives the complete classification of Costs in their relation to Cost unit

![Classification of Costs](image)

The classification of costs on this basis helps to achieve the following objectives (Vijayakumar, 2010).

1- Determination of cost per unit or job.

2- Disclosure of cost at different stages of production.

3- Disclosure of the components of cost.

4- Disclosure of profitable and non-profitable activities.

5- Help in fixing and giving tenders.

6- Guide for future production policy.

7- Disclosure of the effect of different methods of wage payment on cost.

8- Disclosure of the effect of different types of materials on cost.

9- Disclosure of relative efficiency of different machines.

10- Help in substituting labour for capital or vice versa.
11- Disclosure of the important of the cost of a process or of an overhead to total cost.

12- Help in comparing costs for different period and volumes of production.

13- Help in rectifying error in policy-making.

14- Help in increasing profit.

15- Help in weeding out wastages during depression.

**1-1-3-2-4- Classification of Costs in their tendency to vary with activity.**

Costs behave differently when level of production rises or falls, certain costs change in sympathy with production level while other costs remain unchanged. As such on the basis of behavior or variability, costs are classified into:

1- Fixed Costs.

2- Variable Costs.

3- Mixed Costs.

**1- Fixed Costs:** The terminology of ICMA defines fixed cost as the cost which accrues relation to the passage of time and which, within certain limits, tends to be unaffected by fluctuations in the level of activity. A going business should have physical facilities and an organization for use, these things provide the capacity to manufacture and sell, the continuing costs of having capacity incurred in anticipation of future activity are termed as Capacity Costs. In case capacity is utilized, additional costs are incurred such additional costs of manufacturing and selling are controllable with current activity, while capacity costs tend to continue regardless of the current rate of activity as long as the same capacity is maintained (Rajasekaran, et al, 2011). These costs are also known as Standby Costs or Period Costs.

Fixed costs are those which are not expected to change in total within the current budget year, irrespective of assumption that technology and methods of manufacturing remain unchanged.

For the purpose of cost analysis, fixed costs may be classified as follows (Rajasekaran, et al, 2011):
a- Committed Costs: these costs cannot be eliminated instantly, these costs are incurred to maintain basic facilities. Example: rent, rates, taxes, insurance.

b- Policy and Managed Costs: policy costs are incurred in enforcing management policies. Example: housing scheme for employees. Managed costs are incurred to ensure the operating existence of the company. Example: staff services.

c- Discretionary Costs: these are not related to operation. These can be controlled by the management. These occur at the discretion of the management.

Any fixed cost can be represented as below (Jawahar Lal, 2009):

2- Variable Costs: the terminology of ICMA defined Variable Cost as a cost which tend to follow (in the short-term) the level of activity. Variable costs are also known as Marginal Costs, Variable Costs vary directly and proportionally with the output, variable cost per unit is constant but the total costs change corresponding to the levels of output. Variable cost is expressed in terms of unit only, variable costs are also synonymous with engineered costs (Rajasekaran, et al, 2011).

The following figure depicts the behavior of variable costs (Pandey, 2005):
It would be noticed in figure that variable cost is zero when production is nil, when production increases, for example from 4 units to 8 units, variable costs also become double by increasing from Rs 8 to Rs 16. Variable costs are activity costs since they accrue when some activity is performed.

For determining the cost of production, cost incurred are assigned to product, some costs are difficult to be traced to product, variable costs are comparatively easily assignable since they can readily and reasonably be identified with products manufactured. This does not imply that variable costs and direct costs are necessarily identical, some direct costs are variable while others are not, the actions of individuals in a department influence the magnitude of variable costs since they are directly related to activities, it is therefore, a direct responsibility of the department head to control and supervise the incurrence of variable costs (Pandey, 2005).

Thus, in general, variable costs show the following characteristics (Arora, 2013):

a- Variability of the total amount in direct proportion to the volume of output.

b- Fixed amount per unit in the face of changing volume.

c- Easy and reasonably accurate allocation and apportionment to department.
d- Such costs can be controlled by functional managers.

**3- Mixed Costs:** terminology of ICMA defined mixed cost as a cost containing both fixed and variable elements which is thus partly affected by fluctuations in levels of activity. Mixed cost also known as semi-variable or semi-fixed cost, mixed costs consist of features of both fixed and variable costs, these costs vary in total with changes in the level of activity not in direct proportion, due to the fixed part of the element, they do not change in direct proportion to output, due to the variable part of the element. They tend to change with volume, mixed costs change in the same direction of output but not in the same proportion, example: electricity charge, stationery, telephone expenses to illustrate, telephone expenses is a mixed cost, annual rental is Rs. 1000. For every call used the charge per call is Re. 1. Here the annual rental is the fixed part of the element remain unchanged, whereas the call made forma the variable element. It varies as per usage (Rajasekaran, et al, 2011). The figure 1.6 shows the behavior of mixed costs.

![Fig 1.6 behavior of mixed costs.](image)

**1-1-3-2-5- Controllable and Noncontrollable Costs.**

The concept of controllable cost is very important in cost accounting and contributes to the achievement of the objectives of cost control and responsibility accounting. The ICMA defines controllable cost as a cost which can be influenced by the action of a specified member of an undertaking. Basically, controllable cost is the cost over which a manager has direct and complete decision authority. Controllable costs can be controlled by manager at a given organizational level. Some examples of controllable
costs are indirect labour, lubricants, cutting tools, and power costs incurred in the machining department.

Controllable costs do not imply that they are 100% controllable, some costs are partly controllable by responsibility center manager, for example the cost of raw materials is controlled by production managers as well as purchase managers, the production manager controls at quantity level, and the purchase manager at the price level. Such costs are reported to both of them, but one responsible manager should be held accountable for those costs which he can control.

Thy term controllable cost should not be confused with the terms variable cost and indirect cost, these terms are not synonymous, variable costs vary with output but are not necessarily controllable. For example factory supplies used for servicing plant and equipment may vary with the output in the production department, but the production manager cannot control them.

It is controlled by two factors:

A) The time period factor.

B) The decision-making authority which can make a cost controllable or uncontrollable.

If the time period is long enough, all costs can be controllable and curtailed. Similarly the decision-making authority influences the cost, if a responsibility center manager has been delegated the authority to spend the cost, he can control it, but all costs can be said to be controlled by somebody in the organization. The managing director of a company is responsible for all costs, but practically the responsibility and authority of controlling costs is delegated to different levels in the organization. The following figure 1.7 shows the classification of Costs.
1-1-4- Concept of Indirect Costs and their Elements.

1-1-4-1- Concept of Indirect Costs.
Indirect costs are those costs which cannot be identified with, or traced to a single product because they are incurred for several products (Jawahar Lal, 2009). Indirect costs are those cost items which cannot be traced or identified directly with a cost object. These costs are related to or are caused by two or more cost objects, they cannot be attributed to each of the cost objects separately, and it is not easy to determine the amount of indirect costs assignable to each cost object (Pandey, 2005).

Some others defined the indirect costs as: costs which are related to the particular cost object but cannot be traced to it in an economically feasible (cost-effective) way (Charles, et al, 2013).

1-1-4-2- Elements of Indirect Costs.
The three major elements of indirect costs are (Pandey, 2005):
1- **Indirect Materials:** are those materials that are used in the manufacturing operations but do not become the part of finished product. These materials do not enter into the finished goods and cannot be identified with them. Indirect materials are also called supplies. The example of indirect materials are: cotton waste, lubricants, grease, oil, etc. The distinction between direct and indirect materials is not very rigid, it is based on practical and pragmatic ground, some materials like glue, nails, thread, screws or small tools are logically traceable to finished goods, but because of the impracticality of tracing these materials to the specific finished goods, they are traced as indirect materials, if the amount of the materials cost is immaterial and if it is expensive to trace them, it is more prudent to classify such costs as indirect materials cost.

2- **Indirect Labour:** is that which is required to perform manufacturing activities generally, but is not directly involved in the conversion of raw materials into the finished goods. Indirect labour costs are difficult to be identified with a specific finished product. Wages paid to foremen, clerks, material expediters, time keepers, purchase and store assistants, maintenance employees, etc. are examples of indirect labour costs.

The classification of labour costs as direct and indirect is matter of practical expediency, a labour cost will be generally classified as direct labour cost when it is convenient and economically feasible to do so. If high expenses and efforts are involved in identifying a direct labour cost and if it is insignificant in amount, it may be classified as indirect labour cost.

3- **Indirect Expenses:** which cannot be allocated but which can be apportioned to, or absorbed by cost centers or cost units. Indirect expenses comprises all indirect manufacturing costs which cannot be identified with specific units of the finished products. All indirect manufacturing costs except indirect materials and indirect labour costs, the example of indirect expenses are factory rent, depreciation on factory building and equipments, factory insurance, repair and maintenance, power, light, taxes, etc.

It is worth mentioning the total of all indirect costs (i.e., indirect material costs, indirect labour costs, indirect expenses) is termed as Overhead Cost.
Some of the authoritative definitions of overheads are reproduced below (Arora, 2013):

1- Overhead is the aggregate of indirect materials, indirect wages and indirect expenses- CIMA, London.

2- Overhead may be defined as the cost of indirect materials, indirect labour and such other expenses, indirect services as cannot conveniently be charged direct to specific cost units. Alternatively, overhead are all expenses other than direct expenses.

3- Overheads are those costs which do not result from existence of individual cost units.

4- Overhead costs are the operating costs of a business enterprise which cannot be traced directly to a particular unit of output.

Thus, overhead cost is the total of all indirect expenditure. It comprises those costs which the cost accountant is either unable or unwilling to allocate to particular costs units.

Accounting and control of overhead costs is more complex than that of other elements of cost, i.e., direct materials and direct labour. This is because overhead by definition, are indirect costs which cannot be conveniently allocated to cost units.

Hence, there arises the knotty problem of apportioning these indirect costs to cost centers and cost units.

1-1-5- The Traditional Methods Used in the Allocation of Indirect Costs.

To calculate the full production cost of a product, we need to identify the direct costs (direct materials, direct labour and direct expenses) and the indirect costs (indirect materials, indirect labour and indirect expenses). Indirect costs relating to production are generally called overheads. Direct costs can be directly identified with a specific product (cost unit). Overheads cannot be directly identified with a specific cost unit or cost centre.

Distribution of overhead costs to cost unit is one of the most complex problems of cost accounting, this is because overhead costs cannot be identified with individual
cost units and there are no accounting means of exact distribution. Therefore, such costs are analyzed and distributed to various cost centers and cost units on arbitrary bases. The cost accountant is constantly searching for equitable bases to distribute overhead costs to units and divisions of business enterprise and quite often he needs to exercise his own judgment in this regard.

1-1-5-1- Steps in Indirect Costs Distribution.

Indirect costs or overheads cannot be charged to cost units directly. The various steps taken for distribution of overhead costs are as follow:

1- **Collection and Codification of Overheads.**

The first step in distribution of overhead costs is their collection and codification under proper headings, similar overhead costs items should be grouped together. The grouping of overhead costs is done through a technique known as “codification”. Codification is a method of indentifying and describing various overhead expenses in numbers or letters or in a combination of both so that can easily be collected. Following are the objectives of codification (Jawahar Lal, 2009):

1- To collect overhead items of similar nature.

2- To help in the allocation and apportionment of overhead costs to different departments or cost centers.

3- To make an analysis of overhead cost items for planning and control purposes.

4- To help in adopting a mechanized system of accounting.

5- To maintain a reasonable number of accounts which could be economical and useful.

Some important methods of codification are the following:

- **Serial Numbering System.** Under this method item is allotted a fixed number in serial order, for example:

  01 Factory supplies.
02 Indirect labour.

03 Insurance.

04 Factory rent.

- **Number Block.** Under this method, a block number is assigned to cover items of expenditure, for example, 0-10 for maintenance expenses, 11-20 for supervision expenses, etc.

- **Combination of Alphabets and Numbers.** Under this method a code is used which combines the number as well as the alphabets, for example:

  \[ M_1 = \text{Maintenance of plant.} \]

  \[ M_2 = \text{Maintenance of tools.} \]

  \[ M_3 = \text{Maintenance of office building.} \]

  In the above example, \( M \) stands for maintenance and different numbers for different types of maintenance expenses.

- **Numerical Codes.** Under this system, a code number usually consisting of nine digits is used. The first two digits signify whether the cost is fixed or variable, the next three indicate head of expenses, the next two the analysis of expenses for further subdivision, and the last two digits indicate the cost center which incurs the expenditure, for example, 10/121/05/08 Fixed/salary/officers/production.

- **Mnemonic Method.** Under this method, the letters/alphabets are used to indicate an item such as D.P.T. for depreciation on plant and tools.

Among the above methods, the numerical code method is more suitable than the others for a large organization, this method is easy to operate where a mechanical system of accounting is used. A large number of items could be covered under this method. The procedure of codification of overhead is pre-requisite for the collection of overhead.

Production overhead should be collected by understanding order numbers. The main sources from which overhead costs are collected are as follows:
1- Invoice. For collection of indirect expenses, like rent, insurance, etc.

2- Store Requisitions. For collection of indirect materials.

3- Wages Analysis Sheet. For collection of indirect wages.

4- Journal Entries. For collection of those overhead items which do not result in current cash outlay and need some adjustment, e.g., depreciation, charge in lieu of rent, outstanding rent, etc.

2- Allocation of Overheads.

After overhead costs have been collected under various standing order numbers, the next step is to allocate the overhead to cost centers. Certain items of overhead costs can be directly identified with a particular cost center as having been incurred for that cost center. Allotment of such costs to cost center is known as allocation. Thus, allocation may be defined as: The assignment of whole items of cost directly to a cost center. In other words, allocation is charging to a cost center those overheads that result solely from the existence of that cost center. A point to be clearly understood is that allocation can be made only when exact amount of overheads incurred in a cost center is definitely known. For example, rent cannot normally be allocation since rent is payable for the factory as a whole exact amount of rent for each cost center cannot be known. Indirect materials, on the other hand, can be easily allocated to various cost centers in which they are incurred. Other items which are allocated include indirect wages, overtime and idle time cost, power when sub-meters are installed in cost centers, depreciation of machinery, supervision, etc. (Arora, 2013).

In order that overheads can be allocated, they should meet both of the following conditions:

1- The cost center must have caused the overhead cost to be incurred.

2- The exact amount incurred in cost center must be known.

3- Apportionment of Overheads.

Certain overhead costs cannot be directly charged to a department or cost center, such costs are common to a number of cost centers or departments and do not originate
from any specific cost center. Distribution of such overhead costs to various cost centers is known as apportionment. Thus, apportionment may be defined as the distribution of overhead to more than one cost center on some equitable basis. In other words, it is charging a fair share of an overhead cost to a cost center. Where an item of overhead cost is common to various cost centers, it is allotted to different cost centers proportionately. For example the cost of rent, as it cannot be allocated it is apportioned to various cost centers on same equitable basis, *i.e.*, in the ratio of area occupied. Similarly, salary of a general manager cannot be allocated wholly to any on cost center as he attends in general to all the cost centers. It should, therefore, be apportioned to the required cost centers on same equitable basis. Other items which generally cannot be allocated but are apportioned include fire insurance, lighting, and heating, time keeping expenses, canteen expenses, medical and other welfare expenses, etc.

The following are some of the common bases of apportionment of overheads (Rajasekaran, et al, 2011):

<table>
<thead>
<tr>
<th>Overhead</th>
<th>Bases of Apportionment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation, repair, and maintenance of plant machinery and other production activities like insurance premium on assts.</td>
<td>Capital values.</td>
</tr>
<tr>
<td>Depreciation, rent, heating, lighting rates and taxes, maintenance of building and other expenses with respect to the premises and fire-protection service.</td>
<td>Floor area.</td>
</tr>
<tr>
<td>Electric power.</td>
<td>Machine horse power + operation time.</td>
</tr>
<tr>
<td>Water, steam.</td>
<td>Technical estimates.</td>
</tr>
<tr>
<td>Store expenses.</td>
<td>Value of materials issued.</td>
</tr>
</tbody>
</table>
Any expenses related to workers such as supervision, canteen expenses, dispensary expenses and recreational expenses.  

| Number of workers.  

Other general overhead expenses.  

Machine horse or labour horse.  

Delivery expenses.  

Weight, volume etc.  

Audit fees.  

Sales or total cost.  

It should be known that some overheads can be apportioned on more than one basis. The choice of an appropriate basis is really a matter of judgment.

- **Principles of Apportionment.**

  Apportionment of overhead to various production and service centers is based on the following principles (Arora, 2013):

  **1- Service or Use.** This is the most common principle of apportionment of overhead costs. It is based on the theory that greater the amount of service or benefit received by a cost center, the larger should be the share of the cost to be borne by that cost center. For example, rent is apportioned to various centers according to the floor space occupied, telephone cost according to the number of extension telephones in each cost center, and so on.

  **2- Survey or Analysis.** This method is used for those overhead costs that are not directly related to cost center and whose remoteness necessitates an arbitrary distribution. For example, salary of a general manager of a company may be apportioned on the basis of results of a survey which may reveal that 30% of his salary should be apportioned to sales, 10% to administration and 60% to various cost centers. Similarly, lighting expenses may be apportioned on the basis of a survey of the number of light points, size, estimated hours of use, etc.

  **3- Ability to Pay.** This is based on the theory of taxation which holds that those who have the largest income should bear the highest proportion of the tax burden. In
overhead cost distribution, those cost centers which have the largest income may be charged with the largest amount of overheads. This method is generally considered inequitable because it penalizes the efficient and profitable cost center to the advantage of inefficient ones.

4- Efficiency or Incentives. This method uses standards and budgets and apportions the overhead costs on the basis of a present budget or standard. Sometimes, this method is used along with the bases of services rendered or ability to pay method (Jawahar Lal, 2009).

It is worth mentioning that allocation is distinct apportionment in the following aspects (Alex, 2012):

1- Allocation deals with whole items of cost. Apportionment deals with a portion of items of cost.

2- Allocation does not need any bases. Apportionment is mainly done according to some bases.

3- Allocation is direct distribution of costs. Apportionment is an indirect distribution of costs.

4- Re-apportionment of Service Cost Centers to Production Centers.

Once the overheads have been allocated and apportioned to production and service centers, the next step is to re-apportion the service cost centers to production centers. This is necessary because our ultimate objective is to charge overhead to cost units, and no cost units are produced in service centers.

Therefore, the costs of service centers must be charged to production centers which directly come in contact with cost units. This is called secondary distribution.

Some of the important bases of apportionment of service cost centers to production centers are as following:
Table 1.2 Bases of apportionment of service cost centers to production centers.

<table>
<thead>
<tr>
<th>Service Center</th>
<th>Bases of Apportionment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store-keeping center.</td>
<td>Number of material requisition, or value/quantity of materials consumed in each center.</td>
</tr>
<tr>
<td>Purchase center.</td>
<td>Value of materials purchased for each center, or number of purchase others placed.</td>
</tr>
<tr>
<td>Time-keeping center and payroll center.</td>
<td>Number of employees, or total labour or machine hours.</td>
</tr>
<tr>
<td>Personnel center.</td>
<td>Rate of labour turnover, or number of employees in each center.</td>
</tr>
<tr>
<td>Canteen, welfare and recreation service.</td>
<td>Number of employees, or total wages.</td>
</tr>
<tr>
<td>Maintenance center.</td>
<td>Number of hours worked in each center.</td>
</tr>
<tr>
<td>Internal transport service.</td>
<td>Value or weight of goods transported, or distance covered.</td>
</tr>
<tr>
<td>Inspection center.</td>
<td>Direct labour hours or machine operating hours.</td>
</tr>
<tr>
<td>Drawing office.</td>
<td>Number of drawings made or man hours worked.</td>
</tr>
</tbody>
</table>

The methods that are used for the re-apportionment of service cost center overheads are:

1- **Direct Redistribution Method.**

This method is based on the service cost centers providing services to production centers only. The overhead of service cost centers are reapportioned to the production cost centers. This is done on the basis of the proportion of benefits received by the production centers (Rajasekaran, et al, 2011).
2- **Step Distribution Method.**

Under this method, all service centers are arranged in order of their utility in terms of service provided to other centers. Then, the cost of the most serviceable section is first apportioned to another service center as well as to production centers. The service center that serves the next largest number of centers is then taken up, and in this way the process continues till the costs of all service centers are apportioned. Obviously, the cost of the last service center will be apportioned only to production centers (Alex, 2012).

3- **Reciprocal Method.**

Reciprocal method recognizes that if one service center receives from another center, the center receiving the service should be charged. If two service centers provide service to one another, each center should be charged for the cost of service rendered by the other. There are three methods that may be used for reciprocal distribution (Alex, 2012):

1- **Simultaneous Equations Method.** In this method the total overhead cost for each service center is expressed in the form of algebraic equations with the help of percentage distribution of service cost. These simultaneous equations are solved to arrive at the results.

2- **Repeated Distribution Method.** This method consists of closing and reopening the departmental service accounts by successive distribution. The steps involved in this method are as following:

- Apply the given percentage to distribute the primary total of the first service center. This closed the account of the first service center and charges the amount to other centers.

- Apply the given percentage to the second service center whole total is made up of primary charges plus the amount apportioned from service center number one. This closed the second center’s account.

- Apply the same percentage to all other service centers.
- Repeat this process of distribution again with service center number one whose total at present consists of only amounts apportioned from others service centers. In this way, the service center totals become lower and lower with each process of distribution, because for each distribution a substantial amount is charged to the production centers.

- Stop this process at the point where it is felt that the remaining figures are too small to be of any consequence.

3- Trial and Error Method. This method can be easily used when there are two or three service centers involved. Here, the cost of one service center is apportioned to another center, the cost of another center plus the share received from the first center is apportioned back to the first center, and this process is repeated till the balancing figure become negligible.

5- Absorption of Overheads.

The total cost of each production center comprises the following (Arora, 2013):

1- Costs allocated and apportioned to production centers.

2- Costs of service centers re-apportioned to production centers.

The total overhead cost pertaining to a production center or cost center is then charged to or absorbed in the cost of the products or cost units passing through that center. This is known as absorption.

The absorption of overheads is the last step in the distribution plan of overheads, it is defined as: charging of overheads to cost units. In other words, overhead absorption is the apportionment of overheads of the cost centers over cost units. Absorption of overheads is also known as levy, recovery or application of overheads. There are two steps in the absorption of overheads:

1- Computation of Overheads Absorption Rate. For the purpose of absorption of overheads in cost, costs of the cost units, there are mainly six methods for determining absorption rates in all these methods. The overhead rate is computed by dividing the total amount of overhead of cost center by the number of units in the base, such as
number of cost units, machine hours, direct labour cost, price cost, etc. as shown below:

Overheads absorption rate = \frac{\text{Total overheads of cost center}}{\text{Total units in base}}

It should be noted that only one rate is computed for any single group of overheads.

**2- Application of these rates to cost units.** In order to arrive at the overhead cost of each cost unit, the overhead rate is multiplied by the number of units of base in the cost unit.

Overhead absorption = \text{number of units of base in the cost unit} \times \text{overhead rate}.

For example, machine hour rate is $25 and a cost units has used 12 hours of the machine, overheads absorption will be = 12 hours \times $25 = $300.

**1-1-6- Criticisms of Traditional Cost Systems.**

Costing systems are information systems. They require a specific type of information such as direct labour hours and units produced, to be of value. It is from the input data that product costs and other information are determined according to the specific costing system defined methodology. The results obtained would depend on the costing system used, since the same input data could be used in different ways.

It is a well-known fact that the traditional costing systems utilize a single, volume-based cost driver. This is the reason why the traditional product costing system distorts the cost of products. In most cases, this type of costing system assigns the overhead costs to products on the basis of their relative usage of direct labour. For this reason traditional cost systems often report inaccurate product costs.

The problem is in the underlying methodology of the traditional costing systems. They adhere to the assumption that products cause cost. Each time a unit of product is manufactured, it is assumed that cost is incurred. This assumption makes sense for certain direct costs. The assumption does not work for activities that are not performed directly on the product units.

The problem with this approach is that for most overhead activities, the proportions of the activity actually consumed by a specific product, does not universally correspond
with a single cost driver. This holds true for most modern companies where products are produced by a combination of manpower and technology. The traditional cost accounting model employs a volume-based driver, such as direct labour hours or machine hours, for the assignment of all manufacturing overhead costs. The conventional cost accounting model ends up with a cost of goods sold based on absorption costing and includes only product costs as defined in financial accounting.

Fundamentally, traditional costing systems try to assign cost directly to products, rather than to activities first and then from the activities to product units. The typical cost report gives information on what is spent, but not why it is spent.

When overhead costs are cut in order to reduce total costs it is the symptoms that are treated and not the cause. In many cases the cutting of overheads is more likely to lead to a reduction in the quality of the products than to the long term reduction of the cost.

The separation of traceable and fixed cost is crucial when doing segmented reporting of costs. This is important, since traceable fixed costs are booked to departments while common fixed costs are pooled in the traditional costing system approach. The guidelines suggested for using the traditional approach is to use a broad, general guideline in determining which costs are traceable. This approach has obvious inherent inaccuracies.

The traditional costing systems only have one or a few indirect cost pools for each department or whole plant. The application of costs in the traditional costing system is normally based on an indirect cost driver and that the indirect cost applications are often financially based.

The traditional approach to costing of products fundamentally utilizes a system whereby the total costs to produce a number of products are divided amongst the various products. By making use of the traditional costing system, it thus means that all the costs incurred have to be allocated to one or other pro

Traditional costing systems do not reflect current organizational realities because typical product costing procedures were designed in the late nineteenth and early twentieth centuries. In that era, the "prime costs" of direct materials and direct labor,
truly were the primary components of production costs while product line diversity was less common. The production environment of today, with far more automation and indirect costs has caused the true "prime cost" to become the overhead component.

The increase in the relative proportion of overhead cost is distorting product costs because of the traditional cost system techniques for allocating the overhead to product lines. Overhead allocation techniques aggregate this large cost component of factory overhead across product lines. They then apply the aggregated overhead to inventory on a basis not necessarily consistent with the actual resources consumed in the production of the individual product lines. The problem with most cost allocation models (i.e. those based on direct labor, direct materials, or machine hours) is that the driving force behind most overhead costs is not unit output or direct labor. Also, the consumption of resources in production may differ extensively among product lines and may not be labor related. Some costs or departmental cost pools may apply to a single or a few product lines, rather than to all products. Cooper and Kaplan (1988) hold that the product cost distortion caused by the commonly used overhead allocation methods is systematic. The result of their use is under-costing of low volume products and over-costing of high volume products (cross-subsidization of product lines). Therefore, the overhead allocation procedure often produces unreliable product and process cost data for management to utilize in their attempts to control costs in the now highly competitive world market.

A costing system should provide information to help minimise waste, but should not be wasteful in itself. In other words, the resources required to design, implement and maintain a costing system should be less than the benefit derived from the use of the system.
1-2- Conceptual Framework for Activities Based Cost System

In the present era, companies produce wide range of products and direct labour represent only a small percentage of total costs. The intense global competition has made decision errors due to poor cost information more problem and more costly, also in this computer age of advancing technologies and automation, the proportion and importance of overhead in the manufacturing operations is increasing and direct costs are being relegated to the background. Therefore, there is a need for a more sophisticated system of accounting for overhead so that more accurate costs of products and services may be ascertained.

Activity based cost (ABC) is an alternative to traditional way of overhead accounting. It is an upcoming and more refined approach of charging overhead to ascertain more accurate product costs. Activity based cost arose in the 1980s from the increasing lack of relevance of traditional cost accounting methods. It is developed by Cooper and Kaplan for assigning overhead to end products, jobs and processes. It aims to rectify the problem of inaccurate cost information due to selection of wrong bases of indirect cost apportionment.

Through the following reviews the researcher attempts to explain the concept of Activities based cost system, reasons for its emergence, its constituents and the steps involved in its application. It also delineates its advantages and disadvantages. Further a comparison is drawm between Activities based cost system and Traditional cost system.

1-2-1- Concept of Activities Based Cost System.

Traditionally, the costs of manufacturing a product have been categorized as direct material, direct labor, and overhead. Traditional cost systems, also called Volume Based Cost Systems trace overhead costs to the product based on the assumption that products cause the costs. Very few allocation bases have historically been used. The most common allocation base used in Traditional cost systems is direct labor hours. The amount of overhead allocated to a batch of products increases linearly with the volume produced. So, it is assumed that as volume of output increases, direct labor hours increase in a linear fashion (Turney, 1990).
Activity based costing ABC is that costing in which costs are first traced to activities and then to products. ABC is costing system which focuses on activities performed to produce products. Activities become the focal points for cost accumulation. This costing system assumes that activities are responsible for the incurrence of costs and products create the demands for activities, costs are charged to products based on individual product’s use of each activity, ABC tries to ascertain the factors that cause each major activity, cost of such activities and the relationship between activities and products produced. The relationship between activities and products has been shown as follows (Jawahar Lal, 2009):

![Fig. 1.8 ABC Process.](image_url)

In the words of Cooper and Kaplan, ABC system calculate the costs of individual activities and assign costs to cost objects such as products and services on the basis of activities undertaken to produce each product and service. According to C.I.M.A., London, activity based costing is: Cost attribution to cost units on the basis of benefits received from indirect activities, i.e., ordering, setting up, assuring quality, etc (Arora, 2013).

As per Horngren, Dasar and Foster, Activity-based cost (ABC) is a system that focuses on activities as fundamental cost objects and utilizes cost of these activities as building blocks or compiling the costs of other objects (Rajasekaran, et al, 2011).

ABC is defined by Computer Aided Manufacturing-International (CAM-I) as the collection of financial and operating performance information tracing the significant activities of the firm to product costs (Raffish, et al, 1991). ABC is a concept in which overhead is assigned to products based on the number of activities consumed by the products (Harsh, 1993).

Liggett et al. states the underlying philosophy of ABC as follows:

Certain activities are carried out in the manufacture of products. Those activities consume a firm’s resources, thereby creating costs. The products, in turn, consume
activities. By determining the amount of resource (and the resulting cost) consumed by an activity and the amount of activity consumed in manufacturing a product, it is possible to directly trace manufacturing costs to products (Liggett, et al, 1992).

The main objectives of ABC are as follows (Arora, 2013):

1. To reduce distortion in product costs often found in traditional overhead accounting.

2. To provide more accurate product costs leading to more accurate product and customer profitability.

3. To help managers in product pricing and other decisions.

4. To identify the high cost activities and value adding activities.

5. To eliminate non-value adding activities.

1-2-2- Reasons of Emergence of Activities Based Cost System.

In today’s world the characteristics of the new manufacturing environment and manufacturing companies are changing and becoming more information intensive, highly flexible, and immediately responsive to the customer expectations see Table 1.3 (Sullivan, 1992).

Table 1.3 The Changes in Manufacturing Environment.

<table>
<thead>
<tr>
<th>Yesterday</th>
<th>New Paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td>High volume, long production runs, long product life cycles.</td>
<td>Low volume, short product runs, short product life cycles.</td>
</tr>
<tr>
<td>Small number of product variations in a domestic market.</td>
<td>Large number of product variations in an international market.</td>
</tr>
<tr>
<td>Large direct labour component; high cost of processing information.</td>
<td>Relatively high technology costs; relatively low information processing costs.</td>
</tr>
<tr>
<td>Small indirect / overhead costs in relation to direct labour.</td>
<td>Large indirect / overhead costs in relation to direct labour.</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
</tbody>
</table>

Due to the changing manufacturing environment, traditional cost accounting is rapidly disappearing. Traditional accounting systems were developed at a time when direct labor was a large percentage of the total product costs. Changes in manufacturing technologies, such as the just-in-time philosophy, robotics, and flexible manufacturing systems decreased the direct labor component of production and increased overhead costs. In today’s manufacturing environment, direct labor accounts for only 10% of the costs, whereas material accounts for 55% and overhead 35% (See Figure 3.2 and 3.3). As a result, product cost distortion occurs due to allocating overhead costs to the products arbitrarily on the basis of direct labor hours used by each product (Harsh, 1993).

![Pie chart showing the proportion of material, direct labour, and overhead in today's world.](image1)

**Fig 1.9** The proportion of material, direct labour and overhead in today’s world.

![Pie chart showing where the traditional cost system focuses their attention.](image2)

**Fig 1.10** Where the traditional cost system focus their attention.
Cooper reports several situations that can cause distortions to occur, such as production volume diversity, complexity diversity, material diversity, and setup diversity (Cooper, 1988).

The solution to the product cost distortion problem is ABC, as it provides the information to identify the components of overhead more precisely such that product design, development, production, and distribution decisions are better grounded. ABC assigns resource costs to products more accurately, and as a result it acts as a decision support tool for companies. Decisions are not arbitrary, which is the case in traditional accounting systems, but based on facts (Johnson, et al, 1987). From here, we can say that the most important reasons that helped the emergence of ABC as follows (Horngren, et al, 2006):

1- Increase the variety of products so as to meet the demands of different customers.
2- The high proportion of indirect costs due to development of production processes.
3- Progress of information technology.
4- Increased competition in products markets.

All this has led to the need for a new tool to allocate indirect costs on activities and product units.

1-2-3- Constituents of Activities Based Cost System.

The application of ABC system is a complex process that requires experiences and exhausts a lot of resources of the organization so the administration must make sure in advance of the expected benefits are greater than the costs of the application system. The following circumstances and conditions encouraging the application of the system, become necessary:

1- Management's belief that the traditional cost systems prevailing have, which are based on direct labour costs distorted the cost of the product or service.
2- Change in the modern industrial environment in terms of the increasing use of advanced manufacturing systems in production processes which led to the reduction
of direct labor cost of the total cost of the product, whereas indirect costs of the total product cost are found in higher proportion.

3- The multiplicity and diversity of products with different sizes, making the production process is complex.

4- Availability of accounting systems should be able to provide accurate data and information and at the lowest cost in order to identify and measure the relationship between cost and their causes.

5- The increasing use of supporting activities at the organization such as the engineering design of the product, design production processes, programming, marketing, accounting, and automated processing of information, etc.

6- The difficulty of determining the cost of certain products or services, and then the difficulty of interpreting the profitability of certain products.

7- Lowering prices for competing products or services in the market, and the loss of many of the tenders without understanding the reasons for it.

8- Lowering of useful life of the product, which requires the exclusion of certain products and the development and introduction of new products and in line with the expectations of current and future customers.

9- Competition is increasing both at local and global level. It becomes necessary to reduce costs, working as a strategy for continuing the organization and maintaining its market share.

Also in order to understand ABC, we should be familiar with the meaning of the following terms (Arora, 2013):

- **Activity**: An activity may be defined as a particular task or unit of work with a specific purpose. Examples of activities are placing of purchase order, setting up of a machine, after sales service, etc.

As per Raffish and Turney an activity is work performed within an organization. An activity may also be defined as an aggregation of actions performed within an
organization, which ensure the introduction of the concept of ABC. Manufacturing processes have four kinds of activities and they are as following (Dinabandhu, 2008):

1- Unit Level Activities: Is performed for each unit of production. Unite level activities are performed every time a unit of production volume is performed. Unite level activities include use of direct materials, direct labour hours, running a machine and so on.

2- Batch Level Activity: is performed for each batch or group of products rather than each unit of production. Batch level of activities is performed every time a batch of product is produced. Batch level activity includes inspection of every batch, inspection of materials handling, machine set up, purchase ordering, production scheduling and so on.

3- Product Level Activity: It is also known as Product Sustaining Activity and it is performed to support the production of different products. Product level activity includes product design, parts specification and administration and also keeps product drawings and designs up to date.

4- Facility Level Activity: It is also known as Facility Sustaining Activity. According to Robin Cooper, this activity is performed to support the production of products in general. Some costs cannot be related to a particular product line; instead they are related to maintaining facility. Facility sustaining activities includes security, safety, maintenance, estate management and so on.

- Cost object: it is an item for which cost measurement is required. For examples, a product, a service, a job or a customer, etc. are cost objects.

- Resource: A resource is an economic element consumed in performing activities. For example, salaries and consumable stores are resource used in performing manufacturing activities.

- Cost pool: is used in place of cost center. The same definition holds good. So, cost pool may be defined as a location, function, items of equipment in respect to which costs may be ascertained and related to cost units for cost purposes. A cost pool should be homogeneous, that means, in a homogenous cost poll all the costs possess
similar cause and effect relationship with their respective cost allocation basis. An import aspect to be considered is that the number of cost pools should be increased to allocate the costs to each activity accurately, but at the same time much care should be taken to maintain each of such cost pool in a homogenous manner. Cost pool is nothing but a grouping of individual cost items.

- **Cost driver:** It is a factor that causes a change in the cost of an activity. Cost driver is of two types resource consumption cost driver and activity consumption cost driver.

- **Resource consumption cost driver:** It is a measure of the quantity of resource consumed by an activity. For example, number of purchase order placed will determine the cost of purchasing the materials. Similarly, the number of times machines are set up will determine the cost of setting up of machines. Resource cost driver is used to assign the cost of a resource to an activity or cost pool.

- **Activity consumption cost driver:** it is a measure of the frequency and intensity of demand placed on the activities by cost objects. It is used for assigning activity costs to cost objects consuming the activity.

Examples of cost drivers for various businesses are as follows:

<table>
<thead>
<tr>
<th>Business function</th>
<th>Cost driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase of materials</td>
<td>- Number of orders placed.</td>
</tr>
<tr>
<td></td>
<td>- Number of receipts of materials.</td>
</tr>
<tr>
<td></td>
<td>- Number of inspections.</td>
</tr>
<tr>
<td>Production</td>
<td>- Number of machine set ups.</td>
</tr>
<tr>
<td></td>
<td>- Number of units.</td>
</tr>
<tr>
<td></td>
<td>- Number of machine hours.</td>
</tr>
<tr>
<td>Research and development</td>
<td>- Number of research projects.</td>
</tr>
<tr>
<td></td>
<td>- Personnel hours on a project.</td>
</tr>
<tr>
<td></td>
<td>- Complexities of projects.</td>
</tr>
</tbody>
</table>
### 1-2-4- Steps in Activities Based Cost System.

Activity based cost emphasizes the need to obtain a better understanding of the behaviour of overhead costs and thus it seeks to ascertain (i) what causes costs, and (ii) how they relate to product or services. ABC recognizes that in the long run most costs are not fixed and seeks to understand the forces that cause overhead costs to change over time. Activity based cost is a system that focuses on activities, as the activities cause costs. ABC systems assume that cash outflows are incurred to acquire a supply of resources (i.e., labour, material and resources), which are consumed by activities. In other words, activities cause cost and products create demand for activities. A link is made between activities and products by assigning costs to products based on individual product’s consumption or demand for each activity. Therefore, ABC system is based on understanding of the following (Saxena, et al, 2010):

1. Identifying major activities that take place in an organization.
2. Creating a cost pool / cost center for each activity or costing activities.
3. Determining cost driver for each major activity.
4. Assigning cost of activities to products based on products consumption or demand for activities.

The first stage is to identify the major activities in the organization. Examples of activities include machine-related activities (i.e., machining cost center), direct labour-related activities (i.e., assembly departments) and various support activities such as ordering, receiving, material handling, parts administration, production scheduling, packing and dispatching. This step requires the management accountant to
acquire a familiarity with what is happening in the indirect areas of the organization. This has to be done systematically and involves examining physical planes of the work place (to identify how all space is being used) and payroll listings (to ensue all relevant personnel have been taken into account). This examination normally has to be supplemented by the observation of work and particularly by a series of interviews with staff involved. A number of criterias underlie the choice of activities. The activities should be at a reasonable level of aggregation. To break down activities into actions and tasks (i.e., filing an order, photocopying a document) is usually too detailed for product costing. Such actions and tasks are normally combined into large purpose-oriented activities. For example, activities may be listed as follows:

- Production schedule changes
- Customer liaison
- Purchasing
- Production process set-up
- Quality control
- Material handling
- Maintenance

Final choice of activities (i.e., aggregation of actions and tasks) will be judgmental in any organization. In the beginning at the time of introduction of ABC, activity cost pool ran into hundreds. Now-a-days it is felt that 20 to 30 cost pools have become common. The choice is between information details and cost of setting up and operating the system. For example, an activity such as quality control can be subdivided into appraisal activity and prevention activity. The benefit of this would be more detailed profits of cost reported to management and a possible increase in the homogeneity of the costs in each activity cost pool.

2- Creating a Cost pool/cost center for each activity or costing the specific activities.

The second stage requires that a cost center (also called a cost pool) be created for each activity. For example, the total post cost of all set-ups might constitute one cost
pool for all set-up related costs. In other words, after establishing the activity structure for the system, it is necessary to identify the resources consumed by each individual activity during the relevant period. This provides a basis for identifying level of costs in each pool. Both allocation (where particular individuals, suppliers or pieces of equipment are identified as having a full-time commitment to a specific activity) and apportionment (where labour and equipment resources are shared by two or more activities) will be involved at this stage. In the absence of time records, labour and equipment usage will have to be identified in broad terms by observation and interviews. For other costs, such as occupancy, the most appropriate available measures of resource consumption (i.e., space occupied) should be used. Thus some amount of approximation and estimation is inherent in even ABC systems. The activity cost information generated on this pattern is very useful. It represents what is often called, a novel profiling of overhead cost for management rather than analyzing cost in terms of inputs (labour, supplies, and equipment depreciation). It indicates how resources have been applied in the business.

3- Determining cost driver for each major activity.

Determining the cost drivers for each activity. Next step is to identify the factors that influence the cost of a particular activity. The term ‘cost driver’ has been used to describe the events or forces that are significant determinants of the cost of activities. If production scheduling cost is generated by the number of production runs, that each production generated, then number of set-ups would represent the cost driver for production scheduling. A cost driver is a variable, which determines the work volume or work load of a particular activity. It will provide the justification for the amount of resources consumed by an activity and hence its cost. Due to this causal relationship it will be a significant measure of activity cost variation. To permit its practical application in an ABC system, it must be conveniently measurable and readily attributable to individual products. Most cost drivers will reflect the transactions, which underlie the activity under consideration. Hence the number of purchase orders processed, number of customer orders processed, number of inspections undertaken and number of set-ups achieved all represent a volume of transactions related to an activity. Sometimes characteristics chosen represent factors, which primarily determine the number of activities undertaken and for this reason they are used as cost
drivers. For example, number of customers, number of suppliers and number of component parts has all been as cost drivers. These are all situational factors, which one would expect to influence the volume of transactions and hence the cost respectively, of the customer order processing, procurement and scheduling activities. Then special attention should be directed towards cost causality in determining cost drivers. The ascertainments of cost drivers will normally involve repeating interviews with personnel involved in the specific activities. The focus remains on identifying what causes a particular activity to consume and so incur cost. Some typical questions aimed at bringing out the cost drivers are given below:

. What is the number of staff working on a particular activity?

. Why are X number of staff needed?

. Is there sufficient staff? If not, why?

. What might cause the need for more or less staff?

. What is it, that determines the amount of time spent on a particular activity?

. Why is overtime worked?

. Why does the idle time occur?

The end result of this type of questioning will be a typical set of cost drivers for each sub-activity. Given below is a list of cost drivers identified for different activities under customer-order processing: (This is to show pattern of how cost drivers are identified.
## Table 1.5 Customer Order Processing.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Cost drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pricing</td>
<td>Number of orders.</td>
</tr>
<tr>
<td></td>
<td>Number of customers.</td>
</tr>
<tr>
<td></td>
<td>Complexity of orders.</td>
</tr>
<tr>
<td>Setting Agreements</td>
<td>Location of customers.</td>
</tr>
<tr>
<td></td>
<td>Number of orders.</td>
</tr>
<tr>
<td></td>
<td>Number of customers.</td>
</tr>
<tr>
<td>Customer Vetting</td>
<td>Number of customers.</td>
</tr>
<tr>
<td></td>
<td>Size of orders.</td>
</tr>
<tr>
<td></td>
<td>Location of customers.</td>
</tr>
<tr>
<td>Customer Liaison</td>
<td>Order book position.</td>
</tr>
<tr>
<td></td>
<td>Number of customers.</td>
</tr>
<tr>
<td></td>
<td>Number of orders.</td>
</tr>
<tr>
<td>Problem Resolution</td>
<td>Delivery performance.</td>
</tr>
<tr>
<td></td>
<td>Product quality.</td>
</tr>
<tr>
<td></td>
<td>Number of orders.</td>
</tr>
<tr>
<td></td>
<td>Number of customers.</td>
</tr>
<tr>
<td></td>
<td>Location of customers.</td>
</tr>
<tr>
<td>Expediting Delivery</td>
<td>Location of customers.</td>
</tr>
<tr>
<td></td>
<td>Production hold-ups.</td>
</tr>
<tr>
<td></td>
<td>Number of orders.</td>
</tr>
<tr>
<td>Adm./Secretarial</td>
<td>Number of orders.</td>
</tr>
<tr>
<td></td>
<td>Number of problems.</td>
</tr>
<tr>
<td></td>
<td>Number of staff.</td>
</tr>
</tbody>
</table>
Therefore in order to link activity costs to product or service output, a cost driver has to be identified with each cost pool. As historical data is sometimes not available to undertake statistical testing of the relationship between the cost driver and the behaviour of cost in the cost pool, the choice of cost driver may require the exercise of judgement.

In practice, four alternative types of cost driver are to be found:

a- Pure volume cost drivers. Pure volume cost drivers are most common and represent a reasonable homogeneous measure of the output of the activity concerned. Number of customers or number of inspections or number of call-outs are pure volume cost drivers.

b- Weight volume cost drivers. These cost drivers are used, where the output of activity is clearly non-homogeneous. If purchasing were an activity pool and purchase orders were made both domestically and overseas, the overseas orders may involve considerable more administrative work. In this situation, it may be advantageous to weight the overseas orders vis-à-vis the home orders. Based on the assessment of work undertaken to make respective orders, it may be decided that each overseas order be weighted by 1.5 before determining the total weighted volume of cost driver to be used in calculating the appropriate rate.

c- Situation is important in determining its work load and thus holds credence as its cost driver. For example, the number of suppliers pertaining to a particular purchasing activity could be used as the cost driver. In other words, the number of suppliers is not an output measure of the activity but may be a convenient surrogate for a pure volume cost driver such as the number of purchase orders. Further, some of the purchasing cost may relate to vetting and liaising with individual suppliers.

d- Motivational cost drivers. These cost drivers are used when the intention is to motivate cost-conscious behaviour rather than product cost information in the most accurate manner. This type of cost driver may lack some of the qualities mentioned above but its selection may give prominence to one particular aspect of operation and influence managerial behaviour in a desired manner. For example, in Japan, element of direct labour hour has remained a popular cost driver, despite its inherent flaws,
because it makes labour a costly resource and prompts designer to attempt optimum utilization of labour hours.

4- Assigning cost of activities to products based on products consumption or demand for activities.

The last step involves tracing the cost of activities to products according to product’s demand (using cost driver as measure of demand) for these activities performed during production process. A product demand for the activities measured by the number of transactions it generated for the cost driver. The best way to complete the finale step is to apply cost driven rate to individual products. Here it is important to state that if a cost driver rate to be particular the variable chosen must be measurable in a way which permits its identification with individual products For example, the number of parts associated with each product must be known, if products are to be individually costed. The requirement may represent one of the signification cost of ABC, especially where a new system has to be established to collect the cost driver information, both in total and for each product. The ability of a cost driver to meet this requirement should, therefore, be considered, when the cost driver is begin chosen.

The following table is a representative list to show how activities drivers should be listed for specific types of costs:
Table 1.6 Cost drivers for specific types of costs.

<table>
<thead>
<tr>
<th>Cost type</th>
<th>Related Activity Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting costs</td>
<td>Number of billings.</td>
</tr>
<tr>
<td></td>
<td>Number of cash receipts.</td>
</tr>
<tr>
<td></td>
<td>Number of check payment.</td>
</tr>
<tr>
<td></td>
<td>Number of general ledger entries.</td>
</tr>
<tr>
<td></td>
<td>Number of reports issued.</td>
</tr>
<tr>
<td>Administration costs</td>
<td>Hours charged to law suits.</td>
</tr>
<tr>
<td></td>
<td>Number of stockholder contacts.</td>
</tr>
<tr>
<td>Engineering costs</td>
<td>Hours charged to design work.</td>
</tr>
<tr>
<td></td>
<td>Hours charged to process planning.</td>
</tr>
<tr>
<td></td>
<td>Hours charged to tool design.</td>
</tr>
<tr>
<td></td>
<td>Number of engineering change orders.</td>
</tr>
<tr>
<td>Facility costs</td>
<td>Amount of space utilization.</td>
</tr>
<tr>
<td>Human resources costs</td>
<td>Employee hade count.</td>
</tr>
<tr>
<td></td>
<td>Number of benefit changes.</td>
</tr>
<tr>
<td></td>
<td>Number of insurance claims.</td>
</tr>
<tr>
<td></td>
<td>Number of pension changes.</td>
</tr>
<tr>
<td></td>
<td>Number of recruiting changes.</td>
</tr>
<tr>
<td></td>
<td>Number of training hours.</td>
</tr>
<tr>
<td>Manufacturing costs</td>
<td>Number of direct labour hours.</td>
</tr>
<tr>
<td></td>
<td>Number of field support visits.</td>
</tr>
<tr>
<td></td>
<td>Number of jobs scheduled.</td>
</tr>
<tr>
<td></td>
<td>Number of machine hours.</td>
</tr>
<tr>
<td>Marketing and sales costs</td>
<td>Number of customer service contacts.</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Number of orders processed.</td>
</tr>
<tr>
<td></td>
<td>Number of sales contact made.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quality control costs</th>
<th>Number of inspections.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of supplier reviews.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage time (e.g., depreciation, taxes)</th>
<th>Inventory turnover.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage transactions (e.g. receiving)</td>
<td>Number of times handle.</td>
</tr>
</tbody>
</table>

**Value-added activity**

Value-added activity is an activity, which in customers view add usefulness to the product or service. These activities support the primary objective of producing output. Following conditions must be satisfied by a value-added activity:

(i) The activity produces a change of activity,

(ii) The change of state was not achievable by preceding activities, and

(iii) The activity enables other activities to be performed.
Painting a car with a technologically developed special paint with marked impact on aesthetic value will be a value-added activity in an organisation, that manufactures cars.

**Non Value Added Activities**

Non value-added activities are those activities which provide an opportunity of cost reduction without reducing product’s service potential to the customer. Example of non-value-added activities includes inspecting, storing and moving raw materials. Non-value-added activities are those activities which a customer should not be expected to pay for. Reporting non-value-added activities draw management’s attention to the vast amount of waste that has been tolerated by the organization. Because of increased competition, many firms are attempting to eliminate non-value-added activities and the non-essential portion of the value-added activities, because they add unnecessary cost and impede performance. Assessing the value content of activities enables managers to eliminate waste. As wastes are eliminating, costs are reduced.

Example of Non-Value-Added Activities

In the manufacturing operation, five major activities are often cited as wasteful and unnecessary:

1. **Scheduling.** An activity that uses time and resources to determine when different products have access to process and how much will be produced.

2. **Moving.** This activity use time and resources to move materials, work-in-progress and finished goods from one department to another.

3. **Waiting.** This is an activity, in which materials or work-in-process use time and resources by waiting on the next process.

4. **Imparting.** An activity, and in which time and resources are spent ensuring that the products meet specification.

5. **Storing.** An activity that uses time and resources while goods or material held inventory.
1-2-5- Advantages and Disadvantages of Activities Based Cost System.

1-2-5-1- Advantages of Activities Based Cost System.

ABC system is being implemented by a growing number of companies around the world. It has primarily developed on account of the limitation of traditional system of charging overhead. It offers the following advantages (Jawahar Lal, 2009):

1- ABC system brings accuracy and reliability in product cost determination by focussing on cause and effect relationship in the cost incurrence. It recognizes that is activities which cause costs, not products and it is products which consume activities.

2- In advanced manufacturing environment and technology where support functions overhead constitute a large share of total costs, ABC system provides more realistic product costs.

3- ABC system identifies the real nature of cost behaviour and helps in reducing costs and identifying activities which do not add value to the product. With ABC, managers are able to control many fixed overhead costs by exercising more control over the activities which have caused these fixed overhead costs. This is possible since behaviour of many fixed overhead costs in relation to activities now become more visible and clear.

4- ABC system uses multiple cost drivers, many of which are transaction based rather than product volume. Further, ABC is concerned with all activities within and beyond the factory to trace more overheads to the products.

5- ABC system traces costs to areas of managerial responsibility, processes, customers, department besides the product costs.

6- ABC system improves greatly the manager’s decision making as they can use more reliable product cost data. ABC helps usefully in fixing selling prices of products as more correct data of product cost is now readily available.

7- ABC system produces reliable and correct product cost data in case of greater diversity among the products manufactured such as low-volume products, high-volume products. Traditional costing system is likely to bring errors and
approximation in product cost determination due to using arbitrary apportionment and absorption methods.

8- ABC system provides cost driver rates and information on transaction volumes which are very useful to management and performance appraisal of responsibility centers. Cost driver rates can be used advantageously for the design of new products or existing products as they indicate overhead costs that are likely to be applied in costing the product.

ABC system provides not only a base for calculating more accurate product cost but also a mechanism for managing costs. ABC system focuses management’s attention on the underlying causes of costs. It assumes that resource-consuming activities cause costs and that products incur costs through the activities require for designing, engineering, manufacturing, marketing, delivery, invoicing and servicing. By collecting and reporting on the significant activities in which business engages, it is possible to understand and manage costs more effectively.

With ABC system, costs are managed in the long run by controlling the activities that drive them. In other words, the aim is to manage the activities rather than costs. By managing the force that cause the activities (that is, cost drivers), costs will be managed in the long-term. The application of activity-based systems may have the greatest potential for contributing to cost management, budgeting, control and performance evaluation.

1-2-5-2- Disadvantages of Activities Based Cost System.

Activity based cost typically provides better information than traditional overhead allocation process. Still it fails to provide a solution for all managerial problems. Following criticism has been leveled against ABC system (Jawahar Lal, 2009) and (Saxena, et al, 2010):

1- ABC system has numerous cost pool and multiple cost drivers and therefore can be more complex than traditional product costing systems.

2- Some difficulties emerge in the implementation of ABC system, such as selection of cost drivers, assignment of common costs, varying cost driver rates, etc.
3- ABC system has different level of utility for different organization such as large manufacturing firm can use it more usefully than the smaller firms. Also, it is likely that firms depending on cost-plus pricing can take advantages from ABC system as it gives accurate product cost. But those firms who use market based prices may not favour ABC system. The level of technology and manufacturing environment prevailing in different firms also effect the application of ABC system.

4- ABC system implementation requires significant amount of time and cost to implement.

5- An environment of change must be created for implementation of ABC system. It requires overcoming a variety of individuals, organization and environmental barriers as follows:

a- Fear of unknown and shift in status quo,

b- Potential loss of status,

c- A necessity to learn new skill.

To overcome these barriers, a firm must recognize that these barriers exist. The causes of the barriers should be investigated. Then organization should communicate information about, ‘what’, ‘why’ and ‘how’ of ABC to all concerned parties. It presents limitation of ABC system.

6- Employees and managers must be educated in some non-traditional techniques that include new terminology, concepts and performance measurements.

7- Additional time will be required to analyse the activities taking place in the activity centers, trace cost to those activities and determining the cost drivers.

The decision to use ABC system should be made after comparing costs and benefits relating to this system. The advantages of a company using ABC system depends on many factors such as level of competition, number of products manufactured and product diversity. It can be claimed that those companies who operate in a more competitive environment, are in dire need of correct product cost data for taking sound decision with regard to determination of selling prices and taking better cost
management measures. Whether a company manufactures and sells smaller number or large number of product, it influences the operation of ABC system and the degree of sophistication in the system.

1-3- Problem of the Study:

The research problem considers allocating the indirect costs on the products as one of the important problems of costs accounting that was and is still the focal point of concern in many researches and studies, in view of the inaccuracy of results of the currently adopted methods, this is due to the fact that the exploitation of these methods lead to inaccuracy of the products costs data due to the absence of causality relation between the product cost and the resources used by it.

And in view of the continuous rise of the percentage of indirect costs within the use of modern technologies in manufacturing and the change in the manufacturing environment, the research problem attempts to answer the following questions:
1 - Do the manufacturing companies apply activity based cost system?
2- Do the manufacturing companies aware of the importance and benefits of implementation of activity based cost system?
3- Are there any difficulties hindering from the application of activity based cost in companies?

1-4- Objectives of the Study:

This study aims to attain the following objectives:
1- To highlight the importance of activity based cost system by drawing a comparison between the traditional costing system and activity based cost system.
2- To study the main accounting studies in this field which addressed subject of activity based cost.
3- To find out the extent of prevalence of the application of activity based cost system in manufacturing companies.
4- To find out the extent of awareness of the companies and their employees regarding the benefits of application of activity based cost system.
5- Identify the difficulties hindering the application of activity based cost system in the companies.
1-5- Importance of the Study:

The importance of this study resides in that it considers one of the modern costs systems relevant in the allocation of indirect costs, this allocation of costs is deemed a problem in calculating the product cost since the use of appropriate costs systems is considered one of the factors insuring the optimum allocation of resources, measuring the product cost more accurately, and preserving the economic wealth of any society. Also in the case of fulfillment of the conditions of applicability of activity based cost system this means an invitation to the companies to apply it in view of its available advantages.

1-6- Hypotheses of the Study:

First hypothesis (H₀): The manufacturing companies do not apply activity based cost system”.

Second hypothesis (H₀): The manufacturing companies don’t realize the importance and benefits of implementation of activity based cost system.

Third hypothesis (H₀): There are not difficulties preventing the application of activity based cost system in manufacturing companies.
Chapter II
Review of Literature.
A number of researches and studies have been done on various aspects of Activity Based Cost System (ABC). The researcher given an insightful overview of recent scholarship undertaken by scholars in this field.


This study aimed to assess the effectiveness of the application of ABC at Cal Electronic Circuits -U.S. company-. It found that the company had reaped positive results, exceeded the exact cost of the product to include increased production efficiency and competitiveness of this company In addition to increasing the efficiency of the decision-making process as a result of the provision of accurate information about the costs of products.

*(Steiner, 1990): Activity – Based Accounting for Total Quality.*

This study aimed to link the ABC system and the Total Quality Management (TQM) system, where the ABC system encourages Management Accountant to carry out the analysis processes of activities and determine its value to the consumer.

This study was only theoretical and concluded to several of the most important results:

- That the application of the ABC system begins by analyzing each function is performed by employees in the main office at the company in order to determine whether the consumer is in need of their services.

- That establishments who were interested in TQM applied continuous improvement, which includes the following steps:

  - A survey of consumers.
  - Prioritize activities.
  - Budgeting and the allocation of resources on the activities.
  - Determine cost of each activity on the basis of cost drivers.
(Raffish, 1991): How Much Does That Product Really Cost

This study aimed to find out how much is the real cost of products using the ABC system where the current costs systems did not reflect the true costs of the products.

This study has been applied to a section of company of manufacturing electronic circuits, where the current system does not provide accurate information necessary to make decisions in manufacturing or purchasing or investment opportunities.

This study concluded to several of the most important results:

- The ABC system helps to find link between costs and products based on sources that have been consumed in the activities required to get the products.

- The main areas of the ABC system are:
  - Difference between product costs.
  - Activities and cost drivers.

- Identify opportunities to improve costs which do not contain added value.


This study aimed to assess the effectiveness of the application of ABC in Evans Medical -British company- for the manufacture of medicines and lotions, which produce more than 350 diverse products, which began applying this system in 1990.

The study found that the implementation of this system has resulted in achieving several advantages, most prominent being re-pricing of products after it reached cost products more accurately, which proved that application of this system applied in this company have tended to increase the cost of certain products and to reduce the cost of others. For example it has been found that 38 of products were inflated costs by up to 55% and the cost of about 85 of products were reduced by up to 92.5% which necessitated to re-analyze and evaluate the profitability of different products.


This study aimed to design a new model for the ABC system so as to lead to the support of the process of continuous improvement.
This study was applied to one of the companies which were using the ABC system to improve the decisions of the product costs and provision of information needed to rationalize the efforts of continuous improvement.

This study concluded several of the most important results:

- The process of linking information to ABC system led to facilitate the process of preparing the company's quality costs.

- The two-dimensional system helps to reduce costs and improve the quality of informations for ABC system.

*(Johnson, 1992): It’s Time to Stop Overselling Activity – Based Concepts.*

This study aimed to understand the origins and history of ABC system where a lack of understanding of the historical aspects and highlight system errors may lead to repeat the same mistakes of the past.

This study used inductive and analytical approach using data from one of the companies which considered the use of term activity in the early sixties in order to identify the cost drivers.

This study concluded to several of the most important results:

- The objective of using the ABC system and analysis of costs is to improve the quality of accounting information to take sound decisions.

- The development of the ABC system has reached to stage attention of consumers to achieve better profits and competitiveness.

- To achieve global competition, companies must be in the process of continuous improvement.


This study aimed to shed light on the criticisms of the ABC system and respond to them. This study used a style of article where questions represent the criticisms and answers represent the responses to those criticisms.
This study concluded to several the most important results:

- The ABC system data is not only needed by managers to be able to progress in the competitive environment prevailing conditions, but to the integration of the information system with rest of the other information.

- The ABC system helps companies to understand the relationship between programs of improvement process and increase profit.


This study aimed to specifically optimize the cost driver in terms of number and quality, conducted in America. And for the purpose of achieving goals of the study, the researchers developed a mathematical model to very specifically optimize cost driver and their number.

The results of the study indicated that the increase in the number of cost driver used in ABC system lead to an increase in accuracy of costs measured by this system. But at the same time increased the cost and complexity of the system. It also showed that the design of any ABC system needs to identify a large number of cost drivers and then choose the appropriate cost driver for use.

(Merz & Hardy, 1993): ABC Puts Accountants on Design Team at HP.

This study aimed to achieve the effectiveness of the ABC system through the participation of workers and engineers in the company with the accounting department working as a team.

This study was applied to one of the companies that operate in the compilation of electric circuit boards, as this company is concerned with the ABC system and continuously thinking of ways that lead to the possibility of its application.

It concluded with some insightful results:

- That accountants involved in products design decisions and help engineers and production officials in understanding the nature of the behavior of industry costs.
That accountants prepare cost reports that management can understand, as they help the company in getting new business.

That ABC system leads to a high level of professional life for accountants in addition to the production of a good cost-information.

(Pattison & Arendt, 1994): Activity – Based Costing it Doesn’t Work All The Time.

This study aimed to compare the existing system to calculate the cost with the ABC system and the definition of the new system.

This study was applied to one of the companies that have implemented this system gradually, until it satisfied them completely.

That ABC system does not fit with all companies, it must be the company in a competition and in need continuing to reduce their costs.

That the management of the company which applied this system must have to involve employees in the company in the decision-making process and design.

That ABC system helps the company in the best way to estimate the cost that are calculated and allocated to the products in a more objective and accurate mode.

(Partridge, 1994): More Companies Turn To ABC.

The purpose of this study was to determine the reasons why U.S. companies abandoned traditional cost accounting systems and go for the application of the ABC system. To achieve the objectives of this study was conducted on the study population, which consisted of industrial and commercial companies of America.

This study indicated that the most important reasons why U.S. companies are moving towards the application of the ABC system and abandon traditional systems is that ABC system leads its application to provide accurate data on the cost of products and to increase the competitiveness of these companies.

This study also found that 29% of U.S. companies have tended towards the application of the ABC system instead of the traditional cost system, and that 56% of
U.S. companies use the ABC system as an analytical tool and control in addition to their traditional systems.

This study also showed that the percentage of companies that apply the ABC system more than five years ago is 13% and the percentage of companies that applied for more than two years and less than five years is 38%.

This study also found that the functions that were affected by the application of this system in these companies were as follows: 27% sales, marketing 23%, 45% support services, and 5% other functions.


This study aimed to define a process of continuous improvement and linked it to the ABC system through activity-based management (ABM).

This study was applied on one of the companies which apply ABC system, but in a way that did not lead to continuous improvement. It concluded that ABC system is the right tool to streamline and guide the process of continuous improvement through the use of activity-based management.


This study aimed to analyze the ABC system and determine its application steps.

This study was applied to one of the companies to determine the possibility of applying this system and it concluded that ABC system is very effective because it allows for accountant comprehensive vision about the contents of the activity and determine when they should continue to spend on a particular area or stop spending and ABC system is an essential tool to convert efforts to global industrial level.

(Cooper & Kaplan, 1998): Cost Cutting Activity.

This study aimed to see if the application of ABC system will lead to reduce costs. The study used was style study. The researchers were applying the ABC system on the Procurement Service at ABB Ltd in U.S. where this has been divided into a set of
independent activities and studied under the ABC system as an alternative system for traditional systems by following descriptive analytical approach.

This study found that the application of ABC system will lead to exclude activities that do not add value to the product unit and simultaneously keep the activities that add value to the product unit which in turn lead to reduce the cost of products.

*(Narayanan & Ratna, 1999): Activity Based Costing at in Steel Industries.*

This study aimed to demonstrate the effect information provided by ABC system on products and customers, and decisions taken by the company managers, and that application on the company for steel industry in North Carolina in United States, which has four lines production.

To achieve the objectives of the study, the researchers used statistical analysis in the study of the company's financial data and to highlight whether the application of the ABC system provides a strong and clear evidence about providing new and appropriate information for managers and thus influence in the decision-making process.

This study found that the information provided by the ABC system useful in the decision-making process related to the products and customers alike, where the system works on the accuracy of the pricing of products and the cost of dealing with customers.

This study also found that if the company applied the ABC system will achieve two important benefits:

First: working on the development of the internal processes of the company which lead to raise the efficiency of the use of resources.

Second: It reduces the costs in general, and in particular the additional costs, which enhances the ability of the company to achieve more profitability in mixed products.

This study aimed to describe the procedures that allow small business companies to easily switch from traditional cost systems to the ABC system at the lowest risk and with a reasonable investment.

The study also showed that it can apply this system to any small company with a staff of less than 100 employees.

The study concluded that the application of the new cost system is:

- Investment in time and money, and that this system requires programs, equipment and devices to collect information.

- And despite the fact that the ABC system has been used successfully in many large companies. There is no guarantee to achieve the same return in a short time

- It is The proposed method more appropriate for small business firms because it does not require investment for information-gathering system.

Therefore this study has shown that the proposed method can be used in advanced progressive step towards the full implementation.

(Hicks, 1999): Yes, ABC for small Business Too.

The study showed that it is no longer the notion that the size of the project is important, and that the ABC system does not require a huge effort for the application, and it is effective and appropriate for any sort of business.

The study also noted that small and medium-sized enterprises can be developed through ABC system which does not require a large commitment of time or financial resources.


This study aimed to conduct a survey on major industrial companies in the United Kingdom, by applying ABC system, which showed that the rate application of ABC
differ slightly between 1999-1994, but the difference is essential for the application of this system in large companies that represent a high percentage.

The study showed that there is no rapid deployment at the corporate level. In addition to the results it pointed out, the low cost and prices of products and services are levied on companies application of the system during the years 1999-1994.

The study also showed that the success factors of the ABC system is linked to a number of factors, namely:

1 - Evaluate and improve performance.

2 - Support senior management.

3 - Interest in supporting quality.


This study aimed to demonstrate the link between the ABC system and manufacturing performance. This study was applied on 2789 factories in the United States of America, where the method was used Cross Sectional Analysis of all data, which relies on data collection for once.

This study found that the reason for the widespread use of the ABC system was due to the high levels of quality and drop in industrial costs when this system was used.


This study aims to use activities based on costing system as an alternative to the traditional cost system, in order to develop new ways to manage and control costs. During the review, some studies have been applied on activities based costing system in the industrial sector and services sector, and the implications of successful applications in the fields of health care, insurance, transportation, etc.
The study found multiple results, including: activities based costing system provides an accurate tool to manage and measure costs efficiently, especially in the light of globalization and recent trends towards the intensity of competition.

The study recommended the need to focus on the application of the new system, because it works on the re-design activities of company and that by excluding non-essential activities, and thus redistribute resources on products and services of companies in a fair and accurate manner.

(Witherite & Kim, 2006): Implementing Activity-Based Costing in the Banking Industry.

This study examined the application of system costs based on activities in the services sector. Which reviewed the system design costs based on activities in the banks, and the difficulties and the challenges facing its implementation.

The study concluded that the system costs based on activities is the logical choice in the sector services, in particular in the banking sector to achieve many of the benefits, such as determining the cost of transactions as a result the efficient allocation of costs, and the ability to track costs for customers by understanding best of the costs associated with the performance of activities, as well as the ability to measure the profitability of customer or product, the positive implications in the ability to improve the decision-making process, and help banks achieve strategic objectives.

(Sharma & Gupta, 2010) Activity Based Costing: Strategic Implications for Indian Companies

This study is attempt to highlight the development of costing systems globally and the factors responsible for evolution of Activity-based Costing.

The study has done on Indian Companies about the use of the costing systems. 105 companies have surveyed with the attributes: (a) widely held companies (b) in operation for more than 5 years and (c) turnover greater than Rs. 100 crores.

It shows that Activity-based costing is a definite improvement over the traditional methods on the premise that the costs are collected on the basis of activities rather
than products and it can effectively contribute to the top managerial decision-making process.

The survey results indicated a high reluctance on part of companies to disclose their costing methods. However, inclination towards implementation of Activity based costing was high among the ones who responded.

Also it establishes that in spite of superiority of Activity based costing over other costing methods, awareness about it and its implementation is still low in India as compared to the developed countries.

*(Aggarwal & Kumar, 2014)* Applications and Relevance of Activity Based Costing.

The main objective of this study is to explore areas of concerns for Indian firms in their approach towards ABC as an organizational performance management tool.

For the purpose of our study, the sample size consisted of 50 companies in the primary data which belonged to the various sector in the Indian economy. These were global conglomerates manufacturing in the range of 25-100 products and were selected on their market performance in the period 2009-2011. The companies chosen were from a variety of industries.

The study found that Indian companies have started employing ABC costing systems. However, some sectors still seem averse to adopting ABC. Basically, In India the primary use of ABC is for improving organization performance and management.

Also the study reached that, Contrary to the traditional technique, the successful installation and implementation of ABC in the global conglomerate requires high initial investment and expenditure.
Chapter III
Research Methodology
3-1- **Introduction.**

This research is divided into two main sides, namely:

**Firstly: The Theoretical Side**

It aims to building a scientific frame for the research problem dimensions and its objectives by relying on the scientific books, published papers and researches and different periodicals related with the research subject.

**Secondly: The Practical Side**

It aims to collect the data and information required to answer the study questions by relying on the field study methodology, where was designed a questionnaire for this purpose and conducting personal interviews to know both the companies which apply ABC system or which do not, identify whether the manufacturing companies aware of the importance and benefits of this system or not as well as to know the difficulties which prevent its application.

The researcher addressed in the previous chapters of this research the conceptual framework for traditional cost systems in terms of the concept of cost accounting; its objectives and functions, classification of costs, concept of Indirect Industrial costs and their elements, traditional methods used in the allocation of indirect industrial costs and criticisms of traditional cost systems. In addition to the conceptual framework for Activities Based Cost System in terms of the concept, reasons for its emergence, its constituents, steps of application, its advantages and disadvantages.

In this chapter, the researcher is trying to conduct a field study on some manufacturing companies operating in India through direct questionnaire put forward to these companies and interviews with expert officials. Therefore, the study aims to:

1- Identify the extent of prevalence of the application of ABC system in industrial companies in India especially in city of Allahabad.
2- Recognize the benefits of implementing the ABC system from the point of view of these companies.

3- Determine the difficulties hindering the application of ABC system in companies in this city.

To achieve the objectives of the study, a particular research methodology was employed which includes both theoretical and field based study. The methodology discusses the companies which answered the questionnaire and the procedure used in data collection as follows:

3-2- Research Methodology and sample of the Study.

This approach addresses the following points:

1- Sample of the study.

2- Data collection method.

3- Method of implementation of the study.

4- Characteristics of sample of the study.

3-2-1- Sample of the Study.

The sample of the study consists of twenty two manufacturing companies (government and private companies) operating in Allahabad. The companies are selected on basis of manufacture and further the number of employees each company engages in, is also taken into consideration. The employees number was determined by knowledge of researcher, so it is mandatory to take only such companies that employ more than twenty employees. The following methods are adopted by the researcher to reach these companies

1- Internet browsing to find out industrial companies operating in the city of Allahabad in order to obtain their names and locations of these companies.

2- Review the concerned authorities, which is expected to be familiar with the names of the companies and their locations. These actors include audit offices, chartered accountants and tax department in the city.
3- Inquiring of the workers and citizens who live in areas which are in close proximity to these companies, in order to facilitate the access to these companies.

It is worth mentioning that the state of Uttar Pradesh, Allahabad is among the biggest centers for commercial activities. Being a prominent industrial township, there are several thousands of small scale organizations, and some large and medium unit industries as well.

Most of the manufacturing companies are located in Phulpur and Naini, which are the two important industrial zones in the city, with many units of public and private companies along with their factories and offices.

As result, of internet browsing and reviewing the concerned authorities and inquiries, it was found that a few companies exist with only name and an address, where in fact they do not exercise any activity and some of the companies are closed. The researcher also faced the difficulty in contacting some companies in spite of the efforts made for it, so these companies has been excluded from the study. Therefore, the study sample consists of twenty two manufacturing companies.

3-2-2- Data Collection Method.

To gather data, the researcher relied on the field study through distribution a questionnaire to the study sample. The questionnaire includes a group of questions in seven pages, where took into account in preparation of the questionnaire the brevity and clarity, so that it can be answered by the participants in the study unambiguously.

The researcher took following things into account while designing the questionnaire:

- Forward a message to the participants, in which he stressed the importance of their opinions and suggestions for the development of cost accounting. Moreover he explained the objectives of the questionnaire, and how the questions should be answered and noted that all opinions or views will be subject to strict confidentiality and appreciated and will be used for research purposes only.

- Some basic concepts used in this questionnaire are defined clearly, in order to familiarize the participants with these concepts and try to unify these concepts in their
minds. These concepts like Activity based cost system ABC, Activity, Indirect costs, etc.

The questionnaire adopted on two types of questions, namely:

1- Closed questions which are found in:

- The first question when collecting qualitative data for participants in the study, where asked from the participants in the study was to choose one alternative from among the available alternatives (to determine Job title, educational qualification, specialization and years of experience in the job).

- In Second type of questions the participants in the study had to answer (Yes or No) in twenty questions which are related to costs system followed by the company.

- In third type of questions the participants in the study had to chose one answer from (Strongly agree, Agree, Neutral, Disagree, Strongly Disagree) in case of twenty-one questions which are related to the benefits and difficulties of application of ABC system in company.

2- Open questions, where asked to participants in the study to answer these questions, include:

- What are shortcomings which you see in the current system?

- In your opinion, why ABC system is not applied in company?

- Do you have any other suggestions or points of view that needs to be taken into account?

The following is the concept of the questionnaire as one of the primary data collection method in scientific research and the most important its advantages:

A questionnaire is simply a ‘tool’ for collecting and recording information about a particular issue of interest. It is mainly made up of a list of questions, but should also include clear instructions and space for answers or administrative details. Questionnaires should always have a definite purpose that is related to the objectives of the research, and it needs to be clear from the outset how the findings will be used.
Respondents also need to be made aware of the purpose of the research wherever possible, and should be told how and when they will receive feedback on the findings.

A questionnaire is a pre formulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives. Questionnaires are an efficient data collection mechanism when the researcher knows exactly what is required and how to measure the variables of interest (Uma Sekaran, et al 2012).

The advantages of the questionnaire can be summarized in the following points:

1- Can contact a large number of people relatively.

2- Accessibility to people who are spread across a wide geographical area.

3- Respondents are able to complete questionnaires in their own time and telephone call-backs can be arranged for a more convenient time.

4- Face to face questionnaires can make it easier to identify the appropriate person to complete the questionnaire.

3-2-3- Method of Implementation of the Study.

Before embarking on distribution of the questionnaire to the participants in the study, the questionnaire were arbitrated by a group of faculty members, in order to ensure the formulation of questions, so that they are clear, easy to understand and free from ambiguity to become reliable means of data collection of the study. This also required showing the introduction of research to them in order to get constructive amendments to the questionnaire.

Based on the observations made by the faculty members in the arbitration process has helped in making the necessary adjustments and preparation of the questionnaire in its final form, consistent with the objectives of the study (see Appendix).

After the arbitration the questionnaire, the researcher distributed to the sample of the study (previously selected) a questionnaire for each company. The researcher adopted totally on direct distribution (by hand), so as to encourage the participants in the study to answer the questions, as well as explaining the questions in which the respondent
faces a difficulty in understanding or answering them, it was desirous to get maximum percentage of responses.

Further to enrich the study with more insights on the applied costs system in manufacturing companies operating in Allahabad, personal interviews has been conducted with financial managers and accountants after scheduling their appointments in advance. These interviews coincided with distribution process of the questionnaire on the companies.

A period of sufficient time has been given for the participants in the study. Distribution of the questionnaire to the participants and collecting the lists from them took approximately two months and a half, in order to ensure a good period of time to participants in the study, which improved the percentage of accepted lists.

The steps taken by the researcher during the distribution process and interviews can be summarized as follows:

1- The researcher prepared a detailed list of the names and addresses of companies, the suitable time to visit them and the questions that will be asked.

2- The researcher endeavored to obtain confidence of the respondents and reassure them about the information which they provide.

3- The researcher met with the respondents individually without the presence of other people in order to have a positive dialogue.

4- The researcher presented an explanation to the respondents included the objectives and the importance of the study.

5- The researcher followed the same style with all the companies.

However, there are some difficulties the researcher has faced during the execution of the field study, which include:

1- The difficulty of contact with specialists in some companies because of different working conditions for these employees.
2- Some of the companies did not accept to provide the data required by the researcher, especially quantitative data.

3- The researcher found that there are a number of companies which are inactive or permanently closed and others were found just service offices for some companies situated outside the spatial boundaries of the study.

These difficulties led to the inability of the researcher to obtain quantitative data of costs of these companies.

The total number of questionnaires that have been obtained are 19 lists, rate of (86.36%) out of the study sample. The researcher reviewed the lists which collected and a list was ruled out because of its incomplete responses. The number of ready lists for statistical analysis are 18 lists, and increased by 81.81% of the study sample.

The table 3-1 shows the name of companies, their foundation date and the and type of their production.

Table 3.1 Name of companies, their foundation date and the and type of their production.

<table>
<thead>
<tr>
<th>NO</th>
<th>Name of company</th>
<th>Foundation date</th>
<th>Type of production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dey’s Medical Pvt. Ltd</td>
<td>1971</td>
<td>Medicine and perfumed hair oil</td>
</tr>
<tr>
<td>2</td>
<td>Tirupati Bakers Pvt. Ltd</td>
<td>2005</td>
<td>Biscuit</td>
</tr>
<tr>
<td>3</td>
<td>Shyam Dairy products</td>
<td>2007</td>
<td>Milk and milk products</td>
</tr>
<tr>
<td>4</td>
<td>Allahabad Enterprises Pvt. Ltd</td>
<td>2010</td>
<td>Transformer tank</td>
</tr>
<tr>
<td>5</td>
<td>L. C Food Ltd</td>
<td>2006</td>
<td>Flour mill</td>
</tr>
<tr>
<td>6</td>
<td>Veekay Connectors Pvt.</td>
<td>1990</td>
<td>Telecommunication parts</td>
</tr>
<tr>
<td>No</td>
<td>Company Name</td>
<td>Year</td>
<td>Product</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------------------------</td>
<td>------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>7</td>
<td>Indian Farmers Fertiliser Cooperative Ltd (IFFCO)</td>
<td>1981</td>
<td>Urea and Ammonia</td>
</tr>
<tr>
<td>8</td>
<td>Shree Baidyanath Ayurved Bhawan Pvt. Ltd</td>
<td>1961</td>
<td>Medicine</td>
</tr>
<tr>
<td>9</td>
<td>Gururaj Radiators Pvt. Ltd</td>
<td>1990</td>
<td>Radiators for transformer</td>
</tr>
<tr>
<td>10</td>
<td>Unnat Feeds Pvt. Ltd</td>
<td>2009</td>
<td>Poultry feed</td>
</tr>
<tr>
<td>11</td>
<td>General Engineering Works</td>
<td>1972</td>
<td>Transformer parts</td>
</tr>
<tr>
<td>12</td>
<td>Dayalok Transformer Pvt. Ltd</td>
<td>1991</td>
<td>Transformer parts</td>
</tr>
<tr>
<td>13</td>
<td>Allahabad Canning Company</td>
<td>1958</td>
<td>Canned fruits, canned vegetables and juices</td>
</tr>
<tr>
<td>14</td>
<td>Pradeep Transcore Pvt. Ltd</td>
<td>2003</td>
<td>Transformer parts</td>
</tr>
<tr>
<td>15</td>
<td>Triveni Electroplast Pvt. Ltd</td>
<td>1991</td>
<td>Electric wiring harness</td>
</tr>
<tr>
<td>16</td>
<td>Sisco Industries Ltd</td>
<td>1997</td>
<td>Steel</td>
</tr>
<tr>
<td>17</td>
<td>ITI Limited</td>
<td>1971</td>
<td>transmission equipments</td>
</tr>
<tr>
<td>18</td>
<td>Bharat pumps &amp; compressors Ltd</td>
<td>1970</td>
<td>Pumps, compressors and high pressure cylinders</td>
</tr>
</tbody>
</table>
3-2-4-- Statistical Measurements Used in the Study.

1- Frequency Distribution.

Frequency distribution is used to describe the nature of the answers on a particular phenomenon in order to determine the relative importance of each answer.

2- Average.

Average is used to determine the relative importance of each answer compared with the other answers.

3- Standard Deviation.

The standard deviation is used to determine the degree of difference in the answers of participants in the study about the relative importance of each answer.

3-2-5- Characteristics of Sample of the Study.

To find out the characteristics of study sample, it obtained frequency distribution of the participants in the study, about some personality traits, such as a job title, educational qualification, specialization and years of experience in the job. The following presentation classifies characteristics of the participants in the study:
1- Job Title.

Table 3.2 Frequency distribution of the participants in the study according to job title.

<table>
<thead>
<tr>
<th>Details</th>
<th>Number</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountant</td>
<td>10</td>
<td>55.55%</td>
</tr>
<tr>
<td>Head of Department</td>
<td>3</td>
<td>16.66%</td>
</tr>
<tr>
<td>Financial Manager</td>
<td>3</td>
<td>16.66%</td>
</tr>
<tr>
<td>General Manager</td>
<td>1</td>
<td>5.56%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>5.56%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 3.2 shows that 55.55% of the total study participants hold jobs accountant. This leaves the impression that the questionnaire was filled out by professional employees in applying the accounting systems in the companies, the rest of the participants 16.66% Head of department, 16.66% Financial managers, 5.56% General manager and 5.56% Other. The following figure shows frequency distribution of the participants in the study according to job title.

![Frequency Distribution of Participants by Job Title](image)

Fig 3.1 frequency distribution of the participants in the study according to job title.
2. Educational Qualification.

Table 3.3 Frequency distribution of the participants in the study according to educational qualification.

<table>
<thead>
<tr>
<th>Details</th>
<th>Number</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor</td>
<td>8</td>
<td>44.45%</td>
</tr>
<tr>
<td>Postgraduate Diploma</td>
<td>3</td>
<td>16.66%</td>
</tr>
<tr>
<td>Master</td>
<td>5</td>
<td>27.78%</td>
</tr>
<tr>
<td>Ph.D</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Professional Fellowship</td>
<td>2</td>
<td>11.11%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

As shown in Table 3.3 that 44.45% of study participants have university qualifications of not less than a Bachelor's degree. This gives an indication that the participants understand the subject matter of the study, and thus to obtain accurate answers, the rest of the participants 16.66% Postgraduate Diploma, 27.78% Master and 11.11% Professional Fellowship. The following figure shows frequency distribution of the participants in the study according to educational qualification.

![Fig 3.2 frequency distribution of the participants in the study according to educational qualification.](image-url)
3- Specialization.

Table 3.4 Frequency distribution of the participants in the study according to specialization.

<table>
<thead>
<tr>
<th>Details</th>
<th>Number</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>10</td>
<td>55.56%</td>
</tr>
<tr>
<td>Management</td>
<td>3</td>
<td>16.66%</td>
</tr>
<tr>
<td>Financial</td>
<td>4</td>
<td>22.22%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>5.56%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From above table it is clear that 55.56% of the study participants are specialists in accounting. Therefore, they have an adequate accounting knowledge to answer questions of the study. The rest of the participants 16.66% Management, 22.22% Financial and 5.56% other. The following figure shows frequency distribution of the participants in the study according to specialization.

Fig 3.3 frequency distribution of the participants in the study according to specialization.
4- Years of Experience in the Job.

Table 3.5 Frequency distribution of the participants in the study according to Years of experience in the job.

<table>
<thead>
<tr>
<th>Details</th>
<th>Number</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than five years</td>
<td>2</td>
<td>11.11%</td>
</tr>
<tr>
<td>From five to ten years</td>
<td>4</td>
<td>22.22%</td>
</tr>
<tr>
<td>More than ten years</td>
<td>12</td>
<td>66.67%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Evident from table 3.5 that 66.67% of the total study participants have practical experience of not less than ten years. This gives the impression to obtain the realistic views about questions of the study. The following figure shows frequency distribution of the participants in the study according to Years of experience in the job.

![Frequency Distribution Chart](chart.png)

Fig 3.4 frequency distribution of the participants in the study according to Years of experience in the job.

From the above, the characteristics of the study sample are:

1- 55.56% of the total study participants hold job of accountant.

2- 100% of study participants have university qualifications of not less than a bachelor's degree.

3- 55.56% of the study participants are specialists in accounting.

4- 66.67 of the total study participants have practical experience of not less than ten years.
3-2-5- Terms of Study.

1- **Cost Accounting**: The process of accounting for cost from the point at which expenditure is incurred or committed to the establishment of its ultimate relationship with cost center and cost units.

2- **Activity Based Costing ABC**: That costing in which costs are first traced to activities and then to products.

3- **Direct Costs**: These are those costs which can be easily and conveniently identified with a unit of product or other cost object.

4- **Indirect Costs**: Those costs which cannot be identified with, or traced to a single product because they are incurred for several products.

5- **Overhead**: The aggregate of indirect materials, indirect wages and indirect expenses.

6- **Cost is**: The amount of expenditure (actual national) incurred or attributable to a given thing.

7- **Activity**: A particular task or unit of work with a specific purpose, or an aggregation of actions performed within an organization, which ensure the introduction of the concept of ABC.

8- **Cost Object**: It is an item for which cost measurement is required.

9- **Resource**: A resource is an economic element consumed in performing activities.

10- **Cost Pool**: A location, function, items of equipment in respect of which costs may be ascertained and related to cost units for cost purposes.

11- **Cost Driver**: It is a factor that causes a change in the cost of an activity.

12- **Cost Control**: It can be defined as a set of procedures and methods which enable management of the enterprise to verify that the process of expenditure is going according to limits and pre-planned targets.
Chapter IV
Result and Discussion
4-1- **Comparison of Activities Based Cost System with Traditional Costs System.**

In traditional costing system, overhead costs are assumed to be influenced by only units produced. It means, in traditional costing system, cost of batch level, product level and facility level activities are fixed costs, that is, cost of these do not vary as production volume changes. Unit-based cost systems apportion fixed overhead to individual products and variable overhead are directly assigned to products using the base of number of units produced.

When fixed overhead apportioned on the basis of units is made, as in traditional costing, such apportionment is likely to be arbitrary and also may not reflect activities and cost actually consumed by the products. ABC improves product costing procedure (as compared to traditional costing) because it recognizes that many so-called fixed overhead costs vary in proportion to change other than production units. It means, under ABC, the other two level activities-batch level and product level-are assumed to influence fixed overhead costs and batch level and product level, thus, are accepted as non units-based cost drivers. By establishing the link between these cost driver and fixed overhead costs, they are finally traced to individual products.

Figure 3.4. Presents an overview of product cost determination under traditional costing and ABC system (Jawahar Lal, 2009).
1- Traditional costing system.

Stage 1: Overheads assigned to production departments.  
Stage 2: Overhead allocation to products.

2- Activity based costing system.

Stage 1: Overheads assigned to cost center/ cost pool.  
Stage 2: overheads assigned to products using cost driver rates.

Fig 4.1 Comparison of Traditional with Activity Based Cost System.

Figure 3.4 displays that both the costing systems follow a two stage allocation procedure. In traditional costing, in the first stage, overhead costs are allocated to production departments. But in ABC, in the first stage, overhead costs are assigned to
each major activity and not to departments. In traditional costing, overheads are pooled/collated department-wise. But, in ABC, many activity-based cost pools or cost centers are created. In traditional costing, overhead costs of service departments are allocated-reapportioned to production department and therefore in this costing system finally only fewer cost pools exist. But ABC creates separate cost pools for service activities as well and overhead costs of these service activities (service departments) are assigned directly to specific products through applying cost driver rates. Thus, in ABC, there is no need to allocated-reapportion overheads of service departments.

The fundamental difference in the traditional costing system and ABC cost system are summarized in Table 4.1 (Jawahar Lal, 2009).

Table 4.1 Comparsion of traditional costing system with ABC cost system.

<table>
<thead>
<tr>
<th>difference</th>
<th>traditional</th>
<th>ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost pools.</td>
<td>One or a limited number.</td>
<td>Many, to reflect different activities.</td>
</tr>
</tbody>
</table>

While Rajasekaran and others see that ABC system and traditional costing system differ in the following aspects (Rajasekaran, et al, 2011):

1- Basis: Under traditional costing system, overhead costs are identified to each department, whereas each activity serves as a basis for the identification of overheads in ABC system. In ABC system, activities are used as bases instead of departments under traditional costing system.
2- Terminology: Usage of terms differ in ABC system. “Cost pool”, “cost driver” are such terms, whereas in traditional costing system “allocation” or “apportionment”- more popular in usage-are used. One finds it difficult the usage of new terminology under ABC system.

3- Accounting treatment: Traditional costing system uses reallocation of overhead costs to production centers or service centers (department). But ABC system uses separate rates for separate activity centers.

4- Enhances efficiency: Product costing and price fixing are more effective if ABC system is adopted as costs are allocated to each activity-large number of activities accurately, whereas under department costing system this is not adopted. Hence, ABC system enhances the efficiency of an organization in toto.

4-2- The Results of the Statistical Analysis of the Study Data.

The following is a detailed view of the analysis that has been done, and the results that have been obtained.

4-2-1- Results of the Study for the Second Question Related to Costs System Followed by the Company.

The results of the study for the second question, which includes twenty questions are divided into five main categories, which are:

1- The nature of the cost system applicable in the Companies.

2-The nature of the industrial environment which the companies operate.

3- The basis of the allocation of indirect costs.

4- The objective of application the cost system in the companies.

5- The possibility of the application of the ABC system in the companies.

1- The Nature of the Cost System Applicable in the Companies.

This category includes three questions. The following are the results that have been achieved.
Table 4.2 Frequency distribution and percentages of the responses of the study participants about nature of the cost system applicable in the Companies.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is there a cost system in the company.</td>
<td>15</td>
<td>83.3%</td>
</tr>
<tr>
<td>2</td>
<td>Does the company apply ABC system.</td>
<td>3</td>
<td>16.7%</td>
</tr>
<tr>
<td>3</td>
<td>Does the company apply traditional cost system.</td>
<td>8</td>
<td>44.4%</td>
</tr>
<tr>
<td>4</td>
<td>Does the company apply both traditional and ABC system</td>
<td>4</td>
<td>22.2%</td>
</tr>
</tbody>
</table>

From the above table it is clear that 83.3% of companies have a cost system, while 16.7% of companies do not have a cost system, where that 38.9% of companies follow ABC system while 66.6% of companies follow the traditional system costs and 22.2% applying both traditional and ABC system.

2-The Nature of the Industrial Environment which the Companies Operate.

This category includes four questions, the following are the results that have been reached.

Table 4.3 Frequency distribution and percentages of the responses of the study participants about the nature of the industrial environment which the companies operate.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Number</th>
<th>Percentage</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does the company produce a large number of diverse products?</td>
<td>9</td>
<td>50%</td>
<td>9</td>
<td>50%</td>
</tr>
</tbody>
</table>
Is the degree of competition which the company operates be severe?

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Are the prices of competing products lower compared with the company's products?</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Is degree of dependence on the mechanism and mechanization be high?</td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>

Clear from the above table that 50% of the companies surveyed provide a large number of diversified products, which are expected to consume a large number of activities required for the manufacturing process. This would be appropriate to apply the ABC system in these companies that work on the production of diverse products. As evidenced that 50% of the companies surveyed provide a limited number of diverse products, which are expected to vary in the degree of complexity according to specifications and demands of consumers. This difference leads to decrease in direct labor costs and increase in indirect industrial costs, that would be appropriate to apply the ABC system in these companies.

Also we can note from the table that 72.2% of the companies surveyed face severe competition, which means the importance of these companies is to rationalize their resources in order to be more profitable. It is expected to be appropriate to apply the ABC system in these companies, where increasing of the competition is considered one of the reasons that led to the emergence of this system, while 27.8% of these companies are not exposed to severe competition in the market.

Also the results indicate that in 44.4% of these companies, the prices of products are lower compared to the prices of other companies products, while 44.4% of these companies the prices of their products are not less than the prices of other companies
products. This calls for these companies to adopt ABC system with the aim of reducing the costs of their products and put the appropriate prices.

The results also indicate that 66.7% of these companies surveyed, heavily depend on the mechanism in production process, while 33.3% of these companies do not. So it would be appropriate to apply ABC system in these companies which depend on mechanism in their production process, where the dependence on mechanism in production process means reducing the dependence on the human element and on the other hand means increase in the indirect industrial costs.

3- The Basis of the Allocation of Indirect Costs.

This category includes four questions, the following are the results that have been reached.

Table 4.4 Frequency distribution and percentages of the responses of the study participants about the basis of the allocation of indirect costs.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>1</td>
<td>Is the proportion of indirect costs higher than the proportion of fixed costs.</td>
<td>8</td>
<td>44.4%</td>
</tr>
<tr>
<td>2</td>
<td>Is the basis used in the allocation of indirect costs is direct labor hours.</td>
<td>12</td>
<td>66.7%</td>
</tr>
<tr>
<td>3</td>
<td>Is the basis used in the allocation of indirect costs is number of production units.</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>4</td>
<td>Is the basis used in the allocation of indirect costs is the machines operation hours.</td>
<td>7</td>
<td>38.9%</td>
</tr>
</tbody>
</table>
The previous table shows the following results:

- 44.4% of the companies surveyed shows that the increase in the proportion of indirect costs is higher than the proportion of fixed costs, while 55.6% of these companies are not.

- 66.7% of the companies surveyed, the basis used in the allocation of indirect costs is direct labor hours.

- 66.7% of the companies, the basis used in the allocation of indirect costs is number of production units.

- 66.7% of the companies the basis used in the allocation of indirect costs is the machines operation hours.

As a result of the high proportion of indirect costs in some industrial companies, the researcher refers to use of the ABC system as a basis to help these companies to treat the problem of allocating those costs. This system emerged mainly for solving this problem. It is also expected that the proportion of error in determining the cost would be significant, which means the inaccuracy in the calculation of the cost in case of the allocation of costs is the basis of direct labor hours or number of produced units or machines operation hours.

**4- The Objective of Application the Cost System in the Companies.**

This category includes three questions. The following are the results that have been reached.
Table 4.5 Frequency distribution and percentages of the responses of the study participants about the objective of application the cost system in the companies.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Percentage %</td>
</tr>
<tr>
<td>1</td>
<td>Do you think that the current costs system is well and adequate.</td>
<td>18</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Does the current cost system help in taking sound administrative decisions.</td>
<td>16</td>
<td>88.9%</td>
</tr>
<tr>
<td>3</td>
<td>Does the current cost system help in costs control.</td>
<td>17</td>
<td>94.4%</td>
</tr>
<tr>
<td>4</td>
<td>Does the current cost system help in reducing costs.</td>
<td>15</td>
<td>83.3%</td>
</tr>
<tr>
<td>5</td>
<td>Does the current cost system help in calculating product cost more accurately.</td>
<td>17</td>
<td>94.4%</td>
</tr>
</tbody>
</table>

Evident from the previous table that 100% of the companies surveyed think that the current costs system is well and adequate, where as the most of companies see that the current cost system 88.9% helps in taking sound administrative decisions, 94.4% think that it helps in costs control, 83.3% think that this system helps in reducing costs and 94.4% of the companies see that the current cost system helps in calculating product cost more accurately.

The researcher thinks that ABC system will helps these companies in reducing costs, costs control, calculating product cost more accurately and then making sound decisions. As for the companies that do not see a goal from behind the application of
the cost system, it is due to lack of understanding and awareness of these companies to the importance of having a cost system or due to the lack of cost system already.

5- The Possibility of the Application of the ABC System in the Companies.

This category includes four questions. The following are the results that have been reached.

Table 4.6 Frequency distribution and percentages of the responses of the study participants about the possibility of the application of the ABC system in the companies.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>1</td>
<td>Is the senior management of the company the owner of first and final decision in the application of the ABC system?</td>
<td>12</td>
<td>66.7%</td>
</tr>
<tr>
<td>2</td>
<td>Is there a plan for applying ABC system in the company?</td>
<td>5</td>
<td>27.8%</td>
</tr>
<tr>
<td>3</td>
<td>Are the objectives of ABC system clear to the company administration?</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>4</td>
<td>Does the company have an integrated team which is able to implement ABC system?</td>
<td>6</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

From the above table it is clear that 66.7% of companies surveyed said that the senior managements of the companies are the owners of first and final decision in the
application of the ABC system. While 33.3% of these companies said that the
decision-making process regarding the application of the ABC system are partnership
between the different levels of management.

Also the results indicate that 72.2% of these companies said that there is not a plan for
applying ABC system in these companies, while 27.8% of these companies said that
there is a plan for applying ABC system in these companies. This result indicates that
these companies do not realize the importance of the ABC system.

Also we can note from the table that 50% of the companies surveyed said that the
objectives of ABC system are clear to the company administration, while the
remainder companies said no.

As we note from the table that 33.3% of companies surveyed have an integrated team
able to implement ABC system, while the other companies do not have.

From these results the researcher concludes that there is a possibility of the
application of ABC system in some companies especially those companies which
support the process of participation in decision-making between the various levels of
management, as well as those companies which have a team capable of applying this
system.

4-2-2- Results of the Study for the Third Question Related to the Benefits and
Difficulties of Application of ABC System in Companies.

The results of the study for the third question, which includes twenty-one questions
are:
1- The Benefits of Application of ABC System in Companies.

Table 4.7 Frequency distribution and percentages of the responses of the study participants about the benefits of application of ABC system in companies.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Number</th>
<th>Percentage %</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ABC system is considered one of modern systems of cost accounting</td>
<td></td>
<td>13</td>
<td>72.2%</td>
<td>27.8%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>ABC system helps to calculate the cost of the product more accurately</td>
<td></td>
<td>11</td>
<td>61.1%</td>
<td>33.3%</td>
<td>5.6%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>33.3%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>ABC system helps in understanding the behavior of costs and thus helps to find out the causes of indirect costs</td>
<td></td>
<td>14</td>
<td>77.7%</td>
<td>16.7%</td>
<td>5.6%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>16.7%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Indirect costs account for a large proportion of the cost structure, which requires application of ABC system</td>
<td></td>
<td>6</td>
<td>33.3%</td>
<td>16.7%</td>
<td>33.3%</td>
<td>16.7%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>16.7%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>ABC system identifies the real nature of cost behaviour and helps in reducing costs</td>
<td></td>
<td>13</td>
<td>72.2%</td>
<td>27.8%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>27.8%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>ABC system helps in tracing costs to areas of managerial responsibility</td>
<td></td>
<td>10</td>
<td>55.6%</td>
<td>16.7%</td>
<td>27.8%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>16.7%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>ABC system leads to enhance costs control</td>
<td>Number</td>
<td>15</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Number</td>
<td>10</td>
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<td>4</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>55.6%</td>
<td>22.2%</td>
<td>22.2%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ABC system provides the financial and non-financial information that help in taking sound administrative decisions</td>
<td>Number</td>
<td>11</td>
<td>4</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>61.1%</td>
<td>22.2%</td>
<td>16.7%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ABC system improves greatly the manager’s decision making as they can use more reliable product cost data</td>
<td>Number</td>
<td>9</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>50%</td>
<td>38.9%</td>
<td>5.6%</td>
<td>5.6%</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>As result of the diversity of the company's products, which requires the application of ABC system</td>
<td>Number</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>38.9%</td>
<td>27.8%</td>
<td>27.8%</td>
<td>5.6%</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ABC system helps usefully in fixing selling prices of products</td>
<td>Number</td>
<td>11</td>
<td>6</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>61.1%</td>
<td>33.3%</td>
<td>5.6%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ABC system leads to improve the competitive position of the company with other companies</td>
<td>Number</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>50%</td>
<td>38.9%</td>
<td>11.1%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
ABC system leads to the exclusion of activities that do not add value to the company

<table>
<thead>
<tr>
<th>Number</th>
<th>10</th>
<th>5</th>
<th>2</th>
<th>1</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage %</td>
<td>55.6%</td>
<td>27.8%</td>
<td>11.1%</td>
<td>5.6%</td>
<td>-</td>
</tr>
</tbody>
</table>

The previous table shows the following results:

- 100% of the companies surveyed said that ABC system is considered one of modern systems of cost accounting.

- 94.4% of the companies surveyed said that ABC system helps to calculate the cost of the product more accurately.

- 94.4% of the companies surveyed see that ABC system helps in understanding the behavior of costs and thus helps to find out the causes of indirect costs.

- 50% of the companies surveyed think that indirect costs accounted for a large proportion of the cost structure, which requires application of ABC system.

- 100% of the companies surveyed see that ABC system identifies the real nature of cost behaviour and helps in reducing costs.

- 72.3% of the companies surveyed said that ABC system helps in tracing costs to areas of managerial responsibility.

- 100% of the companies surveyed think that ABC system leads to enhance the costs control.

- 77.8% of the companies surveyed said that ABC system provides the financial and non-financial information that help in taking sound administrative decisions.

- 83.3% of the companies surveyed said that ABC system improves greatly the manager’s decision making as they can use more reliable product cost data.

- 88.9% of the companies surveyed see that ABC system helps usefully in fixing selling prices of products.
- 66.7% of the companies surveyed think that as result of the diversity of the company's products, which requires the application of ABC system.

- 66.7% of the companies surveyed think that ABC system helps to improve the production process and the development of the performance in company.

- 88.9% of the companies surveyed see that ABC system leads to improve the competitive position of the company with other companies.

- 83.4% of the companies surveyed see that ABC system leads to the exclusion of activities that do not add value to the company.

From the previous results it is clear that the companies under study are consistent with a high degree in the categories (Strongly agree and Agree) about the benefits of ABC system, this gives an indication that these companies understand and realize the expected benefits from the application of ABC system.

2- Difficulties of application of ABC system in company.

Table 4.8 Frequency distribution and percentages of the responses of the study participants about the difficulties of application of ABC system in companies.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Number</th>
<th>Percentage %</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>There is no costs system in the company</td>
<td>2</td>
<td>11.1%</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>33.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>22.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>16.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>16.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Lack of understanding and conviction of administration the importance of the application of ABC system</td>
<td>3</td>
<td>16.7%</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>16.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>22.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>22.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>22.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>16.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The administrative structure of the company does not help much in success of ABC system

<table>
<thead>
<tr>
<th>Number</th>
<th>1</th>
<th>3</th>
<th>7</th>
<th>4</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>5.6%</td>
<td>16.7%</td>
<td>38.9%</td>
<td>22.2%</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

The difficulty of the division of business undertaken by the company in the clear and specific activities

<table>
<thead>
<tr>
<th>Number</th>
<th>3</th>
<th>4</th>
<th>8</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>16.7%</td>
<td>22.2%</td>
<td>44.4%</td>
<td>5.6%</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

The lack of scientific qualifications and professionalism incapable of implementation ABC system

<table>
<thead>
<tr>
<th>Number</th>
<th>6</th>
<th>4</th>
<th>4</th>
<th>2</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>33.3%</td>
<td>22.2%</td>
<td>22.2%</td>
<td>11.1%</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

Increasing the cost of application of ABC system compared to the benefits expected from it is an impediment to the application of the system in the company

<table>
<thead>
<tr>
<th>Number</th>
<th>5</th>
<th>5</th>
<th>3</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>27.8%</td>
<td>27.8%</td>
<td>16.7%</td>
<td>11.1%</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

The company does not keep pace with modern manufacturing environment it is an impediment to the application of the system in ABC company

<table>
<thead>
<tr>
<th>Number</th>
<th>4</th>
<th>4</th>
<th>2</th>
<th>6</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>22.2%</td>
<td>22.2%</td>
<td>11.1%</td>
<td>33.3%</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

The previous table shows the following results:

- 33.3% of the companies surveyed said that there is no cost system in the companies, while 50% of these companies said that there is cost system in the companies, also we note that 16.7% of these companies are in the neutral category.
- 38.9% of the companies surveyed think that there is lack of understanding and conviction in the administration regarding the application of ABC system. While the same percentage of these companies think that there is understanding and conviction from the administration the importance of the application of ABC system, also the results show that 22.2% of these companies are in the neutral category.

- 22.3% of the companies surveyed found that the administrative structure of the companies do not help much in success of ABC system. While 38.9% of these companies see that the administrative structure of these companies help in the success of the ABC system, it was also noted that 38.9% of these companies are in the neutral category.

- 38.9% of the companies surveyed said that there is difficulty in division of business undertaken by the company to activities that are clear and specific. While 16.7% of these companies said that there is no difficulty in division of business undertaken by the company to activities that are clear and specific, it also showed that 44.4% of these companies in the neutral category.

- 55.5% of the companies surveyed think that the lack of scientific qualifications and professional capability hinder the ABC system. While 22.2% of these companies do not think that. Further it can be noted that 22.2% of these companies are in the neutral category.

- 55.6% of the companies surveyed see that increasing the cost of application of ABC system compared to the benefits expected from it is an impediment to the application of the system in the company. While 27.8% of these companies do not see that, it can also be noted that 16.7% of these companies are in the neutral category.

- 44.4% of the companies surveyed said that the company does not keep pace with modern manufacturing environment. It is an impediment to the application of ABC system in the company. While 50% of these companies said that the company keeps pace with modern manufacturing environment and it is not an impediment to the application of the ABC system in the company. Also we can see that 11.1% of these companies are in the neutral category.
From the previous results it is clear that the companies face some of difficulties and these difficulties differ from one company to other. We also noted an increase in some of the answers in neutral category, which gives an indication that some of participants perhaps do not have permission to answer these type of questions.

4-2-3- Hypotheses testing.

The study hypotheses will be tested as following:

**First hypothesis (H₀):**

“The companies do not apply ABC system “.

And will accept or reject the hypothesis according to the following rule:

-Reject the null hypothesis and accept the alternative hypothesis if the mean of manufacturing companies that apply ABC system is greater than zero.
- Accept the null hypothesis and reject the alternative hypothesis if the mean of manufacturing companies that apply ABC system is equal to zero.

The following table shows the mean and standard deviation of the questions related to nature of the cost system applicable in the companies.

Table 4.9 Mean and standard deviation of the responses of the study participants about nature of the cost system applicable in the Companies.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is there a cost system in the company.</td>
<td>.83</td>
<td>.38</td>
</tr>
<tr>
<td>2</td>
<td>Does the company apply ABC system.</td>
<td>.39</td>
<td>.50</td>
</tr>
<tr>
<td>3</td>
<td>Does the company apply traditional cost system.</td>
<td>.67</td>
<td>.49</td>
</tr>
</tbody>
</table>
From the above table the majority of companies have a traditional cost system and despite the low average companies that follow the ABC system but it is possible to say that there are companies follow this system, as standard deviation values reflect the extent of consensus the views of the participants in the study on questions relating to nature of the cost system applicable in the companies.

It is worth mentioning that the number of companies that said "yes" they applied ABC system of seven companies (see table 4.1), where that the mean equal to .39 which means rejection of the null hypothesis and accept the alternative hypothesis, which states: “The companies applied ABC system”.

**Second hypothesis (H₀):**

“The companies don’t realize the importance and benefits of application of ABC system”.

And will accept or reject the hypothesis according to the following rule:

- Reject the null hypothesis and accept the alternative hypothesis if the mean of manufacturing companies, which see there are benefits from the application of ABC system in company is greater than three.
- Accept the null hypothesis and reject the alternative hypothesis if the mean of manufacturing companies, which see there are not benefits from the application of ABC system in company is smaller than three.

The following table shows the mean and standard deviation of the questions related the benefits of application of ABC system in companies.
Table 4.10 Mean and standard deviation of the responses of the study participants about the benefits of application of ABC system in companies.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ABC system is considered one of modern systems of cost accounting</td>
<td>4.72</td>
<td>.46</td>
</tr>
<tr>
<td>2</td>
<td>ABC system helps to calculate the cost of the product more accurately</td>
<td>4.56</td>
<td>.62</td>
</tr>
<tr>
<td>3</td>
<td>ABC system helps in understanding the behavior of costs and thus helps to find out the causes of indirect costs</td>
<td>4.72</td>
<td>.57</td>
</tr>
<tr>
<td>4</td>
<td>Indirect costs account for a large proportion of the cost structure, which requires application of ABC system</td>
<td>3.67</td>
<td>1.14</td>
</tr>
<tr>
<td>5</td>
<td>ABC system identifies the real nature of cost behaviour and helps in reducing costs</td>
<td>4.72</td>
<td>.46</td>
</tr>
<tr>
<td>6</td>
<td>ABC system helps in tracing costs to areas of managerial responsibility</td>
<td>4.28</td>
<td>.89</td>
</tr>
<tr>
<td>7</td>
<td>ABC system leads to enhance the costs control</td>
<td>4.83</td>
<td>.38</td>
</tr>
<tr>
<td>8</td>
<td>ABC system provides the financial and non-financial information that help in taking sound administrative decisions</td>
<td>4.33</td>
<td>.84</td>
</tr>
<tr>
<td>9</td>
<td>ABC system improves greatly the manager's decision making as they can use more reliable product cost data</td>
<td>4.44</td>
<td>.78</td>
</tr>
<tr>
<td>10</td>
<td>ABC system helps usefully in fixing selling prices of products</td>
<td>4.33</td>
<td>.84</td>
</tr>
</tbody>
</table>
As a result of the diversity of the company's products, which requires the application of ABC system, ABC system helps to improve the production process and the development of the performance in the company. ABC system leads to improve the competitive position of the company with other companies. ABC system leads to the exclusion of activities that do not add value to the company.

From the above table it is that clear the mean of all the benefits is high, which means that the companies under the study strongly agree and agree with the benefits of application of ABC system in companies, as the values of standard deviation indicate extent of consensus the views of the participants in the study about the questions which relate to benefits of application of ABC system in companies.

In this case can say rejection of the null hypothesis and accept the alternative hypothesis, which states: “The companies realize the importance and benefits of application of ABC system”.

**Third hypothesis (H\(_0\))**: “There are not difficulties preventing the application of ABC system in companies”. And will accept or reject the hypothesis according to the following rule:

- Reject the null hypothesis and accept the alternative hypothesis if the mean of manufacturing companies, which see there are difficulties the application of ABC system in companies is greater than three.
Accept the null hypothesis and reject the alternative hypothesis if the mean of manufacturing companies, which see there are not difficulties preventing the application of ABC system in company is smaller than three.

The following table shows the mean and standard deviation of the questions related the difficulties of application of ABC system in companies.

Table 4-11 Mean and standard deviation of the responses of the study participants about the difficulties of application of ABC system in companies.

<table>
<thead>
<tr>
<th>No</th>
<th>Questions</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>There is no costs system in the company</td>
<td>2.61</td>
<td>1.46</td>
</tr>
<tr>
<td>2</td>
<td>Lack of understanding and conviction of administration the importance of the application of ABC system</td>
<td>3</td>
<td>1.37</td>
</tr>
<tr>
<td>3</td>
<td>The administrative structure of the company does not help much in success of ABC system</td>
<td>2.72</td>
<td>1.13</td>
</tr>
<tr>
<td>4</td>
<td>The difficulty of the division of business undertaken by the company in the clear and specific activities</td>
<td>3.28</td>
<td>1.18</td>
</tr>
<tr>
<td>5</td>
<td>The lack of scientific qualifications and professionalism incapable of implementation ABC system</td>
<td>3.56</td>
<td>1.38</td>
</tr>
<tr>
<td>6</td>
<td>Increasing the cost of application of ABC system compared to the benefits expected from it is an impediment to the application of the system in the company</td>
<td>3.39</td>
<td>1.46</td>
</tr>
<tr>
<td></td>
<td>the company does not keep pace with modern manufacturing environment</td>
<td>3.11</td>
<td>1.41</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>it is an impediment to the application of the system in the company</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the above table it is clear the mean is relatively high on some of the difficulties such as the difficulty of the division of business undertaken by the company in the clear and specific activities, lack of scientific qualifications and professionalism incapable of implementing ABC system, increasing the cost of application of ABC system compared to the benefits expected from it is an impediment to the application of the system in the company and the company does not keep pace with modern manufacturing environment. While the difficulties such as there is no costs system in the company and the administrative structure of the company does not help much in success of ABC system considered low in category of disagree.

Based on this we can say that there are difficulties that hinder the application of ABC system in companies under study, therefore null hypothesis is rejected and the alternative hypothesis is accepted, which states: “There are difficulties preventing from the application of ABC system in company”.
Chapter V
Conclusions and Recommendations
This chapter addresses the conclusions which have been reached through the theoretical and field study, as well as recommendations put forward by the researcher in order to further contribute in application of ABC system. Following are main insights:

5-1- Conclusions of the Study.

The study has yielded to reach the following conclusions:

1- That 83.3 % of companies have a cost system, where that 38.9% of companies follow Activity based cost system, while the rest of companies follow the traditional system costs.

2- The companies under study characterize the following:
   a- 50% of the companies surveyed provide a large number of diversified products.
   b- 72.2% of the companies surveyed are exposed to severe competition.
   c- 66.7% of the companies surveyed heavily dependent on the mechanism in production process.

3- The companies use the basis of direct labor hours, number of production units and the machines operating hours in costs allocation.

4- The majority of companies think that the current costs system is well and adequate and it helps in taking sound administrative decision, reducing costs and calculating product cost more accurately.

5- The most of senior managements of the companies are the owner of first and final decision in the application of the Activity based cost system.

6- There is not a clear plan for applying Activity based cost system in these companies.

7- The companies do not have an integrated team that are capable of implementing Activity based cost system.

8- All the companies surveyed believe that activity based cost system achieves the following benefits:
a- Activity based cost system is considered one of modern systems of cost accounting.

b- Activity based cost system helps to calculate the cost of the product more accurately.

c- Activity based cost system helps in understanding the behavior of costs and thus helps to find out the causes of indirect costs.

d- Activity based cost system helps in tracing costs to areas of managerial responsibility.

e- Activity based cost system leads to enhance the costs control.

f- Activity based cost system provides the financial and non-financial information that help in taking sound administrative decisions.

g- Activity based cost system improves greatly the manager’s decision making as they can use more reliable product cost data.

h- Activity based cost system helps usefully in fixing selling prices of products.

i- Activity based cost system helps to improve the production process and the development of the performance in companies.

j- Activity based cost system leads to improve the competitive position of the company with other companies.

k- Activity based cost system leads to the exclusion of activities that do not add value to the product.

9- All the companies surveyed believe that there are difficulties that hinder the application of activity based cost system in these companies, most important of which are:

a- The difficulty of the division of business undertaken by the company in the clear and specific activities.

b- The lack of scientific qualifications and professionalism incapable of implementation activity based cost system.

c- Increasing the cost of application of activity based cost system compared to the benefits expected from it is an impediment to the application of activity based cost system in the companies.

d- The companies do not keep pace with modern manufacturing environment it is an impediment to the application of the system in companies.
5-2. **Recommendations**

1- The companies should start apply activity based cost system gradually in stages until it is fully implemented in order to prove advantages.

2- Companies need to make significant shifts in order to accommodate the technological changes in the modern business environment and keep abreast of all that is new and useful with the application of modern costs systems which are important in the current stage.

3- Companies must overcome all difficulties impeding the application of the activity based cost system.

4- The managements of these companies must realize the importance of the elements of indirect costs and extent of impact method of their allocation on precise determination the cost of their products.

5- Focus should be on activities that add value to the product and the exclusion of activities that do not add value to the product.

6- The companies must that interest in training programs accountants from both practical and professional sides, taking into account the development of these programs.

7- Companies should show interest in using the computer processing in all their operations which may require them to work on the rehabilitation of employees by holding training courses which are necessary to do.

8- The necessity of convincing the administration of these companies regarding the importance of the application of activity based cost system as a system has several benefits.

9- Further researches and studies should be undertaken, to shed light on the importance of activity based cost system and enrich the libraries on this topic.

10- Also researches should be conducted about extent and utility of applicability of activity based cost system in service sector.
The application of ABC system is a complex process that requires greater experience and a lot of resources. So the administration must make sure in advance that the expected benefits of ABC system are greater than the costs of its application.
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Appendix
SHIATS
Joseph School of Business Studies

Questionnaire

On

Extent of applicability of Activities Based Costing System
Applied study on manufacturing companies in Allahabad

Prepared by: Shaban . E. A. Salem, Ph.d. Student

Supervisor: Dr. Shabana Mazhar
* The Honorable Esquire /

I hope you will generously participate in this questionnaire. It is considered necessary and indispensable for the development of the accounting profession, so the views and suggestions that you give will be appreciated because it represents a valuable addition that reflects the reality of this career. Kindly cooperate with the researcher by answering this questionnaire associated with the subject of the study.

Thanking you for your cooperation and your attention and interest.

* The objective of the questionnaire

This questionnaire aims to acquaint whether the company applied ABC system in determining the cost of the product, and what are the advantages of ABC system and the difficulties in hindering the application of the ABC system in this company.

* The content of the questionnaire

This questionnaire includes a set of questions which researcher believes they lead to achieve the objectives of the study.

* Answer questions

Please see some of the following basic concepts used in this questionnaire, answering questions mark (√) in the space provided for it.
* Some of the basic concepts used in the questionnaire:

1- Activity Based Costing System ABC: an accounting system processing all the information pertaining with the financial and operating performance through tracing the main activities and duties carried out with the establishment towards the final product or service. The tracing is done by dividing the indirect costs to multiple cost pools and using a set of cost drivers to trace arrival these costs to the products or services, hence giving rise to causality relation between the activities and the consumption of the economic resources.

2- Activity: a particular task or unit of work with a specific purpose, or an aggregation of actions performed within an organization, which ensure the introduction of the concept of ABC.

3- Indirect costs: are those costs which cannot be identified with, or traced to a single product because they are incurred for several products.

* Disclaimer

All opinions or views will be subject to strict confidentiality and appreciated and will be used for research purposes only.

I am highly obliged and indebted for your sincere cooperation and insightful knowledge

Researcher
Shaban. E. A. Salem
First- General questions.

1- Job Title:

- Accountant..................... (   ).
- Head of Department.......... (   ).
- Financial Manager............ (   ).
- General Manager............... (   ).
- Other (specify)..................

2- Educational qualification:

- Bachelor........................ (   ).
- Postgraduate Diploma......... (   ).
- Master.......................... (   ).
- Ph.D............................. (   ).
- Professional Fellowship...... (   ).
- Other (specify)..................

3- Specialization:

- Accounting..................... (   ).
- Management..................... (   ).
- Financial....................... (   ).
- Other (specify)..................

4- Years of experience in the job:

- Less than five years......... (   ).
- From five to ten years....... (   ).
- More than ten years.......... (   ).
Second- Questions related to costs system followed by the company.

<table>
<thead>
<tr>
<th>No</th>
<th>The nature of the cost system applicable in the Company</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is there a cost system in the company?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Does the company apply ABC system?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Does the company apply traditional cost system?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The nature of the industrial environment which the company operates

<table>
<thead>
<tr>
<th>4</th>
<th>Does the company produce a large number of diverse products?</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Is the degree of competition which the company operates be severe?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>----------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>6</td>
<td>Are the prices of competing products lower compared with the company's products?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>----------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>7</td>
<td>Is degree of dependence on the mechanism and mechanization be high?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The basis of the allocation of indirect costs

<p>| 8  | Is the proportion of indirect costs higher than the proportion of fixed costs? |     |    |</p>
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Is the basis used in the allocation of indirect costs is direct labor hours?</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Is the basis used in the allocation of indirect costs is number of production units?</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Is the basis used in the allocation of indirect costs is the machines operation hours?</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>The objective of application the cost system in the company</strong></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Do you think that the current costs system is well and adequate?</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Does the current cost system help in taking sound administrative decisions?</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Does the current cost system help in costs control?</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Does the current cost system help in reducing costs?</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Does the current cost system help in calculating product cost more</td>
<td></td>
</tr>
<tr>
<td></td>
<td>more accurately?</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>The possibility of the application of the ABC system in the company</strong></td>
<td>Yes</td>
</tr>
<tr>
<td>17</td>
<td>Is the senior management of the company the owner of first and final decision in the application of the ABC system?</td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>Question</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>18</td>
<td>Is there a plan for applying ABC system in the company?</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Are the objectives of ABC system clear to the company administration?</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Does the company have an integrated team which is able to implement ABC system?</td>
<td></td>
</tr>
</tbody>
</table>

**Third-Questions related to the benefits and difficulties of application of ABC system in company.**

<table>
<thead>
<tr>
<th>No</th>
<th>The benefits of application of ABC system in company.</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ABC system is considered one of modern systems of cost accounting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ABC system helps to calculate the cost of the product more accurately</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ABC system helps in understanding the behavior of costs and thus helps to find out the causes of indirect costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Indirect costs account for a large proportion of the cost structure, which requires application of ABC system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>ABC system identifies the real nature of cost behaviour and helps in reducing costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>6</td>
<td>ABC system helps in tracing costs to areas of managerial responsibility</td>
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<td>7</td>
<td>ABC system leads to enhance costs control</td>
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<td>8</td>
<td>ABC system provides the financial and non-financial information that help in taking sound administrative decisions</td>
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<td>9</td>
<td>ABC system improves greatly the manager’s decision making ability as it can use more reliable product cost data</td>
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<td>10</td>
<td>ABC system helps usefully in fixing selling prices of products</td>
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<td>11</td>
<td>As result of the diversity of the company's products, which requires the application of the ABC system</td>
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<td>12</td>
<td>ABC system helps to improve the production process and the development of the performance in company</td>
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<td>13</td>
<td>ABC system leads to improve the competitive position of the company with other companies</td>
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<td>14</td>
<td>ABC system leads to the exclusion of activities that do not add value to the company</td>
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<td><strong>Difficulties of application of ABC system in company</strong></td>
<td><strong>Strongly agree</strong></td>
<td><strong>Agree</strong></td>
<td><strong>Neutral</strong></td>
<td><strong>Disagree</strong></td>
<td><strong>Strongly Disagree</strong></td>
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<td>15</td>
<td>There is no costs system in the company</td>
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<td>16</td>
<td>Lack of understanding and conviction of administration the</td>
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<td>What are the shortcomings which you see in the current system?</td>
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<td>17</td>
<td>The administrative structure of the company does not help much in success of the ABC system</td>
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<td>18</td>
<td>The difficulty of the division of business undertaken by the company in the clear and specific activities</td>
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<td>19</td>
<td>The lack of scientific qualifications and professionalism incapable of implementation ABC system</td>
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<td>20</td>
<td>Increasing the cost of application of ABC system compared to the benefits expected from it is an impediment to the application of the system in the company</td>
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<td>21</td>
<td>the company does not keep pace with modern manufacturing environment</td>
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<td>it is an impediment to the application of the system in the company</td>
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</table>

2- In your opinion, why ABC system is not applied in your company?

3- Do you have any other suggestions or point of view which can be taken into account?