



EIILM UNIVERSITY
S I K K I M

**ADVANCED MANAGEMENT
ACCOUNTING**

SYLLABUS

Concept of Management Accounting

Concept; Tools of Management Accounting; Installation of Management Accounting System; Role of the management Accountant; Management Accounting as a career; Revision of Some Basic Cost Terms and Concepts: Cost Unit, Cost Centre, Profit Centre, Different Types of Costs and its Classification viz. Fixed, Variable, Semi-variable, Direct, Indirect, Marginal, Out of Pocket, Differential, Sunk Costs , Opportunity Cost , Replacement Cost , Joint cost , Conversion Cost , Discretionary Costs , Committed Cost; Cost Tracing; Cost Allocation; Cost Driver; Historical Costing; Absorption Costing; Marginal Costing; Standard Costing; Uniform Costing.

Analysis and Interpretation of Financial Statements

Essentials of Good Financial Statements; Tools of Financial Analysis: Comparative Financial Statements, Common size Statements, Trend Analysis, Statement of changes in Working Capital, Funds Flow, Cash Flow, Ratio Analysis; Basics of Working Capital Management: Working Capital Requirement Forecast , Important Working Capital Ratios.

Management Accounting and Managerial Decision Making

Decisions Making: Decisions Involving Alternative Choices, Pricing Decisions, Need for Revision of Budgets, Revision of Standards, Concept of Limiting Budget Factor; Divisional Performance Appraisal: Meaning of Divisions, Reasons for Divisionalisation; Measurement of Divisional Performance: ROI Approach , Residual Income Approach; Concept of Transfer Price; Different Bases of Formulating Transfer Prices: Market Based, Cost Based , Shadow Price Based.

Behavioral Aspects of Control, MIS, Reporting and Management Audit

The Concept of Group or Social Control Behavioral Theories Relating to Control; Some Behavioral Implications of Control through Budgets; Selection of a Proper Control Strategy; Concept of MIS; Developing a Management Information and Reporting System; Levels of Management and their Information Requirements; Objectives of Management Audit; Distinction between Different Types of Audit; Conducting Management Audit .

Contemporary Issues in Management Accounting

Target Costing; Responsibility Accounting; Inflation Accounting; Activity Based Costing; Quality Costing; Human Resource Accounting; Value Added Accounting; Life Cycle Costing: Product Life Cycle Costing , Project Life Cycle Costing, Management, Accountant's Role in Lifecycle Costing , Value Chain Analysis.

Suggested Readings:

1. Management and Cost Accounting, Drury C, Thomson Business Press.
2. Accounting for Non-Accounting Students, Dyson J R,

COURSE OVERVIEW

There are three strands to the course.

First

We focus on the developments of formal Finance - based management accounting theory.

Second

We consider contemporary cost management issues including activity accounting, strategic cost analysis and management accounting in the digital economy.

Third

We adopt a strategic and organisational perspective to planning and control systems design.

These different approaches provide complementary appreciations of the management process in modern organisations. Some of the subject matter of the course will be dealt with across the three strands, illustrating the conceptual richness of modern management accounting. The synthesis, reconciliation and explanation of different views is an important aspect of the course.

At the conclusion of the semester, you are expected to:

1. Have a fundamental understanding of mainstream management accounting topics and their practical applications,
2. Be able to effectively use quantitative tools to provide timely information to decision-makers,
3. Be able to grasp critical variables in decision-making scenarios and apply the appropriate analyses to make the right decisions,
4. Be able to do well in group discussion settings and to communicate your ideas and thoughts effectively, and
5. Do well in all aspects of this course & receive a good grade.

ADVANCED MANAGEMENT ACCOUNTING

CONTENT

CONCEPT OF MANAGEMENT ACCOUNTING

	Lesson No.	Topic	Page No.
	Lesson 1	Introduction to Management Accounting	1
	Lesson 2	Designing & Installation of Management Accounting	6
	Lesson 3	Role of Management Accounting	10
	Lesson 4	From the Web	13
	Lesson 5	Marginal Costing	16
	Lesson 6	Budgetary Control & Standard Costing	21
	Lesson 7	Basic Cost Concepts	26
	Lesson 8	Practical Applications/ Case Study	30

ANALYSIS AND INTERPRETATION OF FINANCIAL STATEMENTS

	Lesson 9	Financial Statement Analysis	33
	Lesson 10	Techniques of Financial Analysis	37
	Lesson 11	Statement of Change in Financial Position	42
	Lesson 12	Cash Flow Statement	48
	Lesson 13	Working Capital Management	52
	Lesson 14-15	Financial Ratio's	59

MANAGEMENT ACCOUNTING AND MANAGERIAL DECISION MAKING

	Lesson 16-17	Decisions Involving Alternative Choices	73
	Lesson 18-19	Divisional Performance Appraisal	85
	Lesson 20-21	Transfer Pricing	93
	Lesson 22	Case Study	102

BEHAVIORAL ASPECTS OF CONTROL, MIS, REPORTING AND MANAGEMENT AUDIT

	Lesson 23	Behavioural Aspect of Control	103
	Lesson 24-26	Management Information System	109
	Lesson 27	Introduction to Audit	125
	Lesson 28	Audit & Its Types	129
	Lesson 29	Management Audit	134
	Lesson 30	Case Study	139
	Lesson 31	Practical Application of Concepts Under Study Unit 4	140

CONTEMPORARY ISSUES IN MANAGEMENT ACCOUNTING

	Lesson 32	Target Costing	141
	Lesson 33	Responsibility Accounting	147
	Lesson 34-35	Inflation Accounting	152
	Lesson 36	Activity Based Costing (ABC)	162

ADVANCED MANAGEMENT ACCOUNTING			
CONTENT			
	Lesson No.	Topic	Page No.
	Lesson 37	Quality Costing	168
	Lesson 38	Human Resources Accounting	170
	Lesson 39	Value Added Accounting	181
	Lesson 40	Life Cycle Costing	187
	Lesson 41	Value Chain Analysis	192

LESSON 1 :

INTRODUCTION TO MANAGEMENT ACCOUNTING

Learning objectives

After studying this chapter you should be able to

- Explain terms such as management accounting, cost accounting, and financial accounting
- Explain the main features of management accounting
- Differentiate between management accounting and financial accounting

Introduction

Managers use management accounting information to choose strategy to communicate it and to determine how best to implement it. They use management accounting information to coordinate their decisions about designing, producing and marketing a product or service

What is Management Accounting?

Management accounting is very closely linked to cost accounting; so closely, in fact, that it is difficult to say where cost accounting ends and where management accounting begins. Cost accounting simply aims to measure the performance of departments, goods and services. However, management accounting is much, much more and involves:

1. **The provision or information for management:** Indeed, the role of the management accountant could well be described as that of an 'information manager'. The information generated should be designed to assist management, to control business operations and to help management with decision-making. In fulfilling this role the management accounting department/section must consult with the users of the information, i.e. management, to assess its needs in terms of precisely what information is required and when, etc. The aim is, to provide management with a flow of relevant information, e.g. reports, statements, spreadsheets, etc. as and when required. A frequent flow of information (weekly or monthly) should enable management to respond to emerging problems/situations as soon as possible. The early detection of problems means earlier solutions & early action.
2. **Advising management:** A key part of management accounting is to advise management about the economic consequences and implications of its (proposed) decisions and alternative course of action. In particular, this advice should answer a frequently overlooked question: What happens if things go wrong? (If interest rates go up? Or if the sales target is not achieved?)
3. **Forecasting, planning and control:** A lot of management accounting is concerned with the future and predetermined systems such as budgetary control and standard costing. Such systems investigate the differences (i.e. variances) which arise as a result of actual performance being different from planned performance in terms of budgets or standards. In addition, the management accountant should also be

involved in strategic planning, e.g. the setting of objectives and the formulation of policy. The forecasting process will involve accounting for uncertainty (risk) via statistical techniques, such as probability, etc.

4. **Communications:** If the management accounting system is to be really effective it is essential that it goes hand in hand with a good, sound, reliable and efficient communication system. Such a system should communicate clearly by providing information in a form, which the user, i.e. managers and their subordinates, can easily understand (reports, statements, tabulations, graphs and charts). However, great care should be taken to ensure that managers do not suffer from 'information overload', i.e. having too much information much of which they could well do without.
5. **Systems:** The management accounting department/section will also be actively involved with the design of cost control systems and financial reporting systems.
6. **Flexibility:** Management accounting should be flexible enough to respond quickly to changes in the environment in which the company/organization operates. Where necessary information/ systems should be amended/modified. Thus, there is a need for the management accounting section/ department to be involved with the monitoring of the environment on a continuing basis.
7. **An appreciation of other business functions:** Those who provide management accounting information need to understand the role played by the other business functions. In addition to communicating effectively with other business functions, they also need to secure their cooperation and coordination, e.g. the budget preparation process relies on the existence of good communications, cooperation and coordination.

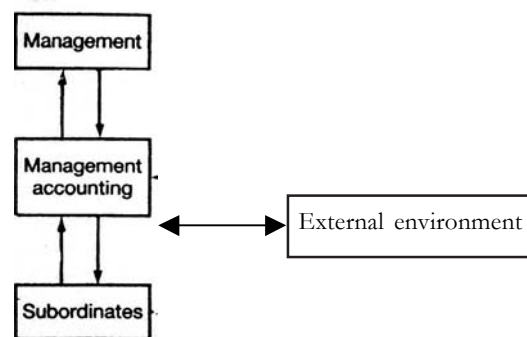


Figure 1.1

8. **Staff Education:** The management accounting department/section needs to ensure that all the users of the information it provides, e.g. managers and their subordinates, are educated about the techniques used, their purpose and their benefits, etc.

9. **Gate keeping:** The management accounting department/section sits at a very important information junction (see Figure 1.1). This gate keeping position places the management accounting section in a position of power; it has access to (can send information to and from) management and subordinates, and communicates with and receives a certain amount of information from the external environment. Its power arises because it can control the flow of information upwards to management - or downwards to subordinates. -
10. **Limitations:** Although management accounting can, and does, provide a lot of useful information, it must be stressed that management accounting is *not* an exact science. A vast amount of the information generated depends upon subjective judgment, e.g. the assessment of qualitative factors or assumptions about the business environment. Management accounting is not the be all and end all of decision-making, it is just one of the tools which can help management to make more informed decisions.
11. **Being the servant:** Finally, having established that management accounting is a tool, it must be emphasized that it is there to serve the needs of management.

Management Accounting, Financial Accounting, and Cost Accounting

Accounting systems take economic events and transactions that have occurred and process the data in those transactions into information that is helpful to managers and other users, such as sales representatives and production supervisors. Processing any economic transaction entails collecting, categorizing, summarizing, and analyzing. For example, costs are collected by cost categories (materials, labor, and shipping); summarized to determine total costs by month, quarter, or year; and analyzed to evaluate how costs have changed relative to revenues, say, from one period to the next. Accounting systems provide information such as financial statements (the income statement, balance sheet, and statement of cash flows) and performance reports (such as the cost of operating a plant or providing a service). Managers use accounting information (a) to administer each of the activity or functional areas for which they are responsible and (b) to coordinate those activities or functions within the framework of the organization as a whole.

Individual managers often require the information in an accounting system to be presented or reported differently. Consider, for example, sales order information. A sales manager may be interested in the total dollar amount of sales to determine the commissions to be paid. A distribution manager may be interested in the sales order quantities by geographic region and customer-requested delivery dates to ensure timely deliveries. A manufacturing manager may be interested in the quantities of various products and their desired delivery dates to schedule production. An ideal database-sometimes called a data warehouse or inform-consists of small, detailed bits of information that can be used for multiple purposes. For example, the sales order database will contain detailed information about product, quantity ordered, selling price, and delivery details (place and date) for each sales order. The data warehouse

stores information in a way that allows managers to access the information that each needs.

Management accounting and financial accounting have different goals. **Management accounting** measures and reports financial and non-financial information that helps managers make decisions to fulfill the goals of an organization. Managers use management accounting information to choose, communicate, and implement strategy. They also use management accounting information to coordinate product design, production, and marketing decisions. Management accounting focuses on internal reporting.

Financial accounting focuses on reporting to external parties. It measures and records business transactions and provides financial statements that are based on generally accepted accounting principles (GAAP). Managers are responsible for the financial statements issued to investors, government regulators, and other parties outside the organization. Executive compensation is often directly affected by the numbers in these financial statements. It is not difficult to see that managers are interested in both management accounting and financial accounting.

Cost accounting provides information for management accounting and financial accounting. Cost accounting measures and reports financial and non-financial information relating to the cost of acquiring or utilizing resources in an organization. Cost accounting includes those parts of both management accounting and financial accounting in which cost information is collected or analyzed.

The internal reporting-external reporting distinction just mentioned is only one of several significant differences between management accounting and financial accounting. Other distinctions include management accounting's emphasis on the future-that's budgeting-and management accounting's emphasis on influencing the behavior of managers and employees. Another distinction is that management accounting is not nearly as restricted by GAAP as is financial accounting. For example, managers may charge interest on owners' capital to help judge a division's performance, even though such a charge is not allowable under GAAP.

Reports such as balance sheets, income statements, and statements of cash flow are common to both management accounting and financial accounting. Most companies adhere to, or only mildly depart from, GAAP for their basic internal financial statements. Why? Because accrual accounting provides a uniform way to measure an organization's financial performance for internal and external purposes. However, management accounting is more wide-ranging than financial accounting's emphasis on financial statements. Management accounting embraces more extensively such topics as the development and implementation of strategies and policies, budgeting, special studies and forecasts, influence on employee behavior, and non-financial as well as financial information.

Cost Management and Accounting Systems

The term **cost management** is widely used in businesses today. Unfortunately, there is no uniform definition. We use cost management to describe the approaches and activities of managers in short-run and long run planning and control decisions that increase value for customers and lower costs of products and services. For example, managers make decisions regarding the amount and kind of material being used, changes of plant processes, and changes in product designs. Information from accounting systems helps managers make such decisions, but the information and the accounting systems themselves are not cost management.

Cost management has a broad focus. For example, it includes but is not confined to the continuous reduction of costs. The planning and control of costs is usually inextricably linked with revenue and profit planning. For instance, to enhance revenues and profits, managers often deliberately incur additional costs for advertising and product modifications.

Cost management is not practiced in isolation. It's an integral part of general management strategies and their implementation. Examples include programs that enhance customer satisfaction and quality, as well as programs that promote "blockbuster" new-product development.

Distinction Between Management Accounting and Financial Accounting

The 12 principal differences between management and financial accounting are described here.

1. **Necessity-** Financial accounting must be done. Enough effort must be expended to collect data in acceptable form and with an acceptable degree of accuracy to meet the requirements of the Financial Accounting Standards Board (FASB) and other outside parties, whether or not the management regards this information as useful. Management accounting, by contrast, is entirely optional, no outside agencies specify what must be done or indeed that anything need be done. Because it is optional, there is no point in collecting a piece of (management accounting information unless its value to management's believed to exceed the cost of collecting it.
2. **Purpose-** The purpose of financial accounting is to produce financial statements for outside users. When the statements have been produced, this purpose has been accomplished. Management accounting information, on the other hand, is only a means to an end, the end being the planning, implementing, and controlling functions of management.
3. **Users-** The users of financial accounting information (other than management itself) are essentially a "faceless" group. The managements of most companies' do not personally know many of the shareholders, creditors, or others who use the information in the financial statements. Moreover, the information needs of most of these external users must be presumed; most external users do not individually request the information they would like to receive. By contrast, the users of management accounting information are known managers plus the people who help these managers-analyze the information. Internal users

information needs are relatively well known because the controller's office solicits these needs in designing or revising the management accounting system.

4. **Underlying Structure-** Financial accounting is built around one fundamental equation: $\text{Assets} = \text{Liabilities} + \text{Owners' Equity}$. In management accounting, there are three types of accounting, each with its own set of principles.
5. **Source of Principles-** Financial accounting information must be reported in accordance with generally accepted accounting principles (GAAP). Outside users need assurance that the financial statements are prepared in accordance with a mutually understood set of ground rules; otherwise, they cannot understand what the numbers mean. GAAP provide these common ground rules.

An organization's management, by contrast, can employ whatever accounting rules it finds most useful for its own purposes. Thus, in management accounting, there may be information on unfilled sales orders, even though these are not financial accounting transactions; fixed assets may be stated at current values rather than historical cost; certain production overhead costs may be omitted from inventories; or revenues may be recorded before they are realized-even though each of these concepts is inconsistent with GAAP. Rather than asking whether it conforms to GAAP, the basic question in management accounting is the pragmatic one: Is the information useful?

6. **Time Orientation-** Financial accounting records and reports the financial history of an organization. Entries are made in the accounts only after transactions have occurred. Although financial accounting information is used as a basis, for making future plans, the information itself is historical. Management accounting includes, in its formal structure, numbers that represent estimates and plans for the future as well as information about the past. The objective of financial accounting is to "tell it like it was," not like it will be.
7. **Information Content-** The financial statements that are the end product of financial accounting include primarily monetary information. Management accounting reports deal with no monetary as well as non-monetary information. These reports show quantities of material as well as its monetary cost, number of employees and hours worked as well as labour costs, units of products sold as well as rupee amounts of revenue, and so on.
8. **Information Precision-** Management needs information rapidly and is often willing to sacrifice some precision in order to gain speed in reporting. Thus, in management accounting approximations are often as useful as, or even more useful than, numbers that are more precise. Although financial accounting cannot be absolutely precise either, the approximations used in management accounting are broader than those in financial accounting.
9. **Report Frequency-** Corporations issue detailed, financial statements only annually and less detailed interim reports quarterly by contrast, fairly detailed management accounting reports are issued monthly in most larger organizations; and

reports on certain activities may be prepared weekly, daily, or in a few instances in real time.

10. Report Timeliness- Because of the needs for precision and a review by outside auditors, plus the time requirements of typesetting, financial accounting reports are distributed several weeks after the close of the ending December 31 generally are not received by shareholders until March or April. By contrast, because management accounting reports may contain information on which management needs to take prompt action, these reports are usually issued within a few days of the end of a month.

11. Report Entity- Financial statements describe the organization as a whole. Although companies that do business in several industries are required to report revenues and income for each industry, these are large segments of the whole enterprise. Management accounting, by contrast focuses, mainly on relatively small parts of the entity that is, on individual products, individual activities, or individual divisions, departments and other responsibility centers. As we shall see, the necessity for dividing the total costs of an organization among these individual parts creates important problems in management accounting that do not exist in financial accounting.

12. Liability Potential- Although it happens infrequently, a company may be sued by its shareholders or creditors for allegedly reporting misleading financial information in its annual report. By contrast, as previously stated, management accounting reports need not be in accord with GAAP and are not public documents. Although a manager may be held liable for some inappropriate action and management accounting information conceivably may have played some role in his or her taking that action, it is the action itself, not the management accounting documents, that gives rise to the liability.

Surveys of Company Practice

"A Day in the Life" of a Management Accountant

What do management accountants do? The following table, based on a survey of CMAs, shows the percentage of respondents who named a particular work activity as in the top five work activity in terms of time devoted to the activity.

Accounting system and financial reporting	62%
Managing the accounting function	42%
Internal consulting	42%
Short-term budgeting	37%
Long-term strategic planning	25%
Financial and economic analysis	24%
Computer system and operations	21%
Process improvement	20%
Performance evaluation	17%
Tax compliance	14%
Accounting policy	13%
Project accounting	11%
Consolidations	11%

In terms of importance, management accountants ranked the abilities and skills needed to succeed as follows:

1. Communication skills
2. Ability to work on a team
3. Analytical/problem solving skill
4. Solid understanding of accounting
5. Understanding of how a business functions
6. Computer skills

What changes in work activities are projected in the future for management accountants?

Projected to become more important are.

- Internal consulting
- Process improvement
- Long-term strategic planning
- Performing financial and accounting analysis
- Computer system and operation

Projected to become less important are

- Accounting systems and financial reporting
- Consolidation
- Managing the accounting/finance function
- Accounting policy
- Short term budgeting
- Project accounting

The increasing use of information technology in the future was seen from the survey as helping management accountants spend a lower percentage of their time on data collection and financial statement preparation and a higher percentage on financial analysis.

The survey indicates a clear shift away from activities we traditionally think of as the core of the controller's responsibilities- managing the function, ensuring business controls, and planning and reporting- toward activities we think of as business partnering- strategic planning, business leadership, analyzing and interpreting information, decision making, process improvements, and performance evaluation.

The following question-answer format summarizes the chapters learning objectives.

1. What information does cost accounting provide?

Cost accounting measures and reports financial information and other information related to the acquisition or consumption of an organization's resources. Cost accounting provides information to both management accounting and financial accounting.

2. How do management accountants support strategic decisions?

Management accountants contribute to strategic decisions by providing information about the source of competitive advantage and by helping managers identify and build a company's resources and capabilities

3. What role do management accountants perform?

In most organizations, management accountants perform multiple roles: problem solving (comparative analyses for decision making), scorekeeping (accumulating data and reporting reliable results), and attention directing (helping managers properly focus their attention).

Notes

Lined area for notes, consisting of two columns of horizontal lines.

LESSON 2: DESIGNING & INSTALLATION OF MANAGEMENT ACCOUNTING

Learning Objectives

After studying this chapter you should be able to:

- Identify the areas, which influence the design of management accounting system
- Design the Management accounting system.
- Understand the procedure of installing the management accounting

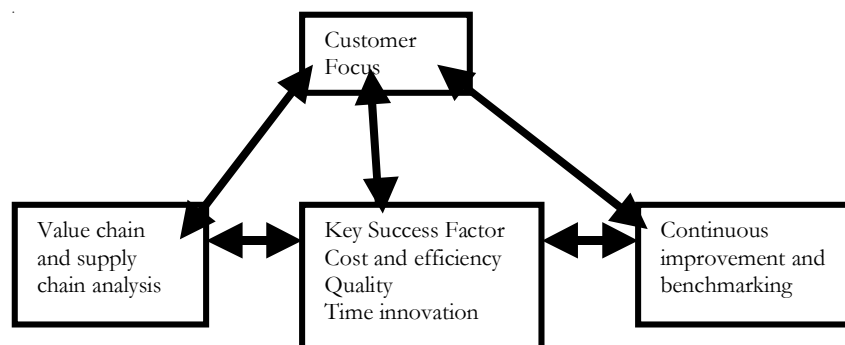
Enhancing the Value of Management Accounting Systems

The design of a management accounting system should be guided by the challenges facing managers. Exhibit 2.1 presents four themes common to many companies. The customer focus theme is particularly critical. The other three themes-value-chain and supply-chain analysis, key success factors, and continuous improvement and benchmarking-are geared to improving customer focus and customer satisfaction. Management accounting helps manager's focus on these four themes.

1. Customer focus- The number of organizations aiming to be "customer- driven" is large and increasing. For example, Asea Brown Boveri (ABB)-a global manufacturer of industrial products-gives high priority to customer focus:

Customer Focus is a guiding principle the way we do business. It is an attitude about everything we do that prompts us to constantly ask ourselves: "How can I add value for the customer?" Our commitment to Customer Focus has been reinforced by the measurable impacts it has had on employee morale and the bottom line

The challenge facing managers is to continue investing sufficient resources in customer satisfaction such that customers who provide a company the most profits are attracted and retained. It is for this reason that airline companies pay special attention to their most frequent travelers. The management accounting system must also track whether the internal business functions are adding value to customers.



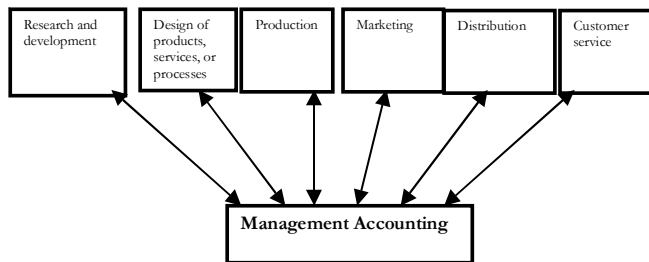
Key themes in Management decision making

Exhibit 2.1

2. Value-chain and supply-chain analysis- Value chain refers to the sequence of business functions in which usefulness is added to the products or services of a company. The term value refers to the increase in the usefulness of the product or service and, as result its value to the customer. Exhibit 2.2 shows six business functions-research and development (R&D), design, production, marketing, distribution, and customer service Management accountants provide information managers need to make decisions in each of these six business functions. We illustrate these business functions using the example of SONY Corporation's television division.

- **Research and development** -Generating and experimenting with ideas related to new products, services, or processes. At SONY, this function includes research on alternative ways of television signal transmission (analog, digital, high definition) and on the clarity of different shapes of television screens
- **Design of products-** services, or processes-Detailed planning and engineering of products, services, or processes. Design at Sony includes determining the number of component parts in a television set and the effect of alternative product designs on manufacturing costs.
- **Production Acquiring** coordinating, and assembling resources to produce a product or deliver a service. Production of a SONY television set includes the acquisition and assembly of the electronic parts, the cabinet, and the packaging used for shipping
- **Marketing-** Promoting and selling products or services to customers or prospective customers. SONY markets its televisions through trade shows, advertisements in newspapers and magazines, and on the Internet.
- **Distribution-** Delivering products or services to customers. Distributions for SONY includes shipping to retail outlets, catalog vendors, direct sales via the Internet, and other channels through which customers purchase televisions.

- **Customer service-** Providing after-sale support to customers. SONY provides customer service on its televisions in the form of customer-help telephone lines, support on the Internet, and warranty repair work.

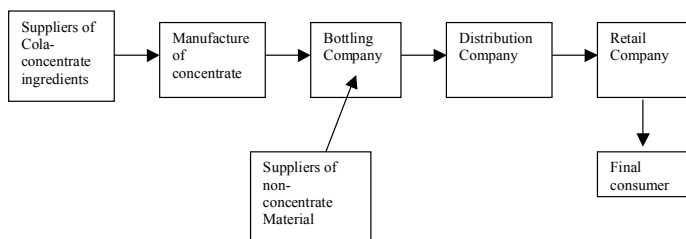


Managers in different parts of chain

Exhibit 2.2

Each function is essential to SONY satisfying its customers and keeping them satisfied (and even delighted) over time. Exhibit 2.2 depicts the usual order in which different business-function activities physically occur. Do not, however, interpret Exhibit 2.2 as implying that managers should proceed sequentially through the value chain when planning and managing their activities. Companies gain (in terms of cost, quality, and the speed with which new products are developed) if two or more of the individual business functions of the value chain work concurrently as a team. For example, inputs into design decisions by managers in production, marketing, distribution, and customer service often lead to design choices that reduce costs in all value-chain functions.

The term supply chain describes the flow of goods, services, and information from the initial sources of materials and services to the delivery of products to consumers, regardless of whether those activities occur in the same organization or in other organizations. Consider the soft drinks, Coke and Pepsi. Many companies play a role in bringing these products to consumers. Exhibit 2.3 presents an overview of the supply chain. Cost management emphasizes integrating and coordinating activities across all companies in the supply chain, as well as across each business function in an individual company's *value chain*. For example, both Coca-Cola Company and Pepsi Bottling Group contract with their suppliers (such as glass and can companies and sugar manufacturers)



Supply chain for a cola bottling company

Exhibit 2.3

3. **Key success factors.** Customers are demanding that companies use the value chain and supply chain to deliver ever-improving levels of performance regarding several (or even all) of the following:

- **Cost and efficiency-** Companies face continuous pressure to reduce the cost of the products or services they sell.

Understanding the tasks or activities (such as setting up machines or distributing products) that cause costs to arise is useful for calculating and managing the cost of products. To set cost-reduction targets, managers start by scanning the market to determine prices that customers are willing to pay for products or services. From this “target price,” managers subtract the operating income they want to earn to arrive at the target cost. Managers strive to achieve the target cost by eliminating some activities (such as rework) and by reducing the costs of performing activities. They do so across all value-chain functions and over the entire life cycle of the product—from its initial R&D to when customer service and support for the product are no longer offered.

- **Quality-** Customers expect high levels of quality. Total quality management (TQM) is a philosophy in which management improves operations throughout the value chain to deliver products and services that exceed customer expectations. TQM encompasses designing the product or service to meet the needs and wants of customers, as well as making products with zero (or minimal) defects and waste. Management accountants evaluate the costs and revenue benefits of TQM initiatives.
 - **Time-** Time has many components. New-product development time is the time to develop and bring new products to market. The increasing pace of technological innovation has led to shorter product life cycles and the need for companies to bring new products to market more rapidly.
4. **Continuous improvement and benchmarking.** Continuous improvement by competitors creates a never-ending search for higher levels of performance to satisfy customers. Some phrases that typify this theme are “We are running harder just to stand still” and “If you’re not going forward, you’re going backward.”

Customer-response time describes the speed at which an organization responds to customer requests. To increase customer satisfaction, organizations must complete activities faster and meet promised delivery dates reliably. Delays or bottlenecks occur when the work to be performed exceeds the available capacity. To increase output, managers need to increase the capacity of the bottleneck operation. The management accountant’s role is to quantify the cost and benefits of relieving the bottleneck constraints.

- **Innovation-** A constant flow of innovative products or services is the basis for ongoing company success. The management accountant helps managers evaluate alternative investment decisions and R&D decisions.

Management accountants help managers track performance on the chosen key success factors vis-a-vis the performance of competitors on the same factors. Tracking what is happening in other companies alerts managers to changes in what their own customers are observing and evaluating.

To compete, many companies are concentrating on improving different aspects of their own operations. Keep in mind, though, that different industries will focus on improving different operating factors. Airline companies,

such as Southwest Airlines, seek to improve the percentage of their flights that arrive on time. Internet companies, such as eBay, seek to improve the percentage of each 24-hour period that customers can access their online systems without delay.

At times a company may have to make more fundamental changes in its operations and restructure its process to achieve improvements in cost, quality, timeliness or service. Management accountants provide the financial and non-financial information that helps managers make decisions about reengineering and continuous improvement.

Designing The Management Accounting System

The system should fit with other organizational characteristics, including goals and objectives, nature of the goods and services produced, organization structure, and the level of sophistication that managers have in using management accounting information. Thus, all of the considerations we mention below may not necessarily apply to a given organization.

1. **Accounting Database:** Accounting information does not just magically materialize when it is needed. The raw data must be “captured” from various source documents. These documents include vendor invoices, employee time cards and other personnel-related records, customer billing and payment records, and so forth. These raw data constitute the organization’s operating information, which is recorded using double-entry record keeping procedures in the organization’s accounts. The complete set of these accounts, called the chart of accounts, determines the structure of the organization’s accounting database.
2. **Level of detail** A major design issue in management accounting is how detailed the chart of accounts should be. For financial accounting purposes, not much detail is required. For example, solely for financial accounting purposes all sales could be credited to a single Sales Revenue account and debited: either to Cash or Accounts Receivable. However, this would make it difficult to perform an analysis of sales by product line, profit center sales district, or individual customer.
3. **Cost Accounting System:** an organization faces many choices when designing its cost accounting system. Those choices include job costing versus standard costs, volume measures and several other choices many organizations activities are sufficiently diverse that several accounting systems must be designed for a given organization. However, there should be one integrated accounting database underlying the several systems, because each system in essence simply aggregates account building blocks in a different way
4. **Management control system** Whereas the availability of detailed accounting database information may be crucial to support full cost and differential accounting analyses, behavioral considerations are at least as important as responsibility accounting information in the management control process.

In the management control process, behavioral considerations are at least as important as accounting

considerations. Thus, a conceptually sound management control system design will not be effective if managers feel that their superiors are using responsibility accounting information in an arbitrary or unfair way.

Installation of Management Accounting System

A system is an established set of procedure for the purpose of achieving specified objectives at minimum cost. It forms a basis for future operations. A lot of difficulty can be avoided if a system is introduced carefully. The approach should be to develop the system that ties up with the existing practices. The executives responsible for the introduction of the system should intimately familiarize themselves with the plant, process and special problems relating to the organization. The installation of a costing system can be discussed below:

1. **Basic consideration:** the following considerations are relevant in the introduction of a costing system:
 - a. It should be simple and practical
 - b. It should be tailor made to the requirements of the organization
 - c. The cost of installation should justify the result
 - d. The system should not sacrifice the utility by introducing meticulous and unnecessary details.
 - e. Textbook approach should be avoided. Sometimes, practical considerations may require adoption of what are theoretically known as “second best”.
 - f. A carefully phased programme should be prepared for the introduction of the system. Network analysis may be careful in the context.
 - g. Active co-operation and participation of executives from different departments will promise the best system.
 - h. The structure of the costing system will be influenced by data-input and data-output of different departments.
 - i. General attitude of management towards cost control.
 - j. Information requirements of management.
2. **Preliminary step** -special attention should be directed to collected information about the various aspects of the organization. This information will provide a base for the steps to be taken for the introduction of an effective costing system. Following points should attract special attention in collecting the information about the organization:
 - a. Size of the firm and nature of business.
 - b. Number of products to be manufactured or the extent of services being rendered.
 - c. Complexities of manufacturing and other operations.
 - d. Organizational structure
 - e. Various objectives, responsibilities and job descriptions
 - f. Analysis of material
 - g. Routing of operations and flow charts
 - h. Scheduling of operations.
 - i. Ascertainment of standard time and methods by time study and motion study.

3. Formal steps -the introduction of actual system will involve the following points:

- a. Coding and classification.
- b. Establishing of cost centers.
- c. Guidelines for separation of fixed and variable costs.
- d. Guidelines for allocation of indirect costs.
- e. Introduction of formats
- f. Specification of different reports and their periodicity
- g. Cost accounts manual
- h. Guidelines for post installation appraisal of costing system.

The procedure of installation of management accounting system may vary from organization to organization depending upon the various factors like size of the organization, type of product, technology used, etc.

The Following Question-answer format Summarizes the Chapters Learning Objectives

1. What should managers do to compete effectively?

Four themes for managers to attain success are customer focus, value-chain and supply-chain analysis, key success factors, and continuous improvement and bench marking.

2. What are the factors affecting the design of management accounting system?

Various factors that affect the design of management accounting system are-Accounting Database that constitutes the organizations operating information, Level of detail, Cost accounting system and management control system.

Notes

LESSON 3: ROLE OF MANAGEMENT ACCOUNTING

Learning Objectives

After studying this chapter you should be able to:

- Understand the management accounts role
- Understand the career opportunities in management accounting.

The Management Accountant's Role

Managers implement strategy by translating it into actions. Managers do this using planning systems and control systems designed to help the collective decisions throughout the organization.

Planning comprises (a) selecting organization goals, predicting results under various alternative ways of achieving those goals, deciding how to attain the desired goals and (b) communicating the goals and how to attain them to the entire organization,

One common planning tool is a budget. A budget is the quantitative expression of a proposed plan of action by management and is an aid to coordinating what needs to be done to implement that plan. The information used to project budgeted amounts includes past financial and non-financial information routinely recorded in accounting systems. The budget expresses the strategy by describing the sales plans; the costs and investments that would be needed to achieve sales goals, the anticipated cash flows, and the potential financing needs. The process of preparing a budget forces coordination and communication across the business functions of a company, as well as with the company's suppliers and customers.

Control comprises (a) taking actions that implement the planning decisions and (b) deciding how to evaluate performance and what feedback to provide that will help future decision-making.

Individuals pay attention to how they are measured. They tend to favor those measures that make their performance look best. Performance measures tell managers how well they and the subunits they are managing are doing. Linking rewards to performance helps to motivate managers. These rewards are both intrinsic (self satisfaction for a job well done) and extrinsic (salary, bonuses and promotions linked to performance). A budget gets serves as much as a control tool as a planning tool. Why? Because a budget is a benchmark against which actual performance can be compared.

Feed back: Linking Planning and Control

Planning and control are linked by feedback: Feedback involves managers examining past performance (the control function) and systematically exploring alternative ways to make better-informed decisions and, plans in the future. Feedback can lead to changes in goals, changes in the ways decision alternatives are identified, and changes in the range of information collected when making predictions. Management accountants play an active role in linking control to future planning.

A Plan must be Flexible enough so that Managers can Seize Sudden opportunities unforeseen at the time the plan is formulated. In no case should" control mean that managers cling to a plan when unfolding events indicate that actions not encompassed by that plan would offer better results for the company.

Problem-Solving, Scorekeeping, and Attention-Directing roles

Management accountants contribute to the company's decisions about strategy, planning, and control, by problem solving, scorekeeping, and attention directing.

1. **Problem solving** - Comparative analysis for decision making of the several alternatives available, which is the best?
2. **Scorekeeping** -Accumulating data and reporting results to all levels of management describing how the organization is doing. Examples of scorekeeping are the recording of actual revenues and purchases relative to budgeted amounts.
3. **Attention directing**- Helping managers focus on opportunities and problems. Attention directing means getting managers to focus on all opportunities that would add value to the company and not to focus only on cost reduction opportunities.

Different decisions place different emphasis on these three roles. For strategic decisions and planning decisions, the problem-solving role is most prominent.

For control decisions (which include both actions to implement planning decisions and decisions about performance evaluation), the scorekeeping and attention directing roles are most prominent because they provide feedback to managers.

Feedback from scorekeeping and attention directing often leads to revise planning decisions and some times make new strategic decisions. Information that prompts a planning decision is frequently reanalyzed and supplemented by the management accountant in the problem-solving role. The ongoing interaction among strategic decisions, planning decisions, and control decisions means that management accountants often are simultaneously doing problem solving, scorekeeping and attention directing activities.

Management accounting information must be relevant and timely to be useful to managers. Management accounting is successful when it provides information to managers that improve their strategic, planning and control decisions. The relationship between managers and management accounting goes both ways, managers who support their management accountants allocate the resources they need to do their jobs. With these resources, management accountants are able to provide better support to the managers enabling them to take right decision. The survey of company practice indicates the increasingly important role management accountants are playing

in helping in helping managers develop and implement strategy. It also describes the abilities and skills needed to be a successful management accountant in the future.

Management Accounting as a Career

The many types and levels of accounting personnel found in the typical organization mean that there are broad opportunities waiting those who master the accounting discipline.

When accounting is mentioned, most people think first of independent auditors who reassure the public about the reliability of the financial information supplied by company managers. These external auditors are called certified public accountants in the United States and Chartered Accountants in many other English-speaking nations. In the United States, an accountant earns the designation of Certified Public Accountant (CPA) and in India Chartered Accountant or Cost Accountant by a combination of education, qualifying experience. The major U.S. professional association in the private sector that regulates the quality of outside auditors is the American Institute of Certified Public Accountants (AICPA).

Training for Top Management Positions

In addition to preparing you for a position in an accounting department, studying accounting-and working as a management accountant—can prepare you for the very highest levels of management. Accounting deals with all facets of an organization, no matter how complex, so it provides an excellent opportunity to gain broad knowledge. Accounting must embrace all management functions, including purchasing, manufacturing, wholesaling, retailing, and a variety of marketing and transportation activities. Senior accountants or controllers in a corporation are sometimes picked as production or marketing executives. Why? Because they may have impressed other executives as having acquired general management skills. A number of surveys have indicated that more chief executive officers began their careers in an accounting position than in any other area, including marketing, production, and engineering.

According to Business Week, management accountants are now getting involved with the operating side of the company, where they give advice and influence production, marketing, and investment decisions as well as corporate planning. Moreover, many controllers who have not made it to the top have won ready access to top management. . . . Probably the main reason the controller is getting the ear of top management these days is that he or she is virtually the only person familiar with all the working parts of the company.

The growing interest in management accounting also stems from its ability to help managers adapt to change. The one constant in the world of business is change. Today's economic decisions differ from those of 10 years ago. As decisions change, demands for information change. Accountants must adapt their systems to the changes in management practices and technology. A system that produces valuable information in one setting may be valueless in another.

Accountants have not always been responsive to the need to change. A decade ago many managers complained about the irrelevance of accounting information. Why? Because their

decision environment had changed but accounting systems had not. However, most progressive companies have now changed their accounting systems to recognize the realities of today's complex, technical, and global business environment. Instead of being irrelevant, accountants in such companies are adding more value than ever. For example, Management Accounting (September 1994) reported on a Champion International Corporation paper mill that made major changes in its accounting system. By working with managers to produce the information considered relevant for their decisions, accountants were regarded as "business partners." Previously, managers had considered accountants to be a "financial police department." Instead of merely pointing out problems, the accountants became part of the solution.

Current Trends

Three major factors are causing changes in management accounting today:

1. Shift from a manufacturing-based to a service-based economy
2. Increased global competition
3. Advances in technology

Each of these factors will affect your study of management accounting.

The service sector now accounts for almost 80% of the employment in the United States. Service industries are becoming increasingly competitive and their use of accounting information is growing.

Global competition has increased in recent years as many international barriers to trade, such as tariffs and duties, have been lowered. In addition, there has been a worldwide trend toward deregulation. The result has been a shift in the balance of economic power in the world. Nowhere has this been more evident than in the United States. To regain their competitive edge, many U.S. companies are redesigning their accounting systems to provide more accurate and timely information about the cost of activities, products, or services. To be competitive, managers must understand the effects of their decisions on costs, and accountants must help managers predict such effects.

By far the most dominant influence on management accounting over the past decade has been technological change. This change has affected both the production and the use of accounting information. The increasing capabilities and decreasing cost of computers, especially personal computers (PCs), has changed how accountants gather, store, manipulate, and report data. Most accounting systems, even small ones, are automated. In addition, computers enable managers to access data directly and to generate their own reports and analyses in many cases. By using spreadsheet software and graphics packages, managers can use accounting information directly in their decision process. Thus, all managers need a better understanding of accounting information now than they may have needed in the past. In addition, accountants need to create database that can be readily understood by managers.

The following Question-answer format Summarizes the Chapters Learning Objectives

- 1. Discuss the role accountants play in the company's value chain functions.

Accounts play a key role in planning and control. Throughout the company's value chain, accountants gather and report cost and revenue information for decision making.

- 2. Identify current trends in management accounting.

The future worth of an accounting system and accountants themselves will be affected by how easily and well they can adapt to change. Current trends affecting accounting systems include growth in the service sector of the economy, increased global competition and advances in technology.

Notes

Horizontal lines for notes on the left side of the page.

Horizontal lines for notes on the right side of the page.

LESSON 4: FROM THE WEB

Job Description

Chartered management accountants provide the financial information necessary for the planning and control of organisations and commercial companies. They establish and maintain financial policies and management information systems, as well as liaise with management colleagues on all aspects of finance.

Management accountants look to the future (rather than the past, as in auditing accounts and tax returns). They can analyse the performance of a business and advise on how it can develop. They can be found working in:

- Industry;
- Commerce;
- Not-for-profit organisations;
- Public sector organisations.

They may work in a finance function or within specialist departments providing financial advice and insight to other professionals.

Typical Work Activities

Typical work activities include:

- Creating, implementing and monitoring processes and procedures around the creation of monthly forecasts;
- Preparing periodic financial statements including profit and loss accounts, budgets, cashflows, variance analysis and commentaries;
- Investigating and developing systems of internal control and conducting internal audits;
- Managing income and expenditure, sales, payroll and stocks;
- Negotiating for major projects loans and grants;
- Offering professional judgement on financial matters and advising on ways of improving business performance; • giving input into strategic planning;
- Liaising with other function managers to put the finance view in context;
- Completing projects within agreed turn-around times;
- Maintaining evidence of continuing professional development (CPD).

Roles may vary depending on the management structure, eg there may be some openings in large firms in a business advisory role.

Roles can also vary depending on the nature of the organisation and, with larger organisations, the department or departments that the individual is based in or supports.

Work Conditions

- Range of typical starting salaries: £14,000 - £25,000 (salary data collected July 03).

- Range of typical salaries for newly qualified chartered management accountants: £25,000 - £40,000 (salary data collected July 03).
- Range of typical salaries at senior levels: £55,000 - £100,000 plus (salary data collected July 03).
- Starting salaries vary enormously according to the size of the organisation, its location and sector. The highest salaries tend to be found in London and the Thames Valley regions. Latest survey details for UK regions and Ireland can be found on the website of the Chartered Institute of Management Accountants (CIMA). Salaries increase substantially on passing the examinations. CIMA report that 9% of their membership earn more than £100,000 per annum.
- Some companies offer excellent packages to cover the cost of studying, including tuition fees and paid study leave.
- Working hours typically include regular extra hours but not weekends or shifts.
- The work is office based but not desk bound.
- After gaining several years of experience, self-employment or freelance work in financial or management consultancy is possible.
- Project work is sometimes available through agencies but this is more common between jobs than as a career itself. Part-time work is more likely with large employers and temporary project working is possible.
- Women make up an increasing proportion of the new intake. New registrations with CIMA indicate around 40% are female. Women are also beginning to take the more senior positions.
- Jobs can be found nationally.
- Chartered management accountants work for a wide variety of employers in the private and public sectors.
- High levels of study whilst working requires significant personal time and determination. The post-qualification workload can be heavy with tight deadlines and high quality demands.
- Travel within a working day, absence from home at night and overseas travel are all occasionally needed.

Occupational Profile

This Occupational Profile forms part of Prospects Planner www.prospects.ac.uk/links/occupations Page 1 of 4

Entry Requirements

Of the current (July 03) graduate trainees studying for the examinations of the Chartered Institute of Management Accountants (CIMA), only half have a relevant degree in business or finance. Although chartered management accountants

tancy is open to graduates of all disciplines, the following degree subjects may increase your chances:

- Business/management;
- Economics;
- Statistics.

An accountancy degree is highly desirable and business degrees offer exemptions from some of the professional qualifications. However, the degree discipline is not as key an issue in recruitment compared to the class of degree; a 2.1 minimum is often sought by larger employers together with high UCAS points. CIMA will accept holders of HNDs, however, many employers will not. Again, the larger employers will seek degree holders only (with a 2.1 or above). Small and medium sized firms (SMEs) may be more flexible and given that they receive fewer applications, may be more willing to look at all that an individual applicant can offer. An HND in business and finance (with the appropriate options) may give some examination exemptions which are allowed on an individual basis. Entry without a degree or HND into CIMA training is possible, however, larger companies do target graduates. A pre-entry postgraduate qualification is not needed but professional qualifications undertaken in-service are usually necessary for progression. To register for CIMA qualifications, you must have the equivalent of a minimum of two subjects at UK GCE Advanced level (A-level) and a minimum of three GCSEs including English language and mathematics. Employers often seek good grades at A-level. Equivalent qualifications may be accepted; details of those accepted for CIMA training are held on their website.

Pre-entry experience is not needed but could be beneficial, such as vacation or sandwich course business experience (not necessarily in finance). Pre-university experience is useful for mature students. Language skills are also useful. It is important that you possess a real interest in business as you need to gain an understanding of how the organization works and be driven to make the most of resources. You need to:

- be comfortable with figures;
- have excellent oral and written communication skills;
- offer IT proficiency;
- possess an aptitude and liking for team work;
- have the confidence to know where your expertise ends and another team member's begins;
- demonstrate a lively and enquiring mind together with analytical and problem solving skills;
- have the stamina and motivation to juggle the demands of examinations and career, as well as a willingness to work long hours. Entry to training with large companies is competitive, usually requiring a good degree pass and good A-level grades.

Competition is less intense in small firms. Large employers' recruitment commences in the autumn but may continue into the summer whereas smaller firms tend to recruit at any time and advertise locally. Job titles vary so keep an open mind when looking for vacancies. It is always important to look at the support given for study and the work experience offered when

choosing a firm and you may need to negotiate a training and study package with the employer. Before accepting a job offer it is recommended that you find out if anyone else within the organisation is currently studying for the CIMA qualification or has recently qualified. This will give you some idea of how committed your potential employer is to training.

Entry problems may be encountered from mid 30s to early 40s. With the possible exception of public service, employers (particularly larger companies) tend to look unfavourably on mature candidates when seeking to fill vacancies on graduate training schemes, preferring graduates entering their first permanent job. Relevant skills and experience may enhance prospects. CIMA does offer a mature student entry route to their qualification. Full details are available on their website.

Training

The training is a combination of examinations and practical experience. The examinations of the Chartered Institute of Management Accountants (CIMA) are arranged in three stages; foundation, intermediate and advanced. To achieve Chartered Management Accountant (ACMA) status, you must complete all three levels, and gain three years of relevant practical experience. This must cover three areas: Basic, Core and Supplementary. At least 18 months of the practical experience must be gained in the Core area. CIMA requires that practical experience is recorded in a 'Career Profile' consisting of personal information, a summary of full employment history and an enhanced CV including details of all relevant practical experience. Many employers offering CIMA training to graduates will have a structured programme that combines the practical experience required with opportunities to study for the examinations. Those who have relevant degrees may qualify for exemptions from certain examinations. Study methods vary but could be block study with a tutor, evening classes or distance learning, or a combination of these.

Chartered Management Accountant

Page 2 of 4 Visit www.prospects.ac.uk/links/occupations - also includes case studies

Career Development

Career progression is dependent on successfully completing Chartered Institute of Management Accountants (CIMA) qualifications. Post-qualification promotion will depend on experience and skills developed, such as management and transferable skills like communication and team work. Experience of working on specific projects may be used to gain specialised expertise or to enable a move to a more strategic role in general management. Mobility will aid advancement - it may be necessary to look outside a company to gain promotion (if opportunities are limited within). Some larger employers will encourage transfers as professional development. They may also require frequent moves to different locations while training, in order to gain maximum exposure to the business. The skills acquired from studying the CIMA examinations, combined with related experience, can open up other career options. CIMA members also work in management consulting, business analysis and project management, for example.

Progression can be to senior positions such as finance director and possibly chief executive.

Typical Employers

These include all types and sizes of industrial, commercial and public sector organisations. Currently (July 03), one third of Chartered Institute of Management Accountants (CIMA) members work in the banking, finance, insurance and other financial services sector.

Other employers include:

- manufacturing;
- utilities;
- retail;
- local and central government.

There are more than 20,000 companies worldwide employing CIMA students.

For details on working in a variety of different industry sectors, see the AGCAS Sector Briefings series, available in your university careers service, or on the Prospects website. All of the sectors profiled could employ management accountants, from voluntary organisations to international companies.

Sources of Vacancies

- Prospects Today;
- Prospects Finalist;
- Accountancy Age;
- Prospects Directory;
- The Hobsons Directory;
- Hays Personnel (<http://www.haysworks.com>)
- national and local press.

Vacancies are sometimes handled by recruitment agencies. They are most often used for part-qualified posts and are useful for relevant degree holders. Agencies with a financial bias will also handle training vacancies and may be a good source of positions with smaller companies, as well as large multinationals.

Related Occupations

- Chartered accountant
- Chartered certified accountant
- Chartered public finance accountant
- Corporate treasurer
- Company secretary
- Financial manager

Chartered Management Accountant

Find comprehensive careers information on www.prospects.ac.uk and in your HE careers service Page 3 of 4

Information Sources

Bibliography

AGCAS and Graduate Prospects products are available from higher education careers services.

AGCAS Publications

Financial Services Sector, Sector Briefing

Graduate Prospects Publications

Prospects City and Finance

Prospects Directory

Prospects Finalist

Prospects Today

Other Publications

Accountancy Age, VNU Business Publications, Weekly

TARGET City and Finance, GTI Specialist Publishers, Annual

Hobsons Guide to Careers in Finance, CRAC/Hobsons Publications, Annual

The Hobsons Directory, CRAC/Hobsons Publications, Annual

Websites

Hays Personnel, <http://www.haysworks.com>

Addresses

Chartered Institute of Management Accountants (CIMA), 22 Chapter St, London, SW1P 4NP Tel: 020 7663 5441

URL: <http://www.cimaglobal.com>

Chartered Institute of Management Accountants (Republic of Ireland Division), 44 Upper Mount Street, Dublin 2

Tel: +353 (0)1 676 1721 URL: <http://www.cimaglobal.com>

Financial Training Company (FTC), 7-13 Melior Street, London, SE1 3QP Tel: 020 7407 5000

URL: <http://www.financial-training.com>

Notes

LESSON 5 : MARGINAL COSTING

Learning Objectives

After studying this chapter you should be able to Understand

- Marginal costing (Various aspects of marginal costing i.e.; Contribution, BEP, P/V Ratio)
- C-V-P analysis (Uses and assumptions)

Tools of Management Accounting

Let us discuss the various tools of management accounting in brief. It assumed that students have a good working knowledge of various tools of management accounting.

Marginal Costing-general

Introduction

Even a school-going student knows that profit is a balancing figure of sales over costs, i.e. Sales - Cost = Profit. This knowledge is not sufficient for management for discharging the functions of planning and control, etc. The cost is further divided according to its behaviour, i.e., fixed cost and variable cost. The age-old equation can be written as:

Sales - Cost = Profit or

Sales - (Fixed cost + Variable Cost), = Profit.

The relevance of segregating costs according to variability can be understood by a very simple example of a shoe-maker, whose cost data for a particular period is given below:

1. Rent of shop is Rs. 1200 for period under consideration,
2. Selling price per pair is Rs. 55.
3. Input material required for making one pair is Rs. 50.
4. He is producing 1000 pairs during period under consideration.

In this data, only two types of costs are mentioned—rent of shop and cost of input materials. The rent of shop will not change, if he produces more than 1,000 pairs or less than 1,000 pairs. This cost is, therefore, referred to as fixed cost. The cost of input material will change according to the number of pairs produced. This is variable cost. Thus, both the costs do not have the same behaviour. This knowledge about the changes in behaviour of costs can yield wonderful results for the shoe-maker in decision-making. Based on these changes in behaviour of costs, a very effective cost accounting technique emerges. It is known as marginal costing. Marginal Costing is a management technique of dealing with cost data. It is based primarily on the behavioural study of cost.

Absorption costing i.e., the costing technique, which does not recognize the difference between fixed costs and variable costs does not adequately cater to the needs of management. The statements prepared under absorption costing do elaborately explain past profit, past losses and the costs incurred in past, but these statements do not help when it comes to predict about tomorrow's result. A conventional income statement

cannot tell what the profit or loss will be, if the volume is increased or decreased. These days there is a cutthroat competition in market and management has got to know its cost structure thoroughly.

Marginal costing provides this vital information to management and it helps in the discharge

of its functions like cost control, profit planning, performance evaluation and decision making. Marginal costing plays its key role in decision making.

Marginal Cost

CIMA defines marginal costing as “the cost of one unit of product or service which would be avoided if that unit were not produced or provided.”

Simple Calculation of Marginal Cost

Suppose following cost data is given:

Variable cost = Rs. 5 per unit,

Fixed Cost for a specific period = Rs. 2,000 and

Present activity level = 200 units.

In this case total cost of producing 200 units will be found out as follows:

Fixed cost + (Variable cost per unit X Present production) =
Total cost.

= Rs.2,000 + (Rs. 5 X 200) = Rs. 3,000

If activity level becomes 201 units aggregate cost will be

= Rs.2,000 + (5 x 201)

= Rs. 2,000 + 1,005 = Rs. 3,005

It means marginal cost is Rs. 5 because change in activity level by one unit leads to a

Change in aggregate cost by Rs. 5.

Marginal Costing: CIMA defines marginal costing as “the accounting system in which variable cost are charged to the cost units and fixed costs of the period are written-off in full against the aggregate contribution. Its special value is in decision-making”.

Process of marginal Costing

Under marginal costing, the difference between sales and marginal cost of sales is found out. This difference is technically called contribution. Contribution provides for fixed cost and profit. Excess of contribution over fixed cost is profit emphasis remains here on increasing total contribution.

Variable Cost. Variable cost is that part of total cost, which changes directly in proportion with volume. Total variable cost changes with change in volume of output. Variable costs are very sensitive in nature and are influenced by a variety of factors. Main aim of ‘marginal costing’ is to help management in controlling variable cost because this is an area of cost which lends itself to control by management.

Fixed Cost. It represents the cost which is incurred for a period, and which, within certain output and turnover limits tends to be unaffected by fluctuations in the levels of activity (output or turnover). Examples are rent, rates, insurance and executive salaries.

Break-even point. Break-even point is the point of sale at which company makes neither profit nor loss. The marginal costing technique is based on the idea that difference of sales and variable cost of sales provides for a fund, which is referred to as contribution. Contribution provides for fixed cost and profit. At break-even point, the contribution is just enough to provide for fixed cost. If actual sales level is above break-even point, the company will make profit if actual sales is below break-even point the company will incur loss.

Contribution. Marginal costing analysis depends a lot on the idea of contribution. In this technique, efforts are directed to increase total contribution only. Contribution is the difference between sales and variable cost, *i.e.*, marginal cost. It can be expressed as follows:

Contribution = Sales - Variable cost of sales.

Suppose sales is Rs. 1000 and variable cost of sales is Rs. 800. The contribution will be

Rs. 200, *i.e.*, Rs. 1000 - Rs. 800.

Key factor or Limiting factor. There are always factors that do not lend themselves to managerial control. For example, if at a particular point of time there is a Government restriction on the import of a material, which forms the principal ingredient of company's product; company cannot produce, as it wishes. It has to plan production taking into consideration this limiting factor. However, its efforts will be directed for maximum utilization of available resources. Thus, limiting factor is a factor which influences the volume of output of an organization at a given point of time.

Key factor is the factor whose influence must be first ascertained to ensure that there is maximum utilization of resources. Gearing the production process in the light of key factor's influences will lead to maximisation of profit. Key factor constrains managerial action and limits output of company. Generally sales is the limiting factor, but any of the following factors can be a limiting factor:

(a) Material (b) Labour (c) Plant capacity (d) Power (e) Government-action.

When a limiting factor is in operation and a decision is to be taken regarding relative profitability of different products, contribution *for* each product is divided by key factor to select the most profitable alternative.

The choice of management rests with the products or projects, which show more contribution per unit of key factor. Thus if sale is the key factor, contribution to sales ratio should be considered. If management is facing labour shortage, contribution per labour hour should be considered

Suppose sales of products A and B are Rs. 100 and Rs 110 and variable cost of sales are Rs. 30 and Rs. 23 respectively. The labour hours (key factor) required for these products are 2 hours and 3 hours respectively. The contribution will be: Product A,

Rs.100-Rs. 30 = 70 per unit or Rs. 35 per hour; Product-B, Rs.110-Rs. 23= Rs. 87 per unit or Rs. 29 per hour. In this situation P/V ratio of product B (79%) is better than P/V ratio of product A (70%) and normal conclusion should be to produce product B. Thus, time is the key factor. Contribution per hour is better in product A than in B. Therefore, during labour shortage product A is more profitable than product B.

Basic Marginal Cost Equation

We know that: Sales - Cost = Profit

or Sales - (Fixed costs + Variable costs) = Profit

or Sales - Variable rests = Fixed costs + Profit

This is known as marginal equation and it is also expressed as follows:

$S - V = F + P$

Where' S = Sales, V = Variable costs of sales

F = Fixed costs and

P = Profit. '

The reader is advised to discourage the use of formulae. All problems on marginal costing should be attempted by use of this basic relationship, as far as possible.

Profit/Volume Ratio. When the contribution from sales is expressed as a percentage of sales value, it is known as profit/volume ratio (or P/V ratio). It expresses relationship between contribution and sales. Better P/V ratio is an index of sound 'financial health' of a company's product. This ratio reflects change in profit due to change in volume. Broadly speaking, it shows how large the contribution will appear, if it is expressed on equal footing with sales. The statement that P/V ratio is 40% means that contribution is Rs. 40, if size of the sale is Rs. 100. One important characteristic of P/V ratio is that it remains the same at all levels of output. P/V ratio is particularly useful when it is considered in conjunction with margin of safety.

P/V ratio may be expressed as:

$P/V \text{ ratio} = (\text{Sales} - \text{Marginal cost of sales})/\text{Sales}$

or = Contribution/Sales

or = Change in contribution/Change in sales

or = Change in profit/Change in sales

Suppose sales price and marginal cost of product are Rs. 20 and Rs. 12 respectively. The P/V ratio will be $(\text{Rs. } 20 - \text{Rs. } 12)/20 = (8 / 20) \times 100 = 40\%$

P /V ratio remains constant at different levels of operations. A change in fixed cost does not result in change in P/V ratio since P/V ratio expresses relationship between contribution and sales.-

Advantages of P/V Ratio

- i. It helps in determining the break-even point
- ii. It helps in determining profit at various sales levels.
- iii. It helps to find out the sales volume to earn a desired quantum of profit.
- iv. It helps to determine relative profitability of different products, processes and departments. .

Improvement of P/V Ratio

P/V ratio can be improved, if contribution is improved. -
Contribution can be improved by any of the following steps:

- i. Increase in sale price.
- ii. Reducing marginal cost by efficient utilization of men, material and machines.
- iii. Concentrating on sale of products with relatively better P/V ratio. This will help to improve overall P/V ratio.

Example - Koko & Company produces a single article.
Following cost data is given about its product-

Selling price per unit	Rs. 20
Marginal cost per unit	Rs. 12
Fixed cost per annum	Rs.800

Calculate: -

- a. P/V ratio
- b. Break-even sales.
- c. sales to earn a profit of Rs. 1,000,
- d. profit at sales of Rs. 6,000
- e. new break-even sales, if sales price is reduced by 10%.

Solution

We know that Sales - Variable cost = Fixed cost + Profit

By multiplying and dividing left hand side by S

$$\text{or } S(S - V)/S = F + P$$

$$\text{or } S \times P/VRatio = \text{Contribution}$$

$$\text{a. } P/VRatio = \text{Contribution}/\text{Sales} \times 100 \\ = (20 - 12)/20 \times 100 = 8/20 \times 100 \text{ or } 40\%$$

- b. Break-even sales -

$$S \times P/V \text{ Ratio} = \text{Fixed Cost}$$

{At break-even sales, contribution is equal to fixed cost}

By putting these values:

$$S \times 40/100 = 800. \quad S = (800 \times 100)/40 = \text{Rs. } 2,000$$

- c. The sales to earn a profit of Rs. 1,000 .

$$S \times P/VRatio = F + P$$

By putting the values:

$$S \times 40/100 = 800 + 1000 \text{ or } S = 1800 \times 100/40 \text{ or } S = \\ \text{Rs. } 4,500 \text{ (or } 225 \text{ units)}$$

- d. Profit at sales of Rs. 6,000

$$S \times P/V \text{ Ratio} = F + P \text{ By putting the given values}$$

$$\text{Rs. } 6,000 \times 40/100 = \text{Rs. } 800 + P \text{ or } P = 2400 - 800 \text{ or} \\ \text{Rs. } 1600$$

- e. New break-even sales, if sales price is reduced by 10%.

$$\text{New Sales Price} = \text{Rs. } 20 - \text{Rs. } 2 = \text{Rs. } 18$$

$$\text{Marginal cost} = \text{Rs. } 12$$

$$\text{Contribution} = \text{Rs. } 6$$

$$P/VRatio = \text{Contribution}/\text{Sales}$$

$$= 6/18 \times 100 \text{ or } 33.33\%$$

$$S \times P/VRatio = F \text{ (at B.E.P. contribution is equal to fixed} \\ \text{cost.)}$$

$$S \times 100/130 = \text{Rs. } 800 \quad S = \text{Rs. } 2,400.$$

Limitations of P/V Ratio

There is a growing trend among companies to use the profit - volume-ratio in deciding the product-worthy additional sale efforts and productive capacity and host of other managerial exercises. Following are the limitations of the use of P/VRatio

1. P/V ratio heavily leans on excess of revenues over variable cost.
2. The P/V ratio fails to take into consideration the capital outlays required by the additional productive capacity and the additional fixed costs, that are added.
3. Inspection of P/V ratio of products can suggest profitable product lines, that might be emphasized and unprofitable lines, which may be re-evaluated or eliminated. Mere inspection of P/V ratio will not help to take final decision. For this purpose, analysis has to be broadened to take into consideration different cost of the decision and opportunity costs, etc. Thus, it indicates only the area to be probed. .
4. The P/V ratios has been referred to as the questionable device for-decision-making because it only gives an indication of the relative profitability of the products/product lines that too if other things are equal.

The above points highlight that P/V ratio should not be used inconsiderately.

Margin of Safety. Margin of safety represents the difference between sales at a given activity and sales at breakeven point. (B.E.P. is the point of sales where company makes neither profit nor loss). Consequently, it indicates the extent to which a fall in demand could be absorbed, before company begins to sustain losses. The margin-of safety is expressed as percentage of sale. The validity of safety always depends on the accuracy of cost estimates. The wide margin of safety is advantageous for the company. Margin of safety depends on level of fixed cost, rate of contribution and level of sales. The relationship of margin of safety with sales can be expressed as follows: -
Sales - Sales at B.E.P = Margin of safety.

Thus, soundness of a business can be measured by margin of safety. This knowledge is very useful in taking policy decision like reduction in price to face the competitors. Margin of safety indicates how much present sales are able to keep business away from, the crucial point, where business will earn neither profit nor loss. Its relationship with P/V ratio and profit can be expressed as follows:

$$\text{Basic marginal cost equation is } S - V = F + P$$

By multiplying, and dividing L.H.S. by S, we get,

$$S(S - V)/S = F + P$$

$$\text{or } S \times P/V \text{ Ratio} = F + P$$

$$\text{or (B.E.S. + margin of safety) } \times P/V \text{ Ratio} = F + P$$

$$\text{(Total sales = B.E.S. + Margin of safety)}$$

$$\text{or (Sales at B.E.P. } \times P/V \text{ Ratio} + \text{Margin of Safety } \times P/V \text{ Ratio)} \\ = F + P \dots\dots\dots(i)$$

But we know that sales at B.E.P. $\times P/V \text{ Ratio} = \text{Fixed Cost}$
(at B.E.P. contribution is just sufficient to meet fixed cost)

By deducting (BEP x P/V Ratio) from L.H.S. and F from R.H.S. in (i), we get

Margin of Safety x P/V Ratio = Profit

Main Features of Marginal Costing

1. Costs are divided into two categories, *i.e.*, fixed costs and variable costs.
2. Fixed cost is considered period cost and remains out of consideration for determination of product cost and value of inventories.
3. Prices are determined with reference to marginal cost and contribution margin.
4. Profitability of departments and products is determined with reference to their Contribution margin.
5. In presentation of cost data, display of contribution assumes dominant role.
6. Closing stock is valued on marginal cost.

Criticism of Marginal Costing

In recent years, there has been a widespread interest in marginal costing. Still very few have adopted it as method of accounting for cost. Main points of criticism are:

1. It is not proper to disregard fixed cost for product for product cost determination and inventory valuation.
2. Marginal costing is especially useful in short profit planning and decision-making. For decision of far reaching importance, one is interested in special purpose cost rather than variability of costs.
3. Marginal costing technique disregards the use of recovering fixed cost through product pricing. For long run continuity of business it is not good. Assets have to be recovered of costs.
4. Establishing variability of costs is not an easy. In real life situations, variable costs are rarely completely variable and fixed costs are rarely completely fixed.
5. Exclusion of fixed cost from inventory valuation does not conform to accepted accounting practice.
6. The income tax authorities do not recognize the marginal cost for inventory valuation. This necessitates keeping of separate books for separate purposes.

Cost-volume-profit Relationship

Introduction

Profit is, always a matter of primary concern to management. The volume of sale never remains constant. It fluctuates up and down and income also goes up and down with fluctuations in volume. Profit is actually the result of interplay of different factors like cost, volume and selling price. Effectiveness of a manager depends on his capability to make right predictions about future profits. This can be done when correct relationship existing between cost, volume and profit is known. For this reason, knowledge of relationship among cost, volume and profit is of immense help to management. This knowledge of cost-volume profit relationship helps management to find out right solution for such problems as are given below:

- i. What should be the volume to be attempted for obtaining a desired profit?
- ii. How will the change in selling price affect the profit position of the company?
- iii. How will the changes in cost affect profit?
- iv. What should be the optimum mix of the company?

These basic questions present themselves to management for solution in different forms. The conventional income and expenditure statement does not provide any answer to all these questions. The answer to all these questions is sought by analysis of cost-volume-profit relationship. Cost-Volume-Profit Analysis spotlights the relationship existing among factors like cost, volume and profit.

Use of Cost-Volume-Profit Analysis

1. This relationship enables management to predict profit over a wide range of volume. This knowledge is very useful in preparing flexible budget.
2. In a lean business season, company has to determine the price of the products very carefully. It becomes necessary sometimes to bring down the price to boost the sale of a product. For all decisions like this, management must determine, by cost-volume profit analysis, what impact this reduction in price is going to have on profit position of a company.
3. Analysis of cost-volume-profit relationship helps in decision-making. There are situations when management has to decide whether it should add to its capacity or not. With the knowledge of cost-volume-profit analysis, a manager can easily take decision showing in its report how utilization of available capacity will lead to increase in profit.
5. Cost-Volume-Profit analysis helps in profit planning. Under profit planning, company first declares the profit that it wants to make during the ensuing year. Thereafter, sales level necessary to yield that profit is attempted. Cost-volume-profit analysis helps in profit planning in the following ways.
 - a. It helps in estimating income at a particular sales level.
 - b. It helps to determine change in profit due to change in sales volume.
 - c. It helps to execute the idea of profit planning. In other words, we arrive at the sales level to be attempted for a desired profit by the knowledge of relationship existing between cost, volume and profit.
 - d. It helps to find out the sales required to meet proposed expenditure.

Assumptions Of Cost-volume-profit Analysis

1. This analysis presumes that costs can be reliably divided into fixed, and variable category. This is very difficult in practice.
2. This analysis presumes an ability to predict cost at different activity volumes. In practice, a lot of experience may be required to reliably develop this ability.

3. A series of break-even charts may be necessary where alternative pricing policies are under consideration. Therefore, differential price policy makes break-even analysis a difficult exercise.
4. It assumes that variable cost fluctuates with volume proportionally, while in practical life the situation may be different.
5. This analysis presumes that efficiency and productivity remain unchanged. In other words, this analysis presents a static picture of a dynamic situation.
6. The break-even analysis either covers a single product or presumes that product mix will not change. A change in mix may significantly change the results.
7. This analysis disregards that selling prices are not constant at all levels of sales. A high level of sales may only be obtained by offering substantial discounts, depending on the competition in the market.
8. This analysis presumes that volume is, the only relevant factor affecting cost. In real life situations, other factors also affect cost and sales profoundly. Break-even analysis becomes over-simplified presentation of facts, when other factors are unjustifiably ignored. Technological methods, efficiency and cost control continuously influence different variables and any analysis which completely disregards these ever changing factors will be only of limited practical value.
9. This analysis presumes that fixed cost remains constant over a given volume range. It is true that fixed costs are fixed only in respect of a given capacity, but each fixed cost has its own capacity. This factor is completely disregarded in the break-even-analysis. While factory rent may not increase, supervision may increase with each additional shift.
10. This analysis presumes that influence of managerial policies, technological methods and efficiency of men, materials and machines will remain Constant and cost control will be neither strengthened nor weakened.
11. This analysis presumes that production and sales will be synchronized at all points of time or, in other words, changes in beginning and ending inventory levels will remain insignificant in amount.
12. The analysis also presumes that prices of input factors will remain constant. Cost-profit-volume analysis is based on the above-mentioned limitation. Attempts to draw inferences disregarding these limitation will lead to formation of wrong conclusions. The application of cost-volume-profit relationship is restricted by the assumptions on which it is based. Therefore, cost-volume-profit analysis cannot be used indiscriminately.

Summary Problem for your Review

The budgeted income statement of Williams gift shop is summarized as follows:

Net revenue	Rs. 800,000
Less: expenses, including Rs. 400,000 of fixed expenses	Rs. 880,000
Net loss	Rs. (80,000)

The managers believes that an increase of Rs. 200,000 on advertising outlays will increase sales substantially.

1. At what sales volume will the store break even after spending Rs. 200,000 on advertising?
2. What sales volume will result in a net profit of Rs. 40,000?

Solution:

1. Note that all data are expressed in dollars. No units are given. Most companies have many products, so the overall break-even analysis deals with rupee sales, not units. The variable expenses are Rs. 880,000-Rs. 400,000=Rs. 480,000. The variable-expense ratio is Rs. 480,000/800,000= 0.60. Therefore the contribution margin is .40. Let S= break-even sales in rupees. Then,

$$S-VC-FC= \text{NET PROFIT}$$

$$S-.60s-(400,000+200,000)=0$$

$$.40S=\text{Rs. } 600,000$$

$$s=600,000/.40$$

$$s= \text{Rs. } 1,500,000$$

2. Required sales = $\frac{\text{Fixed expenses} + \text{target Net Profit}}{\text{Contribution margin ratio}}$

Contribution margin ratio

$$\text{Required sales} = \frac{600,000+ 40,000}{.40}$$

$$\text{required sales} = \text{Rs. } 1,600,000$$

The following question-answer format summarizes the chapters learning objectives.

1. Calculate break-even sales volume in total Rs. and total units
CVP analysis can be approached graphically or with equations. To calculate the break-even point in total units, divide the fixed costs by the unit contribution margin. To calculate the break-even point in total rupees, divide the fixed costs by the contribution-margin ratio.
2. Distinguish between contribution margin and gross margin.
The contribution margin- the difference between sale price and variable costs- is an important concept. Do not confuse it with gross margin, the difference between sales price and cost of goods sold.
3. Understand how cost behavior and CVP analysis manager's use.

Understanding cost behavior patterns and cost-volume-profit relationship can help guide managers decisions. Because one of the main goals of management accounting is controlling and reducing costs, understanding cost behavior is vital to the managers decision-making role. CVP analysis is a technique that is used often by management accountants to both gain an understanding of the cost and profit structure in a company and to explain it to other managers.

Notes

LESSON 6 : BUDGETARY CONTROL AND STANDARD COSTING

Learning Objectives

After studying this chapter you should be able to Understand

- Budgetary control
- Standard costing

Standard Costing

Introduction

From Management's point of view, "What a product should have costed" is more important than "What it did cost". Managers are constantly comparing their product cost with "What it should have costed". Reasons for deviations are rigorously analyzed and responsibilities are promptly fixed. Thus, "what a product should have costed" is a question of great concern to management for improvement of cost performance. A scientific answer to this problem, *i.e.*, an answer based on reasons and consequences, is developed by use of standard costing. Standard Costing is a managerial device, to determine efficiency and effectiveness of cost performance. First of all, we briefly discuss different terms to be used in this lesson.

Standard. It is a predetermined measurable quantity set in defined conditions.

Standard cost:- Standard cost is a scientifically predetermined cost, which is arrived at assuming a particular level of efficiency in utilization of material, labour, and indirect services. CIMA defines standard cost as "a standard expressed in money. It is built up from an assessment of the value of cost elements. Its main uses are providing bases for performance measurement, control by exception reporting, valuing stock and establishing selling prices."

Standard cost is like a model, which provides basis of comparison for actual cost. This comparison of actual cost with standard cost reveals very useful information for cost control. Standard cost has also been referred to as cost plan for a single unit. Cost plan will give element-wise outline of what the product cost should be according to management's thinking. This thinking is not merely an estimate or guess work. It is based on certain assumed conditions of efficiency, economic and other factors. Standard cost is primarily used for following:-

- Establishing budgets
- Controlling costs and motivating and measuring efficiencies.
- Promoting possible cost reduction.
- Simplifying cost procedures and expediting cost reports
- Assigning cost to materials, work-in-process and finished goods inventories.
- Forms basis for establishing bids and contracts and for setting selling prices.

Standard Costing. According to CIMA (London), "standard costing is a control technique which compares standard costs

and revenues with actual results to obtain variances which are used to stimulate improved Performance." Use of standard costing is not confined to industries having repetitive processes and homogeneous products only. This technique has established the advantages of its use in industries having non-repetitive processes like manufacture of automobile, turbines, boilers and heavy electrical equipment.

Standard Costing and Estimated Cost:- following are the points of difference between standard cost and estimated cost.

1. **Scientific Determination:-** standard cost is scientifically determined. It means considerable amount of time and energy is spent to decide how a task should be accomplished and what resources it should consume. Estimated cost is not scientifically determined. It is based on past data relating to product, which is adjusted according to anticipated changes in future.
2. **Representation of Management's View:** standard cost represents management view of efficient operation and relevant expenditure. For this reason, standard cost ensures a particular efficiency in utilization of material, labour and indirect services. The idea of efficiency does not dominate determination of estimated cost.
3. **Different Aims:** "What a product cost should be" and "What a product cost will be" point towards the two different attitudes, that dictate determination of standard cost and estimated cost.
4. **Usage of Control:-** Standard cost primarily helps management in controlling cost performance. For this reason, precision efficiency and analysis become important ingredients of standard cost determination.

Limitations of Historical Costing

1. Data does not provide yardstick of comparison for actual cost.
2. Data is made available too late to correct inefficiencies that are causing costs to go out of limits.
3. Data does not provide motivation to employees to strive for accomplishment of their objectives.
4. Data provides insufficiently for budgeting, planning, decision-making and price quotation.

These limitations of historical costing are primarily responsible for advent and wide usage of standard costing.

Standard Costing and Budgetary Control

Budgetary control and standard costing are two different terms. These techniques are complementary to each other. These are interrelated techniques, but these techniques are not interdependent. Standard costing is introduced primarily to ascertain efficiency and effectiveness of cost performance. Budgetary control is introduced to state in figures an approved plan of

action relating to a particular period both standard costing and budgetary control have to following common features:

1. Both have common object of improving managerial control.
2. Both techniques are based on the presumption that cost is controllable.
3. In both the techniques results of comparison are analyzed and reported to management.

Despite these common features these are two different techniques. The points of difference are summarized as follows:-

1. **Denote Different Ideas.** Standard costing denotes a unit idea. It outlines, what a unit should cost. Standard cost provides a cost plan for a unit whereas budget denotes a “total idea”. The statement clearly explains the difference; “Budgeted cost of material is Rs. 1,000/-, if 10,000 units are produced at a standard cost of Re.1/-each”.
2. **Different aims-** Budget seeks to lay down a monetary limit of expenses, which should not be normally exceeded. If this limit is exceeded the actual profit will fall short of budgeted profit. Standard costing seeks to procure efficient utilization of material, labour and indirect services
3. **Different scope-** Budgets are laid down for all functions of an organisation like production, purchase, selling and distribution and research and development. Standard costing relates primarily to one function *i.e.*, production. It mainly deals with manufacturing cost only
4. **Treatment of Income and Expenditure:-** budget preparation considers both income and expenditure, whereas use of standard costing is mainly confined to expenditure only.
5. **Difference in Treatment of Variance:-** in practical life, budget are taken to be the monetary ceiling. Often efforts are directed to see that budgets are not exceeded, because failure to be in budgetary limit will call for detailed explanation to higher management. In standard costing, variances are subjected to microscopic view with reference to causes and incidence. All distinct deviation are reported to higher management
6. **Different Function:-** Budgetary control describes a monetary limit which, if adhered to will keep the business out of financial crisis. Standard costing emphasizes a particular efficiency in utilization of input resources. It may highlight new areas for

Advantages of Standard Costing

1. Use of standard costing leads to optimum utilization of men, material, and resource.
2. Its use provides a yardstick for comparison of actual cost performance.
3. Only distinct deviation is reported to management. Thus, it helps application of the principle of “management by exception”.
4. It is very useful to management in discharging functions, like planning, control, and decision-making and price fixation.
5. It creates an atmosphere of cost consciousness.

6. It motivates workers to strive for accomplishment of defined targets. It precipitates an attitude that is conducive to efficiency.
7. It highlights areas, where probe promise improvement.
8. Its introduction leads to simplification of procedures and standardization of products.
9. Its introduction enables the management to reduce time required for preparation of reports for pricing, control or quotation.
10. Its use enables to find out the cost of finished goods immediately after completion.
11. If standard costing is used, stock ledgers can be kept in terms of quantities only. This eliminates much clerical effort in pricing, balancing and posting on stores ledger cards.
12. Its use may encourage action for cost reduction.

Limitations of Standard Costing: -

Standard costing is very good system, but it should be giving regard to following limitation:

1. Establishment of standards may demand a lot of skill, imagination and experience. If all factors are not in harmony, desired result will not be forthcoming.
2. Variance analysis is useful, whereas deviation are linked with responsibilities. Sometimes, it is difficult to fix responsibility, because the result happens to be outcome of a number of contributory factors.
3. Standards should correspond to current conditions for best results. Current conditions change very rapidly. Revision of standard is a costly exercise and leads to a lot of associated problems. For this reason revision of standards may get ignored. This delay may be disastrous for effectiveness of the system.
4. It is difficult to use standard costing, when working conditions do not permit standardization of material contents, labor contents or the use of indirect services relating to different jobs, processes and services.
5. Lack of interest by appropriate level of management renders the use of standard costing ineffective.
6. Isolating the Controllable and uncontrollable elements of variances is a very difficult exercise and this difficulty restricts the application of standard costing.
7. Sometimes, use of standard costing creates adverse psychological effects, if standards are set at a high level.

Preliminaries to Establishment of Standards

Before standard cost for different elements of cost is determined, management must take decisions about the following:

1. **Length of period of use.** First of all decision is to be arrived at, relating to a period, for which standards will be used. According to this decision, management will decide to use current standard, basic standard or normal standard. This decision is the starting point for establishment or standards.
2. **Types of standards to be used.** It means that management should decide how tight or looses standards ought to be.

Policy of management will help to take this decision. If cost reduction is the aim, a tight standard will be choice of management. Similarly, if pricing decision and planning the expenditure is the aim of management, standards corresponding to the current conditions will be the choice of management.

3. **Review of existing procedures.** The existing procedure should be subjected to review, because some activities may have to be routinised and wastages, rejections and losses may have to be standardized. This review will call for a complete study of technical and operational aspects of organization.
4. **Classification of accounts.** The existing accounts manual in an organisation may not be sufficient to comply with the requirements of cost collection, cost analysis and variance reporting. For this reason, existing accounts manual may have to be suitably adapted to meet the requirements. This may call for a change in existing classification of heads of accounts.
5. **Review of existing coding system.** The existing coding system is subjected to review to adapt it to introduction of standard costing. This change may demand orientation of existing coding system.

Factors Interfering with the Successful use of Standard Costing

Some of the factors, which tend to interfere with the successful use of standard costing, are summarized below:

1. Some companies have well-developed standard cost plans for product costing. Still they make little use of standard costing for managerial purposes. One valve manufacturing concern had been collecting labour cost variance by departments for several years and yet they did not know what to do with them. When a discussion of these variances took place with the foreman of the department in which the variances occurred, the cost accountant could not believe that he had ignored these variances for control purposes
2. Some standards are out-of-date or unreliable. They are not, therefore, taken seriously.
3. Reports are not made in terms which management understands. Using technical cost accounting terminology will not help executives having a production or sales background.
4. Changing conditions made it necessary to revise standards more often. Many firms do not do this.
5. Sometimes it is difficult for management to make effective use of standards, since it is difficult to determine the sources of variances. When these sources are eventually discovered so much time has elapsed since they occurred that the managerial effectiveness of control is lost.

Special use of Standard Costing

The use of standard costing is fast growing as an effective technique of cost accountancy. Its special uses are discussed under following headings:

1. **Adds to managerial effectiveness and efficiency.** It is not enough for a manager to be effective. He has to be efficient as well. Performance of a manager should be both effective

and efficient, i.e., desired objective should be accomplished with minimum input resources. The use of standard costing provides media to specify these objectives of effectiveness and efficiency. It also provides framework to measure the degree of attainment of effectiveness and efficiency.

2. **Aids inventory costing.** Valuation of inventory at standard cost simplifies the pricing of inventory. It enables the company to follow a consistent practice. All operating gains and losses are charged off to accounting period in which they arise. This enables executives to analyse the variances by type, causes and locations. When standard costing is used, a unit standard cost is available for inventory valuation and pricing of store issues. It avoids the need to compute a new average unit price with each input entry, as is the case, when perpetual inventory records are kept at actual cost.
3. **Help in product pricing.** The knowledge of standard cost of product can be useful as one of many factors to be taken into account for pricing. The standard cost of a product is a useful starting point in pricing. It provides a warning that unless this amount and something more for profit is recovered in the selling price, the product will not be really profitable. The knowledge gained in setting standard cost provides the entire cost picture of the product ranging from its out-of-pocket cost to full costs. With all this information, it becomes possible to ascertain the extent to which an available price will cover out-of-pocket costs and contribute to recovery of fixed costs. The standard cost provides one of the many factors that should be considered in pricing.
3. **Reduces clerical record keeping and aids cost reduction.** Standard costs may result in reduction of clerical work. For example, under actual cost system, each item of each material requisition must be costed separately, when LIFO or FIFO method is used. In a large company, this is an enormous task, since thousands of requisitions may be issued. Under a standard costing system, all the issues of a particular type have to be multiplied once by the standard cost. Under standard costing, only quantities have to be maintained on stores records. This saving is, of course, partially offset by the added cost of establishing and revising standards.

Budgetary Control

Introduction

For effective running of a business, management must know:

- i. Where it intends to go, i.e., organizational objectives.
- ii. How it intends to accomplish its objective.
- iii. Whether individual plans fits in the overall organizational objective.
- iv. Whether operations conform to the plan of operations relating to that period.

Budget control is the device that a company uses for all these purposes.

Budget: a budget is a quantitative expression of plan of action relating to the forthcoming budget period. It represents a written operational plan of management for the budget period. It is always expressed in terms of money and quantity. It is the

policy to be followed during the budget period for attainment of specified objectives.

The essential features of a budget are: (a) financial and quantitative statement of the action plan, (b) laid down prior to the budget period during which it is followed (c) based on management's policy (d) prepared for specified objective.

In the CIMA terminology, budget is defined as follows:--

“A plan expressed in money. It is prepared and approved prior to the budget period and may show income, expenditure, and the capital to be employed. May be drawn up showing incremental effects on former budgeted or actual figures, or be compiled by zero-based budgeting.”

Budgetary Control and Budgeting. The terms budgetary control and budgeting are often used interchangeably to refer to a system of managerial control. Budgetary control implies the use of a comprehensive system of budgeting to aid management in carrying out its functions like planning, coordination and control. It is a system, which uses budgets for planning and controlling different activities of business. This system involves:-

- i. Division of organization on functional basis into different sections (each section is technically known as a budget center)
- ii. Preparation of separate budgets for each “budget center”,
- iii. Consolidation of all functional budgets to present overall organizational objectives during the forthcoming budget period,
- iv. Comparison of actual level of performance against budgets. Comparison process is stretched far enough to declare either attainment of objective or basis of revision of plan of action and
- v. Reporting the variances with proper analysis to provide basis for future course of action.

In the CIMA (London) Terminology

“Budgetary control is the establishment of budgets relating to responsibilities of executives to the requirement of a policy, and the continuous comparison of actual with budgeted results either to secure by individual action the objective of that policy or to provide a basis for revision.”

Budgeting is a way of managing business and industry. It emphasizes that management should anticipate problems and difficulties. Advance decision should be taken for the course of activities during the forthcoming budget period. Budgetary control denotes a formal system based on the concept of budgeting.

Objectives of Budgetary Control

1. **Planning.** Planning is an important managerial function. It helps to decide in advance what to do, how to do it, when to do it and who is to do it. Planning, thus, helps the managers to anticipate eventualities, prepare for contingencies for achieving the ultimate goals. Budget preparation drives the managers to plan ahead. Managers express their operational plans for anticipated business conditions. Without a formal procedure of budgetary control, many operating managers will not find the time to plan ahead. Thus, budgeting is an

important sub-units in the attainment of overall organizational objectives.

2. **Communication.** The employees of an organization should know organizational aims, objectives of sub-units (budget centres) and the part that they have to play for their attainment. Budgets effectively communicate this information to employees.
3. **Coordination.** To coordinate is to harmonize all the activities of a company so as to facilitate its working and its success. Coordination will lead to following results:
 - a. each department will work in harmony with others,
 - b. each department will know the specific role that it has to play in the accomplishment of overall organisational objectives, and.
 - c. the sequential arrangement of activities of different departments is so governed that overlapping of activities and wastage of time and labour is avoided.

A comprehensive system of budgeting helps to coordinate different functional budgets. In other words, a budget will preclude the production department from producing more than the sales department can sell.
4. **Motivation.** If employee have actively participated in budget preparation and if they are convinced that their personal interests are closely associated with the success of organizational plan, budget provide motivation in the form of goals to be achieved. The budgets will motivate the workers, depends purely on how the workers have been mentally and physically involved with the process of budgeting.
5. **Control.** Under the system of budgetary control, budget forecast is thoroughly discussed and reviewed to be finally approved as functional budgets. Thereafter a lot of cuts and adjustments are made to make functional budgets fit in the organizational objectives. Then budget formation is followed by a feedback system to pinpoint the extent of variation between actual level of performance and budgeted level of performance. Thus, the inbuilt mechanism of the routine of budgetary control is bound to precipitate to an operational control
6. **Approved Plan.** A master budget provides an approved summary of results to be expected from proposed plan of operations. It concerns all functions of organization and serves as a guide to executives and departmental heads responsible for various departmental objectives.

Requirements of a Good Budgeting System

Following are the requirements of a good budgeting system:

- i. Budgeting process should be backed and supported by the chief executive of an organization.
- ii. The organizational goal should be quantified and clearly stated These goals should be within the framework of organizations' strategic and long-range plans.
- iii. The organizational goals must be divided in functional goals.

- iv. The functional goals should not conflict with overall organizational objectives.
- v. All in the organization should mentally accept the exercise of budget preparation.
- vi. The persons responsible for execution of budget should participate in budget preparation.
- vii. The budget should be realistic. It should represent goals that are reasonably attainable.
- viii. The budget, should cover all phases of the organization
- ix. The budgeting should be a continuous exercise.
- x. Periodic reports should be prepared promptly comparing budget and actual results.
- xi. Clear-cut organizational lines should be established with appropriate delegation of responsibilities for effective implementation.

Advantages of Budgetary Control

1. A budget programme forces the managers to plan ahead.
2. It forces early consideration of basic policies.
3. All members of top management participate in budget committee. For this reason even planning at departmental level gets benefit of experience of seasoned executives.
4. All functional heads are compelled to make plans in harmony with the plans of other departments.
5. Management is forced to put down in cold figures, what it means by satisfactory results.
6. It demands the most economical use of labour, materials, facilities and capital.
7. It inculcates a habit of timely, careful, adequate consideration of all factors before reaching important decisions.
8. The use of budgets removes clouds of uncertainties for lower levels of management regarding basic policies and objectives.
9. The use of budgets promotes understanding of the problems of co-workers
10. It facilitates periodic self-analysis of the organization.
11. It aids in obtaining bank credit.
12. Management is forced to give timely and adequate attention to the effect of changing business conditions.

Limitations of Budgetary Control

1. Estimates are used as basis for budget plan and estimates are based, mostly on available facts and best managerial judgment. Since a lot of human element is involved in exercising managerial judgment, it is but natural to give some allowance in interpretation and utilization of estimated results. Budgeting based on inaccurate forecasts is useless as a yardstick for measuring the actual performance.
2. The circumstances are constantly changing and, therefore, budgets and budgetary techniques will not be useful, till they are continually adapted.
3. In order that a system may be successful, adequate budget education should be imparted at least through the formative period. Sufficient training programmes should be arranged

to make employees give positive response to budgetary activities.

4. Execution of budgetary control will not automatically occur. A continuous budget consciousness throughout the organization is needed for achievement of this objective.
5. Budgetary control cannot reduce the managerial function to a formula. It is only a managerial tool which measures effectiveness of managerial control.
6. The use of budget may lead to restricted use of resources. Budgets are often taken as limits. Effort may, therefore, not be made to exceed the performance beyond the budgeted targets, even though it may be physically possible.
7. Frequent changes may be called for in budgets due to fast changing industrial climate. It may be difficult for a company to keep pace with these fast changes, because revision of budget is an expensive exercise.

The following Question-answer format Summarizes the Chapters Learning Objectives

1. Explain the major features and advantages of a budget.
A budget expresses in quantitative terms, an organizations objective and possible steps for achieving them. Thus, a budget is tool that helps managers in both their planning and control functions. The two major parts of a budget are the operating budget and the financial budget. Advantages of budget include formalisation of planning, providing a framework for judging performance and aiding in coordinating their efforts.
2. Anticipate possible human relations problem caused by budgets.
The success of a budget depends heavily on employee reaction to it. Negative attitude toward budget usually prevent realization of many of the benefits of budgeting. Such attitude are usually cused by managers who use budgets to force behaviour or to punish employees. Budgets generally are more useful when they are formulated with the willing participation of all affected parties.
3. Understand the importance of budgeting of budgeting to mangers.
The budgetary process compels managers to think and to prepare for changing conditions. Budgets are aids in planning, communicating, setting standards of prformance, motivating personnel towards goals, measuring results and directing attention to problem ares that need investigation.

Notes

LESSON 7: BASIC COST CONCEPTS

Learning Objectives

After studying this chapter you should be able to

- Explain different cost accounting terms.
- Understand basic cost concepts.

Cost Center: for the purpose of costing, it is desirable to divide the organization into sub-units. Cost center is the smallest organizational sub- units for which separate cost collection is attempted. It can be a location, person or item of equipment. A cost center is primarily of two types: (a) personal cost center (b) impersonal cost center, which consists of a location or item of equipment. Whether it is personal or impersonal, cost center represents organizational span for which separate cost determination is attempted for decision-needs of management.

From functional point of view, cost center may be of two types: (a) production cost centers i.e.; cost centers where production is done, for example, milling, turning and assembling and (b) service cost center i.e.; cost center which render services to production centers, i.e.; boiler plant, repair shop, and crane etc.

Formation of appropriate cost center is very important for cost control purposes. Important considerations for formation of cost center are : (i) organization of the factory, (ii) Condition prevalent for incurrence cost, (iii) Management's decision-needs

Different Types of Cost

Cost varies with purpose and the same cost data cannot serve all purposes equally well. The word cost is used in such a wide variety of ways that it is advisable to use it with an adjective or phrase, which will convey the meaning, intended. Certain types of cost are briefly discussed below: -

Profit Center

A profit center is a segment of activity or area of responsibility for which both revenues and costs are accumulated. In general terms, most responsibility centers are viewed as profit centers-taking the difference between revenues and expenses as profit. The managers hold responsibility for both revenues and expenses. The main objective of profit center's manager is to maximize the center 's profit. CIMA defines profit center as a part of business accountable for costs and revenues. It may be called a business center, business unit, or strategic business unit.

Out of Pocket Cost

Out-of-pocket cost is that cost which involves the cash outflow due to a particular management decision. Depreciation on assets is an item of cost, which will not form part of out of pocket cost, because it does not entail cash outflow.

Sunk Cost

CIMA defines it as the past cost not taken into account in decision making.

Replacement Cost

Replacement cost is the cost of replacement in the current market.

Committed Cost

Committed cost is a fixed cost, which results from decisions of prior period. The amount of committed cost is fixed by decisions, which are made in the past, and is not subject to managerial control in the present on short run basis. Examples of committed cost are depreciation, insurance, rent etc.

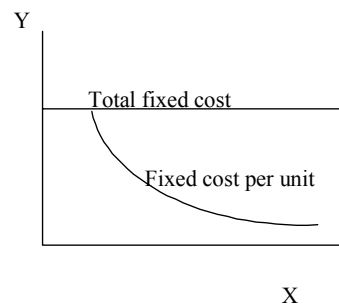
Historical Cost

Historical cost are post mortem costs, which are collected after they have been incurred. These costs, report past events and the time lag between event and its reporting makes the information out of date and irrelevant for decision-making.

Behavior wise Classification

This classification is very important for accounting and control. Based on behavioral patterns, overhead can be divided into the following categories:

- a. **Fixed cost:** fixed cost represents indirect cost, which remains constant in total within current budget period regardless of changes in volume of activity. This concept of fixed cost remains valid within certain output and turnover limits. Fixed overhead does not vary in total. The incidence of fixed overhead on unit cost decreases, as production increases and vice-versa. Examples of fixed overhead are: rent of building, depreciation of plant and machinery, pay and allowances of managers, secretary and accountants, canteen expenses, audit fees etc. Fixed overheads have been called 'period cost' or 'stand-by cost' because these costs will be incurred even when no production activity take place.



- b. **Variable cost** represents that part of indirect cost, which varies with change in volume of activity. It varies in total but its incidence on unit cost remains constant. The examples of variable overhead are: indirect material cost, indirect labour cost, power and fuel, internal transport, lubricants, tools and spares.
- c. **Semi-variable cost:** it is that part of overhead that is partly fixed and partly variable. These overheads show mixed relationship, when plotted against volume. Semi-variable overheads may remain fixed within certain activity level, but

once that level is exceeded, they vary without having direct relationship with volume change. Semi variable costs do not fluctuates in direct proportion to volume. An example of the semi variable overhead cost is the earning of an employee, who is paid a salary of Rs 500 per month (fixed) plus a bonus of Rs 0.50 for each unit completed (variable). If he increases his output from 1000 units to 1500 units, his earnings will increase from Rs 1000 to Rs 1250. an increase of 50% in volume brought about only 25% increase in cost.

Differential cost- differential cost are defined as the difference in total cost between any two acceptable alternatives. Key emphasis in differential costing is on change in total costs associated with alternative decision. Incremental cost is the increase in cost from one alternative to another. Decremental cost is the decrease in cost due to alternative under consideration. Differential cost is a term broader than incremental cost or decremental cost. The term differential costing encompasses both the terms incremental costing and decremental costing.

Opportunity Cost

CIMA has defined it as “the value of a benefit sacrificed in favour of an alternative course of action.” If accepting an alternative requires use of facilities or resources, which are used for some other purpose, there arises an opportunity cost. The opportunity cost is measured by the profit, which would have been earned, if the resources or facilities had been used for second best alternative. It is not easy to measure opportunity cost in all cases, but the relevance of opportunity cost in decision-making cannot be disputed.

Joint cost: are those costs, which are common to the processing of joint products or by products up to the point of separation. In other words, joint costs represent pre-separation cost of joint products or by-products. After the point of separation, the products can be separately identified and post separation costs can be readily attributed to individual products. Costs common to joint products or by-products before the point of separation of their identity, present a problem of allocation. These pre-separation costs should be appropriately apportioned for correct determination of products and managerial analysis for decision-making. Joint costs are incurred as lump sum for the combination and not separately for the individual products. In dairy farming, the cost of milk for the preparation of cream, butter, skimmed milk, etc. will be the joint cost. The term joint cost is used to refer to lump sum costs incurred in the simultaneous production of multiple products that cannot be produced separately. Joint costs present following difficulties for accountants:

1. Determining how it should be apportioned among the individual members of the product-group.
2. If joint cost is not properly apportioned among the joint products, it will lead to incorrect inventory valuation.
3. Incorrect apportionment of joint cost will lead to wrong income measurements relating to individual joint products. This situation may be tolerable for product pricing in some situation, but it is disastrous for managerial analysis and control.

Cost Unit

After the cost of various cost centers has been ascertained, the need arises to express the cost of output. Cost unit is defined as unit of quantity of output in relation to which costs are ascertained or expressed. While cost center is the organizational sub-unit for cost collection, cost unit is the unit of output for which a separate cost is ascertained.

More than one cost unit may be employed within a specified company. If cost unit is to reflect the efficiency being achieved, it may be necessary to consider quantity, quality or other characteristics. This in itself will mean selection of more than one cost unit. A transport contractor may decide to relate his cost to weight carried. This a cost unit, but it is not a logical cost unit, since it does not consider the distance factor, which considerably influence cost. Therefore, an appropriate and accurate cost unit would be ton-mile, which associates weight with distance covered. A few typical examples of cost units are given below:

Industry	Cost unit basis	Industry	Cost unit basis
Automobile	number	sugar	tonne
Bricks	1000Nos.	Steel	tonne
Chemical	litre, gallon, Kg	Power	Kwatt Hr.
Cement	Tonne	Transport	Tonne-Km Passenger-KM
Gas	Cubic metre	Construction	contract

Suppose there is a factory X. it produces electric meters. It is important for the company to know the cost of one meter for obvious reason of cost control and price fixation etc. in this case cost of one meter is a “unit cost”. Since cost is being collected by number, ‘cost unit’ is number.

For determining cost, factory will have to be divided into production and service department A B C may be production department and D and E may be service department. In these cases ABC will be production cost centers and D and E will be service centers. Then, total cost will be distributed among the total number of meters produced. This will give the cost of one meter. In this situation A B C D and E were the cost centers. Cost of one meter is the unit cost. Number is the cost unit. Therefore, unit cost is very important objective. Cost unit is the media to express it. Cost centers are the organizations subdivisions necessary for cost collection and cost ascertainment.

Conversion Costs

Conversion Costs are all manufacturing costs other than direct material costs. These costs represent all manufacturing costs incurred to convert direct materials into finished goods. Some companies use conversion costs to simplify their accounting. They have only two classifications of costs: direct material costs and conversion costs. For these companies, all conversion costs are indirect manufacturing costs. An example is costing system in computer integrated manufacturing (CIM) plants. CIM plants have very few workers. The workers role is to monitor the manufacturing process and maintain the equipment that produces multiple products. Costing system in CIM plants do not have a direct manufacturing labour cost category because direct manufacturing labour costs are small and because it is difficult to trace these costs to products.

Standard Costing

According to CIMA(London), “Standard costing is a control technique which compares standard costs and revenues with actual results to obtain variances which are used to stimulate improved performance.” Use of standard costing is not confined to industries having repetitive processes and homogeneous products only. This technique has established the advantages of its use in industries having non-repetitive processes like manufacturing of automobile, turbines, boilers and heavy electrical equipment.

Discretionary costs have two important features to consider (1) they arise from periodic (usually annual) decision regarding the maximum amount to be incurred and, (2) they have no measurable cause and effect relationship between output and resources used. Examples of discretionary costs include advertising, executive training, R&D, health care and corporate-staff department costs such as legal, human resources and public relations. The most noteworthy aspect of discretionary costs is that managers are seldom confident that the correct amounts are being spent.

Marginal cost is the additional cost resulting from producing and selling one additional cost unit. The marginal cost often decreases as production increases up to a point because of efficiencies created by larger amounts. At some point, however, marginal costs begin to rise with increases in production because facilities begin to be overcrowded or over used, resulting in inefficiencies.

Cost Drivers

A cost driver is a variable, such as the level of activity or volume that casually affects costs over a given time span. That is, there is a cause and effect relationship between a change in the given of activity or volume and a change in the level of costs. For example, if a product design costs change with the number of parts in a product, the number of parts is a cost driver of product-design costs. Similarly, miles driven are often a cost driver of distribution costs. The cost driver of a variable cost is the level of activity or volume whose change causes proportionate in variable costs.

Cost Tracing and Cost Allocation

Direct cost of a cost object is related to the particular cost object and can be traced to that cost in an economically feasible way. For example, the cost of the cans or bottles is a direct cost of Pepsi-colas. The cost of the cans or bottles can be easily traced to or identified with the drink. The term **cost tracing** is used to describe the assignment of direct costs to the particular cost object.

Indirect cost of a cost object are related to the particular cost object but cannot be traced to that cost object in an economically feasible way. For example, the salaries of supervisors who oversee production of many different soft drink products bottled at a Pepsi plant is an indirect cost of Pepsi-colas. Supervision costs are related to the cost object (Pepsi-cola) because supervision is necessary for managing the production and sale of Pepsi-colas. Supervision costs are indirect cost because supervisors also oversee the production of other products such as 7-up. Unlike the cost of cans or bottles, it is

difficult to trace supervision costs to the Pepsi-cola line. The term **cost allocation** is used to describe the assignment of indirect costs to a particular cost object.

Uniform Costing

CIMA defines uniform costing as “a system, using common concepts, principles and standard accounting practice, adopted by different entities in the same industry to facilitate inter-firm comparison.”

Basic Cost Concepts

These terms are based on certain cost concepts, which are summarized below:

1. Concept of objectivity:-

It is this concept that gives direction to the activities related to cost funding, cost analyzing and cost reporting. This concept necessitates goal congruence, i.e; cost exercise has to be in harmony with objectives. Cost treatments and cost strategies are influenced by objectives, which may include internal reporting for operational decisions, internal reporting for non-repetitive decisions and external decisions

2. Concept Of Materiality

This concept that stresses accuracy must be tempered by good judgment, if no distortion of product cost is likely to result. For example, overhead may include some items of direct cost, which may not be material as to justify tracing them to specific unit of production. A particular decision may be useful, but benefits may not be material enough to implement it. Materiality is determined with reference to nature of company’s activities, managerial policies and competitors practices.

3. Concept of time span

All assumptions relating to different cost exercises remain valid only during related time span. The statement that cost is fixed is based on a time span under consideration. No costs will remain fixed for all the time. Time span selected by a company should be long enough to permit the procedures to record the associated cost, output, labor hours and other factors needed in the analysis. If time span is too short, leads and lags in recording the cost data may be quite troublesome. If cost resulting to a particular time span activity is recorded to another time span activity, cost results may turn out to be quite erroneous.

4. Concept of relevant range of activity:

Relevant range of activity represents the span of volume over which the cost behavior is expected to remain valid. Different cost exercises are based on certain assumptions relating to cost behavior patterns, which are valid only within the relevant range of activity. A fixed cost is fixed only in relation to the relevant range of activity during the period. The relevant range of activity may be different between firms and for individual firm also, it may change from time to time.

5. Concept of relevant cost and benefit for operating decisions:

This concept is vital for decision –making purposes. In evaluating alternative courses of action, management should

consider only relevant cost and relevant benefit relating to alternatives under consideration.

- a. Relevant costs and benefits for operating decisions: in operating decisions, concentration is on best use of existing capacity. Incremental analysis based on differential cost and differential revenue is based directly on the concept of relevant cost and benefit. The term opportunity cost also springs from the thought underlying this concept.
- b. Relevance of normal and abnormal cost. The term normal cost and abnormal cost, normal working conditions and abnormal working conditions are frequently used in cost accounting discussions. Normal cost and abnormal cost cannot be treated alike. Similarly, cost accounting strategy for normal conditions will not hold good for abnormal conditions. The term normal stands for anything, which is in agreement with what is representative, usual, or regular. The term abnormal stands for anything, which is different from what is normal, ordinary or expected. Different cost accounting treatments are laid down for normal cost and abnormal cost. Different cost accounting strategies exist for normal circumstances and abnormal circumstances.

The Following Question-answer format Summarizes the Chapters Learning Objectives

1. Explain how cost drivers affect cost behavior?
A cost driver is an output measure of a resource or activity. When the use of a resource or the performance of an activity changes, the level of the cost driver or output measure will also change, causing changes in costs.
2. How do managers decide on a cost object?
A cost object is anything for which a separate measurement of costs is needed. Examples include product, service, project, customer, brand category, activity and department.
3. How do managers decide whether a cost is a direct or indirect cost?
A direct cost is any cost that is related to a particular cost object and can be traced to that cost object in an economically feasible way. Indirect costs are related to the particular cost object but cannot be traced to it in an economically feasible way. The same cost can be direct for one cost object and indirect for other cost objects.
4. How should costs be estimated?
In general, focus on total, not unit costs. When making total cost estimates, think of variable costs as an amount per unit and fixed costs as total amount, the unit cost of a cost object should be interpreted cautiously when it includes a fixed cost component.

Assignment Material

Some important cost classifications considered in Chapter 2 of the text are the following:

Variable costs: Costs which vary, in total, in direct proportion to changes in the level of activity. Unit variable costs remain the same

Fixed costs: Costs which remain constant in total, regardless of changes in the level of activity. Unit fixed costs vary depending on activity level.

Product costs: Costs involved in the purchase or manufacture of goods—direct material, direct labor, and manufacturing overhead

Period costs: Costs which are expensed in the period incurred, i.e, selling and administrative costs

Although much of the discussion in the text relates to these cost classifications and their application in a manufacturing environment; nevertheless, these cost concepts have similar application to many service organizations such as restaurants, banks, etc.

In this field trip assignment, would you please visit a business establishment—fast food restaurant, coffee house, etc. (if you wish, you may use your place of employment) and do the following:

1. Name of selected business:
2. Type of business, i.e., manufacturer, merchandiser, service, etc.
3. Identify three fixed and three variable costs of the business.
4. Identify three product costs and three period costs.
5. Identify at least five practices by which the company practices Total Quality Management.

Notes

LESSON 8 :
PRACTICAL APPLICATIONS/ CASE STUDY

Practical Applications / Case Study
(Based on the unit 1 i.e.; Lesson1-6)

Questions

1. "The emphases of financial accounting and management accounting differ." Explain
2. "The field is less sharply defined. There is heavier use of economics, decision sciences and behavioral sciences." Identify the branch of accounting described in the quotation
3. Distinguish among the scorekeeping, attention directing and problem solving.
4. "Fixed cost decline as volume increases." Do you agree? Explain.
5. Cost behavior is simply identification of cost drivers and their relationships to costs. Comment
6. Is budgeting used primarily for scorekeeping, attention directing, or problem solving?
7. What are major benefit major benefits of budgeting?

Exercises

1. Consider the following short descriptions. Indicate whether each description more closely relates to a major feature of financial accounting or management accounting.
 - a. Behavioral impact is secondary.
 - b. Is constrained by generally accepted accounting principles
 - c. Has a future orientation
 - d. Is characterized by detailed reports
 - e. Field is more sharply defined
 - f. Has less flexibility
 - g. Provides internal consulting advice to managers
2. Fill in the blanks for each of the following independent cases (ignore Income taxes).

	Sales	Variable Exp.	Contribution Margin.	Fixed Expenses	Net Income
i.	90,000	500,000	_____	275,000	_____
ii.	800,000	_____	350,000	_____	80,000
iii.	_____	600,000	340,000	260,000	_____

3. Fill in the blanks for each of the following independent cases:

Case	S.P. Per Unit	V.C. Per Unit	Total Units Sold	Total Cont.	Total F.C.	Net Income.
1.	30	-	120,000	720,000	640,000	-
2.	10	6	100,000	-	320,000	-
3.	20	15	-	100,000	-	15,000
4.	30	20	70,000	-	-	12,000
5.	-	9	80,000	160,000	120,000	-

4. For each of the activities listed below, identify the function that the accountant is performing- scorekeeping, attention direction, or problem solving- and explain why it fits that category.
 1. Preparing a monthly statement of Australian sales for the IBM marketing vice president.
 2. Interpreting difference between actual results and budgeted amounts on a performance report for the Customer Warranty Department of General Electric
 3. Preparing a schedule of depreciation for forklift trucks in the Receiving Department of Hewlett-Packard company plant in Scotland.
 4. Analyzing for a Mitsubishi international Manufacturing manager, the desirability of having some auto parts made in Korea.
 5. Interpreting why a Delhi distribution center exceeded its delivery costs budget.
 6. Explain a Xerox Corporation shipping departments report.
 7. Preparing for the manager of production control of a U.S. steel plant, a cost comparison of two computerized manufacturing control system.
 8. Preparing a scrap report for the finishing department of a Toyota parts plant.
 9. Preparing the budget for the maintenance Department of Fortis Hospital.
 10. Analyzing for the general motors Product designer the impact on product costs of a new headlight.

(ANS 1.S-K; 2. A-D; 3. S-K; 4. P-S; 5. A-D; 6. A-D; 7. P-S; 8. S-K; 9. A-D; 10. P-S)

Collaborative Learning Exercise

1. CVP for a Small Business.

Form a group of two to six Students. Each group should select a very simple business with a single product or one with approximately the same contribution margin percentage for all products. Some possibilities are:

A retail video rental store

An athletic shoe store

A retail Garment Shop.

However, you are encouraged to use your imagination rather than just select one of these examples.

The following tasks might be Split up among the group members.

1. Make a list of all fixed costs associated with running the business you selected. Estimate the amount of each fixed cost per month.
2. Make a list of all variable costs associated with making or obtaining the product or services your company is selling. Estimate the cost per unit for each variable cost.
3. Given the fixed and variable costs you have identified, computed the break-even points for your business in either units or rupee sales.

2. Personal Budgeting.

Budgeting is use full to many different types of entities. One is the individual. Consider the entity that you know best, the college or university student. Form a group of six students and pool the information that you have what it costs to spend a year as a full-time student.

Prepare a revenue and expense budget for an average prospective full-time student at your college or university. Identify possible sources of revenue and the amount to be received from each. Identify the costs a student is likely to incur during the year. You can assume that cash disbursement are made immediately for all expenses, so the budgeted income statement and cash disbursement are made immediately for all expenses, so the budgeted income statement and cash budget are identical.

When all groups have completed their budgets, compare those budgets. What are the differences? What assumptions led to the differences?

Case Study-1

Southwest Flies High

Southwest Airlines reported a 14.3 percent increase in net profit and a rise in passenger yield for the first quarter of 2003. During the first quarter, revenues increased 7.5 percent to \$1.35 billion. This was the Dallas-based airline's 48th consecutive quarter of rising profits in an industry that lost \$7 billion last year. And the company expects to be profitable during the second quarter as well even though revenues are expected to be relatively flat.

The main reason for the company's success is its low-cost structure. The company has limited its capital expenditures and tightened such costs as insurance expense. During the first quarter, the airline's costs increased 2.6 percent to 7.5 cents per available seat mile. When the effects of rising fuel costs are

eliminated from the computation, however, unit costs remained unchanged.

Southwest's chief financial officer, Gary Kelly, said the carrier would focus on adding frequencies in its existing markets this year, but did not rule out opening routes to new cities should rivals go bankrupt or discontinue service in some segments. United Airlines is currently under bankruptcy protection, and American Airlines is considering the idea.

Talking it over and Thinking it Through

1. What is a cost object? What are some of the possible cost objects used by Southwest Airlines?
2. What is the definition of direct costs? Cite some possible examples of Southwest Airlines' direct costs.
3. What is the definition of indirect costs? Cite some possible examples of Southwest Airlines' indirect costs.
4. Define variable costs. What are some of Southwest's variable costs?
5. Define fixed costs. What are some of Southwest's fixed costs?

Case Study-2

Dupont Reports \$213 Million Loss Amid Soft Demand, Higher Costs

DuPont Co. posted a \$213 million second-quarter net loss. There are three main reasons for the loss: decreased sales from soft demand, increased expense from rising raw-materials costs, and large charges for some non-recurring items. The decreased sales stem from sluggish demand in the electronics, auto, textiles, and chemicals businesses. Sales fell 11 percent to \$7.21 billion, with declines coming in each of DuPont's eight main businesses. Its polyester segment recorded an operating loss even before charges for the non-recurring items, and operating profit fell at least 25 percent in each of its other units, including agriculture, coatings, pigments, specialty fibers, and nylon.

Increased raw materials costs are from rising energy-based feedstock's, especially natural gas. Although natural gas prices have declined recently, DuPont said it will take one to two fiscal quarters for the income statement to reflect the cost reductions. Non-recurring charges to income for the latest quarter included \$645 million (\$.62 per share), mostly consisting of costs of announced employee layoffs, asset write-downs and plant closings. The year-ago period included \$261 million in charges related to litigation, restructuring, and acquisition costs, which trimmed earnings by \$.25 per share.

DuPont warned that it expects the current slowdown to continue. At the same time, however, management expects the pressures on the company from the slowing economy to ease some in the fourth quarter as a result of cost-savings and some stabilization in U.S. manufacturing.

Talking it over and Thinking it Through!

The following questions focus on the various product costs of a manufacturer. They will help you understand the various components of product costs and how those costs are presented on the financial statements.

1. Define the term "direct materials."

2. Define the term “direct labor.”
3. Define the term “manufacturing overhead.”
4. Would the natural gas used by DuPont in its manufacturing operations be classified as direct materials, direct labor, or manufacturing overhead? Why?

How are the accounts entitled “raw materials,” “work in process,” and “finished goods” classified? On which financial statement will they appear?

Case Study-3

Lucent Still in Trouble

Lucent Technologies, a manufacturer of routers and switching gear, warned of a larger-than-expected loss for the third quarter. Lucent management had expected the company to begin breaking even by the end of the current fiscal year, but now estimates to break even sometime in the next fiscal year which begins this September. The company, which has suffered from a collapse in telecommunications spending, has struggled through 12 consecutive quarters of losses. The reason for the current quarter’s loss is that revenues are 18 percent less (\$2.4 million) than they were in the second quarter. According to Frank D’Amelio, Lucent’s chief financial officer, the revenue shortfall is due to spending cuts by North American wireless carriers and an unexpected delay in a network contract.

Lucent management is struggling to reduce its break-even point which is currently \$2.4 billion. One way to accomplish that goal is through further job cuts. The number of employees at Lucent was 106,000 at one time; now, that number is being slashed to 35,000. The company may be forced to rethink its strategy of being a wide-ranging equipment supplier.

Because of consecutive quarterly losses, the announcement of the current quarter’s expected loss, and the extension of the break-even target date, Standard and Poor’s has threatened to further downgrade the company’s credit rating, which is already at junk status at B-minus

Talking it over and Thinking it Through!

1. What is meant by the term “break-even point”? How is the break-even point computed?

Answer:

The breakeven point is that quantity of output where total revenues equal total expenses. To compute the breakeven point, all expenses are classified as fixed or variable. Fixed costs are those that do not change in total as volume changes within the relevant range. Variable costs are those that do vary in total as volume changes. To compute the breakeven point, the contribution margin must be computed. The contribution margin per unit equals the unit selling price minus unit variable cost. The contribution margin percent equals contribution margin divided by the selling price. To find the breakeven point in number of units, divide total fixed cost by the contribution margin per unit. To find the breakeven point in total sales, divide fixed costs by the contribution margin percent.

2. Lucent warned of an 18 percent drop in quarterly revenues. What effect does this expected drop in revenues have on the break-even point?

Answer:

If the drop in quarterly revenues is due to fewer units being sold, the breakeven point is not affected. Since the selling price per unit has not changed, the contribution margin per unit has not changed either and the same number of units must be sold to break even. If, however, if revenues decreased because the selling price per unit decreased, then the contribution margin per unit decreased, too. If the contribution margin per unit decreases, the breakeven point (the number of units that must be sold to have zero net income) increases. In this case, the company would need to sell more units to cover fixed costs.

3. The lowered revenue forecast raises the risk of further job cuts at Lucent. What effect will job cuts have on the break-even point?

Answer:

If the jobs being cut at Lucent are salaried personnel, then fixed costs will decrease. If fixed costs decrease, then fewer units will need to be sold to cover them, and the breakeven point will decrease. If the jobs being cut are hourly workers, then variable cost per unit will decrease. If variable cost per unit decreases, the contribution margin per unit will increase and fewer units will need to be sold to cover fixed costs. In either case, the breakeven point will decrease because costs decrease. It’s important to note that as the number of workers is reduced, the company will not be able to produce as many units. Therefore, number of units the company will be able to sell will decrease.

5. Explain three ways Lucent could lower its break-even point?

Answer:

There are three ways (at least) Lucent could lower its break-even point. One way is to reduce fixed costs. The previous question addressed laying off salaried workers. Other fixed costs could be reduced, too. Possibilities would include selling unneeded warehouses, facilities, and equipment. Another way to lower the breakeven point would be to lower the variable cost per unit. The previous question addressed laying off hourly workers. Other variable costs that could be reduced include direct materials (perhaps a different supplier offers a similar direct material for a lower price). Finally, the breakeven point could be reduced if the selling price per unit were increased. Note that just increasing the number of units sold does not affect the breakeven point. In order to reduce the breakeven point, the contribution margin per unit must be increased. Therefore, the selling price per unit must be increased.

Notes

LESSON 9 : FINANCIAL STATEMENT ANALYSIS

Learning Objectives:

After studying this chapter you should be able to

- *Various matters related with financial statement.*
- *Understand usefulness financial analysis.*

Financial Statements

Meaning of Financial Statements

Basically, Financial Statements are organized summaries of detailed information about the financial position and performance of an enterprise. Traditionally, the term 'Financial Statements' is used to denote only two basic statements, which are as under:

- a. Balance Sheet (or Position Statement), which shows the financial position of an enterprise at a particular point of time.
- b. Trading and Profit and Loss Account (or Income Statement) which shows the financial performance of business operations during an accounting period.

Nowadays, in addition to the aforesaid two basic financial statements, a Statement of Retained Earnings and a Cash Flow Statement and Value Added Statement are also prepared in practice.

Usefulness of Financial Statements

The information contained in these statements is used by the management, present and potential investors, lenders, short-term creditors, employees, customers, governments and their agencies to satisfy some of their different needs for information. Users can get better insight about the financial strengths and weaknesses of the firm if they properly analyses the information from their own points of view. The usefulness of the financial statements for some of the users is explained below:

Users	Need for information
1. Short term creditors	Short term creditors need information to determine whether the amount owing to them will be paid when due and whether they should extend, maintain or restrict the flow of credit to an individual enterprises.
2. Long term creditors	Long term creditors need information to determine whether their principles and the interest thereof will be paid when due and whether they should extend, maintain or restrict the flow of credit to an enterprise.
3. Present investor	Present investor need information to judge prospects for their investment

4. Potential investor	and to determine whether they should buy, hold or sell the shares. Potential investor need information to judge prospectus for their investment and to determine whether they should buy, the shares.
5. Management	Management need information to review the firm's (a) short-term solvency, (b) long-term solvency, (c) activity (viz., effective utilisation of its resources), (d) profitability in relation to turnover, (e) profitability in relation to investments and to decide upon the course of action to be taken in future.
6. Employees	Employees and their representative groups are interested in information about the stability and profitability of the employers. They are also interested in information, which enables them to assess the ability of the enterprise to pay remuneration, retirement benefits and to provide employment opportunities.
7. Tax authorities	Tax authorities need information to assess the tax liabilities of an enterprise.
8. Customers	Customers have an interest in information about the continuation of an enterprise, especially when they have established a long-term involvement with, or are dependent on, the enterprise.
9. Government and their agencies	Government and their agencies are interested in the allocation of resources and, therefore, the activities of enterprise. They also require information in order to regulate the activities of enterprise, determine taxation policies and as the basis the national income and similar statistics.
10. Public	Enterprises affect members of the public in a variety of ways. For example, enterprises may make a substantial contribution to the local economy in many ways including the number of people, they employ and their patronage of local suppliers. Financial statements may assist the public by providing information about trends and recent developments in the

prosperity of the enterprise and the range of its activities. While all the information needs of these users cannot be made by financial statements, there are some needs which are common to all users. The information contents of the financial statements which meet information needs of the investors or providers of risk capital will also meet most of the needs of other users.

Elements of Financial Statements

The elements directly related to the measurement of financial position are assets, liabilities and equity. The elements directly related to the measurement of profit are income and expenses.

Let us discuss these elements of Financial Statements as follows:

Asset

An asset is a resource controlled by the enterprise as a result of past events and from which future economic benefits are expected to flow to the enterprise. An enterprise usually employs its assets to produce goods or services capable of satisfying the wants or needs of customers.

Since these goods or services can satisfy wants or needs, the customers are prepared to pay for them and hence contribute to the cash flow of the enterprise. Cash itself renders several services to the enterprise because of its command over other resources. The future economic benefits embodied in an asset may flow to the enterprise in a number of ways: (a) an asset may be used singly or in combination with other assets in the production of goods or services to be sold by the enterprise; (b) exchanged for other assets; (c) used to settle a liability; or (d) distribute to the owners of the enterprise.

Many assets have a physical form. For example, plant and building, plant, equipment etc. are of physical form. However, physical form is not necessary for the existence of an asset. Patents, copyright, etc. are assets from which future economic benefits are expected to flow to the enterprise and so these are assets to the enterprise. although, they do not have any physical form, if controlled by the enterprise.

Many assets for example, receivables and property are associated with legal rights, including ownership. In determining the existence of an asset, the right of ownership is not essential. For example, if a property is held on lease, it is an asset to the enterprise if it controls the benefits which are expected to flow from the property. Thus always legal right of ownership is not a characteristic feature for identifying an asset. What is essential is the controlling right of the benefit emerging from such asset.

The assets of an enterprise result from past transactions or other past events. For example, plant and machinery acquired, is a past transaction from which an asset occurred. But the transactions or event expected to occur in future do not give rise to assets. For example, an intention to purchase a machinery does not meet the, definition of an asset. There is a close relationship between incurring expenditure and generating assets, which may not necessarily coincide. For acquiring a piece

of plant the enterprise needs to incur expenditure. So when expenditure is incurred, this gives an evidence of the existence of an asset. But when the asset is donated to the enterprise, although no expenditure is incurred, an assets is created.

Liability

A liability is it present obligation of the enterprise arising from past events, the settlement of which is expected to result in an outflow from the enterprise of resources embodying economic benefits. An essential characteristic of a liability is that the enterprise has a present obligation. An obligation is a duty or responsibility to act or perform in a certain way. An obligation may be legally enforceable as a consequence of a binding contract or statutory requirement. Obligations also arise, however, from normal business practice, custom and a desire to maintain good business relations or to act in an equitable manner.

A distinction needs to be drawn between a present obligation and a future commitment. A decision by the management of an enterprise to acquire assets in future does not of itself give rise to a present obligation. An obligation normally arises only when the asset is delivered or the, enterprise entries into an irrevocable agreement to acquire the asset.

The settlement of a present obligation usually involves the enterprise giving up resources embodying economic benefit in order to satisfy the claim of the other party. The settlement of (a) present obligation may be done by: (a) payment of cash, (b) transfer of other assets, (c) provision of services (d) replacement of that obligation with another obligation, (e) conversion of the-obligation to equity. The obligation may also be extinguished when the creditor waives the liability.

Liabilities result from past transactions or other past events. Some liabilities can be measured only by using a substantial degree of estimation. For example, income tax liability of a year may not be exactly known at the time of preparation of financial statements. This will be known only when the assessment will be over at some future date. Some enterprise describe these liabilities as provisions.

Equity

Equity is a residual interest in the assets of the enterprise after deducting its liabilities. In a corporate enterprise equity is suitably sub-classified in the balance sheet. For example, in India equity is classified as-share Capital and Reserve and Surplus. Under each head further details are provided. The creation of reserve is sometime required by statute or other law in order to give the enterprise and its creditors and added measure of protection from future losses. Creation of some reserve may be necessary as per tax law of the country. In India creation of Export Profit Reserve is one such requirement. Normally equity is shown at its paid up value.

Income

Income is increase in economic benefits during the accounting period in the form of inflows or enhancement of assets or decreases of liabilities that result in increase in equity, other than those relating to contribution from equity participants. The definition of income encompasses both revenue and gains. Revenue arises in the course of the ordinary activities of an enterprise and is rendered by a variety of different names,

including fees, interest, dividends and rent. Gains represent other items that meet the definition of income and may or may not arise in the course of ordinary activities of an enterprise. Gains include, for example, those arising on disposal of non-current assets. The definition of income also includes unrealized gains. For example, those arising on the revaluation of marketable securities and those resulting from increase in the value of fixed assets. When gains are recognized in the income statement they are usually displayed separately because knowledge of them is useful for making economic decisions. Gains are often reported net of related expenses. Income may also result from settlement of liabilities.

Expenses

Expenses are decreases in economic benefits during the accounting period in the form of outflows or depletions of assets or increase in liabilities that result in decreases in equities other than those relating to distribution to equity participants. The definition of expenses encompasses losses as well as those expenses that rise in the course of the ordinary activities of the enterprise. Expenses in the course of the ordinary activities of the enterprise include, for example, cost of sales, wages, manufacturing expenses, depreciation. They usually take the form of an outflow or depletion of an asset such as cash and cash equivalent, inventory, property, plant and equipment.

Losses represent other items that meet the definition of expenses and may or may not arise in the course of the ordinary activities of the enterprise. Losses include, for example, those resulting from disasters such as fire and flood as well as those arising on disposal of non-current assets. The definition of expenses also includes- unrealized losses for example, those arising from the effects, of increase in the rate of foreign currency. When losses are recognised in the income statement, they are usually displayed separately because such knowledge is useful for the purposes of making economic decisions. Losses are often reported net of related income.

Recognition of Assets, Liabilities, Income and Expenses

Recognition of an Asset

An asset is recognised in the balance sheet when it is probable that the future economic benefits will flow to the enterprise and the asset has a cost or value that can be measured reliably. An asset is not recognized in the balance sheet when expenditure has been incurred and for which it is considered improbable that economic benefits will flow to the enterprise beyond the current accounting period. Instead such a transaction results in the recognition of an expenditure in the income statement.

Recognition of a Liability

A liability is recognised in the balance sheet with its proposal that an outflow of a resource embodying economic benefits will result in the settlement of a present obligation and the amount on which the settlement will take place can be measured reliably.

Recognition of an Income

Income is recognised in the income statement when there is an increase in the future economic benefits related to an increase in an asset or a decrease of a liability which can be measured

reliably. In other words, recognition of income occurs simultaneously with the recognition of increases in assets or decreases in liabilities

Recognition of Expenses

Expenses are recognized in the income statement when a decrease in future benefits related to a decrease in an asset or an increase of a liability has arisen which can be measured reliably. In other words, recognition of expenses occurs simultaneously with the recognition of an increase in liabilities or a decrease of asset.

Measurement of the Elements of Financial Statements

Measurement is the process of determining the monetary amounts at which the elements of the financial statements are to be recognized and carried in the balance sheet and income statement. This involves the selection of the Particular basis of measurement. A number of different measurement bases are employed to different degrees and in varying combinations in financial statements. They include the following:

- Historical cost-** Assets are recorded at the amount of cash or cash equivalents paid or the fair value of the consideration given to acquire them at the time of their acquisition and liabilities are recorded at the amount of proceeds received in exchange for the obligation, or in some circumstances (for example, income taxes), at the amounts of cash or cash equivalents expected to be paid to satisfy the liability in the normal course of business.
- Current cost-** Assets are carried at the amount of cash or cash equivalents that would have to be paid if the same or an equivalent asset was acquired currently. Liabilities are carried at the undiscounted amount of cash or cash equivalents that would be required to settle the obligation currently.
- Realizable (settlement) value** Assets are carried at the amount of cash or cash equivalents that could currently be obtained by selling the assets in an orderly disposal. Liabilities are carried at their settlements values, that is, the undiscounted amounts of cash or cash equivalents expected to be paid to satisfy the liabilities in the normal course of business.
- Present value** Assets are carried at the present discounted value of the future net cash inflows that the firm is expected to generate in the normal course of business. Liabilities are carried at the present discounted value of the future net cash outflows that are expected to be required to settle the liabilities in the normal course of business.

The measurement basis most commonly adopted by enterprises in preparing their financial statements is historical cost. This is usually combined with other measurement bases. For example, inventories are usually carried at the lower of cost and net realizable value, marketable securities may be carried at market value and pension liabilities are carried at their present value. Furthermore, some enterprises use the current cost basis as a response to the inability of the historical cost accounting model with the effects of changing prices of non-monetary assets.

LESSON 10 :

TECHNIQUES OF FINANCIAL ANALYSIS

Learning Objectives

After studying this chapter you should be able to understand

- Concepts related to financial statement.
- Objects of analysis and interpretation
- Types of analysis
- Tools of financial analysis

Analysis and Interpretation of Financial Statements

Analysis and Interpretation of Financial Statements

As stated earlier financial statements comprise the following:

1. Trading and profit and loss account which gives the results of a year's working.
2. Profit and loss appropriation account which gives details about the disposal of the retained income.
3. Balance sheet which gives the financial position of the undertaking as on the accounting date.

Accounting to Mr. Harry Guthmann, "The first and most important function of financial statement is, of course, to serve those who control and direct the business, to the end of securing the profits and maintaining a sound financial condition question as to how efficiently the capital of the business is being utilized, how well credit standards are being observed and whether the financial condition is being improved may be answered from the financial statements." Therefore, the analysis of statements will help the management at self appraisal and the very statements help the shareholders to judge the performance of the management.

The Meaning of Analysis and Interpretation

The financial statements are of much interest to a number of groups of persons. Apart from management there are other interested parties like shareholders, debenture holders, potential investors – large and small, bankers, trade creditors, journalists, legislators and politicians who are increasingly getting interested in the analysis and interpretation of financial statements. "To interpret means to put the meaning of a statement into simple terms for the benefit of a person." Just as the chemist is also required to interpret the financial statements. This is essentially done through the tools of analysis such as comparative statements, common size statements and ratio analysis. These tools may be compared with the laboratory tests, which aid a physician in the diagnosis of a malady. Just as laboratory test are only aids to a physician and the physician must use his intelligence in the correct diagnosis, similarly the tools of analysis only help in establishing relationship between one accounting figure and another in the financial statements and go no far. It is the expert who has to grasp the significance of related figures and form an opinion as to whether the ratio calculated indicates a favorable or adverse state of affairs. Therefore while analysis

comprises resolving the statements by breaking them into simpler statements by a process or rearranging, regrouping and the calculation of ratios, interpretation is the mental process of understanding the terms of such statements and forming opinions of inferences about the financial health, profitability, efficiency and such other aspects of the undertaking.

Objectives of Analysis and Interpretation

The objectives for analysis and interpretation can be many, and a few of them are listed below:

1. To judge the financial health of the undertaking. For example, the finance manager is concerned with the financial health of the business. He has to ensure the proper management of funds. He has to procure them at a low cost and ensure that they are effectively utilized, so that repayment of such funds as and when they become due poses no problem. Creditors and bankers are also interested in this aspect.
2. To judge the earnings performance of the company and the facility with which dividends can be paid from out of earned profits. Potential investors are primarily interested in this aspect and the analysis and interpretation is done with a view to ascertain the company's position in this regard.
3. In the case of institutional investors such as LIC, UTI, etc., the analysis is carried over a long period with a view to identifying companies having growth potential and a sound financial base. According to Mr. Harry G. Guthmann, "investors as a class need to know, first, that the whole financial structure is strong-not merely that the concern will be able to meet current obligations; and second, that there is sufficient evidence in the history of its earnings to warrant a belief in future growth, or at least reasonable stability." Even the existing shareholders must continuously analyze the statements to ensure that their investment is intact and that they would continue to obtain a reasonable return.
4. To judge the ability of the company to pay the principal and interest, arrangements for amortization of debt and the security available for the loans extended. Most of the companies raise a proportion of their capital requirement by issuing debentures. This is because a company pays about 10 to 12 per cent interest on debentures and earns as much as 15 to 20 per cent on the funds so raised. This facilitates the holders as lenders of substantial funds have this objective in view while analyzing the financial statements.
5. To judge the solvency of the undertaking. Every business reduces its working capital requirement by availing trade credits. But the business must be in a solvent position to pay the debts as and when they fall due. So the trade creditors will be mainly interested in assessing the liquidity position for which they look into the following:

- a. Whether the current assets are sufficient to pay off the current liabilities.
- b. The proportion of liquid assets (cash and book debts) to current assets.
- c. Whether the debenture-holders are secured by a floating charge on the current assets.
- d. The business prospects with reference to the future growth and earnings.

In the case of bankers who provide short-term working capital and of late even medium term credit, they generally look into the following:

- a. The purpose and period of the loan,
- b. The manner in which the borrower proposes to repay the loan,
- c. The capacity of the company to repay as judged by the trend of profits,
- d. Banker's position in the event of forced liquidation,
- e. The quality of the management, and
- f. The history of the account in the past.

From the discussion given so far it is clear that there are different objectives in analysis and interpretation and that there are different users, all of them using the same statement but for a different purposes. It is the job of the financial analyst to apply his techniques of analysis and interpret the statement for the user so as to enable him to take a proper and appropriate decision.

Types of Analysis

Financial statements can be subjected to two types of analysis. They are:

1. Trend analysis or dynamic analysis, which is made by analyzing the financial statements over a period of years. This indicates the trend of such variables, as sales, cost of production (or operation) profits, assets and liabilities. For this purpose comparative financial statements are prepared horizontally.
2. Structural analysis or static analysis, which is made by analyzing a single set of financial statements as are prepared on a particular date. It is called structural analysis, because the relationship between different accounting variables is studied as, for example, the ratio of net profit to sales or the ratio of liquid assets to current liabilities.

Tools of Financial Analysis

As discussed earlier, the financial statements must be made simpler for any reader to understand the operating results and the financial health of the business. This is done with the help of the following tools of financial analysis:

- a. Comparative balance sheets and income statements,
- b. Common size percentages,
- c. Trend ratios, and
- d. Ratio analysis.

It is only the analysis with the aid of the above tools that helps the interested reader in giving tongue to the dumb heaps of

figures which in turn help in achieving the ultimate aim of interpreting the financial statements.

I. Comparative Statements

Financial statements of two or more firms may be compared for drawing inferences. This is known as inter-firm comparison. Similarly, there may be inter-period comparison, *i.e.*, comparison of the financial statements of the same firm over a period of years known as trend analysis. This is also known as horizontal analysis, since each accounting variable for two or more years is analyzed horizontally. Inter-firm or inter-period comparisons are very much facilitated by the preparation of comparative statements. In preparing these statements, the items are placed in the rows and the firms of years are shown in the columns. Such arrangement facilitates highlighting the difference and brings out the significance of such differences. The statement also provides for columns to indicate the change from one year to another in absolute terms and also in percentage form. In calculating percentages, there is one difficulty, namely, if the figure is negative, percentages cannot be calculated. Likewise, if the change is from or to a zero balance in account, it is not possible to calculate the percentage.

Advantages

1. These statements indicate trends in sales, cost of production, profits, etc., helping the analyst to evaluate the performance, efficiency and financial condition of the undertaking. For example, if the sales are increasing coupled with the same or better profit margins, it indicates healthy growth.
2. Comparative statements can also be used to compare the position of the firm with the average performance of the industry or with other firms. Such a comparison facilitates the identification of weaknesses and remedying the situation.

Disadvantages

1. Inter-firm comparison may be misleading if the firms are not of the same age and size, follow different accounting policies in relation to depreciation, valuation of stock, etc., and do not cater to the same market.
2. Inter-period comparison will also be misleading if the period has witnessed frequent changes in accounting policies.

The following statements illustrate the comparative financial statements :

COMPARATIVE INCOME STATEMENTS
For the years ended December 31, 1978 and 1979

	1979	1978	Absolute increase (or decrease)	Percentage increase (or decrease)
	Rs.	Rs.	Rs.	
Sales (Net)	11,00,000	10,00,000	1,00,000	10
Less : Cost of goods sold	8,40,000	8,00,000	40,000	5
Gross profit	2,60,000	2,00,000	60,000	30
Less : Operating expenses (Office, Administrative, selling and distribution)	60,000	50,000	10,000	20
Net operating profit	2,00,000	1,50,000	50,000	33 1/3
Other income	20,000	20,000	----	----
Earnings before interest and tax (EBIT)	2,20,000	1,70,000	50,000	29.4
Interest paid	20,000	20,000	----	----
Profit before tax (PBT)	2,00,000	1,50,000	50,000	32-1/2
Income-tax payable	1,00,000	75,000	25,000	33-1/3
Profit after tax (PAT)	1,00,000	75,000	25,000	33-1/3

PRASANTI LIMITED
COMPARATIVE BALANCE SHEETS
As on 31st December 1978 and 1979

	1979	1978	Absolute increase (or decrease)	Percentage increase (or decrease)
	Rs.	Rs.	Rs.	
Fixed assets	5,00,000	4,00,000	1,00,000	25
Investments	1,00,000	1,00,000	----	----
Working capital : (Current assets less current liabilities)	2,00,000	1,00,000	1,00,000	100
Capital employed	8,00,000	6,00,000	2,00,000	33-1/3
Less Debentures	2,00,000	2,00,000	----	----
Shareholders' funds represented by	6,00,000	4,00,000	2,00,000	50
Preference share capital	2,00,000	1,00,000	1,00,000	100
Equity share capital	3,00,000	2,00,000	1,00,000	50
Reserve and surplus	1,00,000	1,00,000	----	----
	6,00,000	4,00,000	2,00,000	50

Brief Comments

- The comparative income statement suggests that there is a jump of 30 per cent in gross profit because of increase in sales and increase in the profit margin. Increase in the gross profit margin can be ascertained from the fact that the 10 per cent increase in sales is not accompanied by a proportionate increase in the cost of production. However, the net profit is reduced by Rs.10, 000 because of the increase in operating expenses. The overall position of the income statement indicates as favorable situation.
- The analysis of balance sheet changes indicates an increase of 33 1/3 % in capital employed due to 25 per cent increase in fixed assets and 100 per cent increase in working capital. There is no increase in debenture liability and the increase in the current liabilities is only marginal. Therefore the increase in the total assets is substantially due to increase in owners' equity indicating a very satisfactory financial position.

II. Common-size Statements

Financial statements when read with absolute figures are not easily understandable, sometimes they are even misleading. It is, therefore, necessary that figures reported in these statements should be converted into percentage to some common base. In profit and loss account sales figure is assumed to be equal to 100 and all other figures are expressed as percentage of sales. Similarly, in balance sheet the total of assets or liabilities is taken

as 100 and all the figures are expressed as percentage of the total. This type of analysis is called vertical analysis. This is a static relationship because it is a study of relationship existing at a particular date. The statements so prepared are called common-size statements. A few illustrations of common size statements are given below.

Illustration 2

From the profit and loss accounts of Dharmasa Ltd for the years ended on 31st December, 1977, 1978, and 1979 prepare common size statement and interpret.

DHARMASA LTD
PROFIT AND LOSS ACCOUNTS
For the years ended December 31

	1979 Rs.	1978 Rs.	1977 Rs.
Net sales	31,85,025	22,30,150	14,35,075
Cost of goods sold	22,70,150	15,35,075	10,45,175
Gross margin	9,14,875	6,95,075	3,89,900
Operating expenses	6,01,825	4,02,025	2,35,550
Net operating income	3,13,050	2,93,050	1,54,350
Interest expense	30,750	18,750	2,000
Net income before income tax	2,82,300	2,74,300	1,52,300
Provision for taxes at 50%	1,41,150	1,37,150	76,175
Net income after income tax	1,41,150	1,37,150	76,175
Depreciation included in cost of goods sold and operating expense	91,800	58,025	28,925

(B) Common-size statement

DHARMASA LTD
PROFIT AND LOSS ACCOUNT (COMMON-SIZE)
For the years ended December 31

	1979 %	1978 %	1977 %
Net sales	100.0	100.0	100.0
Cost of goods sold	71.3	68.8	72.8
Gross margin	28.7	31.2	27.2
Operating expenses	18.9	18.1	16.4
Net operating income	9.8	13.1	10.8
Interest expense	1.0	0.8	0.1
Net income before income-tax	8.8	12.3	10.7
Provision for tax	4.4	6.1	5.3
Net income after income-tax	4.4	6.2	5.4

Interpretation. The absolute figures in rupees show that sales, cost of goods sold and gross profit all have continuously increased since 1977. But common-size statement reveals that cost of goods sold in relation to sales decreased in 1978 and again increased in 1979. Consequently rate of gross profit in 1978 over 1977 increased but in 1979 over 1978 decreased. Similarly, net profit after tax, in absolute figures, shows an

increasing trend since 1977 but the rate of net profit on sales in 1979 is 4.4 in contrast to 6.2 in 1978 and 5.4 in 1977.

Illustration 3

From the following income statement of X – has Ltd. for the years ending December 31, 1978 and 1979 you are required to prepare common-size statements:

	1978 Rs.	1979 Rs.
Gross	1,51,500	1,41,540
Less Returns	1,500	1,540
Net sales	1,50,000	1,40,000
Cost of goods sold	1,05,000	99,400
Gross profit	45,000	40,600
Expenses:		
Selling expenses	7,500	7,560
General expenses	4,500	4,500
Financial expenses	750	560
Total expenses	12,750	12,620
Net profit	32,250	29,980

Solution

X –has Ltd.
COMMON-SIZE STATEMENT

	1978	1979
Gross sales	101.0	101.1
Less : Returns	1.0	1.1
Net sales	100.0	100.0
Cost of goods sold	70.0	71.0
Gross profit	30.0	29.0
Expenses :		
Selling expenses	5.0	5.4
General expenses	3.0	3.2
Financial expenses	0.5	0.4
Total expenses	8.5	9.0
Net profit	21.5	20.0

III. Trend Analysis

For analysing the trend of data shown in the financial statements it is necessary to have statements for a number of years. This method involves the calculation of percentage relationship that each statement item bears to the *same item* in the “*base year*”. Trend percentages disclose changes in the financial and operating data between specific periods and make possible for the analyst to form an opinion as to whether favorable or unfavorable tendencies are reflected by the data. The following is an example of trend analysis of the asset side of the balance sheet of Martir Limited :

MARTIR LTD.
COMPARATIVE BALANCE SHEET
as on December 31, 1974-79

(Rupees in ‘000)

Assets	December 31					Trend percentages Base date : December 31,1974 100					
	1974	1975	1976	1977	1978	1979	1975	1976	1977	1978	1979
Current assets :	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	%	%	%	%	%
Cash	15.4	18.2	16.0	14.3	14.5	11.8	118	104	93	94	77
Marketable securities	7.2	5.5	4.4	5.6	6.9	2.7	76	61	78	96	37
Debtors	3.3	29.7	28.8	25.1	29.4	29.7	98	95	83	97	98
Stock-in-trade (Fifo)	39.4	37.4	35.9	36.2	42.6	41.8	95	91	92	108	106
Other current assets	1.8	0.5	3.4	4.4	2.6	0.6	----	----	----	----	----
Total current assets	94.1	91.3	88.5	85.6	96.0	86.6	97	94	91	102	92
Long-term investments	1.2	4.9	5.3	6.8	1.3	11.6	408	442	567	108	967
Property, plant, etc.	121.6	141.1	156.9	170.2	187.3	206.7	116	129	140	154	170
Less : Accumulated depreciation	49.7	58.4	63.4	70.3	72.3	80.9					
Net	71.9	82.7	93.5	99.9	115.0	125.8	115	130	139	160	175
Total assets	167.2	178.9	187.3	192.3	212.3	224.0	107	112	115	127	134

LESSON 11: STATEMENT OF CHANGE IN FINANCIAL POSITION

Learning Objectives

After studying this chapter you should be able to

- *basic concept underlying the changes in financial position.*
- *understand the statement of changes in financial position (SCFP): working capital basis*
- *under stand the method of preparing the funds flow statement.*

Statement of Changes in Financial Position

Introduction

The balance sheet and income statement (profit and loss account) are the traditional basic financial statements of a business enterprise. While they do furnish useful financial data regarding its operations, a serious limitation of these statements is that they do not provide information regarding changes in the firm's financial position during a particular period of time. In operational terms, they fail to answer questions such as:

- What have been the factors responsible for the difference in owner's equity, assets and liabilities of the firm at two dates of consecutive balance sheets?
- What have been the premier financing and investment activities of the firm during this period?
- Have long-term sources been adequate to finance fixed assets purchases?
- Does the firm possess adequate working capital?
- Why did the firm not pay dividends in spite of adequate profits?
- How much funds have been generated from operations?
- Has the liquidity position of the firm improved?

The statement of changes in financial position (SCFP) overcomes these limitations of basic financial statements. In other words, "the SCFP throws light on the above aspects which are of considerable interest to the financial managers and outside investors.

Meaning of Changes in Financial Position

The statement of changes in financial position (SCFP) is a statement of flows, that is, it measures the changes that have taken place in the financial position of a firm between two balance sheet dates. It summarizes the sources from which 'funds have been obtained and the uses to which they have been applied. As a statement of sources and uses of funds, drawing on the information contained in the basic financial statements, it shows the source of funds and application of funds during the period. The changes in financial position could be related to several different concepts of funds. The two most common usages of the term funds are cash and working capital. Viewed in this sense, the SCFP would explain the

changes in cash or working capital. Accordingly, there are two statements, that is, statement of changes in cash (popularly called cash flow statement) and statement of changes in working capital (popularly known as sources and uses statements or funds flow statements). The preparation and use of the SCFP, as a tool of financial analysis and management, is illustrated here with reference to changes in (i) the net working capital, (ii) the cash position and (iii) the total resources.

Statement of Changes in Financial Position (SCFP): Working Capital Basis

The net working capital, NWC, of a firm is the amount by which its current assets, CA, exceed its current liabilities, CL. The magnitude of working capital is a measure of the safety margin that exists for the protection of short-term creditors. Working capital may also be viewed as funds available for acquisition of non-current assets as well as to repay non-current liabilities. Any transaction that results in an increase in working capital is a source of WC any transaction that causes a net decrease in WC is an application of WC. Some transactions merely change the form of working capital, without altering the amount of working capital as such. Clearly, such items neither constitute a source nor the use of working capital.

General Rules

Let us formulate some general rules to ascertain which transactions give rise to a source or a use of working capital and which do not. This exercise is useful for the preparation of the funds flow statement. Symbolically,

$$WC = CA - CL \dots\dots\dots(1)$$

From Eq. 1 the following may be deduced:

1. Transactions affecting WC:
 - a. An increase in CA causes an increase in WC.
 - b. A decrease in CA causes a decrease in WC.
 - c. An increase in CL causes a decrease in WC.
 - d. A decrease in CL causes an increase in WC. .
2. Transactions not affecting WC:
 - e. A simultaneous increase in CA and CL does not affect WC.
 - f. A simultaneous decrease in CA and CL does not affect WC.

Concrete Examples Corresponding to Each General Rule:

- Issue of equity shares causes an increase in cash (CA) and increase in non-current liability (NCL)
- Purchase of non-current assets (NCA) causes decrease in cash (CA) and increase in (NCA).
- Bank overdraft to repay long-term loans causes an increase in CL and decrease in NCL.

- Bank overdraft paid by issue of debentures causes a decrease in bank overdraft (CL) and an increase in NCL.
- Purchase of inventories on credit causes an increase in inventory (CA) and an increase in creditors (CL)
- Payment of creditors causes a decrease in cash (CA) and a decrease in creditors (CL).

A close examination of the above rules and illustrations shows that a transaction which gives rise to a source or use of working capital should affect both the current account (CA or CL), and the non-current account (NCA or NCL) simultaneously. However, if a transaction occurs where either only current accounts [as shown in rules (e) and (t)] are affected, working capital is not changed. Likewise, if both non-current accounts are affected as a result of the transaction, it does not bring about any change in the working capital. For instance, a conversion of debentures into equity increases one component of NCL (equity) and decreases another component of NCL (debentures).

Adjustment to Profit

Net income (or loss) as shown by the profit or loss account

Add: Depreciation expenses

Amortization of goodwill, patents and other intangible assets;

Amortization of discount on debentures or share issue expenses

Amortization of extraordinary losses occurred in previous years

Loss on sale of non-current assets

Less: Amortization of premium received on debentures;

Profit on sale of equipment

Profit on revaluation of non-current assets

Dividends and interest

(A+B+C) = funds from business operations.

Figure 1

Sources and Uses of Working Capital

The major sources and use of working capital are summarized below:

1. Sources of Working Capital
 - a. Funds from business operations
 - b. Other incomes
 - c. Sale of non-current assets
 - d. Long-term borrowings
 - e. Issue of additional equity capital or preference share capital
2. Uses of Working Capital
 - a. Losses from business operations
 - b. Purchase of non-current assets
 - c. Redemption of debentures and/or preference shares
 - d. Dividends to share holders

Funds from Business Operations The profit/loss figure, as shown in the profit and loss account of the firm, *per se* does not /indicate the quantum of working capital provided by business operations because the revenues and expenses shown do not run parallel to the flow of the working capital. The profit and loss account contains a variety of write-offs and other adjustments which do not involve any corresponding movement of funds. Therefore, appropriate adjustments are to be made to the profit disclosed by the profit and loss account to arrive at the funds from business operations. For this purpose: (i) all such expenses which have been deducted from revenue but do not reduce working capital are to be added back, (ii) such items as have been added to revenue but have not contributed to the working capital are to be subtracted and (iii) all such revenues which are not directly caused by business operations should also be deducted and shown separately in the statement. The items requiring adjustment are listed in Exhibit 1

An Alternative Method of Estimating Funds from Business Operations

The alternative method of measuring funds provided by business operations in actual practice, is by recasting the profit and loss account itself. To be specific, the profit and loss account should be prepared afresh so as to incorporate: 1) business revenues providing working capital on the income side (leaving out the items which are to be deducted as per Exhibit 1); and (ii) only those operating expenses which involve the use of working capital (leaving out the items which are to be added as per Exhibit 1). The balancing figure of such a statement would represent the amount of net working capital provided (or used) in business operations. Exhibit 2 summarizes the format of such a procedure.

Adjusted Profit and Loss Account

A. Sales revenue

B. Less: Expenses using working capital

Cost of raw material used

Wages and salary expenses

Manufacturing expenses

Advertising expenses

Insurance expenses

Office expenses

Other operating expenses

Interest

Income taxes

(A-B) = funds from business operations.

Exhibit 2

Funds from business operations can also be obtained from the statement of retained earnings. In order to ascertain funds from business operations with the help of the statement of retained earnings, the following procedures should be adopted:

1. Balance of profit at the end of the year requires adjustment as explained in Exhibit 1
2. The amount of transfer to the general reserve or any other reserve indicating appropriation out of profits should be added back as these transactions merely involve the

reclassification of items and do not involve any corresponding use of working capital.

3. Payment of dividends (as is separately shown under “uses” of the statement) should be added back.
4. Finally, the balance of profit at the beginning of the year should be deducted.

Example 1

The computation of funds from business operations is shown in Example 3.1.

From the following income statement of Hypothetical Ltd., determine the funds obtained from operations, using various methods.

Income Statement of Hypothetical Ltd. for the Current Year

	Amount (Rs thousand)	Amount (Rs thousand)
Sales revenues	200	420
Less: Cost of goods sold	40	
Operating cash expenses Depreciation	30	
Amortization of:		
(i) Patent	5	
(ii) Preliminary expenses	2	
Loss on sale of old equipment		
Operating income	<u>3</u>	<u>280</u>
Less: Income taxes		140
Add: Other income:		<u>70</u>
Gain on sale of land	5	
Gain on redemption of debentures	1	
Dividends from investments in other companies	4	
Revaluation of land	<u>15</u>	
Net income		
Beginning balance of P&L A/c		<u>25</u>
Net Income for the current year		<u>25</u>
Less: Transfer to general reserve		<u>25</u>
Amortisation of goodwill		55
Dividend on preference shares		<u>25</u>
Dividend on equity shares		150
Ending balance of P&L A/c	15	
	5	
	20	
	<u>40</u>	<u>80</u>
		<u>70</u>

Solution

Alternative 1: (Based on Exhibit 2)

Sales revenues	420
Less: Expenses using working capital:	
Cost of goods sold	200
Operating cash expenses	40
Income taxes	<u>70</u>
Funds from business operations	110

Alternative 2: (Based on Exhibit 1)

Net Income	95
Add: Expenses not involving the use of working capital	
Depreciation	30
Amortisation of	
(i) Patent	5
(ii) Preliminary expenses	2
Loss on sale of equipment	3
	<u>40</u>

Less: Income not augmenting working capital:	
Revaluation of land	15
Income separately reported:	
Dividends from investment in other companies	4
Incomes clubbed with other items of sources	
Gain from sale of land	5
Gain from redemption of debentures	1
Funds from business operations	<u>110</u>

Alternative 3: (Retained Earnings Statement as Base)

Ending balance of profit and loss A/c	70
Add: Expenses not involving the use of working capital	
Depreciation	30
Amortisation of	
Patent	5
Preliminary expenses	2
Goodwill	3
Loss on sale of equipment	15
Transfer to general reserve	
Expenses separately reported	
Dividends on preference shares	20
Dividends on equity shares	40
Less; income not augmenting working capital	
Revaluation of land	15
Income separately reported:	
Dividends from investment in other companies	4
Income clubbed with other items of sources:	
Gain from sale of land	5
Gain from redemption of debentures	1
	<u>25</u>
Less: Beginning balance of P&L Net Funds from business operations	<u>55</u>
Funds from business operations	110

Changes in Non-Current Assets

Apart from the funds from operations, the transactions relating to non-current assets also require some special consideration. The changes in non-current assets like patents, goodwill and other intangible assets are due to their amortization or acquisitions. If there is a decrease in their balances, it is reasonable to assume, in the absence of information to the contrary, that the asset has been amortized. An increase, on the other hand, implies purchase of an asset and accordingly should be indicated as use of funds.

The changes in other non-current assets particularly plant and equipment account require a more careful analysis to ascertain funds obtained from their sale or funds used in their acquisition.

For this purpose, we should investigate three things: (i) increase/decrease in plant and equipment account and accumulated depreciation (if plant and equipment is maintained on gross basis), (ii) gain or losses in the profit and loss account

indicating that plants and equipment have been sold, and (iii) other information relating to the acquisition and retirement of plant and equipment that accompanies the financial statements. This is shown in Example 2.

Example 2

From the following information furnished to you relating to plant and equipment account of Hypothetical Ltd, determine the funds obtained from sale of old plant and equipment

	Previous year {Rs thousand}	Current Year (Rs thousand)
Plant and equipment (gross)	100	125
Accumulated depreciation	20	30
Additional information:		
i. Loss - on sale of plant and equipment		1
ii. Depreciation charged during the year on plant and equipment		14
iii. Purchase of new plant during the year		35

Solution

The gross increase in plant and equipment is Rs 25,000, But the reported purchases are Rs 35,000. From these two items of information, it follows that in the absence of any sale on plant account, its balance as at the end of the current year would have been Rs 1,35,000 [Rs 1,00,000 (opening balance) + Rs 35,000 (additions during the year)]. But the balance of the account is Rs 125,000, indicating that plant and equipment having a gross book value of Rs 10,000 has been sold.

Further, there is an increase in the balance of accumulated depreciation by Rs 10,000 but the depreciation amount charged during the year is Rs 14,000. Therefore, in the absence of any write-off of the depreciation during the year, its balance would have been Rs 34,000 [Rs 20,000 (opening balance) + Rs 14,000 (charged during the year)] as against Rs 30,000 as at the end of current year. These facts, taken together, indicate that the amount of depreciation on the plant sold is Rs 4,000.

The following information relating to the plant and equipment that has been sold is, thus, available:

Gross book value (original purchase cost)	Rs 10,000
Accumulated depreciation	Rs. 4,000
Net book value (Rs 10,000 - Rs 4,000)	Rs. 6,000
Therefore, sale proceeds of plant (Rs 6,000 - Rs1,000 loss)	Rs. 5,000

Changes in Non-Current Liabilities

The changes in non-current liabilities (NCL) account will either due to fresh issues of shares and debentures or their redemption. The increase in the NCL account is indicative of an additional issue of securities and is regarded as a source of funds/working capital. However, if it is due to the issue of bonus shares, it is not a source of funds. It simply amounts to reclassification of accounts, that is, reducing retained earnings/reserves and increasing equity share capital should be checked whether the new issue of securities is at par, premium or discount. In the case of the latter two situations, the net increase would not be a true representation of the source of

funds. In the case of premium, the actual amount received would be more, while it would be less if the new issue is made at discount. Likewise, in the case of the retirement of debt or preference shares care should be taken to ascertain whether the redemption is at par, premium or discount.

Example 3 comprehensively illustrates the SCFP-working capital basis.

Example 3

Given below are the balance sheets as on March 31st, previous year and current year and a statement of income and reconciliation of earnings for the current year of Electronics Ltd (EL). The only item in the

buildings and equipment account sold during the year was a specialised machine that originally cost Rs 15,000. The accumulated depreciation on this machine at the time of sale was Rs 8,000. The machine was sold for Rs 6,000 and full payment was received in cash. Electronics Ltd purchased patents for Rs.16,000 during the year. Besides cash purchases of plant and equipment, the assets of another company were also purchased for Rs 1,00,000 payable in fully paid-up shares, issued at par; the assets purchased being goodwill, Rs 30,000 and equipments, Rs 70,000.

COMPARATIVE BALANCE SHEETS

	March 31 st previous year (Rs. Thousand)	March 31 st current year (Rs. Thousand)
Cash	74	37
Accounts receivable	54	47
Inventories		
Inventories	312	277
Prepaid expenses	6	4
Land	60	60
Patents	55	65
Building and equipments	420	550
Less: accumulated depreciation	(105)	(120)
Goodwill	-	30
Total assets	876	950
Accounts payable	58	94
Notes payable	28	8
Estimated income taxes accrued	86	12
Social income taxes accrued	3	5
Debentures	220	60
Equity capital	250	560
Retained earnings	231	211
Total liabilities	876	950

Statement of Income and Reconciliation of Earnings for Current Year

	Amount (Rs thousand)
Net sales	1970
Less cost of goods sold	1480
Gross profit	490
Less operating expenses (includes' depreciation on buildings and equipment and amortisation of patents)	486
Less interest on debentures	14
Net loss from operations	(10)
Less other revenues	7
Net loss	(3)
Add retained earnings (previous year)	231
Less dividend paid	228
Less loss on sale of assets	17
Retained earnings (March 31, current year)	211

From the foregoing information, prepare a funds-flow statement for Electronics Ltd.

Solution

Funds Flow Statement of Electronics Limited for the Current Year

	Amount (Rs thousand)	
(A) Sources of Funds:		
Funds from business operations:		
Net sales	1970	
Less: Cost of goods sold	1480	
Less: Cash operating expenses	457	
Less: Interest	14	(7.8)
Funds from other revenues	7	(2.9)
Sale of non-current assets (machine)	6	(2.5)
Issue of long-term liabilities for cash (equity capital)	210	(86.8)
(B) Uses of Funds:		
Purchase of non-current assets:		
Buildings and equipment (cash)	75	(31.0)
Patents	16	(6.6)
Payment of long-term liabilities (debentures)	160	(66.1)
Recurring payments to investors:		
Dividend paid to shareholders	<u>16</u>	<u>(6.6)</u>
	267	(110.3)
Net decrease in working capital (B-A) (uses-sources)	25	(10.3)

Statement of Changes in Working Capital (Amount in Rs. Thousand)

	March 31 Previous year	March 31 Current year	WC Increase (+)	WC Decrease (-)
(a) Current assets				
Cash	74	37		37
Accounts receivable	54	47		7
Inventory	312	277		35
Prepaid expense	<u>6</u>	<u>4</u>		2
	<u>446</u>	<u>365</u>		
(b) Current liabilities	58	94		36
Accounts payable	28	8	20	
Notes payable	86	12	74	
Estimated income tax	<u>3</u>	<u>5</u>		2
Social security tax	<u>175</u>	<u>119</u>		
	271	246	94	119
		25	25	
Net working capital (CA-CL)				
Decrease in net working capital				

The above example highlights the financing and investing activities of eceltronics Ltd. Its major source of funds is the issue of additional equity (86.8%) funds from other sources constitute a minor part (13.2%) of its total financial resources. On the uses side , the major items are payment of long term liabilities (66.1%) and purchases of building and equipment (31%). In absolute terms, the funds obtained by the issue of equity shares in the market (Rs. 210,000) have been utilized orimarily for repayment of debentures (Rs. 160,000) and partly for the purchase of building and equipment (Rs. 75,000)

It reflects shaortages of working capital with electronics Ltd.. there has been a decrease in every component of current assets. The EL is required to raise additional long term funds to salvage its current financial position.

The abov illustration clearly shows the immense usefulness of statement of changes in financial position to know major activities of the EL: financial, operational, and investment.

Summary

The SCFP, as a statement of financial analysis, demonstrates changes in funds (net working capital, cash and total resources) over a period of time, generally between two consecutive years.

The SCFP, based on net working capital concept, is more popularly known as funds-flow statement. According to this basis, only those transactions which bring about changes in net working capital are included in the statement while others are excluded. The statement enumerates major sources and uses of working capital. The major sources of working capital are funds from business operations, non-operating incomes, sale proceeds of fixed assets, raising additional share capital and long-term borrowings. The principal uses of working capital are purchase of fixed assets, repayment of long-term borrowings, redemption of preference shares/debentures, payment of dividends, and so on.

Assignment Material

- What are the different meanings of the term 'funds' in the preparation of statement of changes in financial position? Which meaning of funds is appropriate for long-range financial planning?
- What is the purpose of the statement of changes in financial position? How does it differ from a balance sheet or income statement?
- What additional information is required to convert a statement of sources and uses of net working capital into a statement of changes in financial position?
- "The analysis of the flow of funds through an organization can be very useful to the management". Elucidate this statement.
- The following are the summarized balance sheets of V. Ltd as at March 31 st previous year and current year:

Liabilities	Previous Yr	Current Yr	Assets	Previous Yr	Current Yr
Share capital	200,000	260,000	Goodwill	-	20,000
P & L A/c	39,690	41,220	Machinery	112,950	116,200
Reserves	50,000	50,000	Building	148,500	144,250
Tax provision	40,000	50,000	Stock	111,040	97,370
Bank overdraft	59,510	-	Sundry debtors	87,490	73,360
Bills payable	33,780	11,525	Cash	2,500	2,700
Sundry creditors	39,500	41,135			
	462,480	453,880		462,480	453,880

The following additional information is obtained from the general ledger:

- During the current year an interim dividend of Rs. 26,000 was paid.
 - The assets of another company were purchased for Rs. 60,000 payable in fully paid shares of V. Ltd. These assets included stock Rs. 22,000 and machinery Rs. 18,000. In addition, sundry purchases of machinery amounted to Rs. 5,600.
 - Income-tax paid during the year amounted to Rs. 25,000
 - The net profit for the year before tax was Rs. 62,530.
 - Prepare a statement showing the sources and application of funds for the current year and a schedule setting out changes in working capital.
6. The non-current assets and equities of northern tools Ltd. Are given at the beginning and at end of the current year:

	End (Rs. ,000)	Beginning (Rs., 000)
Plant assets, net depreciation	285	127
Investment in shares	580	264
Bonds payable	140	500
Capital stock	800	800
Retained earnings	821	476

You are unable to obtain complete balance sheet data or an income statement for the year, but the following information is available:

- Dividend Rs. 75,000 were paid
 - A gain on the sale of equipment of Rs. 26,000 has been included in net income. The gross plant assets increased by Rs. 186,000 even though equipment costing Rs. 58,000 with a net book value of Rs. 38,000 was sold.
- Prepare a statement of sources and uses of net working capital from the information mentioned above.
7. Prepare funds flow statement of Atlantic Business Corporation Ltd. From the following information. Balance sheet as at April 1 and March 31 current year

	April 1	March 31
Cash and bank	40,000	44,400
Accounts receivable	10,000	20,700
Inventories	15,000	15,000
Land	4,000	4,000
Business premises	20,000	16,000
Plant and equipment	15,000	17,000
Accumulated depreciation	(5,000)	(2,800)
Patents and trade marks	1,000	900
Total assets	100,000	115,200
Current liabilities	30,000	32,000
Bonds payable	22,000	22,000
Bonds payable discount	(2,000)	(1,800)
Capital stock	35,000	43,500
Retained earnings	15,000	19,500
Total liabilities	100,000	115,200

Notes

LESSON 12 :

CASH FLOW STATEMENT

Learning Objectives:

After studying this chapter you should be able to

- *Basic concept underlying the changes in financial position.*
- *Understand the statement of changes in financial position (SCFP): cash basis*
- *Under stand the method of preparing the cash flow statement.*

Statement of Changes in Financial Position (SCFP): Cash Basis

The statement of change in financial position based on working capital is of immense use in long-range financial planning. The long-term financing and investment activities are specifically portrayed. The net working capital requirements (in one lump sum amount) are shown as a residual figure. However, the working capital concept may conceal or exclude too much. It treats increases in inventories and accounts receivable as equivalent to increase in cash. Likewise, an increase in accounts payable and accrued expenses are treated as equivalent to an increase in bank overdraft. This is not a correct treatment. In fact, accrued expenses like wages and salaries may become payable in the next 10 days or so; sundry creditors bills may fall due for payment during the next one month, whereas bank overdraft may be for a longer period of, say, three months or even more. Similarly, inventories and accounts receivable undergo a transformation before they become money assets (cash). It is possible that there is sufficient net working capital as revealed by the statement of changes in financial position and yet the firm may be unable to meet its current liabilities as and when they fall due. It may be due to a sizeable piling up of inventories and an increase in debtors caused by a slow-down in collections. The firm's failure to meet its short-term commitments, in spite of its sound long-range financial position and adequate profitability, may plunge it into technical insolvency. Therefore, in making plans for the more immediate future (short-range financial planning), the management is vitally concerned with a statement of cash flows which provides more detailed information. Such a statement is useful for the management to assess its ability to meet obligations to trade creditors, to pay bank loans, to pay interest to debenture holders and dividends to its shareholders. Furthermore, the projected cash flow statements prepared month-wise or so (which are constructed like the funds statement) can be useful in presenting information of excess cash in some months and shortage of cash in others. By making available such information in advance, the statement of cash flows enables the management to revise its plans. In the months when cash receipts are expected to be greater than cash payments, bank overdraft can be repaid, short-term government securities can be purchased, cash discount can be availed of and so on. Likewise, in the months when cash payments are expected to exceed

receipts, the firm would be required to arrange for bank overdraft or sell its marketable securities.

In essence, cash flow statements are statements of changes in financial position prepared on the basis of funds defines (as cash or cash-equivalents. In short, cash flow statements summaries sources of cash inflows and uses of cash outflows of the firm during a particular period of time.

Preparation of Cash Flow Statement

The principal difference between a funds-flow statement and the cash flow statement lies in the amount shown as resources provided by business operations. Therefore, from the point of preparing a cash flow statement, funds from business operations are to be adjusted so as to obtain cash from operations. Most of the other items reported in the funds statement generally involve cash receipts or payments-for example, issue of equity shares or preference shares, sale or purchase of non-current assets like equipments, building and so on. These items also appear in a cash flow statement.

Cash from Business Operations

Funds from business operations under working capital concept are based on accrual accounting procedure in that sales, whether credit or cash, are recognized as a source of working capital. Likewise, purchases whether credit or cash are considered as a use of working capital. But, under the cash concept of funds, the concern is with the cash basis of accounting. Only cash sales and cash receipts from debtors against credit sales are recognized as a source of cash. Similarly, cash purchases and cash payments to suppliers for credit purchases are regarded as the use of cash. The same holds true for other expenses and incomes. No consideration is given for outstanding and prepaid expenses and incomes.

Thus, every item in the profit and loss account is altered according to the cash approach. Some of the items of adjustment of the profit and loss account in the cash flow approach would be the same as in the funds statements, for instance, depreciation on plant and equipment, amortization of various deferred revenue expenses and so on. Since these items do not involve any corresponding outflow of funds (cash), they are added back to determine funds from operations in funds statements. The logic that is applied in the funds statement also applies in the cash flow statement, but the analysis is required to be extended further. Cash is only one of the current assets and is part of the net working capital. Therefore, the changes in all of the other current assets and in the current liabilities must be analyzed in relation to their effect on cash. The rules for relating the changes in current assets and current liabilities to the profit and loss account in the computation of a flow of cash from operations are summarize below: -

- All the increases in current assets excluding cash and decreases in current liabilities, which increase working capital, decrease cash. The decrease in current liabilities takes place when they are paid in cash. For Instance, decrease in creditors, bank overdrafts, bills payable and dividends payable will occur due to their payment. A word of explanation is necessary to show the negative impact of increase in current assets on cash. For instance, an increase in sundry debtors takes place because credit sales are greater than cash collections from them; inventories Increase when the cost of goods purchased is more than the cost of goods sold. Increase in prepaid expenses involves payment of more cash than is required for their current services.
- From the first follows the second rule-all decreases in current assets other than cash and increases in current liabilities, which causes a decrease in working capital increase cash. Debtors would decrease because cash collections are more than current credit sales. Inventories would decrease because cost of goods sold is more than cost of goods purchased; decrease in prepaid expenses reflects that the firm has paid for less services than are currently used. Exhibit 3.3 shows the procedure for determining cash from business operations.

Exhibit 3.3 Cash Flows from Business Operations

(A) Working capital from business operation (as per funds-flow statement)
(B) Adjustment to convert to cash basis:
(i) Add: Decrease in WC (-CA or + CL)
Decrease in current assets other than cash (item wise)
Increase in current liabilities (item-wise)
(ii) Less: Increase in WC (+ CA or -CL)
Increase in current assets other than cash (item-wise)
Decrease in current liabilities (item-wise)
(C) Cash flow from business operations

The complete cash flow statement for Electronics Ltd. of Example 3 is shown below

Cash Flow Statement of Electronics Ltd. for the Current Year

	Amount (Rs. thousand)	Percentages
(A) Sources of Cash:		
Cash inflow from business operations	7	3.0
Cash inflow from other revenues	7	3.0
Sale of non-current assets (machine)	6	2.6
Issue of long-term liabilities:		
Issue of equity shares	210	91.4
Total sources of cash	230	100.0
(8) Uses of Cash:		
Purchases of non-current assets:		
Building and equipments	75	32.6
Patents	16	6.9
Payment of. long-term liabilities:		
Retirement of debentures	160	69.6
Recurring payment to investors:		

- Dividends 'paid" to shareholders	16	6.9
Total uses of cash	267	116
Decrease in Cash: (uses-sources)		

Statement of Changes in Financial Position (SCFP): Total Resource Basis

The SCFP statements based on working capital as well as cash are incomplete and inadequate to the extent that they omit some major financial and investment activities like issue of equity shares or debentures for purchase of building or plant and machinery, conversion of debentures into shares, issue of bonus shares, and the like. Such items, of course, do not affect working capital but are significant and, therefore, need to be shown in the SCFP to achieve the objective of showing all financing and investment activities of the firm. The SCFP statement prepared on the basis of the total resources concept includes all these significant financial transactions. Thus, the 'total resources' concept is the best and the most comprehensive approach to disclose the changes in the financial position of the firm. For the firm in Example 3, the SCFP on total resources basis is illustrated in Table Given below

SCFP based on Total Resources of Electronics Ltd. , for the Current Year

	Amount (Rs. thousand)	Percentages
(A) Total Resource Provided:		
Funds from business operations	33	9.3
Funds from other revenues	7	2.0
Sale of non-current assets (machine)	6	1.7
Issue of long-term liabilities:		
Equity capital (for cash)	210	59.0
Equity capital (for purchase of equipments and goodwill)	100	28.0
	356	100
(B) Total resources Used:		
Purchase of non-current assets:		
Building and equipment (cash)	75	21.1
Equipment (in exchange for equity shares)	70	19.7
Goodwill (in exchange for equity shares)	30	8.4
Patents	16	4.5
Payment of debentures	160	44.9
Dividends paid to shareholders	16	4.5
Interest paid to debenture holders	14	3.9
	381	107.0
(C) Net Decrease in Working Capital (B-A)	25	7.0

Note: Figures in brackets are percentage to total resources.

Practical Problems

Problem

The summarized balance sheet of omega Ltd. As on March 31, Year1, year2, year 3 are given below (Rs. in lakhs)

	As on march 31		
	Year1	Year2	Year3
Liabilities			
Paid-up equity capital	194	194	194
Long-term borrowings			
From banks	68	97	124
From others	281	343	379
Current liabilities	52	54	99
Assets			
Gross block	355	356	361
Less: depreciation	69	95	122
Net block	286	261	239
Current assets	143	199	234
Profit & loss Accounts	166	228	323

Solution

Statement and uses of funds of omega Ltd. For years 2 and 3 (Rs. lakhs)

	Year2	Year3
Source of funds:		
Issue of long-term liabilities		
Borrowings from banks	29	27
Borrowings from others	62	36
Total source	91	63
Uses of funds:		
Funds lost in operations	36	66
Purchase of non-current assets:		
Fixed assets	1	5
Total uses	37	73
Increase (decrease) in working capital	54	(10)

Comment

The firm is suffering from heavy cash losses in both years. In fact its net worth is negative.

The firm has resorted to borrowing to finance its operations. Borrowing have not been used to finance expansion. Given these facts, the firm is likely to go into liquidation in near future as the firm does not seem to have the capacity to service/ repay its long-term borrowings.

Importance and Usefulness

The SCFP is used for two principal purposes: (i) as a means of analysing what has happened in the past and (ii) as a means of planning and decision making for future.

As a tool of historical analysis, the statement highlights not only the magnitude and direction of change in the net working capital during the period of two successive balance sheets but also the factors responsible for it. The information shown in the SCFP is relevant to those making economic decisions. It helps to provide answers to some of the important financial questions related to the company such as:

1. Where did the profits go?
2. Why are dividends not larger?

3. How was it possible to distribute dividends in excess of current earnings or in the presence of a net loss for the period?
4. Why have the net current assets gone down although the net income has gone up?
5. How is it that the net current assets have risen even though there has been a net loss for the period? 6. Why must money be borrowed to finance purchases of new plant and equipment when the cash flow (the sum of the net income and depreciation) is in excess of the required amount?
7. How was the expansion in plant and equipment been financed?
8. What happened to the proceeds of the sale of plant and equipment resulting from a contraction of operations?
9. How was the retirement of debt accomplished?
10. What became of the assets derived from an increase in outstanding share capital?
11. What became of the proceeds of the debt issue?
12. How was the increase in working capital financed?

These questions apart, the SCFP also enables the management to ascertain whether the magnitude and type of commitment pertaining to various sources of raising funds are in conformity with the type of commitment required for their corresponding uses. To be specific, it enables the management to see whether the long-term funds are adequate to finance major fixed assets expansion. A situation in which short-term sources (bank overdraft, temporary loans, etc.) constitute the bulk of sources for long-term purposes may not be desirable. Such a pattern of financing is likely to cause problems for the firm to meet its current liabilities in future. Besides, the SCFP also indicates the extent of reliance on external resources *vis-a-vis* the internal sources in the use of funds. Thus, the SCFP clearly highlights the firm's financing and investment activities.

Moreover, the SCFP is of utmost significance for working capital management decisions also. By listing all transactions of sources and uses of working capital, it provides the management with a net figure of changes in working capital during the two consecutive balance sheet dates. In case the change in WC is significant, it will provoke the management to make an in-depth investigation analysis into its causes. The undesired increase or decrease in WC entails cost. The former clearly involves higher interest cost. Besides interest costs, there are chances of inventory accumulations, locking up of receivables, maintaining excessive cash balances, and so on. The latter situation is still more dangerous in terms of its serious consequences to the smooth functioning and running of the business. Clearly, the SCFP provides a measure of sound working capital management.

The SCFP, when prepared on a projected basis, has immense potential/utility as a tool of financial planning. It shows the effect of various financing and investment decisions on WC in future. If the implementation of the decision results in excessive or inadequate WC, steps may be taken to improve the situation or review the decisions. For instance, if the WC position is expected to deteriorate, funds may be raised by

borrowing or issuing new equity shares. If the required amount is not feasible to be raised, plans for acquisition of assets may be postponed or alternative operative plans can be developed to ensure that the desired future level of business operations, expansion, and so on, are achieved. Thus, the SCFP enables the management to revise/review its investments, operations and financing activities so as to conform to the desired financial inflow and outflow of resources. Above all, the long-term lenders of funds can use the statement as a means of estimating the firm's ability to service its debts.

Summary

The SCFP, based on cash concept of funds, is commonly referred to as the cash-flow statement. In the preparation of such a statement all the items that increase/decrease cash are included but all those items which have no effect on cash are excluded. Hence, it is essentially a tool of short-term financial planning.

The SCFP, based on all resources concept of funds, is the most comprehensive and appropriate basis of measuring' the changes in the financial position. Unlike funds-flow statement, the statement based on total resources does not exclude major financing and investment activities such as purchase of assets by new issue of shares and debentures, conversion of debentures, etc. which do not affect working capital. Thus, *all financial resources concept* is the best approach to disclose the changes in the financial position of a firm among the three alternative concepts of funds.

Case Study -1

What Kind of Earnings?

Shareholders evaluate the success of their investments by calculating the rate of return on investment (ROI). The complex and fast-moving telecoms industry requires heavy investment to build and support new services. So much so that the return on investment is negligible until a complete network is in place. For that reason, many investors focus on earnings before interest, taxes, depreciation, and amortization (ebitda), which approximates a company's free cash flow. Many in the telecoms industry argue that the generation of free cash flow, and subscriber growth, is more important than ROI. As an example, a spokesman in the investor relations department of Vodafone pointed out that the company's ebitda showed \$874 million in free cash flow even though its net loss was over \$11.7 billion.

The use of EBITDA, however, is coming under scrutiny. Many have misused the statistic. Telewest was using it as a trigger for awarding bonuses to directors. The directors received almost \$700,000 while the company lost \$1.9 billion. In addition, EBITDA ignores equipment purchases. For some, the biggest problem with EBITDA is that depreciation and amortization are ignored, and investors need to consider interest, too. Paying careful attention to the amount of interest shown on the income statement can indicate how much a telecom will suffer if it becomes forced to pay higher interest on its bank borrowing and bonds.

Talking it over and Thinking it Through!

1. What are four purposes of the Statement of Cash Flows?

2. Describe the information provided on the Statement of Cash Flows. What three categories of cash flows are shown on the statement?
3. Which category of cash flows on the Statement of Cash Flows most resembles EBITDA?
4. How are EBITDA and cash flows from operating activities similar? How are they different?
5. Explain how a financial statement user would be better informed by looking at the Statement of Cash Flows rather than at EBITDA.

Notes

LESSON 13: WORKING CAPITAL MANAGEMENT

Learning Objectives:

After studying this chapter you should be able to:

- Understand the basics of working capital management
- Forecast working capital management
- Understand important working capital ratios.

Working Capital Management Working capital management is management for the short-term. This is of critical importance to a firm. As pointed out in the text, managers spend about 70% managing for the short-term. This makes sense. Every day companies take in money, write receipts, balance checkbooks, record receivable records, and manage inventory and the like. Also, short-term management should not be discounted. As the old saying goes, “If you can make it in the short-term long enough, you don’t need to worry about the long-term.” Cash budgets may be utilized in managing working capital.

Working capital has to do with the short-term accounts of a firm — current assets and current liabilities. Net working capital is defined as current assets less current liabilities. The secret to good working capital management is simple — “use someone else’s money every chance you get and don’t let anyone else use yours.” Within reason, of course. To do that, the following strategies might be employed; again within reason. A company wouldn’t want to stretch out its payables for so long a period that it’s forced out of business.

Stretch out accounts payable as long as possible. If a bill is due on the 13th, don’t pay it on the 10th. If a company has enough clout, they can negotiate longer terms with vendors.

Turn receivables as quickly as possible. Make it easy for customers to pay. Lockboxes, prepaid envelopes, discounts, etc. may be utilized.

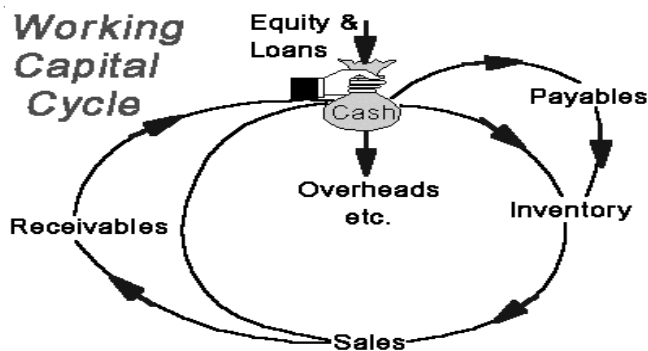
Turn inventories as quickly as possible. Inventories may be a big investment for a firm and they earn no interest. Just-in-time inventory methods and some other strategies are used to hold down a firm’s investment in inventories.

Working Capital Cycle

Cash flows in a cycle into, around and out of a business. It is the business’s life blood and every manager’s primary task is to help keep it flowing and to use the cashflow to generate profits. If a business is operating profitably, then it should, in theory, generate cash surpluses. If it doesn’t generate surpluses, the business will eventually run out of cash and expire.

The faster a business expands, the more cash it will need for working capital and investment. The cheapest and best sources of cash exist as working capital right within business. Good management of working capital will generate cash will help improve profits and reduce risks. Bear in mind that the cost of providing credit to customers and holding stocks can represent a substantial proportion of a firm’s total profits.

There are two elements in the business cycle that absorb cash - **Inventory** (stocks and work-in-progress) and **Receivables** (debtors owing you money). The main sources of cash are **Payables** (your creditors) and **Equity and Loans**.



Each component of working capital (namely inventory, receivables and payables) has two dimensionsTIME and MONEY. When it comes to managing working capital - **TIME IS MONEY**. If you can get money to move faster around the cycle (e.g. collect monies due from debtors more quickly) or reduce the amount of money tied up (e.g. reduce inventory levels relative to sales), the business will generate more cash or it will need to borrow less money to fund working capital. As a consequence, you could reduce the cost of bank interest or you’ll have additional *free* money available to support additional sales growth or investment. Similarly, if you can negotiate improved terms with suppliers e.g. get longer credit or an increased credit limit, you effectively create *free* finance to help fund future sales.

If you	Then
Collect receivables (debtors) faster	You release cash from the cycle
Collect receivables (debtors) slower	Your receivables soak up cash
Get better credit (in terms of duration or amount) from suppliers	You increase your cash resources
Shift inventory (stocks) faster	You free up cash
Move inventory (stocks) slower	You consume more cash

It can be tempting to pay cash, if available, for fixed assets e.g. computers, plant, vehicles etc. If you do pay cash, remember that this is no longer available for working capital. Therefore, if cash is tight, consider other ways of financing capital investment - loans, equity, leasing etc. Similarly, if you pay dividends or

increase drawings, these are cash outflows and, like water flowing down a plug hole, they remove liquidity from the business.

Sources of Cash

Sources of additional working capital include the following:

Existing cash reserves

Profits (when you secure it as cash !)

Payables (credit from suppliers)

New equity or loans from shareholders

Bank overdrafts or lines of credit

Long-term loans

If you have insufficient working capital and try to increase sales, you can easily over-stretch the financial resources of the business. This is called *overtrading*. Early warning signs include:

Pressure on existing cash

Exceptional cash generating activities e.g. offering high discounts for early cash payment

Bank overdraft exceeds authorized limit

Seeking greater overdrafts or lines of credit

Part-paying suppliers or other creditors

Paying bills in cash to secure additional supplies

Management pre-occupation with *surviving* rather than managing

Frequent short-term emergency requests to the bank (to help pay wages, pending receipt of a cheque)

Handling Receivables (Debtors)

Cashflow can be significantly enhanced if the amounts owing to a business are collected faster. Every business needs to know... who owes them money... how much is owed... how long it is owing... for what it is owed.

Late payments erode profits and can lead to bad debts.

Slow payment has a crippling effect on business, in particular on small businesses who can least afford it. **If you don't manage debtors, they will begin to manage your business** as you will gradually lose control due to reduced cashflow and, of course, you could experience an increased incidence of bad debt. The following measures will help manage your debtors:

1. Have the right mental attitude to the control of credit and make sure that it gets the priority it deserves.
2. Establish clear credit practices as a matter of company policy.
3. Make sure that these practices are clearly understood by staff, suppliers and customers.
4. Be professional when accepting new accounts, and especially larger ones.
5. Check out each customer thoroughly before you offer credit. Use credit agencies, bank references, industry sources etc.
6. Establish credit limits for each customer... and stick to them.
7. Continuously review these limits when you suspect tough times are coming or if operating in a volatile sector.
8. Keep very close to your larger customers.

9. Invoice promptly and clearly.

10. Consider charging penalties on overdue accounts.

11. Consider accepting credit /debit cards as a payment option.

12. Monitor your debtor balances and ageing schedules, and don't let any debts get too large or too old.

Recognize that the longer someone owes you, the greater the chance you will never get paid. If the average age of your debtors is getting longer, or is already very long, you may need to look for the following possible defects:

- Weak credit judgment
- Poor collection procedures
- Lax enforcement of credit terms
- Slow issue of invoices or statements
- Errors in invoices or statements
- Customer dissatisfaction.

Debtors due over 90 days (unless within agreed credit terms) should generally demand immediate attention. Look for the warning signs of a future bad debt. For example.....

- Longer credit terms taken with approval, particularly for smaller orders
- Use of post-dated checks by debtors who normally settle within agreed terms
- Evidence of customers switching to additional suppliers for the same goods
- New customers who are reluctant to give credit references
- Receiving part payments from debtors.

Profits only come from paid sales.

The act of collecting money is one which most people dislike for many reasons and therefore put on the long finger because they convince themselves there is something more urgent or important that demand their attention now. **There is nothing more important than getting paid for your product or service. A customer who does not pay is not a customer.**

Here are a few ideas that may help you in collecting money from debtors:

- Develop appropriate procedures for handling late payments.
- Track and pursue late payers.
- Get external help if your own efforts fail.
- Don't feel guilty asking for money.... its yours and you are entitled to it.
- Make that call now. And keep asking until you get some satisfaction.
- In difficult circumstances, take what you can now and agree terms for the remainder. It lessens the problem.
- When asking for your money, be hard on the issue - but soft on the person. Don't give the debtor any excuses for not paying.
- Make it your objective is to get the money - not to score points or get even.

Managing Payables (Creditors)

Creditors are a vital part of effective cash management and should be managed carefully to enhance the cash position.

Purchasing initiates cash outflows and an over-zealous purchasing function can create liquidity problems. Consider the following:

- Who authorizes purchasing in your company - is it tightly managed or spread among a number of (junior) people?
- Are purchase quantities geared to demand forecasts?
- Do you use order quantities which take account of stock-holding and purchasing costs?
- Do you know the cost to the company of carrying stock ?
- Do you have alternative sources of supply ? If not, get quotes from major suppliers and shop around for the best discounts, credit terms, and reduce dependence on a single supplier.
- How many of your suppliers have a returns policy ?
- Are you in a position to pass on cost increases quickly through price increases to your customers ?
- If a supplier of goods or services lets you down can you charge back the cost of the delay ?
- Can you arrange (with confidence !) to have delivery of supplies staggered or on a just-in-time basis ?

There is an old adage in business that if you can buy well then you can sell well. Management of your creditors and suppliers is just as important as the management of your debtors. It is important to look after your creditors - slow payment by you may create ill-feeling and can signal that your company is inefficient (or in trouble!).

Remember, a good supplier is someone who will work with you to enhance the future viability and profitability of your company.

Inventory Management

Managing inventory is a juggling act. Excessive stocks can place a heavy burden on the cash resources of a business. Insufficient stocks can result in lost sales, delays for customers etc.

The key is to know how quickly your overall stock is moving or, put another way, how long each item of stock sit on shelves before being sold. Obviously, average stock-holding periods will be influenced by the nature of the business. For example, a fresh vegetable shop might turn over its entire stock every few days while a motor factor would be much slower as it may carry a wide range of rarely-used spare parts in case somebody needs them.

Nowadays, many large manufacturers operate on a just-in-time (JIT) basis whereby all the components to be assembled on a particular today, arrive at the factory early that morning, no earlier - no later. This helps to minimize manufacturing costs as JIT stocks take up little space, minimize stock-holding and virtually eliminate the risks of obsolete or damaged stock. Because JIT manufacturers hold stock for a very short time, they are able to conserve substantial cash. JIT is a good model to strive for as it embraces all the principles of prudent stock management.

The key issue for a business is to identify the fast and slow stock movers with the objectives of establishing optimum stock levels for each category and, thereby, minimize the cash tied up in stocks. Factors to be considered when determining optimum stock levels include:

- What are the projected sales of each product?
- How widely available are raw materials, components etc.?
- How long does it take for delivery by suppliers?
- Can you remove slow movers from your product range without compromising best sellers?

Remember that stock sitting on shelves for long periods of time ties up money which is not working for you. For better stock control, try the following:

- Review the effectiveness of existing purchasing and inventory systems.
- Know the stock turn for all major items of inventory.
- Apply tight controls to the significant few items and simplify controls for the trivial many.
- Sell off outdated or slow moving merchandise - it gets more difficult to sell the longer you keep it.
- Consider having part of your product outsourced to another manufacturer rather than make it yourself.
- Review your security procedures to ensure that no stock “is going out the back door !”

Higher than necessary stock levels tie up cash and cost more in insurance, accommodation costs and interest charges.

Key Working Capital Ratios

The following, easily calculated, ratios are important measures of working capital utilization.

Ratio	Formulae	Result	Interpretation
Stock Turnover (in days)	$\frac{\text{Average Stock} \times 365}{\text{Cost of Goods Sold}}$	= x days	On average, you turn over the value of your entire stock every x days. You may need to break this down into product groups for effective stock management. Obsolete stock, slow moving lines will extend overall stock turnover days. Faster production, fewer product lines, just in time ordering will reduce average days.
Receivables Ratio (in days)	$\frac{\text{Debtors} \times 365}{\text{Sales}}$	= x days	It takes you on average x days to collect monies due to you. If your official credit terms are 45 day and it takes you 65 days... why ? One or more large or slow debts can drag out the average days. Effective debtor management will minimize the days.
Payables Ratio (in days)	$\frac{\text{Creditors} \times 365}{\text{Cost of Sales (or Purchases)}}$	= x days	On average, you pay your suppliers every x days. If you negotiate better credit terms this will increase. If you pay earlier, say, to get a discount this will decline. If you simply defer paying your suppliers (without agreement) this will also increase - but your reputation, the quality of service and any flexibility provided by your suppliers may suffer.
Current Ratio	$\frac{\text{Total Current Assets}}{\text{Total Current Liabilities}}$	= x times	Current Assets are assets that you can readily turn in to cash or will do so within 12 months in the course of business. Current Liabilities are amount you are due to pay within the coming 12 months. For example, 1.5 times means that you should be able to lay your hands on \$1.50 for every \$1.00 you owe. Less than 1 times e.g. 0.75 means that you could have liquidity problems and be under pressure to generate sufficient cash to meet oncoming demands.
Quick Ratio	$\frac{(\text{Total Current Assets} - \text{Inventory})}{\text{Total Current Liabilities}}$	= x times	Similar to the Current Ratio but takes account of the fact that it may take time to convert inventory into cash.
Working Capital Ratio	$\frac{(\text{Inventory} + \text{Receivables} - \text{Payables})}{\text{Sales}}$	As % Sales	A high percentage means that working capital needs are high relative to your sales.

Other working capital measures include the following:

- Bad debts expressed as a percentage of sales.
- Cost of bank loans, lines of credit, invoice discounting etc.
- Debtor concentration - degree of dependency on a limited number of customers.

Once ratios have been established for your business, it is important to track them over time and to compare them with ratios for other comparable businesses or industry sectors.

Determinants of working Capital

A firm should plan its operations in such a way that it should have neither too much nor too little working capital. The total working capital requirement is determined by a wide variety of factors. These factors, however, affect different enterprises differently. They also vary from time to time. In general, the following factors are involved in a proper assessment of the quantum of working capital required.

General Nature of Business

The working capital requirements of all enterprise are basically related to the conduct of business. Enterprises fall into some broad categories depending on the nature of their business. For instance, public utilities have certain features which have a bearing on their working capital needs. The two relevant features are: (i) the cash nature of business, that is, cash sale, and (ii) sale of services rather than commodities. In view of these features, they do not maintain big inventories and have, therefore, probably the least requirement of working capital. At the other extreme are trading and financial enterprises. The nature of their business is such that they have to maintain a sufficient amount of cash, inventories and book debts. They have necessarily to invest proportionately large amounts in working capital. The manufacturing enterprises fall, in a sense, between these two extremes. The industrial concerns require fairly large amounts of working capital though it varies from industry to industry depending on their asset structure. The proportion of current assets to total assets measures the relative requirements of working capital of various industries. Available data in respect of companies in India confirm the wide variations in the use of working capital by different enterprises. The percentage of current assets to total assets was found to be the lowest in hotels, restaurants and eating houses (10-20 per cent range), while in electricity generation and supply it was in the range of 20-30 per cent. The enterprises in the tobacco, construction and trading groups had, as is to be expected, the highest component of working capital (80-90 per cent range). The other industrial groups fall between these limits though there are very wide inter-industry variations.³

Production Cycle

Another factor that has a bearing on the quantum of working capital is the production cycle. The term 'production or manufacturing cycle' refers to the time involved in the manufacture of goods. It covers the time-span between the procurement of raw materials and the completion of the manufacturing process leading to the production of finished goods. Funds have to be necessarily tied up during the process of manufacture, necessitating enhanced working capital. In other words, there is some time gap before raw materials become finished goods. To

sustain such activities the need for working capital is obvious. The longer the time-span (i.e. the production cycle), the larger will be the tied-up funds and, therefore, the larger is the working capital needed and vice versa. There are enterprises which, due to the nature of business, have a short operating cycle. A distillery, which has an ageing process, has generally to make a relatively heavy investment in inventory. The other extreme is provided by a bakery. The bakeries sell their products at short intervals and have a very high inventory turnover. The investment in inventory and consequently working capital is not very large. Further, even within the same group of industries, the operating cycle may be different due to technological considerations. For economy in working capital, that process should be selected which has a shorter manufacturing process. Having selected a particular process of manufacture, steps should be taken to ensure that the cycle is completed in the expected time. This underlines the need for effective organisation and coordination at all levels of the enterprise. Appropriate policies concerning terms of credit for raw material and other supplies can help in reducing working capital requirements. Often, companies manufacturing heavy machinery and equipment minimise the investment in inventory or working capital by requiring advance payment from customers as work proceeds against orders. Thus, a part of the financial burden / relating to the manufacturing cycle time is passed on to others.

Business Cycle

The working capital requirements are also determined by the nature of the business cycle. Business fluctuations lead to cyclical and seasonal changes which, in turn, cause a shift in the working capital position, particularly for temporary working capital requirements. The variations in business conditions may be in two directions: (i) upward phase when boom conditions prevail, and (ii) downswing phase when economic activity is marked by a decline. During the upswing of business activity, the need for working capital is likely to grow to cover the lag between increased sales and receipt of cash as well as to finance purchases of additional material to 'cater to the' expansion of the level of activity. Additional funds may be required to invest in plant and machinery to meet the increased demand. The downswing phase of the business cycle has exactly an opposite effect on the level of working capital requirement. The decline in the economy is associated with a fall in the volume of sales which, in turn, leads to a fall in the level of inventories and, book debts. The need for working capital in recessionary conditions is bound to decline. In brief, business fluctuations influence the size of working capital mainly through the effect on inventories. The response of inventory to business cycles is mild or violent according to nature of the business cycle.

Production Policy

The quantum of working capital is also determined by production policy. In the case of certain lines of business, the demand for products is seasonal, that is, they are purchased during certain months of the year. What kind of production policy should be followed in such cases? There are two options open to such enterprises- either they confine their production only to periods when goods are purchased or they follow a steady

production policy throughout the year and produce goods at a level to meet the peak demand. In the former case, there are serious production problems. During the slack season, the firms have to maintain their working force and physical facilities without adequate production and sale. When the peak period arrives, the firms have to operate at full capacity to meet the demand. This kind of arrangement would not only be expensive but also inconvenient. Thus, serious difficulties will be encountered in trying to match production to the ebb and flow of the seasonal demand pattern. A better alternative is a steady production policy independent of shifts in demand for the finished goods. This means a large accumulation of finished goods (inventories) during the off-season and their abrupt sale during the peak season. The progressive accumulation of stock naturally requires an increasing amount of working capital which remains tied up for some months. Working capital planning has to incorporate this pattern of requirement of funds when production and seasonal sales are steady. This strategy (steady production policy) is, however, not necessarily adopted by everyone. It may be possible for instance, for instance, for some to follow a policy of diversification which will enable them to engage the working force and the physical facilities in some other activity. If this is possible, there will be no major working capital problem. Moreover, the nature of some products may be such that accumulation of inventories may create special risk and cost problems. For them, a production policy in tune with the changing demands may be preferable. Therefore, production policies have to be formulated on the basis of the individual setting of each enterprise and the magnitude and dimension of the working capital problems will accordingly vary.

Credit Policy

The credit policy relating to sales and purchases also affects the working capital. The credit policy influences the requirement of working capital in two ways: (i) through credit terms granted by the firm to its customers buyers of goods; (ii) credit terms available to the firm from its creditors.

The credit terms granted to customers have a bearing on the magnitude of working capital by determining the level of book debts. The credit sales result in higher book debts (receivables). Higher book debts mean more working capital. On the other hand, if liberal credit terms are available from the suppliers of goods (trade creditors), the need for working capital is less. The working capital requirements of a business are, thus; affected by the terms of purchase and sale, and the role given to credit by a company in its dealings with-creditors and debtors.

Credit terms fixed by an enterprise are affected by the prevailing trade practices as well as changing economic conditions. If, for example, competition is keen, there would be pressure to grant generous credit terms. Nevertheless, there is wide scope for managerial discretion in working out a suitable credit policy relevant to each customer based on the merits of each case. For instance, liberal credit facilities can be extended on the basis of credit rating. This will avoid the problem of having excess working capital. Similarly, the collection procedure can be so framed that funds, which would otherwise be available for meeting operating needs are not locked up. Thus, adoption of

rationalised credit policies would be a significant factor in determining the working capital needs of an enterprise.

Growth and Expansion

As a company grows, it is logical to expect that a larger amount of working capital is required. It is, of course, difficult to determine precisely the relationship between the growth in the volume of business of a company and the increase in its working capital. The composition of working capital in a growing company also shifts with economic circumstances and corporate practices. Other things being equal, growth industries require more working capital than those that are static. The critical fact, however, is that the need for increased working capital funds does not follow the growth in business activities but precedes it. Advance planning of working capital is, therefore, a continuing necessity for a growing concern. Or else, the company may have substantial earnings but little cash.

Vagaries in the Availability of Raw Material

The availability or otherwise of certain raw materials on a continuous basis without interruption would sometimes affect the requirement of working capital. There may be some materials which cannot be procured easily either because of their sources are few or they are irregular. To sustain smooth production, therefore, the firm might be compelled to purchase and stock them far in excess of genuine production needs. This will result in an excessive inventory of such materials. The procurement of some essential raw materials is difficult because of their sporadic supply. This happens very often with raw materials which are in short supply and are controlled to ensure equitable distribution. The buyer has in such cases very limited options as to the quantum and timing of procurement. It may so happen that a bulk consignment may be available but the firm may be short of funds, while when surplus funds are available the commodities may be in short supply. This element of uncertainty would lead to a relatively high level of working capital. Finally, some raw materials may be available only during certain seasons. They would have to be necessarily obtained, when available, to provide for a period when supplies are lean. This will cause seasonal fluctuations in working capital requirements.

Profit Level

The level of profits earned differ from enterprise to enterprise. In general, the nature of the product, hold on the market, quality of management and monopoly power would by and large determine the profit earned by a firm. A priori, it can be generalized that a firm dealing in a high quality product, having a good marketing arrangement and enjoying monopoly power in the market, is likely to earn high profits and vice versa. Higher profit margin would improve the prospects of generating more internal funds thereby contributing to the working capital pool. The net profit is a source of working capital to the extent that it has been earned in cash. The cash profit can be found by adjusting non-cash items such as depreciation, outstanding expenses and losses written off, in the net profit. But, in practice, the net cash inflows from operations cannot be considered as cash available for use at the end of cash cycle. Even as the company's operations are in progress, cash is used

for augmenting stock, book debts and fixed assets. It must, therefore, be seen that cash generation has been used for furthering the interest of the enterprise.

The availability of internal funds for working capital requirements is determined not merely by the profit margin but also by the manner of appropriating profits. The availability of such funds would depend upon the profit appropriations for taxation, dividend, reserves and depreciations.

Level of Taxes

The first appropriation out of profits is payment or provision for tax. The amount of taxes to be paid is determined by the prevailing tax regulations. The management has no discretion in this respect. Very often, taxes have to be paid in advance on the basis of the profit of the preceding year. Tax liability is, in a sense, short-term liability payable in cash. An adequate provision for tax payments is, therefore, an important aspect of working capital planning. If tax liability increases, it leads to an increase in the requirement of working capital and vice versa. Management has no discretion in regard to the payment of taxes; in some cases non-payment may invite penal action. There is, however, wide scope to reduce the tax liability through proper tax planning. The service of tax experts can be availed of to take advantage of the various concessions and incentives through avoidance as opposed to evasion of taxes. Tax planning can, therefore, be said to be an integral part of working capital planning.

Dividend Policy

Another appropriation of profits that has a bearing on working capital is dividend payment. The payment of dividend consumes cash resources and, thereby, affects working capital to that extent. Conversely, if the firm does not pay dividend but retains the profits, working capital increases. In planning working capital requirements, therefore, a basic question to be decided is whether profits will be retained or paid out to shareholders. In theory, a firm should retain profits to preserve cash resources and, at the same time, it must pay dividends to satisfy the expectations of investors. When profits are relatively small, the choice is between retention and payment. The choice must be made after taking into account all the relevant factors.

There are wide variations in industry practices as regards the interrelationship between working capital requirements and dividend payment. In some cases, shortage of working capital has been a powerful reason for reducing or even skipping dividends in cash. There are occasions, on the other hand, when dividend payments are continued in spite of inadequate earnings in a particular year because of sound liquidity. Sometimes, the dilemma is resolved by the payment of bonus shares. This enables the payment of dividend without draining away the cash resources and, thus, without reducing working capital dividend policy, is thus, a significant element in determining the level of working capital in an organisation.

Depreciation Policy

Depreciation policy also exerts an influence on the quantum of working capital.

Depreciation charges do not involve any cash outflows. The effect of depreciation policy on working capital is, therefore,

indirect. In the first place, depreciation affects the tax liability and retention of profits. Depreciation is allowable expenditure in calculating net profits. Enhanced rates of depreciation lower the profits and, therefore, the tax liability and, thus, more cash profits. Higher depreciation also means lower disposable profits and, therefore, a smaller dividend payment. Thus, cash is preserved. In the second place the selection of the method of depreciation has important financial implications. If current capital expenditure falls short of the depreciation provision, the working capital position is strengthened and there may be no need for short-term borrowing. If, on the other hand, the current capital expenditure exceeds the depreciation provision, either outside borrowing will have to be resorted to or a restriction on dividend payment coupled with retention of profits will have to be adopted to prevent the working capital position from being adversely affected. It is in these ways that depreciation policy is relevant to the planning of working capital.

Price Level Changes

Changes in the price level also affect the requirements of working capital. Rising prices necessitate the use of more funds for maintaining an existing level of activity. For the same level of current assets, higher cash outlays are required. The effect of rising prices is that a higher amount of working capital is needed. However, in the case of companies which can raise their prices proportionately, there is no serious problem regarding working capital. Moreover, the price rise does not have a uniform effect on all commodities. It is likely that some firms may not be affected at all. In brief, the implications of changing price levels on working capital position vary from company to company depending on the nature of its operations, its standing in the market and other relevant considerations.

Operating Efficiency

The operating efficiency of the management is also an important determinant of the level of working capital. The management can contribute to a sound working capital position through operating efficiency. Although the management cannot control the rise in prices, it can ensure the efficient utilisation of resources by eliminating waste, improving coordination, and a fuller utilisation of existing resources, and so on. Efficiency of operations accelerates the pace of cash cycle and improves the working capital turnover. It releases the pressure on working capital by improving profitability and improving the internal generation of funds.

To conclude, the level of working capital is determined by a wide variety of factors which are partly internal to the firm and partly external (environmental) to it. Efficient working capital management requires efficient planning and a constant review of the needs for an appropriate working capital strategy.

Practical Problem

1. X&Y Ltd. is desirous to purchase a business and has consulted you, and one point on which you are asked to advise them, is the average of working capital will required in the first years's working.

You are given the following estimates and are instructed to add 10% to your computed figure to allow for contingencies.

	Amount
i. Average amount backed up for stocks:	
Stock of finished product	5000
Stocks of stores and materials	8000
ii. Average credit given:	
Inland sale's, 6 weeks credit	312000
Export sales, 1.5 weeks credit	78000
iii. Average time lag in payment of wages and other outgoings:	
Wages, 1.5 months	260000
Stocks and materials, 1.5 months	48000
Rent and royalties, 6 months	10000
Clerical staff, 0.5 month	62400
Manager, 0.5 months	4800
Miscellaneous expenses, 1.5 months	48000
iv. Payment in advance:	
Sundry expenses (paid quarterly)	8000
Undrawn profits on an average throughout the year	11000

Set up your calculations for the average amount of working capital required

Solution

Statement to determine net working capital for X&Y Ltd.

	Amount (Rs.)
a. Current assets	
i, Stock of finished product	5000
ii. Stock of stores and materials	8000
iii. Debtors	
Inland sales (Rs.312,000 x 6/52)	36000
Export sales (Rs. 78,000x 3/104)	2250
iv. Advance payment of sundry expense (Rs.8,000 x1/4)	2000
Total investment in current assets	53250
b. Current liabilities:	
i. Wages (260,000x3/104)	7500
ii. Stocks/ materials (48,000x 3/24)	6000
iii. Rent, royalties (10000x 6/12)	5000
iv. Clerical staff (62400x 1/24)	2600
v. Manager (4800 x 1/24)	200
vi. Miscellaneous Expenses (48,000x 3/24)	6000
Total estimate of current liabilities	27300
c. Net working capital:	
i. Current assets- current liabilities (A-B)	25950
ii. Add 10% contingency allowance	2595
Average amount of working capital required	28545

Summary

The need for working capital or current assets from the operating or cash cycle of the firm. The operating cycle refers to the length of time to convert the non-cash current assets into cash. in other words , cash cycle refers to the time involved in completing the following sequence of events : conversion of

cash into inventory, conversion of inventory into receivables and conversion of receivables into cash.

Working capital requirement are determined by a variety of factors in general, the following factors are relevant for the proper assessment of the quantum of working capital required: general nature of business, production cycle, business cycle, production policy, credit policy, growth and expansion, availability of raw materials, profit level, level of taxes, dividend policy, depreciation policy, price level, changes, operating efficiency.

Assignment Material

- 'Working capital management deals with decisions regarding the appropriate mix and level of current assets and current liabilities'. Elucidate the statement.
- Length of operating cycle is the major determinant of working capital needs of a business firm. Explain.
- Describe in brief the various factors, which are taken into account in determining the working capital needs of a firm.
- ABC Company has the following selected asset and liabilities:

	Rs.
Cash	45,000
Retained earning	160000
Equity share capital	150000
Debtors	60000
Inventory	111000
Debentures	100000
Provision for taxation	57000
Expenses outstanding	21000
Land and building	300000
Goodwill	50000
Furniture	25000
Creditors	39000

You are required to determine (a) gross working capital and (b) net working capital.

Notes

LESSON 14-15 : FINANCIAL RATIO'S

Learning Objectives

- Show the use of financial ratios to get useful information from financial statements.
- Recognize the diagnostic role of financial ratios.
- Highlights the utility of financial ratios in credit analysis and competitive analysis as well as in determining the financial capability of the firm.
- Understand the limitations of financial ratios.

Ratio Analysis

Meaning and Rationale

Ratio analysis is a widely - used tool of financial analysis. It is defined as the systematic use of ratio to interpret the financial statements so that the strengths and weaknesses of a firm as well as its historical performance and current financial condition can be determined. The term ratio refers to the numerical or quantitative relationship between two items/variables. This relationship can be expressed as (i) percentages, say, net profits are 25 per cent of sales (assuming net profits of Rs 25,000 and sales of Rs 1,00,000), (ii) fraction (net profit is one-fourth of sales) and (iii) proportion of numbers (the relationship between net profits and sales is 1:4). These alternative methods of expressing items which are related to each other are, for purposes of financial analysis, referred to as ratio analysis. It should be noted that computing the ratios does not add any information not already inherent in the above figures of profits and sales. What the ratios do is that they reveal the relationship in a more meaningful way so as to enable us to draw conclusions from them.

The rationale of ratio analysis lies in the fact that it makes related information comparable. A single figure by itself has no meaning but when expressed in terms of a related figure, it yields significant inferences. For instance, the fact that the net profits of a firm amount to, say, Rs 10 lakhs throws no light on its adequacy or otherwise. The figure of net profit has to be considered in relation to other variables. How does it stand in relation to sales? What does it represent by way of return on total assets used or total capital employed? If, therefore, net profits are shown in terms of their relationship with items such as sales, assets, capital employed, equity capital and so on, meaningful conclusions can be drawn regarding their adequacy. To carry the above example further, assuming the capital employed to be Rs 50 lakh and Rs 100 lakh, the net profits are 20 per cent and 10 per cent respectively. Ratio analysis, thus, as a quantitative tool, enables analysts to draw quantitative answers to questions such as: Are the net profits adequate? Are the assets being used efficiently? Is the firm solvent? Can the firm meet its current obligations and so on?

Basis of Comparison

Ratios, as shown above, are relative figures reflecting the relationship between variables. They enable analysts to draw conclusions regarding financial operations. The use of ratios, as a tool of financial analysis, involves their comparison, for a single ratio, like absolute figures, fails to reveal the true position. For example, if in the case of a firm, the return on capital employed is 15 per cent in a particular year, what does it indicate? Only if the figure is related to the fact that in the preceding year the relevant return was 12 per cent or 18 per cent, it can be inferred whether the profitability of the firm has declined or improved. Alternatively, if we know that the return for the industry as a whole is 10 per cent or 20 per cent, the profitability of the firm in question can be evaluated. Comparison with related facts is, therefore, the basis of ratio analysis. Four types of comparisons are involved: (i) trend ratios, (ii) inter-firm comparison, (iii) comparison of items within a single year's financial statement of a firm, and (iv) comparison with standards or plans.

Trends ratios involve a comparison of the ratios of a firm over time, that is, present ratios are compared with past ratios for the same firm. The comparison of the profitability of a firm, say, year 1 through 5 is an illustration of a trend ratio. Trend ratios indicate the direction of change in the performance-improvement, deterioration or constancy-over the years.

The inter-firm comparison involving comparison of the ratios of a firm with those of others in the same line of business or for the industry as a whole reflects its performance in relation to -its competitors.

Other types of comparison may relate to comparison of items within a: single year's financial statement of a firm and comparison with standards or plans.

Types of Ratios

Ratios can be classified into four broad groups: (i) Liquidity ratios, (ii) Capital structure/leverage ratios, (iii) Profitability ratios, and (iv) Activity ratios.

Liquidity Ratios

The importance of adequate liquidity in the sense of the ability of a firm to meet current/short-term obligations when they become due for payment can hardly be overstressed. In fact, liquidity is a prerequisite for the very survival of a firm. The short-term creditors of the firm are interested in the short-term solvency or liquidity of a firm. But liquidity implies, from the viewpoint of utilization of the funds of the firm, that funds are idle or they earn very little. A proper balance between the two contradictory requirements, that is, liquidity and profitability, is required for efficient financial management. The liquidity ratios measure the ability of a firm to meet its short-term obligations and reflect the short-term financial strength/solvency of a firm. The ratios which indicate the liquidity of a firm are: (i) net

working capital, (ii) current ratios, (iii) acid test/quick ratios, (iv) super quick ratios, (v) turnover ratios, and-(vi) defensive-interval ratios.

Net Working Capital

Net working capital (NWC) represents the excess of current assets over current liabilities. The term current assets refers to assets which in the normal course of business get converted into cash without diminution in value over a short period, usually not exceeding one year or length of operating cash cycle whichever is more. Current liabilities are those liabilities, which at the inception are required to be paid in short period, normally a year. Although NWC is really not a ratio, it is frequently employed as a “ measure of a company’s liquidity position. An enterprise should have sufficient NWC in order to be able to meet the claims of the creditors and the day-to-day needs of business. The greater is the amount of NWC, ‘: the greater is the liquidity of the firm. Accordingly, NWC is a measure of liquidity. Inadequate working capital is the first sign of financial problems for a firm.

There is, however, no predetermined criterion as to what constitutes adequate NWC. Moreover, the size of the NWC is not an appropriate measure of the liquidity position of a firm as shown in Table 1

Net Working Capital

	Company A	Company B
Total current assets	Rs 1,80,000	Rs 30,000
Total current liabilities	1,20,000	10,000
NWC	60,000	20,000

If the size of NWC is a measure of liquidity, Company A must be three times as liquid as Company B. However, a deeper probe would show that this is not so. A comparison of current liabilities and current assets of both the firms shows that for each rupee of current liability, B has Rs 3 of current assets, while A has only Rs 1.50. Thus, while A has three times the NWC of B, the current assets of the former are only 1.5 times its current liabilities as compared to 3 times in case of the latter. Obviously, from the viewpoint of the ability to meet its current obligations, firm B is in a better position than firm A. Another limitation of NWC, as a measure of liquidity, is that a change in NWC does not necessarily reflect a change in the liquidity position of a firm. Witness Table 2

Change in Net Working Capital

	End-year 1	End-year 2
Current assets	Rs 1,00,000	Rs 2,00,000
Current liabilities	25,000	1,00,000
NWC	75,000	1,00,000

Although the NWC has gone up for the firm in Table 4.2 from Rs 75,000 to Rs 1,00,000, that is, by Rs 25,000 or 33.3 per cent between two points of time, there is, in reality, a deterioration in the liquidity position. In the first year, the firm had Rs 4 of current assets for each rupee of current liabilities; but by the end of the second year the amount of current assets for each rupee of current liabilities declined to Rs 2 only, that is, by 50 per cent. For these reasons, NWC is not a satisfactory measure of the

liquidity of a firm for inter-firm comparison *qr* for trend analysis.4 A better indicator is the current ratio.

Current Ratio

The current ratio is the ratio of total current assets to total current liabilities. It is calculated by dividing current assets by current liabilities:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{current liabilities}}$$

The current assets of a firm, as already stated, represent those assets which can be, in the ordinary course of business, converted into cash within a short period of time, normally not exceeding one year and include cash and bank balances, marketable securities, inventory of raw materials, semi-finished (work-in-progress) and finished goods, debtors net of provision for bad and doubtful debts, bills receivable and prepaid expenses. The current liabilities defined as liabilities which are short-term maturing obligations to be met, as originally contemplated, within a year, consist of trade creditors, bills payable, bank credit, provision for taxation, dividends payable and outstanding expenses. The current ratio for firms A and B of Table 1 are shown in Table 3.

Current Ratio	Firm A	Firm B
<u>Current assets</u>	<u>Rs 1,80,000</u>	<u>Rs 30,000</u>
Current liabilities	Rs 1,20,000	Rs 10,000
	= 3 : 2 (1.5 : 1)	3 : 1

Rationale

The current ratio of a firm measures its short-term solvency, that is, its ability to meet short-term obligations. As a measure of short-term/current financial liquidity, it indicates the rupees of current assets available for each rupee of current liability obligation. The higher the current ratio, the larger is the amount of rupees available per rupee of current liability, the more is the firm’s ability to meet current obligations and the greater is the safety of funds of short-term creditors. Thus, current ratio, in away, is a measure of margin of safety to the creditors_

The need for safety margin arises from the inevitable unevenness in the flow of funds through the current assets and liabilities account. If the flows were absolutely smooth and uniform each day so that inflows exactly equaled absolutely maturing obligations, the requirement of a safety margin would be small. The fact that a firm can rarely count on such an even flow requires that the size of the current assets should be sufficiently larger than current liabilities so that the firm would be assured of being able to pay its current maturing debt as and when it becomes due. Moreover, only making payment whereas the current assets available to liquidate them are subject to shrinkage for various reasons, such as bad debts, inventories becoming obsolete or unsaleable and occurrence of unexpected losses in can settle the current liabilities marketable securities and so on. The current ratio measures the size of the short-term liquidity ‘buffer’. A satisfactory current ratio would enable a firm to meet its obligations even when the value of the current assets declines.

Acid- Test/Quick Ratio

One defect of the current ratio is that it fails to convey any information on the composition of the current assets of a firm. A rupee of cash is considered equivalent to a rupee of inventory or receivables. But it is not so. A rupee of cash is more readily available (i.e. more liquid) to meet current obligations than a rupee of, say, inventory. This impairs the usefulness of the current ratio. The acid-test ratio is a measure of liquidity designed to overcome this defect of the current ratio. It is often referred to as quick ratio because it is a measurement of a firm's ability to convert its current assets quickly into cash in order to meet its current liabilities. Thus, it is a measure of quick or acid liquidity.

The acid-test ratio is the ratio between quick current assets and current liabilities and is calculated by dividing the quick assets by the current liabilities:

$$\text{Acid-test ratio} = \frac{\text{Quick assets}}{\text{Current liabilities}}$$

The term quick assets refers to current assets which can be converted into cash immediately or at a short notice without diminution of value. Included in this category of current assets are (i) cash and bank balances; (ii) short-term marketable securities and (iii) debtors/receivables. Thus, the current assets, which are excluded, are prepaid expenses and inventory. The exclusion of inventory is based on the reasoning that it is not easily and readily convertible into cash. Prepaid expenses by their very nature are not available to payoff current debts. They merely reduce the amount of cash required in one period because of payment in a prior period. The acid-test ratio is calculated in Table 4.

TABLE 4

Acid-Test Ratio

Cash	2,000
Debtors	2,000
Inventory	12,000
Total current assets	<u>16,000</u>
Total current liabilities	8,000
i. Current ratio	2 : 1
ii. (ii) Acid-test ratio	0.5 : 1

Turnover Ratio

The liquidity ratios discussed so far relate to the liquidity of a firm as a whole. Another way of examining the liquidity is to determine how quickly certain current assets are converted into cash. The ratios to measure these are referred to as turnover ratios. These are, as activity ratios, covered in detail later in this chapter. Here, we focus on them to supplement the three liquidity ratios discussed above. The three relevant turnover ratios are (i) inventory turnover ratio; (ii) debtors turnover ratio; and (iii) creditors turnover ratio.

Inventory Turnover Ratio It is computed by dividing the cost of goods sold by the average inventory. Thus, Cost of goods sold

$$\text{Inventory turnover ratio} = \frac{\text{cost of goods sold}}{\text{Average inventory}}$$

The cost of goods sold means sales' minus gross profit. The average inventory refers to the simple average of the opening and closing inventory. The ratio indicates how fast inventory is sold. A high ratio is good from the viewpoint of liquidity and *vice versa*. A low ratio would signify that inventory does not sell fast and stays on the shelf or in the warehouse for a long time. This is illustrated in

Example 1

A firm has sold goods worth Rs 3,00,000 with a gross profit margin of 20 per cent. The stock at the beginning and the end of the year was Rs 35,000 and Rs 45,000 respectively. What is the inventory turnover ratio?

Solution

$$\begin{aligned} \text{Inventory turnover ratio} &= \frac{(\text{Rs } 3,00,000 - \text{Rs } 60,000)}{(\text{Rs } 35,000 + \text{Rs } 45,000) \div 2} \\ &= 6 \text{ (times per year)} \end{aligned}$$

$$\begin{aligned} \text{Inventory holding period} &= \frac{12 \text{ months}}{6} \\ &= 2 \text{ months.} \end{aligned}$$

Debtors Turnover Ratio

It is determined by dividing the net credit sales by average debtors outstanding during the year. Thus,

$$\text{Debtors turnover ratio} = \frac{\text{Net credit sales}}{\text{Average debtors}}$$

Net credit sales consist of gross credit sales minus returns, if any; from customers. Average debtors is the simple average of debtors at the beginning and at the end of year. The analysis of the debtors turnover ratio supplements the information regarding the liquidity of one item of current assets of the firm. The ratio measures how rapidly debts are collected. A high ratio is indicative of shorter time-lag between credit sales and cash collection. A low ratio shows that debts are not being collected rapidly. This is shown in Example 2.

Example 2

A firm has made credit sales of Rs 2,40,000 during the year. The outstanding amount of debt at the beginning and at the end of the year respectively was Rs 27,500 and Rs 32,500. Determine the debtor turnover ratio.

Solution

$$\begin{aligned} \text{Debtors turnover ratio} &= \frac{\text{Rs } 2,40,000}{(\text{Rs } 27,500 + \text{Rs } 32,500) \div 2} \\ &= 8 \text{ (times per year)} \end{aligned}$$

$$\begin{aligned} \text{Debt collection period} &= \frac{12 \text{ months}}{\text{debtors turnover}} \\ &= 1.5 \text{ months} \end{aligned}$$

Creditors Turnover Ratio

It is a ratio between net credit purchases and the average amount of creditors outstanding during the year. It is calculated as follows:

$$\text{Creditors turnover ratio} = \frac{\text{Net credit purchases}}{\text{Average creditors}}$$

Net credit purchases = Gross credit purchases *less* returns to suppliers

Average creditors = Average of creditors outstanding at the beginning and at the end of the year.

A low turnover ratio reflects liberal credit terms granted by suppliers, while a high ratio shows that accounts are to be settled rapidly. The creditors turnover ratio is an important tool of analysis as a firm can reduce its requirement of current assets by relying on supplier's credit. The extent to which trade creditors are willing to wait for payment can be approximated by the creditors turnover ratio. Consider Example 3.

Example 3

The firm of Examples 4.1 and 4.2 has made credit purchases of Rs 1,80,000. The amount payable to the creditors at the beginning and at the end of the year is Rs 42,500 and Rs 47,500 respectively. Find out the creditors turnover ratio.

Solution

$$\text{Creditors turnover ratio} = \frac{(\text{Rs } 1,80,000)}{(\text{Rs } 42,500 + \text{Rs } 47,500) + 2} = 4 \text{ (times per year)}$$

$$\text{Creditor's payment period} = \frac{12 \text{ months}}{\text{Creditors turnover ratio (4)}} = 3 \text{ months}$$

The summing up of the three turnover ratios has a bearing on the liquidity of a firm. The combined effect of the three turnover ratios is summarized below:

Inventory holding period	2 months
Add debtor's collection period	+ 1.5 months
Less creditor's payment period	- 3 months
	0.5 month

As a rule, the shorter is this period, the better are the liquidity ratios as measured above and *vice versa*.

Defensive- Interval Ratio

The liquidity ratios of a firm outlined in the preceding discussions throw light on the ability of a firm to pay its current liabilities. Apart from paying current liabilities, the liquidity position of a firm should also be examined in relation to its ability to meet projected daily expenditure from operations. The defensive-interval ratio provides such a measure of liquidity. It is a ratio between the quick liquid assets and the projected daily cash requirements and is calculated according to Equation below:

Liquid assets

Defensive-interval ratio = Projected daily cash requirement where

$$\text{Projected cash operating expenditure} = \frac{\text{Projected daily cash requirement}}{\text{Number of days in a year (365)}}$$

The projected cash operating expenditure is based on past expenditures and future plans. It is equivalent to the cost of goods sold excluding depreciation, plus selling and administrative expenditure and other ordinary cash expenses. Alternatively, a very rough estimate of cash operating expenses can be obtained by subtracting the non-cash expenses like depreciation and amortization from total expenses. Liquid assets, as already stated, include current assets excluding inventory and prepaid expenses.

The defensive-interval ratio measures the time span a firm can operate on present liquid assets (comprising cash and marketable securities and cash collected from debtors) without resorting to next year's income. Consider Example 4.

Example 4

The projected cash operating expenditure of a firm from the next year is Rs 1,82,500. It has liquid current assets amounting to Rs 40,000. Determine the defensive-interval ratio.

Solution

$$\text{Projected daily cash requirement} = \frac{\text{Rs } 1,82,500}{365} = \text{Rs } 500$$

$$\text{Defensive-interval ratio} = \frac{\text{Rs. } 40,000}{\text{Rs } 500} = 80 \text{ days}$$

The figure of 80 days indicates that the firm has liquid assets, which can meet the operating cash requirements of business for 80 days without resorting to future revenues. A higher ratio would be favorable, as it would reflect the ability of a firm to meet cash requirements for a longer period of time. It provides a safety margin to the firm in determining its ability to meet basic operational costs. A higher ratio would provide the firm with a relatively higher degree of protection and tends to offset the weakness indicated by low current and acid test ratios.

To conclude the discussion of liquidity ratios, the short-term solvency of a firm can be judged not merely in terms of the traditional liquidity ratios such as current and acid tests, but the analysis should also be extended towards examining the quality of turnover of the items of current assets on which such ratios are based. These qualitative considerations (turnover ratios) coupled with the defensive-interval ratios would reveal the true liquidity position of the firm.

The liquidity ratios are, no doubt, primarily relevant from the viewpoint of the creditors of the firm. In theory, therefore, the higher the liquidity ratio, the better is the firm. "But high ratios have serious implications from the firm's point of view. High current and acid test ratios would imply that funds have unnecessarily accumulated and are not being profitably utilized. Similarly, an unusually high rate of inventory turnover may indicate that a firm is losing business by failing to maintain an adequate level of inventory to serve the customer's needs. A rapid turnover of debtors may reflect strict credit policies that hold revenue below levels that could be obtained by granting more liberal credit terms.

Finally, while interpreting the short-term position of the firm by the creditors, it should be recognized that the management may be tempted to indulge in 'window-dressing' just before the financial statements are prepared so as to make the current financial position appear better than what it actually is. For instance by postponing purchase, allowing inventories to fall below the normal levels, using all available cash to payoff current liabilities and pressing collection on debtors, the current and acid-test ratios, and debtors turnover ratios may be artificially improved. Even when no deliberate attempt has been made to present a good picture, the current financial position shown by the year-end financial statements is probably more favorable than at any other time of the year. This is particularly true when a firm adopts a natural business year that ends during ebb in the seasonal swing of business activity. At the time of peak activity, debtors, inventories and current liabilities tend to be at higher levels. In such cases, an analysis of current financial position based solely on year-end data will tend to over-state a firm's average liquidity position.

Leverage/Capital Structure Ratios

The second category of financial ratio is leverage or capital structure ratios. The long-term creditors would judge the soundness of a firm on the basis of the long-term financial strength measured in terms of its ability to pay the interest regularly as well as repay the installment of the principal on due dates or in one lump sum at the time of maturity. The long-term solvency of a firm can be examined by using leverage or capital structure ratios. The leverage or capital structure ratios may be defined as financial ratios which throw light on the long-term solvency of a firm as reflected in its ability to assure the long-term creditors with regard to (i) periodic payment of interest during the period of the loan and (ii) repayment of principal on maturity or in predetermined installments at due dates.

There are, thus, two aspects of the long-term solvency of a firm: (i) ability to repay the principal when due, and (ii) regular payment of the interest. Accordingly, there are two different, but mutually dependent and interrelated, types of leverage ratios. First, ratios, which are based on the relationship between, borrowed funds and owner's capital. These ratios are computed from the balance sheet and have many variations such as (a) debt-equity ratio, (b) debt-assets ratio, (c) equity-assets ratio, and so on. The second type of capital, structure ratios, popularly called coverage ratios, are calculated from the profit and loss account. Included in this category are (a) interest coverage ratio, (b) dividend coverage ratio, (c) total fixed charges coverage ratio, (d) cash flow coverage ratio, and (e) debt services-coverage ratio.

Debt-Equity Ratios

The relationship between borrowed fund and owner's capital is a popular measure of the long-term financial solvency of a firm. This relationship is shown by the debt-equity ratios. This ratio reflects the relative claims of creditors and shareholders against the assets of the firm. Alternatively, this ratio indicates the relative proportions of debt and equity in financing the assets of a firm. The relationship between outsiders, claims and owner's capital can be shown in different ways and, accordingly, there are many variants of the debt-equity (D/E) ratio.

One approach is to express the D/E ratios in terms of the relative proportion of long-term debt and shareholders' equity. Thus,

$$\text{D/E ratio} = \frac{\text{Long-term debt}}{\text{Shareholders' equity}}$$

The debt considered here is exclusive of current liabilities. The shareholders' equity includes (i) equity and preference share capital, (ii) past accumulated profits but excludes fictitious assets like past accumulated losses, (iii) discount on issue of shares and so on.

Another approach to the calculation of the debt-equity ratio is to relate the total debt (not merely long term debt) to the shareholders' equity. That is,

$$\text{D/E ratio} = \frac{\text{Total debt}}{\text{Shareholders' equity}}$$

The DIE ratio is, thus, the ratio of total outside liabilities to owners' total funds. In other words, it is the ratio of the amount invested by outsiders to the amount invested by the owners of business.

The difference between this and the first approach is essentially, in respect of the treatment of current liabilities. While the former excludes them, the latter includes them in the numerator (debt). Should current liabilities be included in the amount of debt to calculate the D/E ratio? While there is no doubt that current liabilities are short-term and the ability of a firm to meet such obligations is reflected in the liquidity ratios, their amount fluctuates widely during a year and interest payments on them are not large, they should form part of the total outside liabilities to determine the ability of a firm to meet its long-term obligations for a number of reasons. For one thing, individual items of current liabilities are certainly short-term and may fluctuate widely but, as a whole, a fixed amount of them is always in use so that they are available more or less on a long-term footing. Moreover, some current liabilities like bank credit, which are ostensibly short term, are renewed year after year and remain by and large permanently in the business. Also, current liabilities have, like the long-term creditors, a prior right on the assets of the business and are paid along with long-term lenders at the time of liquidation of the firm. Finally, the short-term creditors exercise as much, if not more, pressure on management. The omission of current liabilities in calculating the D/E ratio would lead to misleading results.

How should preference share capital be treated? Should it be included in the debt or equity? The exact treatment will depend upon the purpose for which the DIE ratio is being computed. If the object is to examine the financial solvency of a firm in terms of its ability to avoid financial risk, preference capital should be clubbed with equity capital. If, however, the DIE ratio is calculated to show the effect of the use of fixed-interest/dividend sources of funds on the earnings available to the ordinary shareholders, preference capital should be clubbed with debt.

Debt to Total Capital Ratio

The relationship between creditors' funds and owner's capital can also be expressed in terms of another leverage ratio. This is the debt to total capital ratio. Here, the outside liabilities are

related to the total capitalization of the firm and not merely to the shareholder's equity. Essentially, this type of capital structure ratio is a variant of the D/E ratio described above. It can be calculated in different ways.

One approach is to relate the long-term debt to the permanent capital of the firm. Included in the permanent capital is shareholders' equity as well as long-term debt. Thus,

$$\text{Debt to total capital ratio} = \frac{\text{Long - term debt}}{\text{Permanent capital}}$$

Another approach to calculating the debt to capital ratio is to relate the total debt to the total assets of the firm. The total debt of the firm comprises long-term debt plus current liabilities. The total assets consist of permanent capital plus current liabilities. Thus,

$$\begin{aligned} \text{Debt to total assets capital ratio} &= \frac{\text{Total debt}}{\text{Total assets}} \\ &= \frac{\text{Total debt}}{\text{Permanent capital} + \text{Current liabilities}} \end{aligned}$$

Still another variant of the D/E ratio is to relate the owner's/ proprietor's funds with total assets. This is called the *proprietary ratio*. The ratio indicates the proportion of total assets financed by owners. symbolically it is equal to:

$$\frac{\text{Proprietor's funds}}{\text{Total assets}}$$

Finally, it may also be of some interest to know the relationship between equity funds (also referred to as net worth) and fixed-income bearing funds (preference shares, debentures and other borrowed funds). This ratio, called the *capital gearing ratio*, is useful when the objective is to show the effect of the use of fixed interest/dividend source of funds on the earnings available to the equity shareholders.

Coverage Ratios

The second category of leverage ratios is coverage ratios. These ratios are computed from information available in the profit and loss account. For a normal firm, in the ordinary course of business, the claims of creditors are not met out of the sale proceeds of the permanent assets of the firm. The obligations of a firm are normally met out of the earnings or operating profits. These claims consist of (i) interest on loans, (ii) preference dividend, and (iii) amortization of principal or repayment of the installment of loans or redemption of preference capital on maturity. The soundness of a firm, from the viewpoint of long-term creditors, lies in its ability to service their claims. This ability is indicated by the coverage ratios. The coverage ratios measure the relationship between what is normally available from operations of the firms and the claims of the outsiders. The important coverage ratios are: (i) interest coverage, (ii) dividend coverage, (iii) total coverage, (iv) total cash flow coverage, and (v) debt service coverage ratio.

Interest Coverage Ratio

It is also known as 'time-interest-earned ratio'. This ratio measures the debt servicing capacity of a firm insofar as fixed interest on long-term loan is concerned. It is determined by dividing the operating profits or earnings before interest and taxes (EBIT) by the fixed interest charges on loans. Thus,

$$\text{Interest coverage} = \frac{\text{EBIT}}{\text{Interest}}$$

It should be noted that this ratio uses the concept of net profits before taxes because interest is tax-deductible so that tax is calculated after paying interest on long-term loan. This ratio, as the name suggests, shows how many times the interest charges are covered by the EBIT out of which they will be paid. In other words, it indicates the extent to which a fall in EBIT is tolerable in the sense that the ability of the firm to service its interest payments would not be adversely affected. For instance, an interest coverage of 10 times would imply that even if the firm's EBIT were to decline to one-tenth of the present level, the net profits available for servicing the interest on loan would still be equivalent to the claims of the creditors. On the other hand, coverage of five times would indicate that a fall in operating earnings only to up to one-fifth level could be tolerated. From the point of view of the creditors, the larger the coverage, the greater is the ability of the firm to handle fixed-charge liabilities and the more assured is the payment of interest to the creditors. However, too high a ratio may imply unused debt capacity. In contrast, a low ratio is a danger signal that the firm is using excessive debt and does not have the ability to offer assured payment of interest to the creditors.

Dividend Coverage Ratio.

It measures the ability of a firm to pay dividend on preference shares, which carry a stated rate of return. This ratio is the ratio (expressed as x number of times) of net profits after taxes (EAT) and the amount of preference dividend. Thus,

$$\text{Dividend coverage} = \frac{\text{EAT}}{\text{Preference dividend}}$$

It can be seen that although preference dividend is a fixed obligation, the earnings taken into account are after taxes. This is because, unlike debt on which interest is a charge on the profits of the firm, the preference dividend is treated as an appropriation of profit. The ratio, like the interest coverage ratio, reveals the safety margin available to the preference shareholders. As a rule, the higher the coverage, the better it is from their point of view.

Total Coverage Ratio While the interest coverage and preference dividend coverage ratios consider the fixed obligations of a firm to the respective suppliers of funds, that is, creditors and preference shareholders, the total coverage ratio has a wider scope and takes into account all the fixed obligations of a firm, that is, (i) interest on loan, (ii) preference dividend, (iii) lease payments, and (iv) repayment of principal. Symbolically,

$$\text{Total coverage} = \frac{\text{EBIT} + \text{Lease payment}}{\text{Interest} + \text{Lease payments} + (\text{Preference dividend} + \text{Instalment of principal})/(1 - t)}$$

Cashflow Coverage Ratio However, coverage ratios mentioned above, suffer from one limitation, that is, they relate the firm's ability to meet its various financial obligations to its earnings. In fact, these payments are met out of cash available with the firm. Accordingly, it would be more appropriate to relate cash resources of a firm to its various fixed financial obligations. The ratio, so determined, is referred to as *total cash flow coverage ratio*. Symbolically,

$$\text{Total coverage} = \frac{\text{EBIT} + \text{Lease Payments}}{\text{Interest} + \text{lease payment} + (\text{preference Dividend} + \text{instalment of principal}) / (1-t)}$$

The overall ability of a firm to service outside-liabilities is truly reflected in the total cash flow coverage ratio: the higher the coverage, the better is the ability.

Profitability Ratios

Apart from the creditors, both short-term and long-term, also interested in the financial soundness of a firm are the owners and management or the company itself. The management of the firm is naturally eager to measure its operating efficiency. Similarly, the owners invest their funds in the expectation of reasonable returns. The operating efficiency of a firm and its ability to ensure adequate returns to its shareholders depends ultimately on the profits earned by it. The profitability of a firm can be measured by its profitability ratios. In other words, the profitability ratios are designed to provide answers to questions such as (i) is the profit earned by the firm adequate? (ii) What rate of return does it represent? (iii) What is the rate of profit for various divisions and segments of the firm? (iv) What are the earnings per share? (v) What was the amount paid in dividends? (vi) What is the rate of return to equity-holders? And so on.

Profitability ratios can be determined on the basis of either sales or investments. The profitability ratios in relation to sales are (a) profit margin (gross and net) and (b) expenses ratio. Profitability-in relation to investments is measured by (a) return on assets, (b) return on capital employed, and (c) return on Shareholders equity

Profitability Ratios related to Sales

These ratios are based on the premise that a firm should earn sufficient profit on each rupee of sales. If adequate profits are not earned on sales, there will be difficulty in meeting the operating expenses and no returns will be available to the owners. These ratios consist of (i) profit margin, and (ii) expenses ratios.

Profit Margin

The profit margin measures the relationship between profit and sales. As the profits may be gross or net, there are two types of profit margins: Gross profit margin and Net profit margin.

Gross Profit Margin is also known as gross margin. It is calculated by dividing gross profit by sales thus,

$$\text{Gross profit margin} = \frac{\text{Gross profits}}{\text{Sales}} \times 100$$

If the sales of a firm amount to Rs 40,00,000 and its gross profits are Rs 10,00,000, the gross margin should be 25 % (Rs 10,00,000 ÷ Rs 40,00,000). If the gross margin (25 per cent) is

deducted from 100, the result (75 per cent) is the ratio of cost of goods sold to sales. The former measures profits in relation to sales, while the latter reveals the relationship between cost of production and sale price.

Gross profit is the result of the relationship between prices, sales volume and costs. A change in the gross margin can be brought about by changes in any of these factors. The gross margin represents the limit beyond which fall in sales prices are outside the tolerance limit. Further, the gross profit ratio/margin can also be used in determining the extent of loss caused by theft, spoilage, damage, and so on in the case of those firms which follow the policy of fixed gross profit margin in pricing their products.

A high ratio of gross profits to sales is a sign of good management as it implies that the cost of production of the firm is relatively low. It may also be indicative of a higher sales price without a corresponding increase in the cost of goods sold. It is also likely that cost of sales might have declined without a corresponding decline in sales price. Nevertheless, a very high and rising gross margin may also be the result of unsatisfactory basis of valuation of stock, that is, overvaluation of closing stock and or under valuation of opening stock. A thorough investigation of the factors having a bearing on the high gross margin is called for.

A relatively low gross margin is definitely a danger signal, warranting a careful and detailed analysis of the factors responsible for it. The important contributory factors may be (i) a "high cost of production reflecting acquisition of raw materials and other inputs on unfavorable terms, inefficient utilisation of current as well as fixed assets, and so on; and (ii) a low selling price resulting from severe competition, inferior quality of the product, lack of demand, and so on.

A firm should have a reasonable gross margin to ensure adequate coverage for operating expenses of the firm and sufficient return to the owners of the business, which is reflected in the net profit margin.

Net Profit Margin is also known as net margin. This measures the relationship between net profits and sales of a firm. Depending on the concept of net profit employed, this ratio can be computed in two ways:

1. Operating profit =

$$\frac{\text{Earnings before interest and taxes (EBIT)}}{\text{Sales}}$$

2. Net profit ratio = $\frac{\text{Earnings after interest and taxes (EAT)}}{\text{Sales}}$

The net profit margin is indicative of management's ability to operate the business with sufficient success not only to recover from revenues of the period, the cost of merchandise or services, the expenses of operating the business (including depreciation) and the cost of the borrowed funds, but also to leave a margin of reasonable compensation to the owners for providing their capital at risk. The ratio of net profit (after interest and taxes) to sales essentially expresses the cost price effectiveness of the operation.

A high net profit margin would ensure adequate return to the owners as well as enable a firm to withstand adverse economic conditions when selling price is declining, cost of production is rising and demand for the product is falling.

A low net profit margin has the opposite implications. However, a firm with a low profit margin can earn a high rate of return on investments if it has a higher inventory turnover. The profit margin should, therefore, be evaluated in relation to the turnover ratio. In other words, the overall rate of return is the product of the net profit margin and the investment turnover ratio. Similarly, the gross profit margin and the net profit margin should be jointly evaluated. The need for joint analysis arises because the two ratios may show different trends.

For Example

The gross margin may show a substantial increase over a period of time but the net profit margin may (i) have remained constant, or (ii) may not have increased as fast as the gross margin, or (iii) may actually have declined. It may be due to the fact that the increase in the operating expenses individually may behave abnormally. On the other hand, if either as a whole or individual items of operating expenses decline substantially, a decrease in gross margin may be associated with an improvement in the net profit margin.

Expenses Ratio

Another profitability ratio related to sales is the expenses ratio. It is computed by

dividing expenses by sales. The term expenses includes (i) cost of goods sold, (ii) administrative expenses (iii) selling and distribution expenses, (iv) financial expenses out excludes taxes, dividends and extraordinary losses due to theft of goods, good destroyed by fire and so on..

There are different variants of expenses ratios. That is,

$$1. \text{ Cost of goods sold ratio} = \frac{\text{Cost of goods sold}}{\text{Net sales}} \times 100$$

$$2. \text{ Operating expenses ratio} = \frac{\text{Administrative expenses} + \text{Selling expenses}}{\text{Net sales}} \times 100$$

$$3. \text{ Administrative expenses ratio} = \frac{\text{Administrative expenses}}{\text{Net sales}} \times 100$$

$$4. \text{ Selling expenses ratio} = \frac{\text{Selling expenses}}{\text{Net sales}} \times 100$$

$$5. \text{ Operating ratio} = \frac{\text{Cost of goods sold} + \text{Operating expenses}}{\text{Net sales}} \times 100$$

$$6. \text{ Financial expenses ratio} = \frac{\text{Financial expenses}}{\text{Net sales}} \times 100$$

Example 6

From the following information of a firm, determine (i) gross profit margin and (ii) net profit margin.

1. Sales	Rs 2,00,000
2. Cost of goods sold	1,00,000
3. Other operating expenses	50,000

Solution

$$i. \text{ Gross profit margin} = \frac{\text{Rs 1,00,000}}{\text{Rs 2,00,000}} = 50 \text{ per cent}$$

$$iii. \text{ Net profit margin} = \frac{\text{Rs 50,000}}{\text{Rs 2,00,000}} = 25 \text{ per cent}$$

The operating efficiency of the firm is fairly good. Assume, however, that the investments are Rs 10,00,000. The return on investments works out to be 5 per cent only. From the owner's point of view, rate of return on investments is a better measure of testing the profitability of a firm.

Profitability Ratios Related to Investments

Return on Investments (ROI) As already observed, the profitability ratios can also be computed by relating the profits of a firm to its investments. Such ratios are popularly termed as return on investments (ROI). There are three different concepts of investments in vogue in financial literature: assets, capital employed and shareholders' equity. Based on each of them, there are three broad categories of ROIs. They are (i) return on assets, (ii) return on capital employed, and (iii) return on shareholders' equity.

Return on Assets (ROA) Here, the profitability ratio is measured in terms of the relationship between net profits and assets. The ROA may also be called profit-to-asset ratio. There are various possible approaches to define net profits and assets, according to the purpose and intent of the calculation of the ratio. Depending upon how these two terms are defined, many variations of ROA are possible.

The concept of net profit may be (i) net profits after taxes, (ii) net profits after taxes plus interest, and (iii) net profits after taxes plus interest minus tax savings. Assets may be defined as (i) total assets, (ii) fixed assets, and (iii) tangible assets. Accordingly, the different variants of the ROA are:

$$1. \text{ Return on assets (ROA)} = \frac{\text{Net profit after taxes}}{\text{Average total assets}} \times 100$$

The ROA based on this ratio would be an underestimate as the interest paid to the creditors is excluded from the net profits. In point of fact, the real return on the total assets is the net earnings available to owners (EAT) and interests as assets are financed by owners as well as creditors. A more reliable indicator of the true return on assets, therefore is the net profits inclusive of interest.

$$2. \text{ ROA} = \frac{\text{Net profit after taxes} + \text{Interest}}{\text{Average total assets}} \times 100$$

3. ROA =

$$\frac{\text{Net profit after taxes} + \text{Interest}}{\text{Average tangible assets.}} \quad \times 100$$

4. ROA =

$$\frac{\text{Net profit after taxes} + \text{Interest}}{\text{Average fixed assets}} \quad \times 100$$

These measures, however, may not provide correct results for inter-firm comparisons particularly when these firms have markedly varying capital structures. As a measure of operating performance, therefore, the above equations should be substituted by the following.

ROA =

$$\frac{\text{EAT} + \text{Interest} - \text{Tax advantage on interest}}{\text{Average total assets/Tangible assets/Fixed assets}}$$

This equation correctly reports the operating efficiency of firms as if they are all equity-financed.

The ROA measures the profitability of the total funds investments of a firm. It, however, throws no light on the profitability of the different sources of funds which finance the total assets. These aspects are covered by other ROIs.

Return on Capital Employed (ROCE)

The ROCE is the second type of ROI. It is similar to the ROA except in one respect. Here the profits are related to the total capital employed. The term capital employed refers to long-term funds supplied by the creditors and owners of the firm. It can be computed in two ways. First, it is equal to non-current liabilities (long-term liabilities) plus owners' equity. Alternatively, it is equivalent to net working capital plus fixed assets. Thus, the capital employed basis provides a test of profitability related to the sources of long-term funds. A comparison of this ratio with similar firms, with the industry average and over time would provide sufficient insight into how efficiently the long-term funds of owners and creditors are being used. The higher the ratio, the more efficient is the use of capital employed.

The ROCE can be computed in different ways, using different concepts of profits and capital employed. Thus,

1. ROCE =

$$\frac{\text{Net profit after taxes EBIT}}{\text{Average total capital employed}} \quad \times 100$$

2. ROCE =

$$\frac{\text{Net profit after taxes} + \text{Interest} - \text{Tax advantage on interest}}{\text{Average total capital employed}} \quad \times 100$$

3. ROCE =

$$\frac{\text{Net profit after taxes} + \text{Interest}}{\text{average total capital employed} - \text{average intangible assets}} \quad \times 100$$

Return on Shareholders' Equity

This profitability ratio carries the relationship of return to the sources of funds yet another step further. While the ROCE expresses the profitability of a firm in relation to the funds supplied by the creditors and owners taken together, the return

on shareholders' equity measures exclusively the return on the owners' funds.

The shareholders of a firm fall into two broad groups: preference shareholders and equity shareholders. The holders of preference shares enjoy a preference over equity shareholders in respect of receiving dividends. In other words, from the net profits available to the shareholders, the preference dividend is paid first and whatever remains belongs to the ordinary shareholders. The profitability ratios based on shareholders' equity are termed as return on shareholders' equity. There are several measures to calculate the return on shareholders equity: (i) Rate of return on (a) total shareholders' equity and (b) equity of ordinary shareholders; (ii) earnings per share; (iii) dividends per share; (iv) dividend-pay-out ratio; (v) dividend and earnings yield; and (vi) price-earnings ratio.

Return on Total Shareholders' Equity According to this ratio, profitability is measured by dividing the net profits after taxes (but before preference dividend) by the average total shareholders' equity the term shareholders' equity includes (i) preference share capital; (ii) ordinary shareholders' equity consisting of (a) equity share capital, (b) share premium, and (c) reserves and surplus less accumulated losses. The ordinary shareholders' equity is also referred to as net worth. Thus, Return on total shareholders' equity =

$$\frac{\text{Net profit after taxes}}{\text{Average total shareholders equity}} \quad \times 100$$

The ratio reveals how profitably the owners' funds have been utilised by the firm. A comparison of this ratio with that of similar firms as also with the industry average will throw light on the relative performance and strength of the firm.

Return on Ordinary Shareholders' Equity (Net Worth)

While there is no doubt that the preference shareholders are also owners of a firm, the real owners are the ordinary shareholders who bear all the risk, participate in management and are entitled to all the profits remaining after all outside claims including preference dividends are met in full. The profitability of a firm from the owners' point of view should, therefore, in the fitness of things be assessed in terms of the return to the ordinary shareholders. The ratio under reference serves this purpose.

It is calculated by dividing the profits after taxes and preference dividend by the average equity of the ordinary shareholders.

Thus,

Return on equity funds =

$$\frac{\text{Net profit after taxes} - \text{Preference dividend}}{\text{Average ordinary shareholders' equity or net worth}} \quad \times 100$$

This is probably the single most important ratio to judge whether the firm has earned a satisfactory return for its equity-holders or not. Its adequacy can be judged by (i) comparing it with the past record of the same firm, (ii) inter-firm comparison, and (iii) comparisons with the overall industry average. The rate of return on ordinary shareholders' equity is of crucial significance in ratio analysis vis-à-vis from the point of the owners of the firm.

Earnings Per Share (EPS) measures the profit available to the equity shareholders on a per share basis, that is, the amount that they can get on every share held. It is calculated by dividing the profits available to the shareholders by the number of the outstanding shares. The profits available to the ordinary shareholders are represented by net profits after taxes and preference dividend. Thus,

$$\text{EPS} = \frac{\text{net profit available to equity holders}}{\text{Numbers of ordinary shares outstanding}}$$

EPS is widely used ratio. Yet, EPS as a measure of profitability of a firm from the owners point of view, should be used cautiously as it does not recognize the effect of increase in equity capital as a result of retention of earnings. In other words, if EPS has increased over the years, it does not necessarily follow that the firms profitability has improved because the increased profits to the owners may be the effect of an enlarged equity as a result of profit retentions, though the number of ordinary shares outstanding still remain constant. another limitation of EPS is that it does not reveal how much is paid to the owners as dividend, nor how much of the earnings are retained in the business. It only shows how much theoretically belongs to the ordinary shareholders.

As a profitability ratio, the EPS can be used to draw inferences on the basis of (i) its trends over a period of time, (ii) comparison with the EPS of other firms, and (iii) comparison with the industry average.

Dividend Per Share (DPS) is the dividends paid to the shareholders on a per share basis. In other words, DPS is the net distributed profit belonging to the shareholders divided by the number of ordinary shares outstanding. That is,

$$\text{DPS} = \frac{\text{dividend paid to ordinar shareholders}}{\text{Number of ordinary shares outstanding}}$$

The DPS would be better indicators than EPS as the former shows what exactly is received by the owners. Like the EPS, the DPS also should not be taken at its face value as the increased retention without any change in the number of outstanding shares.

Dividend-pay out (D/P) ratio is also known as pay-out ratio. It measures the relationship between the earnings belonging to the ordinary shareholders and the dividend paid to them. In other words the D/P ratio shows what % share of the net profit after taxes and preference dividend is paid out as dividend to the equity holders. It can be calculated by dividing the total dividend paid to the owners by the total profits/earnings available to them. Alternatively, it can be found out by dividing the DPS by the EPS. Thus,

$$1. \text{ D/P} = \frac{\text{total dividend to equity shareholders}}{\text{Total net profit belonging to equity holders}} \times 100$$

$$2. \text{ D/P} = \frac{\text{dividend per ordinary share (DPS)}}{\text{Earnings per share (EPS)}} \times 100$$

If the D/P ration is subtracted from 100, it will give what percentage share of the net profit are retained in the business.

The D/P ratio is an important and widely-used ratio. The pay-out ratio can be compared with the trend over the years or an inter-firm and intra-industry comparison would throw light on its adequacy.

Earnings and Dividend Yield is closely related to the EPS and DPS. While the EPS and DPS are based on the book value per share, the yield in terms of the market value per share. The earnings yield may be defined as the ratio of earnings per share to the market value per ordinary share.

Similarly, the dividend yield is calculated by dividing the cash dividends per share by the market value per share. That is

$$1. \text{ Earning yield} = \frac{\text{EPS}}{\text{Market value per share}} \times 100$$

$$2. \text{ Dividend yield} = \frac{\text{DPS}}{\text{Average value per share}} \times 100$$

The earning yield is also called the earning-price ratio.

Price Earnings (P/E) Ratio is closely related to the earnings yield/earnings price ratio. It is actually the reciprocal of the latter. This ratio is computed by dividing the market price of the shares by the EPS. Thus,

$$\text{P/E ratio} = \frac{\text{Market price of share}}{\text{EPS}}$$

The P/E ratio reflects the price currently being paid by the market for each rupee of currently reported EPS. In other words, the P/E ratio measures investor's expectations and the market appraisal of the performance of a firm. In estimating the earnings, therefore, only normally sustainable earnings associated with the assets are taken into account. That is, the earnings are adjusted for income from, say, discontinued operations and extraordinary items as well as many other items not expected to occur. This ratio is popularly used by security analysts to assess a firm's performance as expected by the investors.

Activity Ratios

Activity ratios are concerned with measuring the efficiency in asset management. These ratios are also called efficiency ratios or asset utilization ratios. The efficiency with which the assets are used would be reflected in the speed and rapidity with which assets are converted into sales. The greater is the rate of turnover or conversion, the more efficient is the utilization/management, other things being equal. For this reason, such ratios are also designated as turnover ratios. Turnover is the primary mode for measuring the extent of efficient employment of assets by relating the assets to sales. An activity ratio may, therefore, be defined as a test of the relationship between sales (more appropriately with cost of sales) and the various assets of a firm. Depending upon the various types of assets, there are various types of activity ratios

Inventory (or Stock) Turnover Ratio

This ratio indicates the number of times inventory is replaced during the year. It measures the relationship between the cost of goods sold and the inventory level. The ratio can be computed in two ways.

First, it is calculated by dividing the cost of goods sold by the average inventory. Symbolically,

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average Inventory}}$$

Therefore, average inventory may be obtained by using another basis, namely, the average of the opening inventory and the closing inventory [i.e., (opening inventory + closing inventory) + 2]

Not only are there difficulties in getting detailed information regarding inventory level, but data may also not be readily available to an analyst in respect of the cost of goods sold. To solve the problem arising out of non-availability of the required data, the second approach to the computation of inventory turnover ratio is based on the relationship between sales and closing inventory. Thus, alternatively,

$$\text{Inventory turnover} = \frac{\text{Sales}}{\text{Closing inventory}}$$

Receivables (Debtors) Turnover Ratio and Average Collection Period

The second major activity ratio is the receivables or debtors turnover ratio. Allied and closely related to this is the collection period. It shows how quickly receivables or debtors are converted into cash. In other words, the debtors turnover ratio is a test of the liquidity of the debtors of a firm.

The liquidity of a firm's receivables can be examined in two ways: (i) debtors receivables turnover; (ii) average collection period.

The debtors turnover shows the relationship between credit sales and debtors of a firm. It can be calculated in two ways:

$$1. \text{ Debtor turnover} = \frac{\text{Credit sales}}{\text{Average debtors} + \text{Average bills receivable}}$$

This approach requires two types of data. First, credit sales, which may not be readily available to the analyst. Similarly, the computation of the figure of average debtors and bills receivable involves practical difficulties. In theory, these figures should be measured, as in the case of average inventory, on the basis of the monthly average. Since this type of information is not likely to be available to the analyst, the alternative is to use the average of the opening and closing balances of debtors and bills receivable. The average in the above equation refers to the average of the opening and closing balances.

To avoid the difficulty arising out of the non-availability of information in respect of credit sales and average debtors and bills receivable, the alternative method is to calculate the debtors

turnover in terms of the relationship between total sales and closing balance of debtors. Thus,

$$\text{Debtors turnover} = \frac{\text{total sales}}{\text{Debtors} + \text{Bills receivable}}$$

The first approach to the computation of the debtors turnover is superior in that the question of the speed of conversion of sales into cash arises only in the case of credit sales. The effect of adopting the second approach would be to inflate the receivables turnover ratio.

The second type of ratio for measuring the liquidity of a firm's debtors is the average collection period. This is, in fact, interrelated with, and dependent upon, the receivables turnover ratio. It is calculated by dividing the days in a year by the debtors turnover. Thus,

$$\text{Average collection period} \text{ Debtors turnover} = \frac{\text{Months (days) in a year}}{\text{Debtors turnover}}$$

Assets Turnover Ratio

This ratio is also known as the investment turnover ratio. It is based on the relationship between the cost of goods sold and assets/investments of a firm. A reference to this was made while working out the overall profitability of a firm as reflected in its earning power. Depending upon the different concepts of assets employed, there are many variants of this ratio.

Thus,

1. Total assets turnover = $\frac{\text{Cost of goods sold}}{\text{Average total assets}}$
2. Fixed assets turnover = $\frac{\text{Cost of goods sold}}{\text{Average fixed assets}}$
3. Capital turnover = $\frac{\text{Cost of goods sold}}{\text{Average capital employed}}$
4. Current assets turnover = $\frac{\text{Cost of goods sold}}{\text{Average current assets}}$

$$\text{Working capital turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Net working capital}}$$

Here, the total assets and fixed assets are net of depreciation and the assets are exclusive of fictitious assets like debit balance of profit and loss account and deferred expenditures and so on.

The assets turnover ratio, howsoever defined, measures the efficiency of a firm in managing and utilizing its assets. The higher the turnover ratio, the more efficient is the management and utilization of the assets while low turnover ratios are indicative of underutilization of available resources and presence of idle capacity. In operational terms, it implies that the firm can expand its activity level (*in* terms of production and sales) without requiring additional capital investments. In the case of high ratios, the firm would normally be required, other

things being equal, to make additional capital investments to operate at higher level of activity. To determine the efficiency of the ratio, it should be compared across time as well as with the industry average. In using the assets turnover ratios one point must be carefully kept in mind. The concept of assets/fixed assets is net of depreciation. As a result, the ratios likely to be higher in the case of an old and established company as compared to a new one, other things being equal. The turnover ratio is in such cases likely to give a misleading impression regarding the relative efficiency with which assets are being used. It should, therefore, be cautiously used.

Importance And Limitations Of Ratio Analysis

Importance

As a tool of financial management, ratios are of crucial significance. The importance of ratio analysis lies in the fact that it presents facts on a comparative basis and enables the drawing of inferences regarding the performance of a firm. Ratio analysis is relevant in assessing the performance of a firm in respect of the following aspects: (i) liquidity position, (ii) long-term solvency, (iii) operating efficiency, (iv) overall profitability, (v) inter-firm comparison, and (vi) trend analysis.

Liquidity Position

With the help of ratio analysis conclusions can be drawn regarding the liquidity position of a firm. The liquidity position of a firm would be satisfactory if it is able to meet its current obligations when they become due. A firm can be said to have the ability to meet its short-term liabilities if it has sufficient liquid funds to pay the interest on its short-maturing debt usually within a year as well as to repay the principal. This ability is reflected in the liquidity ratios of a firm. The liquidity ratios are particularly useful in credit analysis by banks and other suppliers of short-term loans.

Long-term Solvency

Ratio analysis is equally useful for assessing the long-term financial viability of a firm. This aspect of the financial position of a borrower is of concern to the long-term creditors, security analysts and the present and potential owners of a business. The long-term solvency is measured by the leverage/capital structure and profitability ratios which focus on earning power and operating efficiency.

Ratio analysis reveals the strengths and weaknesses of a firm in this respect. The leverage ratios, for instance, will indicate whether a firm has a reasonable proportion of various sources of finance or if it is heavily loaded with debt in which case its solvency is exposed to serious strain. Similarly, the various profitability ratios would reveal whether or not the firm is able to offer adequate return to its owners consistent with the risk involved.

Operating Efficiency

Yet another dimension of the usefulness of the ratio analysis, relevant from the viewpoint of management, is that it throws light on the degree of efficiency in the management and utilisation of its assets. The various activity ratios measure this kind of operational efficiency. In fact, the solvency of a firm is, in the ultimate analysis, dependent upon the sales revenues

generated by the use of its assets-total as well as its components.

Overall Profitability

Unlike the outside parties which are interested in one aspect of the financial position of a firm, the management is constantly concerned about the over-all profitability of the enterprise. That is, they are concerned about the ability of the firm to meet its short-term as well as long-term obligations to its creditors, to ensure a reasonable return to its owners and secure optimum utilisation of the assets of the firm. This is possible if an integrated view is taken and all the ratios are considered together.

Inter-firm Comparison

Ratio analysis not only throws light on the financial position of a firm but also serves as a stepping-stone to remedial measures. This is made possible due to inter-firm comparison and comparison with industry averages. A single figure of a particular ratio is meaningless unless it is related to some standard or norm. One of the popular techniques is to compare the ratios of a firm with the industry average. It should be reasonably expected that the performance of a firm should be in broad conformity with that of the industry to which it belongs. An inter-firm comparison would demonstrate the firm's position vis-à-vis its competitors. If the results are at variance either with the industry average or with those of the competitors, the firm can seek to identify the probable reasons and, in that light, take remedial measures.

Trend Analysis

Finally, ratio analysis enables a firm to take the time dimension into account. In other words, whether the financial position of a firm is improving or deteriorating over the years. This is made possible by the use of trend analysis. The significance of a trend analysis of ratios lies in the fact that the analysts can know the direction of movement, that is, whether the movement is favourable or unfavourable. For example, the ratio may be low as compared to the norm but the trend may be upward. On the other hand, though the present level may be satisfactory but the trend may be a declining one.

Limitations

Ratio analysis is a widely used tool of financial analysis. Yet, it suffers from various limitations. The operational implication of this is that while using ratios, the conclusions should not be taken on their face value. Some of the limitations which characterise ratio analysis are (i) difficulty in comparison, (ii) impact of inflation, and (iii) conceptual diversity.

Difficulty in Comparison One serious limitation of ratio analysis arises out of the difficulty associated with their comparability. One technique that is employed is inter-firm comparison. But such comparisons are vitiated by different procedures adopted by various firms. The differences may relate to:

- Differences in the basis of inventory valuation (e.g. last in first out, first in first out, average cost and cost)
- Different depreciation methods (i.e. straight line vs written down basis);

- Estimated working life of assets, particularly of plant and equipment;
- Amortisation of intangible assets like goodwill, patents and so on;
- Amortisation of deferred revenue expenditure such as preliminary expenditure and discount on issue of shares;
- Capitalisation of lease;
- Treatment of extraordinary items of income and expenditure; and so on.

Secondly, apart from different accounting procedures, companies may have different accounting periods, implying differences in the composition of the assets, particularly current assets. For these reasons, the ratios of two firms may not be strictly comparable.

Another basis of comparison is the industry average. This presupposes the availability, on a comprehensive scale, of various ratios for each industry group over a period of time. If, however, as is likely, such information is not compiled and available, the utility of ratio analysis would be limited.

Impact of Inflation

The second major limitation of the ratio analysis as a tool of financial analysis is associated with price level changes. This, in fact, is a weakness of the traditional financial statements, which are based on historical costs. An implication of this feature of the financial statements as regards ratio analysis is that assets acquired at different periods are, in effect, shown at different prices in the balance sheet, as they are not adjusted for changes in the price level. As a result, ratio analysis will not yield strictly comparable and, therefore, dependable results. To illustrate, there are two firms, which have identical rates of returns on investments, say 15 per cent. But one of these had acquired its fixed assets when prices were relatively low, while the other one had purchased them when prices were high. As a result the book value of the fixed assets of the former type of firm would be lower, while that of the latter higher. From the point of view of profitability, the return on the investment of the firm with a lower book value would be overstated. Obviously, identical rates of returns on investment are not indicative of equal profitability of the two firms. This is a limitation of ratios.

Conceptual Diversity

Yet another factor which influences the usefulness of ratios is that there is difference of opinion regarding the various concepts used to compute the ratios. There is always room for diversity of opinion as to what constitutes shareholders' equity, debt, assets, profit and so on. Different firms may use these terms in different senses or the same firm may use them to mean different things at different times.

Reliance on a single ratio for a particular purpose may not be a conclusive indicator. For instance, the current ratio alone is not an adequate measure of short-term financial strength; it should be supplemented by the acid-test ratio, debtors turnover ratio and inventory turnover ratio to have a real insight into the liquidity aspect.

Finally, ratios are only a post-mortem analysis of what has happened between two balance sheet dates. For one thing, the position in the interim period is not revealed by ratio analysis. Moreover, they give no clue about the future.

Summary

The focus of financial/ratio analysis is on key figures contained in the financial statements and the significant relationships that exist between them. The type of relationship to be investigated by an analyst would largely depend upon his objective and purpose of evaluation.

Short term creditors, bankers and others suppliers of short term loans are primarily interested in judging the firm's ability to pay its currently maturing obligations. This ability is reflected in the liquidity ratios of a firm. Conventionally, a current ratio of 2:1 and acid test ratio of 1:1 is considered fairly satisfactory the debenture holders, financial institutions and other suppliers of long term funds would find it useful to assess the long term financial viability of a firm. This is measure by the leverage and coverage ratios. The leverages ratios indicate whether the firm is employing a reasonable proportion of debt or if it is heavily loaded with debt in which case its solvency is exposed to serious strain.

The question relating to efficacy with which various resources of the firm are utilized is answered by the activity efficiency ratios. Include in his category are various turnover ratios such as debtors, inventory, current assets, net working capital, total assets and so on. These ratios are particularly useful from the point of view of the management of a firm.

Assignment Material

1. There are four groups of financial ratios; liquidity, leverage, activity and profitability financial analysis is conducted by four types of analysts: management, equity investors, long term creditors and short term creditors. You are required to (a) explain each type of ratio (b) explain the emphasis of each type of analyst (c) state if the same basic approach to financial analysis should be taken by each group of analysts.
2. What is the importance of ratio analysis? Briefly discuss the importance of the following accounting ratios (a) liquidity ratio (b) debt-equity ratio (c) stock turnover ratio
3. What procedure would you adopt to study the liquidity of a business firm?
4. How would you analyze the financial position of a company from the point of view of (a) an investor (b) a creditor and a financial executive of the company?
5. Discuss the importance of ratio analysis for inter firm and intra firm comparisons, including circumstances responsible for its limitations. If any.
6. How does the acid test ratio differ from the current ratio? How are they similar?
7. What are the limitations of financial ratios as a technique for appraising the financial position of a company?
8. B. Raj ltd sells goods on cash as well as credit. The following particulars are extracted from their books of accounts for the current year – end.

	Rs.
Total gross sales	100,000
Cash sales (included in above)	20,000
Sales returns	7000
Total debtors at the end	9000
Bills receivable	2000
Provision for doubtful debts at the end of the year	1000
Total creditors at the end	10000

Calculate the average collection period.

9. The following are the ratios relating to the activities of national traders ltd.

Debtor's velocity	3 months
Stock velocity	8 months
Creditors velocity	2 months
Gross profit ratio	25 months

Gross profit for the current year ended December 31 amounts to Rs. 400,000. closing stock of the year is Rs. 10,000 above the opening stock. Bills receivable amount to Rs. 25,000 and bills payable to Rs. 10,000. Find out (a) Sales (b) sundry debtors (c) closing stock and (d) sundry creditors.

10. From the following details, prepare the balance sheet of ABC ltd.

Stock turnover	6
Capital turnover ratio	2
Fixed assets turnover ratio	4
Gross profit	20%
Debt collection period	2 months
Creditors payment period	73 days

The gross profit was Rs. 60,000. Closing stock was Rs. 5,000 in excess of the opening stock.

11. the capital of E. Ltd is as follows:

9% preference shares Rs. 10 each	Rs. 300,000
equity shares of Rs. 10 each	Rs. 800,000
	Rs. 1100,000

Additional information : profit (after tax at 35 %) Rs. 2,70,000; depreciation Rs. 60,000. equity dividend paid 20 %. Market price of equity shares Rs. 40

You are required to compute the following, showing the necessary workings:

- a. dividend yield on the equity shares.
- b. Cover for the preference and equity dividends
- c. Earnings per share
- d. Price-earnings ratio.

12. Alpha manufacturing company ltd. Has drawn up the following profit and loss account for the year ended march 31

To opening stock	26000	By sales	160000
To purchases	80000	By closing stock	38000
To wages	24000		
To manufacturing exp	16000		
To gross profit c/d	52000		
	198000		198000
To selling and distribution exp	4000	By gross profit b/d	52000
To administrative exp	22800	By compensation for acquisition of land	4800
To value of furniture lost	800		56800
To general expenses	1200		
To net profit	28000		
	56800		56800

Notes

LESSON 16-17: DECISIONS INVOLVING ALTERNATIVE CHOICES

Learning Objectives:

After studying this chapter you should be able to

- Use opportunity cost to analyze the income effect of a given alternative.
- Decide whether to make or buy certain parts or products.
- Decide whether a joint product should be processed beyond the split-off point.
- Understand the relation ship between accounting information and decision in the production stage of the value chain.

Multiple Alternative Decisions

With a large number of alternatives, information over-head may occur, which means that decision maker has more information than can be absorbed reasonably. Consideration of multiple alternatives complicates computation and interpretation of the cost analysis. However, analysis is still possible. Break-even point and cost indifference points should be calculated. It will be recalled that a cost indifference point is the activity level, at which total cost is identical between two alternatives. With multiple alternatives each alternative is compared with every other alternative to determine the cost indifference point and cost indifference points increase geometrically with the number of different alternatives. The manager selects the alternative with the lowest cost at the expected level of activity. The possible number of separate cost indifference points for multiple alternatives is $x(x-1)/2$ where x equals number of alternatives. The complexity of the analysis of decisions involving more than three alternatives grows rapidly. How the decision swings at various levels in a multiple alternative situation will be clear from the following example:

Example

In Lost Country Court Systems, each person brought before the court, a search of criminal record is made and a case report is prepared. Currently all this is being done manually. Two other methods of doing this are being suggested. One method requires the use of semi-automatic equipment and reduces labour time. A second method almost fully automatic and reduces labour time even more. Both of the proposed methods require leasing of the equipment. In addition, the equipment requires periodic maintenance and repair, which are covered by maintenance contrast. The court administration has to choose between keeping the current system or switching to one of the two new systems. Data for three alternatives are given below :

Cost Analysis of three case processing methods

	A Manual	B Semi- automatic	C Fully automatic
Monthly Fixed Costs:			
Occupancy	Rs.1,500	Rs.1,500	Rs.1,500
Maintenance contract	----	500	1,000
Equipment lease	----	2,500	10,000
Total	1,500	4,500	12,500
Unit Variable Costs			
Supplies	Rs.4	Rs.8	Rs.2
Labour	20	6	2
Total	24	14	4

Description of the alternatives

Alternative A: Current manual system

Supply cost is Rs.4 per report.

Each report requires 5 hours' labour.

Labour rate is Rs.4 per hour.

Alternative B: Semi Automatic System.

Supply cost is Rs.8 per report.

Machine must be leased for Rs.2,500 a month.

Each report requires 1 hour of labour

Labour rate is Rs.6 per hour.

Alternative C: Automatic System.

Supply cost is Rs.2 per report.

Machine lease cost is Rs.10,000 a month.

Each report requires 15 minutes of labour.

Labour rate is Rs.8 per hour.

Required

- a. You are appointed to give your expert opinion to the court administration based on your analysis with your suggestions.
- b. Present your analysis on graph paper with comments.

Solution

- a. First step is to compute the cost indifference point for each possible combination of alternatives using relevant cost data. Comparing the current manual system (alternatives A with the semi-automatic system (alternative B) yields cost indifference point AB:

Cost indifference point AB = Differential fixed Cost +
Differential variable cost per unit

= (Rs.4,500 – Rs.1,500) + (Rs.24.00 – Rs.14.00/case) = 300 cases.

Second step. Second cost comparison should be between the current manual system and the fully automatic system yielding indifference point AC.

Cost indifference point AC

$$= (\text{Rs.}12,500 - \text{Rs.}1,500) + (\text{Rs.}24/\text{case} - \text{Rs.}4/\text{case}) = 550 \text{ cases.}$$

Third step. The final comparison should be between semi-automatic system, and the fully automatic system yielding indifference point BC.

Cost indifference point BC

$$= (\text{Rs.}12,500 - \text{Rs.}4,500) + (\text{Rs.}14/ - \text{Rs.}4/\text{case}) = 800 \text{ cases.}$$

At this point in the analysis, there is not yet sufficient information. The cost information analyzed above states:

With 0 to 300 cases use alternative A. With 300 to 800/cases use alternative B. Above 800 cases use alternative C. To make the decision, it is necessary for the administration to determine most likely activity level that will occur in the future. Past history of courts report processing activity may be a good indicator of what can be expected. Administration should find out, whether there are other factors that influence the decision. For example, alternative C may be the most desirable, but it may be politically unfeasible to eliminate the jobs of current employees.

Decision Making Models

Decision-making becomes complex, when numerous alternatives are to be evaluated. Another problem is that many decisions are non-recurring in nature and cannot be resolved by relying on past experience with similar situations. Decision-making involves following phases:

1. Selection of measurement criterion such as a minimum cost, maximum profit or maximum rate of return. The criterion permits a quantitative comparison of alternatives, in terms of goodness or desirability.
2. Preparation of forecasts of uncontrollable factors and identification of the restrictions or constraints, that affect controllable factors.
3. Formulation of alternative courses of action and evaluation of each alternative using the measurement criterion referred to a 1 above.

To facilitate this, a decision model can be prepared to guide the formulation and evaluation of alternatives. A formal decision model is a symbolic or numerical representation of the variables and parameters that affect a particular decision. Variables are factors controlled by management and parameters are operating constraints or limitations.

Steps in Building a Decision Model

1. Define the parameters of the project.
2. Identify possible alternative courses of action and select a measurement criterion.
3. Develop information for each alternative.
4. Construct incremental analysis of alternatives.
5. Prepare formal report to management.

Major Short-term Decisions

Sell or Process Further

Additional processing adds value to a product and increases its selling price above the amount, for which it can be sold at split off. The decision to process further depends upon whether the increase in total revenues exceeds the additional costs incurred for processing beyond split off point. Joint costs incurred prior to split off point have no effect on the decision. The costs incurred before split off are past cost, sunk cost or irrelevant cost for these decisions. Only future incremental revenue and differential cost should be considered. Differential cost of additional processing should include all production costs that will be incurred.

Important Points for Decision-making

1. Only relevant costs are used in evaluating alternative price indifference point.
2. Cost indifference point should be used when preference shifts from one alternative to another alternative at a particular level.
3. Sunk costs are not relevant for decision-making.
4. The fixed cost of the firm must be examined to see whether it will change due to decision under consideration. If decision variables cause in fixed cost, then fixed cost is relevant to the analysis.
5. Depreciation on an asset purchased in past is irrelevant to decision making.
6. If fixed assets can be sold, then cash inflow due to disposal is relevant for decision making.
7. Allocated joint costs are not relevant to single product decision. Joint costs become relevant only when one alternative is to terminate.
8. Costs after split-off point are relevant to decision making.
9. Opportunity cost represents the benefit forgone by rejecting one alternative to accept another alternative. This must be considered in decision making.
10. If an alternative involves investment, then interest on investment is a major consideration.
11. When choice is involved between two alternatives, emphasis should be to find out net advantage of taking a particular decision. Steps taken are:
 - i. Identify revenue for each alternative.
 - ii. Identify cost for each alternative taking a particular care to include opportunity cost.
 - iii. Identify profit for each alternative and the profit (loss) of preferring one alternative to another.

Alternatively, match incremental revenue with differential cost of alternatives involved. Either approach can be followed.
12. Remember that a decision should not be taken on revenue and cost analysis alone. Qualitative considerations like customer relationship and inter-product relationship may be the major consideration in implementing a decision.
13. Cost accumulated for stock valuation purposes should not be used for decision making purposes.

Quantitative and Qualitative Factors

It is difficult to quantify in monetary terms all the important elements of a decision. At times, decision is dictated not by quantitative factors but by qualitative factors, which are not amenable to precise quantification. For example, the decision to purchase from outside supplier can result in the closing down of company's facilities for manufacturing of component. The effect of such a decision might lead to redundancies and a decline in employee morale, which could affect future output. In addition, company may become dependent on outside supplier, who may not always deliver in time. In that situation, company's reputation to meet its delivery schedule will suffer and this may lead to loss of customer goodwill and decline in future sales. All qualitative factors must be properly reported and weighed in decision making. Given below is a summary of non-quantitative considerations relating to certain major decisions.

Non-quantitative Factors

Make/Buy decision

- a. Quality reliability
- b. Adherence to delivery schedule.
- c. Continuous source of supply.
- d. Availability of space if the company has to revert to decision to manufacture in future.

Special Order

Risk of lost orders, if customers or wholesalers learn of special selling prices.

Overtime vs. Additional Shift

- a. Quality of work on second shift.
- b. Training problems of new workers if all are assigned to second shift.
- c. Balancing trained workers and new workers in different shifts.

Continue Operations vs. Temporary Shut Down

- a. Loss of trained personnel.
- b. 'Word-of-mouth' advertising from off-season customers.
- c. Other alternative to increase off-season business.
- d. Regular customers may be lost.
- e. Resumption of operation may call for heavy expenditure.

Expand or Contract

- i. Quality should not go down.
- ii. Workers with required level of experience may not be available.
- iii. Expansion may require fresh licensing
- iv. Financial calculation may give rosy picture, but position of obsolescence may not justify the decision. For example all factories in scooter industry are facing severe problems due to sudden influx of new improved models. In this situation, relying on financial analysis above for expansion may not be justified. A detailed note on risk involved should always accompany proposals for expansion.

If a product is processed beyond split off, fixed overheads that are common to other production activity must be excluded from the decision analysis. This decision can be taken in following two situations.

- A. The company already processes a product beyond split-off and has invested in the equipment and required personnel.
- B. The company is evaluating the possibility of further processing beyond split off and must incur certain equipment costs and other fixed costs, if additional processing is to incur.

Important considerations in situation A.

- i. Certain fixed costs such as supervisory salaries are related to additional processing. If these production salaries would be eliminated by selling products at split off, these costs are relevant and should be considered in decision making. If salaried personnel would be assigned other duties in the company, when additional processing is discontinued, then salary costs are not relevant as they are incurred in either decision alternative.
- ii. If equipment used for additional processing will remain idle or be used in other processes, then it should be ignored in the decision analysis.
- iii. Depreciation is never relevant in short run operating decision, since depreciation is an allocation of costs incurred in past time period.
- iv. If the equipment is sold for cash and not used for additional processing, the annual cash equivalent cost is the annual cash flow of an annuity at a specific interest rate for which present value equals the salvage value received from selling old equipment. Length of the assumed annuity should correspond with the remaining useful life of the equipment. This annual cost factor is not depreciation, but it is opportunity cost of continuing to use the equipment.

Condition

B It is capital budgeting problem. If a company must expand its physical capacity to allow additional processing it is not sufficient to determine whether incremental revenue exceeds differential costs. Since new investment in machinery are involved, rate of return on this investment must be considered. Condition *B* is a problem requiring rate of return analysis on new investment. Condition *A* is problem of how to best use existing facilities.

Example

M/s Vasax Fertilisers produce a variety of three chemical products, i.e., "Green Grow", and "Super Green", which are three joint products of a particular production process. For each 10,000 kg. batch of material converted into products: Rs.60,000 of joint production are incurred. At the split-off point, 50% of the output is Green grow, 30% of the output is Greener Grow; and 20% of the output is Super Green. Each product is processed beyond split-off, and the following variable costs are incurred for additional processing.

Product	Kg	Additional Processing Cost (Rs.)
Green Grow	5,000	5,000
Greener Grow	3,000	15,000
Super Green	2,000	5,000
	<u>10,000</u>	

Selling price information is given below:

Product	At split-off Rs.	Unit selling price, if sold After additional processing
Green Grow	4	6
Greener Grow	12	15
Super Green	20	25

Required

- Should all the products be processed further ?
- Tillet and Company has offered to buy all joint products at split-off and will pay unit price of Rs.4 for Green Grow, Rs.12 for Greener Grow and Rs.20 for Super Green. Should this offer be accepted by Vasax Fertiliser?

Solution

Statement Showing differential costs and incremental revenue of a batch of 10,000 kg. Total Revenue if sold

Products	Kg.	After Processing	At split off	Intermental Revenue	Differential Cost
Green Grow	5,000	Rs.30,000	Rs.20,000	Rs.10,000	Rs.5,000 ©
Greener Grow	3,000	45,000	36,000	9,000	15,000
Super Green	2,000	50,000	40,000	10,000	5,000 @

@ Only Super Green should be sold after additional processing. Additional processing is not desirable for Greener Grow as the differential cost of Rs.15,000 in this is more than the incremental revenue of Rs.9,000. Total income will exceed by selling Green Grow at split-off point. It should be noted that joint production costs of Rs.60,000 per 10,000 kg. are not relevant to the decision.

Discontinuing Sales to a Certain Type of Customer

A company, may face a situation in which it has to take a decision, whether to sell its goods to small customers or large customers. In this situation emphasis should be to find out net advantage of selling to a particular class of customers. It calls for matching of differential revenues and differential costs. Determine whether placing orders with large customers furnishes business, which provides a higher contribution margin per week of sales personnel efforts. Therefore, company may take a decision to apply greater sales efforts to large customers and discontinue salespersons' visits to smaller customers. Assuming that there is an adequate supply of new large customers, which could be approached for business, for which following data is collected.

	If sold to large customers	If sold to small customers
Revenue per week	Rs.10,000	Rs.6,000
Variable cost per week	<u>4,500</u>	<u>3,750</u>
Contribution Margin per week	<u>5,500</u>	<u>2,250</u>

It is also assumed in this situation that a sales person can make one successful call to a large customer per week or three successful calls to small customers per week (average of Rs.2,000 sales revenue per small customers).

This is clear from the data collected that selling to large customers maximizes the contribution margin per unit of time. The company's contribution increases by R.3,250 (the difference in the contribution margins) per sales-person per week if sales are made to large customers. The cost and revenue data given above can also be presented as follows:

Relevant Revenue and Costs of Alternatives

	Sell to large customers	Sell to small customers	Differential
Revenue per week	Rs.10,000	Rs.6,000	Rs.4,000
Cost per week	4,500	3,750	3,250

Net advantage per week of selling to large customers.

Readers should not that, when choice is involved in two alternatives, emphasis should be to find out the relative net advantage of taking a particular decision by matching differential revenue and differential cost.

Retain or Replace Decision

Management often faces this decision. Choice is to be made between retention of equipment and its replacement. Basically, replacement of machine or equipment is a capital investment or long term decision requiring use of discounted cash flow technique. Here, discussion is confined to short-range problems. Therefore, only one aspect of replacement will be dealt with, i.e., how to deal with written-down value of old equipment. Different cost approach is primarily followed because replacement will invariably involve additional fixed cost. Major considerations relevant to this decision are given below:

- Determine relevant items of cash outflows and inflows due to the decision.
- Book value or written-down value is irrelevant for this decision. Loss on sale of old machinery is irrelevant for this decision.
- Sale proceeds of old equipment is relevant for the decision and should be considered for this analysis.
- Replacement of machinery may bring down the cost per unit, but it may involve capital outlay. Here, company may have to decide at what point replacement will be justified

- v. Profit or loss on the sale of assets being replaced may affect taxation payment and this taxation effect should be included in analysis.

Example

A company owns a machine which was purchased three years ago for Rs.18,000. Depreciation based on useful life of six years with no salvage value has been recorded each year. The present written down value of equipment is Rs.9,000. Management is considering replacing this machine with a new machine which will reduce the variable operating costs. The new machine will cost Rs.7,000 and will have expected life of three years with no scrap value. The variable operating costs are Re.0.30 per unit of output for the old machine and Re.0.20 per unit for the new machine. It is expected that both the machines will be operated at their maximum capacity of 20,000 units per annum. The current disposal or sale value of the old machinery is Rs.4,000. Should the company retain or replace? Assume (exclusively for simplicity) that Rs.1 of cash inflow or outflow in year 1 is equal to Re.1 of each outflow in say year 3.

	Retain present machine	Buy new machine	Relative benefit of replacement
Variable Costs: (20,000 units at Re.0.30 for 3 years)	Rs.18,000	Rs.12,000	Rs.(6,000)
Sale proceeds of old machine	----	(4,000)	(4,000)
Capital Cost of New Machine	----	<u>7,000</u>	<u>7,000</u>
	<u>18,000</u>	<u>15,000</u>	<u>(3,000)</u>

Thus, it is advantageous to replace the equipment.

Note. Depreciation charge and loss on sale of old machine should be ignored for this decision.

Make or Buy Decision

A company has to take this decision, when it has to face following choice:

- a. Buy certain part or sub-assemblies from outside suppliers or
- b. Use available capacity to produce the item within the factory.

This problem involves determining how best to use the available capacity. Least costly alternative is selected from available alternatives. Following are major considerations:

- i. Costs that will be incurred under both alternatives are not relevant to the analysis.
- ii. Potential uses of available capacity should be considered.
- iii. Pertinent quantitative factors must be evaluated in the decision process. These considerations include price stability from suppliers, reliability of delivery and quality specifications of materials or components involved. Qualitative factors are not included in incremental cost analysis, but they are kept into account to test the reasonableness of any decision based purely on quantitative cost studies. If additional equipment must be purchased to permit production, make or buy decision is no longer a short run operating decision and it becomes and it becomes a

problem of capital expenditure which necessitates consideration of required rate of return.

Example 11.7

Anish Plast & Co. produces plastic paper staplers for office use. All parts are produced internally with the exception of the metal base plate. At present these plates are purchased from Vishnu Plast & Co. at a price of Rs.300 per thousand plates. Annual stapler sales have averaged 1,00,000 units and no change in consumer demand is anticipated. Vishnu Plast has informed Anish Plast that the purchase price of the plate will be increased to Rs.400 per thousand effective immediately. Anish Plast has unused plant capacity that is adequate to handle the production of the plates. Management has requested the controller to prepare a feasibility study of producing the plates internally instead of purchasing them from Vishnu Plast. The controller was informed that another company in the area is willing to take on rent the unused plant space for storage purposes at an annual rental of Rs. 5,000. The cost controller assembled the following cost data, which discloses that annual manufacturing costs for internal production of plates are Rs.41,000 with following details for 1,00,000 units:

Raw materials	Rs.8,500
Direct labour	8,000
Variable factory overhead	10,500
General fixed overheads	<u>14,000</u>
	<u>41,000</u>

Prepare a statement showing annual costs to make plates, buy plates and cost increase or savings, if plates are produced. In your presentation, mark relevant items of cost as ‘R’.

Solution

Statement showing the cost of making, buying and consequential effect on cost.

(For 1,00,000 units)

Cost Description	Annual Costs Make plates	Buy plates	Cost increase or (savings) if plates are produced
Raw Material (R)	Rs.8,500	----	8,500
Direct Labour (R)	8,000	----	8,000
Variable O.H.	10,500	----	10,500
Fixed Overhead	14,000	Rs.14,000	----
Purchase Plates (R)	----	40,000	(40,000)
Rent received (R)	-----	<u>(5,000)</u>	<u>5,000</u>
	41,000	49,000	(8,000)

Comments

Cost will reduce by Rs.8,000 or profit will increase by Rs.8,000 if company makes the plates.

Notes:

- i. The general overhead is included in the schedule. This cost is not relevant and it has no effect on the decision. This item of cost will not appear in the relevant cost analysis.
- ii. Rental of unused factory space produces a cash revenue, if plates are purchased. Therefore, forgone rental is an opportunity cost of production alternative and appears in the incremental cost column as an addition to incremental production cost.

Pricing Decisions for Special Orders

When a company has got excess or idle production capacity, management consider the possibility of selling additional products at less than normal selling price. It is important to note here that units sold at lower prices are marginal output (*i.e.*, they are produced in addition to regular output volume). The basic problem is to determine an acceptable price for marginal output. This type of situations arise, when company receives a special order from a foreign customer or from a firm, that intends to resell the product under a private label or brand name. Cost analysis using contribution approach is a useful technique to find out short run profit effects of special order transactions. Pricing analysis concentrates on the recovery of incremental costs caused by accepting the order. Total selling price of the special order must recover variable costs incurred in order to provide a positive contribution margin. Unless fixed costs are incurred to facilitate the transaction, any contribution margin provided by the special order will increase profit. If the company starts including normal fixed overhead costs, bid may be too high and company may lose the entire order. For pricing of special order, fixed cost will be relevant only when it is incurred to facilitate the order. An unusual aspect of special order situation is that special order is not anticipated or included in the period budget or overhead rate determination. If planned capacity is attained, all fixed overhead costs will be absorbed by regular operations. Therefore, fixed overheads which are incurred regardless of special order decision are not relevant to pricing analysis. If regular customers come to know that price cuts are being allowed, company's total sales may be adversely affected. As a general rule, total price for special order should be incremental cost plus desired profit.

Example

Marlson Chair Company received an offer in October 1993 to sell 25,000 outdoor patro chairs to Easy Life Corporation. Easy Life will like Marlson & Co. to bid for the proposed sales order and indicates that this is a one-time order.

Marlson Company produces 4,00,000 chairs annually by operating at 80% of full capacity. Regular selling price for this type of chairs is Rs.33. The chairs required are similar to those currently being produced by Marlson & Co. Budgeted annual production costs and other expenses for 1993 are as follows:

Volume of 4,00,000 chairs	Total	Per unit
Raw Material	Rs.17,00,000	Rs.4.25
Direct Labour	23,00,000	5.75
Variable Factory Overhead	31,00,000	7.75
Fixed Factory Overhead	25,00,000	
Variable Selling costs	5% of selling price	
Fixed Selling and Administration Overhead	Rs.14,50,000	

Marlson Company wants to earn a minimum profit of Re.1 per chair and no selling expenses will be incurred for special order transactions. Assume that normal operations will not be affected by the special order and that regular sales volume for 1993 is 4,00,000 chairs as initially planned.

Required

- a. What should be minimum price to be quoted by Marlson & Co.?
- b. Prepare an income statement analysis showing the position of Marlson & Co. without special order, for special order and with special order.

Solution

(a)	Variable cost to be incurred	(Per unit)
	Raw Material	Rs.4.25
	Direct Labour	5.75
	Variable Overhead	<u>7.75</u>
	Total Variable Cost per unit	<u>17.75</u>
• ••	Total incremental cost for 25,000 unit (25,000 x Rs.17.75)	Rs.4,43,750
	Desired Profit (25,000 x Rs.1.00)	<u>25,000</u>
		<u>4,68,750</u>
	Unit selling price to be quoted by Marlson & Co. (4,68,750 + 25,000)	Rs.18.75

Income Statement Analysis

(b)

Details	Without special order	For special order	With special order
Sales	Rs.1,32,00,000	Rs.4,68,750	1,36,68,750
Less: Variable costs:			
Raw Material	Rs.17,00,000	Rs.1,06,250	Rs.18,06,250
Direct Labour	23,00,000	1,43,750	24,43,750
Variable Factory overhead	31,00,000	1,93,750	32,93,750
Variable Selling Costs	<u>6,60,000</u>	---	<u>6,60,000</u>
Total Variable Costs	<u>77,60,000</u>	<u>4,43,750</u>	<u>82,03,750</u>
Total Contribution	<u>54,40,000</u>	25,000	<u>54,65,000</u>
Fixed Factory Overhead	25,00,000	---	25,00,000
Fixed Selling and Adm. Overhead	<u>14,50,000</u>	---	<u>14,50,000</u>
Total Fixed Overhead	<u>39,50,000</u>	---	<u>39,50,000</u>
Profit	14,90,000	25,000	15,15,000

Some authors refer to the same problem by "Accept for Reject decisions". In short run, as long as relevant revenues are in excess of relevant costs for each decision, profits will be increase or losses decreased. A policy of minimizing losses can also be continued for a short period, as in the long term, a company must generate profits, if it is to stay in business.

Example

KOKO & Co. has undertaken to hire certain plant and machinery at a cost of Rs.50,000 for the quarter ending 31st March 1993 and the rent has already been paid in advance. The company produces large-scale equipment on order. A customer has offered to pay Rs.80,000 for a special job which will incur a material cost of Rs.10,000 and a labour cost of Rs.40,000. Labour can be hired casually as required. The market for large-scale equipment is badly depressed and it is most unlikely that any other order will be forthcoming. There are no alternative uses for plant and machinery. It is to be assumed that no other will be forthcoming. There are no alternative uses for plant and machinery. It is to be assumed that no other cost exists. (a) Should the company accept the order? (b) In the next quarter company do not hire the plant and machinery and the customer repeats the order. How should the company negotiate with the customer now?

Solution

a. The short-term decision is correct, as the relevant costs are Rs.50,000 and proposed selling price is Rs.80,000. Acceptance of the order reduces loss by Rs.30,000, as is shown in the following profit statement:

	Profit/loss, if Contract is accepted		Profit/loss, if Contract is not accepted	
	Rs.	Rs.	Rs.	Rs.
Revenue		80,000		----
Rent	50,000		50,000	
Labour	40,000		----	
Materials	10,000	<u>1,00,000</u>	----	<u>50,000</u>
(Profit/loss)		<u>(20,000)</u>		<u>50,000</u>

By accepting the order the firm is making the most of its past incorrect decision of committing itself to fixed costs of Rs.50,000.

b. Company has not hired plant and machinery in the following accounting period. Hiring will be based on whether the plant and machinery will be put to profitable use. If plant and machinery will only be used for this particular order, then relevant cost of the order will be Rs.1,00,000. Company should hire the plant and machinery if the customer is prepared to pay more than Rs.1,00,000.

Elimination of Unprofitable Segment

Sometimes management have to decide whether to shut down or continue a segment of the organization. A segment can be a product, department or sales territory etc., based on decision-needs of management. The decision involves choice from the two alternatives, i.e., either to keep the segment or to eliminate it. Key concept is to isolate avoidable cost. This decision is of special importance in performance evaluation. To evaluate the financial consequences of eliminating a segment, it is necessary to concentrate on the differential effect of the decision. As a general rule, it is unprofitable to eliminate any segment for which contribution margin exceeds the avoidable fixed costs.

Example

C.D. Corporation wants to evaluate the potential elimination of Division C. The basic information regarding costs and revenue is given below:-

	Division A and B	Division C	Total Company
Sales	Rs.90,000	Rs.10,000	Rs.1,00,000
Variable expenses	<u>(35,000)</u>	<u>(5,000)</u>	<u>(40,000)</u>
Contribution margin	55,000	5,000	60,000
Traceable fixed costs	<u>(37,000)</u>	<u>(11,000)</u>	<u>(48,000)</u>
Divisional Income	<u>18,000</u>	<u>(6,000)</u>	<u>(12,000)</u>
Unallocated fixed costs			<u>8,000</u>
Income before taxes			<u>4,000</u>

- What will be the increase or decrease in profit by eliminating Division C if all costs traceable to division C are avoidable? Should the company eliminate?
- Assume that executives and supervisory personnel in Division C will be reassigned to other divisions, if division is eliminated. Included in Rs.11,000 of traceable fixed costs

of Division C are Rs.8,000 of salaries for these personnel. What is the effect of eliminating division C with this assumption.

- c. Assume that fixed assets of Division C can be sold of Rs.1,00,000 if Division C is eliminated. Remaining life of these assets is 10 years. Company can earn interest of 15% on invested funds. By what amount will this information affect the benefit to eliminate?

Solution

- a. Statement showing comparative profits assuming that costs traceable to Division C are avoidable.

Total company operations, if it			Benefit or (Cost) to eliminate C	Remarks
Particulars	Keeps C	Eliminates C		
(i)	(ii)	(iii)	(iv)	
Sales	1,00,000	90,000	10,000	Sales decrease.
Variable expenses	<u>40,000</u>	<u>35,000</u>	<u>(5,000)</u>	Cost reduction, decrease
	60,000	55,000	5,000	in contribution.
Total Fixed Cost	<u>56,000</u>	<u>45,000</u>	<u>11,000</u>	Cost reduction.
Profit	4,000	10,000	6,000	Profit increase.

Alternative presentation. Alternatively this information can also be presented as follows concentrating on column (iv) only (i.e., based on relevant data approach)

1.	Advantages of eliminating C	Amount
	Increase in sales	Nil
	Decrease in cost (Rs.5,000 + Rs.11,000)	Rs. <u>16,000</u>
	Total advantage	<u>16,000</u>
2.	Disadvantage to eliminate C	
	Decrease in sales	Rs.10,000
	Increase in costs	<u>Nil</u>
	Total disadvantage	<u>10,000</u>
3.	Incremental profit by eliminating C	
	(1-2)	6,000
(B)	1. Advantage to eliminate Division C	
	Reduction in variable expenses	Rs.5,000
	Reduction in fixed expenses (Rs.11,000 – Rs.8,000)	<u>3,000</u>
	Total benefit	8,000
	2. Disadvantage to eliminate C	
	Reduction in sales	<u>10,000</u>
	3. Decrease in profit by eliminating Division C	<u>2,000</u>

- c. Rs.19,924 should be added to the annual benefits of eliminating Division C. The equivalent annual cash flow of Rs.19,924 is computed by using annuity table for an

assumed annuity of ten years at 15% with a present value of Rs.1,00,000.

$$\text{Cash flow} = \text{Rs.1,00,000} \div 5.019 = \text{Rs.19,924}$$

The equivalent annual cash flow of Rs.19,924 is the opportunity cost of keeping division C or alternatively it is a benefit from eliminating the division C.

Decision to Shut Down Facilities

Sometimes management is confronted with the possibility of shutdown of both manufacturing and marketing facilities, it is always in the interest of company to continue to operate the facilities as long as products or services sold recover variable cost and make some contribution toward recovery of fixed cost. A shutdown of facilities does not eliminate all costs. Depreciation, interest, property tax and insurance continue during complete inactivity. If operations are continued, certain expenditure connected with shutting down will also be saved. Further, costs will have to be incurred when a closed facility is reopened can be saved. In the event of shutdown company may lose the benefit of experience of present employees. In the event of shut-down of facilities, morale of employees and confidence of customer is adversely affected. Recruitment and training of new workers would add to cost. Loss of customers is another major consideration. It is in the interest of company to continue the operations as long as differential costs or any amount above that can be obtained. This can be explained by income statements prepared for sales at different capacities.

	Shutdown	1,000	2,000	3,000	4,000	5,000
Sales Revenue @ Rs.3	---	Rs.3,000	6,000	9,000	12,000	15,000
Variable cost @ Rs.2	---	<u>2,000</u>	<u>4,000</u>	<u>6,000</u>	<u>8,000</u>	<u>10,000</u>
Marginal contribution	---	1,000	2,000	3,000	4,000	5,000
Fixed Cost	<u>2,000</u>	<u>5,000</u>	<u>5,000</u>	<u>5,000</u>	<u>5,000</u>	<u>5,000</u>
Loss	<u>2,000</u>	<u>4,000</u>	<u>3,000</u>	<u>2,000</u>	<u>1,000</u>	---

From the above data, suspension can be recommended when sales volume drops below 3,000 units. This is the point at which operation loss exceeds the shutdown cost. This point can be determined without income statement as follows:

Fixed Cost, if plant operates	5,000
Fixed Cost, if plant is shutdown	<u>2,000</u>
Additional cost to be recovered when operating	<u>3,000</u>
Each unit sold contributes Re.1.00 to recovery of fixed cost:	
Sales price per unit	Re.3.00
Variable cost per unit	2.00
Contribution	1.00

Therefore, sales of 3,000 units (Rs.3,000 ÷ Re.1.00) are necessary to recover Rs.3,000 of fixed costs. Now, it is assumed that selling price will be reduced to Rs.2.80 per unit. At what volume will the shutdown cost be less than the loss from operations? The drop in selling price reduces contribution to Re.0.80 per unit:

Selling price per unit	Rs.2.80
Variable cost per unit	<u>2.00</u>
	<u>0.80</u>

Sales of 3,750 units (Rs.3,000 ÷ Re.0.80) would be necessary to recover an additional Rs.3,000 of non-variable costs:

Price to Pay for Raw Materials

The question is frequently raised as to what constitutes the maximum price one can afford to pay for raw material. This is particularly the case where established selling price is the rule. Here the manufacturer may work back from the selling price and deduct from it the desired profit, the operating expenses, the manufacturing overhead and the direct labour. This would leave a residual value representing the amount available for raw material. An alternative method is to have recourse to differential costing.

Example

A refinery has been offered 10,000 gallons of cylinder stock. The usual bargaining process will determine the final price. The prospective purchaser is interested in knowing how high a price he can pay and still make a profit.

The stock purchased would be processed into conventional bright stock and sold at that stage, since the blending unit for making finished motor oil is currently working at full capacity. The available information is as follows:

Cylinder stock is of such a quality and type that it will probably yield 90% bright stock, 5% caprolectum and 5% loss. Current price are:

Bright stock Rs.5.00 per gallon; Caprolectum – no market.

Differential costs associated with processing 10,000 gallons of cylinder stock through several units:

Solvent dewaxing	Re.0.20 per gallon
Solvent extraction	0.20
Filtering	<u>0.10</u>
Total	<u>0.50</u>

Determine how much price can be paid for cylinder stock.

Solution

Revenue-Bright stock	(9,000 x Rs.5)	Rs.45,000	
Differential cost	(10,000 x Re.0.50)	<u>5,000</u>	
Margin		<u>40,000</u>	
Quantity of cylinder stock		10,000	gallons

Price at which company makes neither profit nor loss Rs.40,000 ÷ Rs.10,000 or Rs.4.00 per gallon.

The refinery is ready to bargain for the purchase of the cylinder stock. At purchase price of Rs.4.00 per gallon, purchaser makes neither profit nor loss. To pay more would result in a loss, to pay less would result in profit. A decision has to be taken, how much profit is required to justify the purchase. Here the concept of opportunity cost will also enter into the final decision, if the

available capacity can be more profitably used for another purpose.

Expand or Contract

Management sometimes faces a situation where it has to decide whether its operations should be expanded or contracted. Major considerations relevant to the decision are:

- Expansion means addition in capacity level that calls for incurring of huge capital outlay. Therefore, one dimension of the problem requires it to be considered from capital budgeting point of view.
- Expansion means eventual improvement in production and sales. For improvement in sales, drop in selling price may be necessary. This requires inclusion of another dimension to the analysis for this problem.
- Next major consideration is to determine whether it will be possible to sell the increased production. Expansion should not lead to increased inventories.
- Contraction may result in reduction of some fixed cost, but decision will have to consider lost contribution.

Change vs. Status Quo

A company may have old machine and it may be possible for management to replace it with a machine with updated technology. Thus it is not a simple problem of assets replacement only. It is a choice between change and status quo. A company may be busy carrying out operations manually but now it may require to work on an automatic equipment with larger capacity, lower unit cost and better quality. The question of deciding between “change and status quo”, often benefits in terms of lower unit cost and costs in terms huge capital outlay. Following are the major considerations relevant to this decision.

- Saving in terms of lower unit cost should be matched with capital outlay. Decision for the change will be taken at a point where benefits of replacement in terms of lower unit cost equal to capital outlay required for replacement (cost indifference point). But, this is only one cost consideration.
- There may be non-cost consideration in “change vs. status quo” decision. For example local laws may prohibit retrenchment, which may be necessary to avail lower unit cost due to change. In this situation financial analysis may permit decision of replacement, but it cannot be implemented, till some alternative productive job is found for workers being retrenched due to change.
- Consideration of risk involved due to change should accompany the proposal. Quantitative approaches should be adopted for quantification of impact of risk on a particular decision.

Example

A company has decided to open a branch sales office. Clerical work connected with filing orders and billing customers will be done in this office and the company is studying various possible methods for accomplishing this work in order to find the most economical one. The following two methods are for consideration:

	Method A	Method B
Cost of Equipment (A-Manual; B-Automatic)	Rs.2,000	Rs.15,000
Life (years)	10	10
Repairs and maintenance per annum	50	100
No. of clerks required	3	2
Annual salaries of each clerk/ machines operator	3,000	3,500

In case of Method A, any increase over present volume of work will require an additional clerk. The cost of supplies is Rs.100 p.a. In case of Method B two clerks can handle double the present volume of work and only added expenses will be for additional paper, forms and similar supplies. Rate of interest is 8% on the average amount invested in the equipment during its expected life.

Solution

Method A is manual one whereas Method B is automatic one. In order to arrive at the final conclusion, it is essential to find out the annual costs of both the methods:

Statement of Annual Costs		
	Method A	Method B
Equipment cost (initial investment)	Rs.2,000	Rs.15,000
Depreciation @ 10% p.a.	200	1,500
Interest @ 8% on average capital*		
Method A (Rs.1,000 x 0.08)	80	
Method B (Rs.7,500 x 0.08)		600
Maintenance	50	100
Supplies	100	200
Salaries – Method A (3 x Rs.3,000)	9,000	
Method B (2 x Rs.3,500)	<u>0</u>	<u>7,000</u>
Total annual cost	<u>9,430</u>	<u>9,400</u>

*(Initial investment + Zero) ÷ 2

Since, there is little difference in expected annual costs, the decision should be arrived at after considering other non-cost factors such as:

1. Quality and availability of service for equipment.
2. Adaptability to changes in operations performed.
3. Effect on cost if volume increases or decreases.
4. Availability of trained employees or cost of training.
5. Technological changes.
6. Availability of capital for purchase of equipment.

Adding a New Product to the Line

A company is often confronted with the problem of adding a new product to the existing product line. This new product is to be manufactured in the existing plant without any capital investment (for capital investment, capital budgeting approach based on time value of money becomes relevant). In a case of this type new product can be priced even a little above the marginal cost. Following situations may cause this assumption to be questionable: (i) Suppose plant is operating at 80% of the practical capacity, when the question of adding a new product say product B was raised. If the sale of existing product A is only temporarily depressed, subsequent recovery in sale of product A may make it necessary to use the full capacity of the plant for product A. This may require expansion of the plant if product B is continued in production. Additional fixed costs attributable to product B will then be incurred. (ii) Additional usage of plant facilities may shorten their life and make replacement necessary at an early date. The effect of this is to increase the amount of depreciation, which should be charged during the year. In this case, this additional depreciation and increased maintenance and repair costs are cost of Product B. This is the rare situation, where even depreciation may become relevant cost.

The conditions listed above usually require some time to become evident. Hence, product B can probably be produced as a temporary measure. Differential cost analysis may be reasonably accurate from short-range point of view, but from the long-range point of view it would be realistic to charge product B with average share of fixed cost associated with all the facilities used in producing and selling the new addition to product line.

Example

Product X of De Costa & Company has not achieved the customer acceptance expected and the company has excess production capacity. In search of a new product to produce with existing facilities, the company has narrowed its study to two: Product Y and Product Z. The relevant data is given below:

	Rupees per unit	
	Product Y	Product Z
Selling price	Rs.20.00	Rs.2.50
Costs:		
Direct material	Rs.10.00	Rs.0.80
Direct labour	3.00	0.45
Variable factory overhead	1.00	0.15
Variable selling overhead	<u>2.00</u>	<u>0.50</u>
	<u>16.00</u>	<u>1.90</u>
Fixed selling overhead	6,000	10,000

The current fixed factory overhead of Rs.15,000 p.a. and fixed selling overhead of Rs.5,000 p.a. would not be affected and are not relevant. The company has sufficient excess capacity to

produce 4,000 units of Product Y or 30,000 units of Product Z. Market studies indicate that these units may be sold at the planned market prices. Which product should be added?

Solution

Statement showing the contribution margin and product margin of the two products:

		Product Y		Product Z
No. of units		4,000		30,000
	Per unit	Total	Per unit	Total
Sales	Rs.20.00	Rs.80,000	Rs.2.50	Rs.75,000
Variable costs:				
Direct materials	10.00	40,000	0.80	24,000
Direct labour	3.00	12,000	0.45	13,500
Variable factory overhead	1.00	4,000	0.15	4,500
Variable selling overhead	<u>2.00</u>	<u>8,000</u>	<u>0.50</u>	<u>15,000</u>
Total Variable costs	<u>16.00</u>	<u>64,000</u>	<u>1.90</u>	<u>57,000</u>
Contribution margin	4.00	16,000	0.60	18,000
Identifiable fixed selling overhead		<u>6,000</u>		<u>10,000</u>
Product margin		<u>10,000</u>		<u>8,000</u>

After subtracting the directly identifiable fixed selling costs from the contribution margin, the result is the product margin, the amount that net income will be increased by producing and selling the product. Product Y with a product margin of Rs.10,000 should be produced and sold.

Decision Making and Limiting Factors

Sometimes a company combats following situations:

- i. Full capacity is being utilized.
- ii. Output is restricted by such limiting factors as shortage of labour, shortage of materials or factory space etc.
- iii. Demand is in excess of company's productive capacity.

In a situation of this type company faces the problem of deciding best product mix. Stress remains on contribution per unit of limiting factor and best utilization of available resources. In a situation, where more than one resource is scarce, it is necessary to resort to linear programming method to determine the optimal production programme.

Example

A company produces three products and is reviewing the production and sales budgets for the next accounting period. Following information is available for the three products.

	Product X	Product Y	Product Z
Contribution per unit	Rs.12	Rs.10	Rs.6
Machine hours required per unit	6 hours	2 hours	1 hour
Estimated sales demand	200 units	200 units	200 units
Required machine hours	1,200 hours	400 hours	200 hours

Machine capacity is limited to 1,200 hours and is insufficient to meet total sales demand.

- i. You have been asked to advise as to which products should be produced during the period.
- ii. State one assumption in which products mix advised by you in (i) based on contribution per unit of limiting factor will not hold good.

	Products		
	X	Y	Z
Contribution per unit	Rs.12	Rs.10	Rs.6
Machine hrs. required per unit	6 hrs.	2 hrs.	1 hrs.
Contribution per machine hour	Rs.2	Rs.5	Rs.6
Ranking	3rd	2nd	1st

Step 1. First 200 units of product Z should be produced utilizing 200 hrs. and leaving 1,000 unutilised hours as contribution per unit of machine hour is highest in the case of product Z.

Step 2. 200 units of Product Y should be produced utilizing 400 hrs. and leaving 600 machine hours still unutilized.

Step 3. 600 available machine hours should now be utilized for Product X producing 100 units.

- i. Following product mix is proposed:

Production	Machine hours used	Balance Machine hours
200 units of Z	200	1,000
200 units of Y	400	600
100 units of X	600	---

This production will yield highest total contribution as follows:

200 units of Z x Rs.6	Rs.1,200
200 units of Y x Rs.10	2,000
100 units of X x Rs.12	<u>1,200</u>
Total contribution	<u>4,400</u>

- ii. It is necessary to consider other qualitative factors before the proposed production programme is implemented. For

example, customer goodwill will be lost causing a fall in future sales if company is unable to supply all three products to, say, 150 of its regular customers. Company's relation with customer may at times compel the management to take a sub-optimal decision in a temporary situation.

Summary

Opportunity costs should always be considered when deciding on the use of limited resources. The opportunity cost of a course of action is the maximum profit foregone from other alternative actions. Decision makers may fail to consider opportunity costs because they are not reported in the financial accounting system.

One of the most important production decisions is the make-buy decision. Should a company make its own parts or products or should it buy them from outside sources? Both qualitative and quantitative factors affect this decision. In applying relevant cost analysis to a make-buy situation, a key factor to consider is the use of facilities.

Another typical production situation is deciding whether to process further a joint product or sell it at the split-off point. The relevant information for this decision includes the costs that differ beyond the split-off point. Joint costs that occur before split-off are relevant.

Assignment Material

1. Qualitative factors generally favor making over buying a component. Do you agree? Explain
2. What is the split-off point and why is it important in analyzing joint costs?

Case Study

The Minnetonka Corporation, which produces and sells to wholesalers a highly successful line of water skis, has decided to diversify to stables sales throughout the year. The company is considering the production of cross-country skis.

After considerable research, a cross-country ski line has been developed. Because of the conservative nature of the company management, however Minnetonka's president has decided to introduce only one type of the new skies for this coming winter. If the product is a success, further expansion in future years will be initiated.

The ski selected is mass-market ski that comes with a special binding. It will be sold to wholesalers for Rs. 80 per pair. Because of available capacity, no additional fixed charges will be incurred to produce the skis. A Rs. 100,000 fixed charge will be absorbed by the skis, however, to allocate a fair share of the company's present fixed costs to the new product.

Using the estimated sales and production of 10,000 pair of skis as the expected volume, the accounting department has developed the following costs per pair of skis and bindings:

	Rs.
Direct labor	35
Direct material	30
Total overhead	15
Total	80

Minnetonka has approached a subcontractor to discuss the possibility of purchasing the bindings. The purchase price of the bindings from the subcontractor would be Rs. 5.25 per binding, or Rs. 10.5 per pair. If the Minnetonka Corporation accepts the purchase proposal, it is predicted that direct labor and variable costs would be reduced by 10% and direct material costs would be reduced by 20%.

Questions

1. Should the Minnetonka Corporation make or buy the bindings? Show calculations to support your answer.
2. What would be the maximum purchase price acceptable to the Minnetonka Corporation for the bindings? Support your answer with an appropriate explanation.
3. Instead of sales of 10,000 pair of skis, revised estimates show sales volume at 12,500 pair. At this new volume, additional equipment, at an annual rental of Rs. 10,000 must be acquired to manufacture the bindings. This incremental cost would be the only additional fixed cost required even if sales increased to 30,000 pair. Under these circumstances, should the Minnetonka Corporation make or buy the bindings? Show calculations to support your answer.
4. The company has the option of making and buying at the same time. What would be your answer to requirement 3 if this alternative were considered? Show calculations to support your answer.
5. What non-quantifiable factors should the Minnetonka Corporation consider in determining whether they should make or buy the bindings?

Learning Exercise

A popular term for make or buy decisions is "outsourcing" decisions. There are many examples of outsourcing, from Nike's outsourcing of nearly all its production activities to small firms outsourcing of their payroll activities. Especially popular outsourcing activities are ware housing and computer systems.

The purpose of this exercise is to share information on different types of outsourcing decisions. It can be done in small groups. Each student should pick an article from the literature that tells about a particular company's outsourcing decision.

What You are Required to do

1. List as many details about the outsourcing decision as you can. Include the type of activity that is being outsourced, the size of the outsourcing, and the type of company providing the outsourcing service.
2. Explain why the company decided to outsource the activity. If reasons are not given in the article, prepare a list of reasons that you think influenced the decision.
3. What advantages are there to outsourcing the activity?

Notes

LESSON 18-19: DIVISIONAL PERFORMANCE APPRAISAL

Learning Objectives:

On a study of this lesson you will be able understand.

- The meaning of Divisions
- Reasons for Divisionalisation
- Concept of cost, Profit and Investment centers
- Measurement of Divisional performance (ROI, and Residual Income approach)

Introduction

- HMT, the Rs.756.38 crore giant in the public sector, is going in for a total organizational restructuring. This re-organization is to be done in two phases. The first phase of transformation is already over, according to which HMT has been split into five divisions: machine tools; tractors; industrial machinery; engineering and components; and consumer products.
- RBI Governor C.Rangarajan is all set on reforming our central bank, so that it keeps in step. with the liberalization of the rest of the economy. As part of its comprehensive organizational restructuring, it is planning to reduce its departments from 25 to 18 - which will include 11 new ones - by the end of 1993.

The above are two examples of companies who have used divisionalization to increase their efficiency. What is meant by a division? A division may be defined as “an organizational unit headed by a man fully responsible for the profitability of its operations, including planning, production, financial and accounting activities, and who usually, though not always, has his own sales force”. In a divisionalized organization, the divisional head enjoys the authority to determine how the operations under his control are to be carried out. He is also absolutely responsible for the generation of profit from his division.

As opposed to a divisional organization is the functional organization where no division or department has the exclusive responsibility for any product or market or profit. Let us take a look at the organizational chart of a functional organization.

Functional Organization

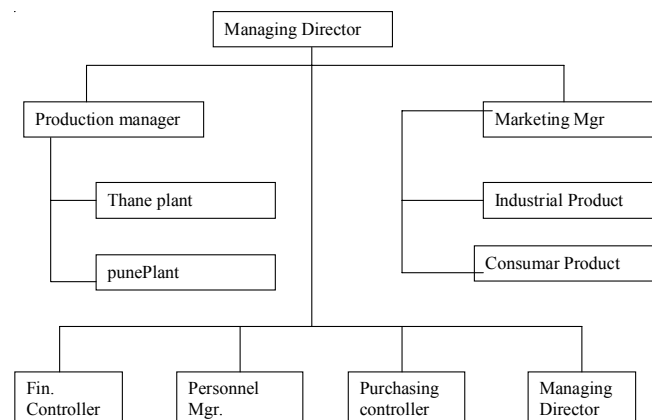
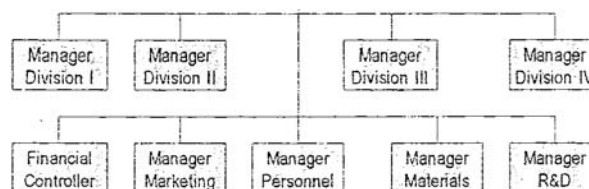


Figure above shows the organization chart in a highly summarized form, of a functionally organized firm. The company manufactures two types of products: Industrial products (Rubber and rubber-based products) and Consumer Products (Confectionery and milk products) in four different locations. The plants manufacturing confectionery and milk products are located at Thane, Pune and Bangalore, whereas the rubber plant is located at Cochin. These products are marketed all over the country and no particular department has the exclusive responsibility for any product or for any market.

Let us now take a look at an organizational chart of a divisionally organized firm.



Divisional Organization

Figure shows a summarized version of an organization chart of a divisionally organized firm. The company is organized into four divisions; which are fairly autonomous. Each divisional manager has autonomy over the production and marketing operations of his division and is accountable to the top management for the profitability of his division.

Reasons for Divisionalization

Why do many large, diversified organizations resort to divisionalization? Let us look at some of the major reasons.

- A divisional set up brings about a kind of decentralization which is well-suited for highly diversified firms, the various activities of which may call for different types of organization structures. For example, ITC Limited, one of the well-diversified companies in India has got a tobacco division, an agri products division, a hotels division, a trading-division etc. It is planning to diversify further into

areas like food processing, aqua farming and beer marketing. Each of these divisions will have to be autonomous and be responsible for their performance for the company to grow.

- Divisional operations provide an excellent training ground for grooming up top management personnel. When a manager is entrusted with profit responsibility, he learns to make rational trade-offs between revenues and costs.
- When a manager is given overall responsibility of a particular division, his performance can be measured more accurately.
- A higher level of performance can be attained when individual managers are provided with greater scope for initiative.
- Since the profit performance of various divisions can be compared with each other and with the overall profit of the company, it becomes easier for top management to formulate strategies and allocate resources.

Pre-requisites For Effective Divisionalization

- The organization must have two or more units for which revenues and costs can be measured separately.
- Each division should be sufficiently independent of other divisions with respect to production, marketing activities and profit responsibility.
- Top management, respecting the autonomy of divisions, should not interfere too much in divisional matters.

Costs of Divisionalization

- Managers may make dysfunctional divisions
 - by focusing on and acting to improve their own division's performance at the expense of the organization;
 - by being aware of only facts pertaining to their division and not the organization as a whole.
- This means that the relations between the divisions should be so regulated that it should not be possible for a division to enhance its profits at the cost of the organization as a whole.
- Managers tend to duplicate central services that might be less expensive when centralized for the whole organization. Eg : accounting, advertising, personnel etc.

Concept of Cost, Profit and Investment Centers

We have mentioned earlier that in a divisionalized company, each divisional head is accountable to the top management for the profitability of his division. 'the basic,' concept behind this is referred to as RESPONSIBILITY ACCOUNTING. Responsibility accounting centers on the idea that an organization is simply a group of individuals working towards common goals. The more each individual can be assisted in the 'performance of his or her tasks, then the better chance the organization has of achieving the goals it has aimed for. Responsibility accounting recognizes each person in an organization who has any control over cost or revenue to be a "separate responsibility center" whose stewardship must be defined, measured and reported upward in the organization.

Responsibility Center

A responsibility center is any point within an organization where control over occurrence of cost or generation of revenue is found. Such a point could be an individual, an operation, a department, a division or in a centralized set up the entire organization itself.

Cost Center

A cost center is any responsibility center that has control over the incurrence of cost. A cost center has no control over sales or generation of revenue.

Profit Center

By contrast to a cost center, a profit center has control over both cost and revenue. An autonomous division is a profit center.

Investment Center

An investment center is any responsibility center within an organization that has control over cost and revenue, and also has control over investment of funds. Corporate headquarters of any company is a typical example. Whenever a segment of an organization has control over the making of investment in such areas as plant and machinery, receivables, inventory and entry into new markets, it can be termed as an investment center. A particular division, for example, the tractor division of HMT is an investment center.

Measurement of Divisional Performance

The development of concepts such as investment centers, cost centers and profit centers is largely a result of the growth of decentralization and divisionalization of incorporate structures. Managers of investment centers and profit, centers are. as stated earlier, given large amounts of autonomy in diverting, the affairs in the areas of responsibility. So great is this autonomy that the various profit and investment centers are often viewed as being virtually independent businesses, with their managers having about the same control over decisions as if in fact they were running their own independent firms.

Competition between divisions is particularly keen when it comes to passing out funds for expansion of product line or for introduction of new product lines. This poses a dilemma to top management. How do they decide which division or profit center gets new investment funds as they become available? How do they decide which divisions are most profitably using the funds which have already been entrusted to their care?

Divisional profitability is typically measured by combining profits and investments into a single performance measure. Two such measures popularly employed in practice are:

- Return on Investment (ROI)
- Residual Income (RI)

The ROI Formula

In order to understand the concepts behind the ROI formula, let us examine the funds flow model illustrated below.

As a rupee leaves the central pool of cash in an investment center, it is invested in inventory. The inventory is then sold, and an account receivable is created, which is subsequently collected from the customer. Upon collection from the customer, the rupee, which was started through the operating cycle, is returned back into the central pool of cash. This rupee when

paid up by the customer would have brought back with it whatever additional rupees or paise the customer has been willing to pay above the cost of the goods, which the customer purchased. The number of these additional rupees will measure thus the division's profitability or paise, which we may call the "margin", earned.

But a division's profitability is also dependent on another factor. Realizing that a rupee going through the operating cycle will bring back a certain sum of additional paise with it, we will naturally be anxious to send that rupee through the cycle as many times during the period as we possibly can. The number of trips a rupee makes through the operating cycle over a defined period is referred to as the "turnover" which is also based on the amount of investment in that particular division. Thus we see that a division's profitability will be a product of the margin (number of paise brought back by a rupee in one trip of the operating cycle), multiplied by the turnover (number of times a rupee makes the trip in a period). This line of reasoning gives rise to the ROI formula:

$$\text{ROI} = \text{Margin} \times \text{Turnover}$$

Where,

$$\text{Margin} = \frac{\text{Net Operating Income}}{\text{Sales}} \quad \text{and}$$

Turnover =

$$\frac{\text{Sales}}{\text{Operating Assets}}$$

Therefore,

$$\text{ROI} = \frac{\text{Net Operating Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Operating Assets}}$$

Students may note that in this formula both profits as measured by margin and investments as measured by turnover have been combined.

One of the real advantages of the ROI formula is that it forces the manager to control his/her investment in operating assets, as well as to control expenses, profit rate and sales volume.

Students may have noticed in the ROI formula given that net operating income was used rather than net income. The reason is that the definition of income used in the formula should be consistent with the asset base to which it is related. When dealing with "operating" assets as a base it is common practice to use "net operating" income or EBIT (Earnings Before Interest and Taxes). The operating asset base used in the formula is computed as the average between the opening and closing balances of all assets held for productive use in that division including cash, inventory, accounts receivable and fixed assets.

Pioneers

The Du Pont Company of the United States was the first major corporation to recognize the importance of looking at both profit margin and turnover of operating assets in assessing the performance of a divisional manager. To them must go the credit of pioneering the ROI concept. The ROI formula is now recognized as one of the best single measures of a manager's performance when he is in control of an investment center. It nicely blends together many aspects of the managed responsi-

bilities into a single figure that can be compared against competing investment centers as well as other firms within the industry.

Net Operating Income	Rs. 10,000
Sales	Rs. 1,00,000
Operating Assets	Rs. 50,000

Controlling the Rate of Return

When being measured by the ROI formula, a manager can improve his performance in three ways:

- By increasing sales
- By reducing expenses
- By reducing assets.

To illustrate how the rate of return can be controlled by each of these three actions, let us assume the following data for an investment center or division.

The rate of return generated by the investment center would be:

$$\frac{\text{Net Operating Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Operating Assets}}$$

$$\text{ROI} =$$

$$= 0.1 \times 2 = 0.2 \text{ or } 20\%$$

Approach 1 : Increase Sales

Let us assume that the division is able to increase sales from Rs.1,00,000 to Rs.1,10,000. Let us also assume that net operating income increases from Rs.10,000 to Rs.12,000. The operating assets remain constant.

$$\text{Here, ROI} = \frac{\text{Rs.12,000}}{\text{Rs.1,10,000}} \times \frac{\text{Rs.1,10,000}}{\text{Rs.50,000}}$$

$$= 0.109 \times 2.2 = 23.98\%$$

After an initial glance at the ROI formula, one is inclined to think that the sales figure is neutral as it could be canceled out, because it appears as the numerator in the margin computation and denominator in the turnover computation. We do not do this for two reasons. First, it would tend to draw attention away from the fact that the rate of return is a function of both margin and turnover.

Second, it would tend to conceal the fact that control of sales is one way to control ROI. If a manager can either (1) increase sales proportionately faster than expenses or (2) increase sales while holding investment in assets relatively constant, he can increase the ROI.

How can sales be increased proportionately faster than expenses? This is often possible in those situations where fixed expenses are high in relation to variable expenses. Once the break-even-point is reached, net operating income will increase rapidly for each additional unit sold.

Approach 2 : Reduce Expenses

Let us assume that the center above is able to reduce expenses by Rs.1,000, so that net operating income increases from Rs.10,000 to Rs.11,000. Both sales and operating assets remain constant.

$$\begin{aligned} \text{ROI} &= \frac{\text{Rs. } 11,000}{\text{Rs. } 1,00,000} \times \frac{\text{Rs. } 1,00,000}{\text{Rs. } 50,000} \\ &= 0.11 \times 2.00 = 22\% \end{aligned}$$

Often the easiest route to increased ROI is to concerted effort to control expenses. When profit margins begin to be squeezed, this is generally the first line of attack by a manager. The discretionary costs come under scrutiny first. Firms under extreme pressure to reduce expenses have gone so far , eliminate coffee breaks, leave travel concessions under the reasoning that nothing could more emphatically impress the staff with the need to be cost conscious.

Approach 3 : Reduce Operating Assets

Let us assume that operating assets can be reduced from Rs.50,000 to Rs.45,000. Sales and net operating income remain unchanged.

$$\begin{aligned} \text{ROI} &= \frac{\text{Rs. } 10,000}{\text{Rs. } 1,00,000} \times \frac{\text{Rs. } 1,00,000}{\text{Rs. } 45,000} \\ &= 0.1 \times 2.22 = 22.22\% \end{aligned}$$

Managers have always been sensitive to the need to control operating expenses and operating margins. They have not always been equally sensitive however, to the need to control investment in operating assets. Companies that have adopted the ROI approach t, measuring divisional managerial performance report that one of the first reactions on the part of investment center managers is to trim down their investment operating assets. This is because these managers realize that an excessive investment in operating assets reduce the asset turnover and hurt the ROI. The funds released py cutting down investment in operating assets can be put to other uses which generate return What avenues are open to a divisional manager to control investment in operating assets? One way is to pare out obsolete and redundant machinery and inventory. Another way is to speed up collection g receivables. As the level of investment in operating assets come down, the asset turnover is increased.

Evaluation of ROI

Advantages of ROI : A useful measure of divisional performance. ROI offers the following advantages

1. Widely accepted and understood. it is a comprehensive measure of business performance.
2. Because it is a ratio, it is suitable for comparative analysis. It is a common denominator for inter-divisional and inter-firm comparisons.
3. As a measure for divisional performance appraisal. ROI provides motivation for optimal asset utilization.

Problems with ROI : ROI suffers from several limitations which may impair its usefulness considerably.

1. Many subjective judgments are applied in computing divisional profit and divisional investment.
2. The use of ROI may distort allocation of resources in the firm. To illustrate this point, consider a firm which is presently earning an overall ROI of 12 percent. Two of its divisions. A and B, have ROI of 15 percent and 10 percent

respectively. Division A has an income of RS.15 lakhs and investment base of Rs.100 lakhs; division B has an income of Rs.10 lakhs and investment base of Rs.100 lakhs.

Division A has an investment opportunity which has an expected ROI of 14 percent (income of Rs.4.2 lakhs in relation to investment of RS.30 lakhs); division B has an investment opportunity which has an expected return of 11 percent- (income of Rs.3.3 lakhs in relation to investment of Rs.30 lakhs). Division A is likely to reject the investment opportunity of earning 14 percent ROI because it causes a decline in its divisional ROI. Yet, this investment opportunity is desirable from the overall company point of view. Division B is likely to accept the investment opportunity of earning 11 percent ROI because it enhances its divisional ROI. Yet this investment opportunity is not desirable from the overall company point of view.

3. The methods employed in practice to calculate the investment base tend to motivate managers to take decisions which may not be congruent with the larger interests of the firm. Divisional fixed assets are generally included in the investment base at original cost or net book value. If original cost value is used, a manager may dispose of a useful asset whose profit contribution is less than the divisional ROI objective. because the disposal of the asset leads to reduction in investment base equal to the original cost of the asset. If net book value is used, the motivation to add a new asset is weakened because its book value, to begin with. Is equal to its cost price.

The Concept of Residual Income

Hitherto we have assumed that the purpose of an investment center or division should be to maximize the rate of return which it is able to generate on operating assets. There is another concept of measurement of divisional performance, known as “Residual Income”. This was developed by the General Electric Company of the US as an alternative to ROI. Residual Income (RI) is the net operating income which. a division is able to earn above some minimum rate of return on operating assets. This minimum required rate of return is normally equal to the “average cost of capital” for the firm. This cost of capital is multiplied with the average operating assets of the division to get what is called the “interest charge” and this is reduced from the net operating income of the division to arrive at the RI. When RI is used to measure performance, the purpose is to maximize the total amount of RI and not to maximize the total ROI figure.

Let us consider the following data for two comparable divisions.

	Performance Measured by ROI (Division P)	Measured by RI (Division Q)
(a) Average Operating Assets	Rs. 1,00,000z	Rs. 1,00,000
(b) Net Operating Income	Rs. 20,000	Rs. 20,000
ROI (b÷a)	20%	
Minimum required rate of return of firm assumed to be 15%		
Interest charge = 15% of 1,00,000		Rs. 15,000
RI		Rs. 5,000

Evaluation

- Many companies view RI as being a better measure of performance than ROI. They argue that the RI approach encourages managers to make profitable investments that would be rejected by managers being measured by the ROI approach. To illustrate, let us assume that each of the divisions above is presented with an opportunity to make an investment of say, Rs.25,000 in a new project (a new machine) that would generate a return of 18% on total invested assets. The Manager of Division P would probably reject this opportunity. Note from the table above that his division is already earning a return of 20% on its assets. If he takes on a new project that provides a return of only 18%, then his overall ROI will be reduced as shown below:

	Present	New (in Rupees) Project	Overall
(a) Average Operating Assets	1,00,000	25,000	1,25,000
(b) Net Operating Income	20,000	4,500*	24,500
ROI = (b÷a)	20%	18%	19.6%
*25,000 x 18% = 4,500			

Since the performance of the manager of this division is being measured according to the maximum rate of return which he is able to generate on invested assets, he will not be interested in any investment opportunity which reduces his current ROI figure. He will tend to think and act along these lines, even though the opportunity he rejects may have benefited the company as a whole.

On the other hand, the manager of Division Q will be very anxious to accept the new investment opportunity. The reason is that he is concerned about maximizing his RI and not ROI. Any project that provides a return greater than the minimum requirement of 15% will be attractive since it will add to the total amount of the residual income figure.

Under these circumstances the new investment opportunity with its 18% return will clearly be attractive as shown below.

	(in Rupees)		
	Present	New	Overall
		Project	
Average Operating Assets	1,00,000	25,000	1,25,000
Net Operating Income	20,000	4,500*	24,500
Minimum required rate of return @ 15% interest charge	15,000	3,750**	18,750
RI	<u>5,000</u>	<u>750</u>	<u>5,750</u>
* 25,000 x 18% = 4,500			
** 25,000 x 15% = 3,750			

Thus, by accepting the new investment project, the manager of Division Q will increase her division's RI figure and thereby show an improved performance as a manager. It encourages divisional managers to undertake projects whenever the rate of return on the project exceeds cost of capital. In this way it overcomes a signal shortcoming of the ROI method under which, as we have seen above, the manager of a division may act contrary to the interest of the firm as a whole.

Limitations of RI: Although an improvement over ROI, RI is not free from shortcomings:

- The problems in measuring divisional income and divisional investment described in the context of our discussion of ROI are present in the measurement of RI as well. Moreover, there is the additional problem of defining the minimum required rate of return (cost of capital) associated with various investment opportunities.
- RI is an absolute quantity and not a ratio like ROI which can be readily employed for inter-divisional comparisons.
- Under the RI approach, one would expect the larger divisions to have more RI than the smaller divisions, not necessarily because they are better managed, but simply because of the bigger numbers involved.

ROI and RI have been employed with a modicum of success by many large sized undertakings which have resorted to divisionalization. However, exclusive reliance on one single profitability measure may lead to manipulation of the system and consequent distortion in decision-making. In order to overcome this limitation many firms like General Electric Company have developed multiple goal structures with parameters like profitability, market position, productivity, product leadership, employee attitudes, balance between short-term and long-term goals, etc.

Treatment of Share or Corporate Assets

Typically, in a divisionalized firm there are certain corporate assets which serve divisions or which are used for the central administration of various divisions. These include, among other things, the fixed assets at the head office, company research establishment, and service facilities. In addition, two important current assets, viz., cash and accounts receivable may be centrally controlled.

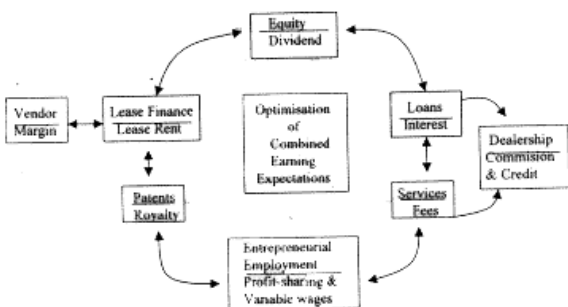
Should such assets be allocated to divisions? If yes, what basis may be used for such allocation? Let us consider these assets one by one.

- Fixed Assets at Head Office:** There seems no point in allocating centrally held and centrally used fixed assets. Hence the question of how the allocation should be made does not arise.
- Shared Facilities:** Sometimes several divisions share the same building and services. Investment in shared buildings may be allocated on the basis of floor areas occupied by various divisions. Investment in shared services and facilities may be allocated on the basis of proportionate usages.
- Cash:** Many divisionalized firms manage the bulk of their cash centrally for purposes of better planning, utilization, and control. Strictly speaking, in this case, cash balances held by the corporate office do not represent divisionally controllable assets. Yet, there seems to be a strong need to allocate central cash balance to various divisions because the quantum of cash balance maintained centrally is governed largely by divisional activity levels.

Generally companies determine the cash to be included in the divisional investment base by means of a simple rule of thumb. A commonly used procedure is to use a certain percentage of external sales. However, cash expenses are more relevant than sales. So, an alternative may be used in which the cash to be included in the divisional investment

volumes and liquidity, to compensate the possible damage caused by the two leverages. Combination (3) exhibits a conservative approach to business, with low operational and financial efficiencies and exposures. Of course, even in a perfect market, there are pockets of imperfect conditions which support an enterprise to manipulate its capital structure and maximize, its advantage. The Modigliani- Miller Theory (the M-M model), therefore fails to understand the gray areas of extra competence to be shown by an enterprise. The above matrix explores such Grey area with various combinations. One can enlarge this matrix with a few more variables and conditions.

The bench - marking of 'combined earning expectation' could be further complex and hence much more interesting. When the promotee-shareholders of a corporation decide to enlarge their interest in the corporation through various exposures, they face the problem of deciding the optimality of the combination of such exposures. The optimality of course can not be perfectly rationalized as individual shareholders may have varied expectations and perceptions. Optimality cannot be rationalized for another important reason, i.e. the impact of different exposures on each other. Look at the following diagram.



An investor enjoying multiple relations with an enterprise will have to trade off between his various inflows (incomes) from the enterprise, keeping in mind the impact of his lease rental on the enterprise's bottom - line, which would ultimately decide the investor's dividend-income from the same enterprise. The Maximisation of his combined inflows from such enterprise would also depend on following strategic considerations-

1. Sustainability of returns
2. Tax planning
3. Scope for growth of returns from one segment of the total investment in the enterprise (e.g the investor may concentrate on his ' fees - income' rather than 'lease-income ' looking at the growth-prospects for the services sector)
4. The enterprise's strategic growth plans &
5. Other investor's expectations.

A smart investor may develop an algorithm to analyse the connectivity between two inflows, with macro-eye on other inflows. Very often such connectivity may be expressed with an ' input-output' or cost-revenue; relationship as follows-

$$\begin{matrix} \text{Maximisation of Revenue} \\ \text{For the investor} \\ (D + I + R + F + C + W + \dots) \end{matrix} = \begin{matrix} \text{Net impact of Interest cost on Dividend} \\ \text{cost and choice between interest cost of} \\ \text{Funds invested \& lease rental and so on...} \\ (I \Rightarrow D \Rightarrow RE \Rightarrow) \end{matrix}$$

Where

- D— Dividend
- W — Wages
- I— Interest
- Re — Retained Earnings
- R— Rent, Royalty
- F — Fees
- C — Commission

The bench - marking of earning expectation from different functional divisions treated as profit centres' or 'investment centres' :-

One can very well decide the ROI expected from the production division or marketing division, where most of the investment is in physical or tangible assets. In these divisions, the employee-productivity is quantifiable and very visible. The problem is in deciding an ROI to be expected from the division like HRD, Finance, R & D where intangible assets are more, results are intangible & very long term. The finance division may be expected to raise funds at a certain rate of cost of capital. This one time performance of the division may comprise almost 50% of the year's total performance, expected from the division. The performance is more intellectual and intangible. It is not based on physical assets like plants, premises, inventories & receivables. Hence , the denominator in the ratio of 'Return on Investment' i.e. the investment is much less physical. Therefore one can not (& should not) apply the normal ROI to the finance-division.

Perhaps we require to design two more type of ROI, to be made applicable to the divisions using intellectual capital and time as capital. An enterprise selling more of services, would prefer to compute the ROI on 'Time as a Resource'. Whereas, a trading corporation would find an ROI more appropriate, if it is directly related to the investment in receivable and inventories. Let us look at some of these alternate definition of ROI -

1) Physical ROI =

$$\frac{\text{Profit}}{\text{Physical or Quantifiable \& Tangible Assets}}$$

Physical ROI could be the most commonly used definition of ROI.

2) Intellectual ROI =

$$\frac{\text{Profit}}{\text{Quantum of intellectual capital}}$$

Quantifying the intellectual capital itself is a matter of standardisation. The industry should arrive at some commonly acceptable method of valuing (& quantifying) the intellectual resources. This ratio is more applicable to staff functions. Research & development and divisions involved in strategic activities e.g. corporate planning , budgeting , economic and environmental scanning etc.

3) Intellectual - Time ROI =

$$\frac{\text{Profit}}{\text{Quantum of intellectual time spent.}}$$

This ratio should be very appropriate for the consultancy and advisory divisions or businesses. Pricing of consultancy assignment should depends on both the factors involved i.e. intellectual ability and time. There could be four different

combinations possible in consultancy business, making to four strategic business units as follows —

If X = Intellectual capital and

Y = Time Resource

Combination (1)

High 'X' + High 'Y'

Most complex, time-consuming and hence high profile-highly priced assignments should fall under this category.

Combination (2)

High 'X' + Low 'Y'

One-time, strategic advisory service may belong to this category. One advise on a taxation problem might save millions of dollars of the client. Hence, pricing of such an assignment would depend more on client's advantage and less on the quantified sum of 'X' and 'Y'

Combination (3)

Low 'X' + High 'Y'

Assignments of routine but time-consuming advisory services should fall under this category e.g. software installations with problem-solving sessions.

Combination (4)

Low 'X' + Low 'Y'

These are the simplest, routine services offered to the internal or external clients e.g. routine, simple maintenance services are a good example of this combination. 'Routine personnel services' should be another such example —

Time ROI or Entrepreneurial ROI -

$$\frac{\text{Total combined profit from all the businesses (a + b + c + d)}}{\text{Total combined entrepreneurial time devoted (a 1 + b 1 + c 1 + d 1)}}$$

The 'Time ROI' of each business, therefore could be -

$$\frac{a}{a 1}, \frac{b}{b 1}, \frac{c}{c 1}, \text{ and } \frac{d}{d 1}$$

Each business requires different amount of 'Physical investment'. The time factor may be used as a weightage to define the 'total weighted investment' —

Suppose physical investment }
Involved in each business } I 1, I 2, I 3 and I 4

Now the ROI would be —

$$\frac{a}{a 1 \cdot I 1}, \frac{b}{b 1 \cdot I 2}, \frac{c}{c 1 \cdot I 3}, \text{ and } \frac{d}{d 1 \cdot I 4}$$

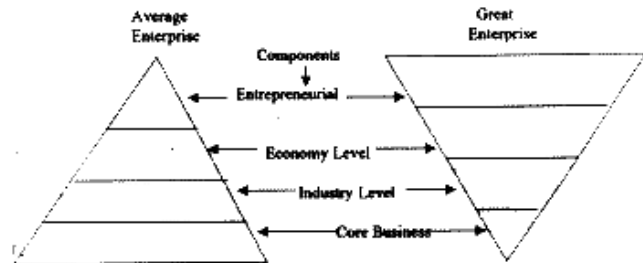
The trading ROI -

A trader depending on his business strategy, may invest more in inventories or receivables. He should therefore relate his earnings to such 'Key resource component' and compare against the industry's bench - marks -

$$\frac{\text{Profit}}{\text{Inventory}} \text{ or } \frac{\text{Profit}}{\text{Receivables}} \text{ or } \frac{\text{Profit}}{\text{Inventory} + \text{Receivables}} \text{ or } \frac{\text{Profit}}{\text{Net working capital}}$$

The Ultimate Components of a Bench-marked ROI -

An average enterprise and a great enterprise would differently apply weightages to the prime components of a bench - marked ROI as follows-



The entrepreneurial component of the earning expectations of a great enterprise is always very high, which further comprise of the following -

- Ability to stretch the 'core- competence' to networking competence'.
- Speed to implement new ideas and capture new markets
- Better ability to transform 'uncertainty' into visible risk' and visible risk' into manageable risk'.
- Capacity to sustain 'business maturity' against ' generation gap'.

Notes

LESSON 20-21 : TRANSFER PRICING

Learning Objectives:

After studying this chapter you should be able to

- Explain transfer prices and criteria used to evaluate them
- Calculate transfer prices using different methods
- Construct a general guideline for determining a minimum transfer price.

In a large organization, a central management cannot monitor and control all the operation parameters of every subunit. For this reason, large organizations are usually separated into divisions. Each division is an autonomous unit and its manager has the freedom to take all necessary action. But a decentralized organization has difficulty evaluating the performance of the division managers. Furthermore, the central management of the organization needs to coordinate the actions of the divisions to maximize the organization's total profit. In order to evaluate the performance of each division, a method is needed for measuring the contribution of each division to the total profit of the organization. A common solution to this problem is to set prices for intermediate goods which are transferred from one division to another. These prices are known as transfer prices. Transfer prices are mainly used

1. To evaluate division managers' performance based on the profits that he generates,
2. To help coordinate the divisions' decisions to achieve the organization's goals - i.e., to ensure goal congruence
3. To enable the divisions to take decisions like the pricing of the final product,
4. To preserve divisions' autonomy.

In the classical Transfer Pricing (TP) problem, we usually think of two divisions in a decentralized organization. Division 1 produces an intermediate good and Division 2 transforms it into a final good and sells it in the market. Division 1 "sells" a quantity of the intermediate good to Division 2 at a certain price. This price (the transfer price) is used to place a value on the transaction between the two divisions. The total transaction value is considered as income by the selling division and as expense by the buying division. This allows the net profits of the two divisions to be determined. The division managers are evaluated by the profits that their divisions generate, but the organization's objective is to maximize its total profit. The objectives of the organization and those of the division managers are often incompatible. There fore, the problem of the organization is to determine a pricing rule that serves its own goals, taking into account the objectives of the divisions. This is easy in a world of perfect information, where central management can calculate the optimal transfer prices. The problem is more difficult when there is asymmetry of information (i.e., some information is private). Division managers may

wish to conceal some information, in order to manipulate the outcome in their own favor.

In practice the problem is still more complicated. In addition to the asymmetry of information, divisions may have multiple products or may face capacity constraints, the product may have to be manufactured by a chain of more than two divisions, some of the intermediate goods may also be sold in the market, etc. Let us briefly discuss the transfer pricing methods in common use today. We list here only some of the more common methods that appear in the accountancy literature. Cost methods: The transfer price is a certain function of the production cost of the selling division. It may or may not include a fixed cost component. There are several variations of this approach such as cost plus fixed fee, cost plus a fixed percentage of the cost, full cost plus markup, variable cost, marginal cost.

Market price methods: If there is a market for the intermediate good, then the market price is used as the transfer price. Often the transfer price is the market price minus the selling expenses.

Dual price methods: The price that the selling division receives is not equal to the price that the buying division pays - and is usually higher. This mechanism generates a deficit, which is set off by central management. Because central management sets the optimal transfer price, and hence sets the transaction volume to be optimal, this mechanism yields higher performance than other methods. However, it is not commonly used because it requires central management to be involved in the complex process of price setting.

Negotiated transfer prices: The transfer price is reached by negotiation between the relevant division managers. The advantage of this method is that it preserves the divisions' autonomy. Its problem is the sensitivity of the outcome to the managers' negotiation skills.

Each method in this list can be applied in various ways. For example, the markup in the cost-plus method can be determined as a percentage of the cost, which equals a certain return on investment of either the division or the organization. The transfer pricing mechanism that an organization applies may have a critical impact on the organization's performance. Although the transfer-pricing problem has been studied for many years it is still considered an open problem.

In decentralized organizations, much of the decision-making power resides in its individual subunits. In these cases, the management control system often uses *transfer prices* to coordinate the actions of the subunits and to evaluate their performance.

A transfer price is the price one sub-unit (department or division) charges for a product or service supplied to another subunit of the same organization. It for example, a car manufacturer has a separate division that manufactures engines;

the transfer price is the price the engine division charges when it transfers engines to the car assembly division. The transfer price creates revenues for the selling subunit (the engine division in our example) and purchase costs for the buying subunit (the assembly division in our example), affecting each subunit's operating income. These operating incomes can be used to evaluate subunit performance and to motivate their managers. The product or service transferred between subunits of an organization is called an intermediate product. This product may either be further worked on by the receiving subunit or, if transferred from production to marketing, sold to an external customer.

In one sense, transfer pricing is a curious phenomenon. Activities within an organization are clearly non-market in nature; products and services are not bought and sold as they are in open-market transactions. Yet, establishing prices for transfers among subunits of a company has a distinctly market flavor. The rationale for transfer prices is that subunit managers (such as the manager of the engine division), when making decisions, need only focus on how their decisions will affect their subunit's performance without evaluating their impact on company wide performance. In this sense, transfer prices ease the subunit managers' information-processing and decision-making tasks. In a well designed transfer-pricing system, optimizing subunit performance (the performance of, the engine division) leads to optimizing the performance of the company as a whole.

As in all management control systems, transfer prices should help achieve a company's strategies and goals and fit its organization structure. In particular, they should promote *goal congruence* and a sustained high level of *management effort*. Subunits selling a product or service should be motivated to hold down their costs; subunits buying the product or service should be motivated to acquire and use inputs efficiently. The transfer price should also help top management evaluate the performance of individual subunits and their managers. If top management favors a high degree of decentralization, transfer prices should also promote a high degree of subunit autonomy in decision-making. That is, a subunit manager seeking to maximize the operating income of his or her subunit should have the freedom to transact with other subunits of the company (on the basis of transfer prices) or to transact with outside parties.

Transfer-Pricing Methods

There are three methods for determining transfer prices:

1. Market-based transfer prices. Top management may choose to use the price of a similar product or service publicly listed in, say, a trade association Web site. Also, top management may select, for the internal price, the external price that a subunit charges to outside customers.
2. Cost-based transfer prices. Top management may choose a transfer price based on the costs of producing the product in question. Examples include variable production costs, variable and fixed production costs, and full costs of the product. Full costs of the product include all production costs plus costs from the other business functions (R&D, design, marketing, distribution, and customer service). The

costs used in cost based transfer prices can be actual costs or budgeted costs. Sometimes, the cost based transfer price includes a markup or profit margin that represents a return on subunit investment.

3. Negotiated transfer prices. In some cases, the subunits of a company are free to negotiate the transfer price between themselves and then to decide whether to buy and sell internally or deal with outside parties. Subunits may use information about costs and market prices in these negotiations, but there is no requirement that the chosen transfer price bear any specific relationship to either cost or market-price data. Negotiated transfer prices are often employed when market prices are volatile and change occurs constantly. The negotiated transfer price is the outcome of a bargaining process between the selling and buying subunits. To see how each of the three transfer-pricing methods works, and to see the differences among them, we examine transfer pricing at Horizon Petroleum Inc. against the four criteria: goal congruence, management effort, subunit performance evaluation" and subunit autonomy (if desired).

An Illustration of Transfer Pricing

Horizon Petroleum has two divisions. Each operates as a profit center. The Transportation Division purchases crude oil in Matamoros, Mexico. It also operates a pipeline that transports crude oil from Matamoros to Houston, Texas. The Refining Division manages a refinery at Houston that processes crude oil into gasoline. Let's assume gasoline is the only salable product the refinery makes and that it takes two barrels of crude oil to yield one barrel of gasoline.

Variable costs in each division are variable with respect to a single cost driver in each division: barrels of crude oil transported by the Transportation Division, and barrels of gasoline produced by the Refining Division. The fixed costs per unit are based on the budgeted annual output of crude oil to be transported and the budgeted annual output of gasoline to be produced. Horizon Petroleum reports all costs and revenues of its non-U.S. operations in U.S. dollars using the prevailing exchange rate.

- The Transportation Division has obtained the rights to certain oil fields in the Matamoros area. It has a long-term contract to purchase crude oil produced from these fields at \$12 per barrel. The division transports the oil to Houston and then sells it to the Refining Division. The pipeline from Matamoros to Houston has the capacity to carry 40,000 barrels of crude oil per day.
- The Refining Division has been operating at capacity (30,000 barrels of crude oil a day), using oil supplied by Horizon's Transportation Division (an average of 10,000 barrels per day) and oil sought from other producers and delivered to the Houston Refinery (an average of 20,000 barrels per day at \$21 per barrel).
- The Refining Division sells the gasoline it produces at \$58 per barrel.

Horizon Petroleum's variable and fixed costs per barrel of crude oil in the Transportation Division and variable and fixed costs per barrel of gasoline in the Refining Division, the external

market prices of buying crude oil, and the external market prices of selling gasoline. What's missing in the exhibit is the actual transfer price from the Transportation Division to the Refining Division. This transfer price will vary depending on the transfer-pricing method used. Transfer prices from the Transportation Division to the Refining Division under each of the three methods are:-

- Method A: Market-based transfer price of \$21 per barrel of crude oil based on the competitive market price in Houston.
- Method B: Cost-based transfer prices at, say, 110% of full costs, when full costs are the costs of the crude oil purchased plus the Transportation Division's own variable and fixed costs: $1.10 \times (\$12 + \$1 + \$3) = \17.60 .
- Method C: Negotiated transfer price of \$19.25 per barrel of crude oil, which is between the market-based and cost-based transfer prices.

Division Operating income of Horizon Petroleum for 100 Barrels of crude oil under alternative Transfer-Pricing Method

	Method A: Internal Transfer at market Prices	Method B: Internal Transfer at 110% of Full costs	Method B: Internal Transfer at Negotiated Prices
Transport Division			
Revenues (\$21, \$17.6, \$19.25) x 100 barrels of crude oil	2100	1760	1925
Deduct	1200	1200	1200
Crude oil purchase costs \$ 12x 100	100	100	100
Division variable cost, \$1x 100 barrels of crude oil	300	300	300
Division operating income	500	160	325
Refining Division			
Revenues \$ 58x 50 barrels of gasoline	2900	2900	2900
Deduct			
Transferred-in-cost (\$21, \$17.6, \$19.25) x 100 barrels of crude oil	2100 ←	1760 ←	1925 ←
Division variable cost, \$8x50 barrels of gasoline	400	400	400
Division fixed costs, \$6x50 barrels of gasoline	300	300	300
Division operating income	100	440	275
Operating income of both divisions together	600	600	600

Exhibit above presents division operating incomes per 100 barrels of crude oil purchased under each transfer-pricing method. Transfer prices create income for the selling division and corresponding costs for the buying division that cancel out when division results are consolidated. The exhibit assumes all three transfer-pricing methods yield transfer prices that are in a range that does not cause division managers to change the business relationships. That is, Horizon Petroleum's total operating income from purchasing, transporting, and refining the 100 barrels of crude oil and selling the 50 barrels of gasoline is the same, \$600 - equal to revenues of \$2,900 minus costs of crude oil purchases of \$1,200, minus transportation costs of \$400, and minus refining costs of \$ 700 - regardless of the internal transfer prices used. Note further that in all

Three methods, summing the two division operating incomes equals Horizon Petroleum's total operating income of \$600. By keeping total operating income the same, we focus attention on the effects of different transfer-pricing methods on the operating income of each division. Subsequent sections of this chapter relax this assumption.

Consider first methods A and B in the first two columns of Exhibit 22-2. The operating income of the Transportation Division is \$340 more (\$500 - \$160) if transfer prices are based on market prices -(using method A) rather than on 110% of full costs (using method B). However, the operating income of the Refining Division is \$340 more (\$440 - \$100) if transfer prices are based on 110% of full costs (using method B) rather than market prices (using method A). If the Transportation Division's sole criterion were to maximize its own division operating income, it would favor transfer prices at market prices. In contrast, the Refining Division would prefer transfer prices at 110% of full costs to maximize its own division operating income. Little wonder that subunit managers take considerable interest in setting transfer prices, especially those managers whose compensation or promotion directly depends on subunit operating income. To reduce the excessive focus of subunit managers on their own subunits, many companies compensate subunit managers on the basis of both subunit and company wide operating incomes.

If market prices of crude oil in the Houston area fluctuated in response to local supply-and-demand conditions, then under market-based method A, the operating incomes of the transportation and Refining divisions would fluctuate as well. The Transportation and Refining divisions may instead prefer to negotiate at more stable, long - run transfer price Method C assumes a \$19.25 transfer price which is between the full cost and market-based transfer prices. In our example, the negotiated transfer price splits the \$600 of operating income almost equally between the divisions (\$325 for the Transportation Division and \$275 for the Refining Division). Note, method B also has the effect of shielding both divisions from fluctuations in crude oil prices in Houston. As above Exhibit shows, the \$17.60 transfer price depends only on the full costs of the Transportation Division. The market price of crude oil in Houston is irrelevant to this calculation.

This example illustrates how the choice of a transfer-pricing method divides the company wide operating income pie among individual divisions.

Market-based Transfer Prices

Perfectly Competitive Market Case

Transferring products or services at market prices generally leads to optimal decisions when three conditions are satisfied: (1) The market for the intermediate product is perfectly competitive, (2) interdependencies of subunits are minimal and (3) there are no additional costs or benefits to the company as a whole from buying or selling in the external market instead of transacting internally. A perfectly competitive market exists when there is a homogeneous product with buying prices equal to selling prices and no individual buyers or sellers can affect those prices by their own actions. By using market-based transfer prices in a perfectly competitive market, a company can achieve (1) goal congruence (2) management effort, (3) subunit performance evaluation, and (4) subunit autonomy.

Reconsider Horizon Petroleum. Assume there is a perfectly competitive market for crude oil in the Houston area. As a result the Transportation Division can sell and the Refining Division can buy as much crude oil as each wants at \$21 per barrel. Horizon would like its managers to buy or sell crude oil internally. Think about the decisions that Horizon's division managers would make if each had the option to sell or buy crude oil externally. If the transfer price between Horizon's Transportation and Refining divisions is set below \$21, the manager of the Transportation Division will be motivated to sell all crude oil to outside buyers in the Houston area at \$21 per barrel. If the transfer price is set above \$21, the manager of the Refining Division will be motivated to purchase all crude oil requirements from outside suppliers. Only a \$21 transfer price will motivate the Transportation Division and the Refining Division to buy and sell internally. That is, neither division profits by buying or selling in the external market.

Suppose division managers are evaluated on their individual division's operating income; The Transportation Division will sell, either internally or externally, as much crude oil as it can profitably transport and the Refining Division will buy, either internally or externally, as much crude oil as it can profitably refine. At a \$21 per barrel transfer price the actions that maximize division operating income are also the actions that maximize operating income of Horizon Petroleum as a whole. Furthermore, division managers will be motivated to exert management effort to maximize their own division's operating income. Market prices also serve to evaluate the economic viability and profitability of each division individually. For example, if under market-based transfer prices, the Refining Division consistently shows small or negative profits, Horizon may decide to shutdown the Refining Division and simply transport and sell the oil to other refineries in the Houston area.

Distress Prices

When supply outstrips demand, market price may drop well below their historical averages. If the drop in prices is expected to be temporary these low market prices are sometimes called distress prices. Deciding whether a current market price is a

distress price is often difficult. The market prices of several agricultural commodities such as wheat and oats, have stayed for many years at what observers initially believed were temporary distress levels!

Which transfer price should be used for judging performance if distress prices prevail? Some companies use the distress prices themselves, but others use long-run average prices, or "normal" market prices. In the short run, the manager of the selling subunit should meet the distress price as long as it exceeds the incremental costs of supplying the product or service. If not, the selling division should stop selling the product or service to the buying division; the buying division should buy the product or service from an out-side supplier. These actions would increase division and company wide operating income. If the long-run average market price is used, forcing the manager to buy internally at a price above the current market price will hurt the buying division's short-run performance and understate its profitability. Using the long-run average market price, however, provides a better measure of the long-run viability of the supplier division. If the price remains low in the long run, though, the company should use the distress price as the transfer price. If the distress price is lower than the variable and fixed costs that can be saved if manufacturing facilities are shutdown, the manager of the selling subunit should dispose of its production facilities, and the buying subunit should purchase the product from an outside supplier.

Cost-based Transfer Prices

Cost-based transfer prices are helpful when market prices are unavailable, inappropriate, or too costly to obtain. For example, the product may be specialized or the internal product may be different from the products available externally in terms of quality and customer service.

Full-Cost Bases

In practice, many companies use transfer prices based on full costs. To approximate market prices, cost-based transfer prices are sometimes set at full cost plus a margin. These transfer prices, however, can lead to sub optimal decisions. Suppose Horizon Petroleum makes internal transfers at 110% of full cost. Recall, the Refining Division purchases, on average, 20,000 barrels of crude oil per day from a local Houston supplier, who delivers the crude oil to the refinery at a price of \$21 per barrel. To reduce crude oil costs, the Refining Division has located an independent producer in Matamoros-Gulfmex Corporation that is willing to sell 20,000 barrels of crude oil per day at \$16 per barrel, delivered to Horizon's pipeline in Matamoros. Given Horizon's organization structure, the Transportation Division would purchase the 20,000 barrels of crude oil in Matamoros from Gulfmex, transport it to Houston, and then sell it to the Refining Division. The pipeline has unused capacity and can ship the 20,000 barrels at its variable cost of \$1 per barrel without affecting the shipment of the 10,000 barrels of crude oil per day acquired under its existing long-term contract arrangement. Will Horizon Petroleum incur lower costs by purchasing crude oil from Gulfmex in Matamoros or by purchasing crude oil from the Houston supplier? Will the Refining Division show lower crude oil purchasing costs by

using oil from Gulfmex or by using its current Houston supplier?

The following analysis shows Horizon Petroleum's operating income would be maximized by purchasing oil from Gulfmex. The analysis compares the incremental costs in both divisions under the two alternatives. The analysis assumes the fixed costs of the Transportation Division will be the same regardless of the alternative chosen. That is, the Transportation Division cannot save any of its fixed costs if it does not transport Gulfmex's 20,000 barrels of crude oil per day.

- Alternative 1: Buy 20,000 barrels from Houston supplier at \$21 per barrel. Total costs to Horizon Petroleum are 20,000 barrels \times \$21 per barrel = \$420,000.
- Alternative 2: Buy 20,000 barrels in Matamoros at \$16 per barrel and transport it to Houston at a variable cost of \$1 per barrel. Total costs to Horizon Petroleum are 20,000 barrels \times (\$16 + \$1) per barrel = \$340,000.

There is a reduction in total costs to Horizon Petroleum of \$80,000 (\$420,000 - \$340,000) by acquiring oil from Gulfmex.

Suppose the Transportation Division's transfer price to the Refining Division is 110% of full cost. The Refining Division will see its reported division costs increase if the crude oil is purchased from Gulfmex:

- Alternative 1: Buy 20,000 barrels from Houston supplier at \$21 per barrel. Total costs to Refining Division are 20,000 barrels \times \$21 per barrel = \$420,000.
- Alternative 2: Buy 20,000 barrels from the Transportation Division of Horizon Petroleum purchased from Gulfmex. Total costs to Refining Division are 20,000 barrels \times \$22 per barrel = \$440,000.

As a profit center, the Refining Division can maximize its short-run division operating income by purchasing from the Houston supplier at \$420,000.

The transfer-pricing method has led the Refining Division to regard the fixed cost (and the 10% markup) of the Transportation Division as a variable cost. That's because the Refining Division looks at each barrel that it obtains from the Transportation Division as a variable cost of \$22 per barrel; if 10 barrels are transferred, it costs the Refining Division \$220; if 100 barrels are transferred, it costs \$2,200. From the viewpoint of Horizon Petroleum as a whole, its variable cost per barrel is \$17 (\$16 to purchase the oil from Gulfmex plus \$1 to transport it to Houston). The remaining \$5 (\$22 - \$17) per barrel is the Transportation Division's fixed cost and markup. Buying crude oil in Houston costs Horizon Petroleum an additional \$21 per barrel. For the company, it is cheaper to buy from Gulfmex in Matamoros. But the Refining Division sees the problem differently. From its perspective, it prefers buying from the Houston supplier at a cost of \$420,000 (20,000 barrels \times \$21 per barrel) because buying from Gulfmex costs the division \$440,000 (20,000 barrels \times \$22 per barrel). In this example, the transfer price based on full cost plus a markup does not induce goal congruence.

What transfer price will promote goal congruence for both the Transportation and Refining divisions? The minimum transfer price is \$17 per barrel. A transfer price below \$17 does not

provide the Transportation Division with an incentive to purchase crude oil from Gulfmex in Matamoros, whereas a transfer price above \$17 generates contribution margin to cover its fixed costs. The maximum transfer price is \$21 per barrel. A transfer price above \$21 will cause the Refining Division to purchase crude oil from the external market rather than from the Transportation Division. A transfer price between the minimum and maximum transfer prices of \$17 and \$21 will promote goal congruence. Each division will increase its own reported division operating income by purchasing crude oil from Gulfmex in Matamoros while increasing Horizon Petroleum's operating income. For example, a transfer price based on the full costs of \$20 without a markup will achieve goal congruence; the Transportation Division will show no operating income and will be evaluated as a cost center.

In the absence of a market-based transfer price, senior management at Horizon Petroleum cannot easily determine the profitability of the investment made in the Transportation Division and hence whether Horizon should keep or sell the pipeline. Furthermore, if the transfer price had been based on the actual costs of the **Transportation Division, it would** provide the division with no incentive to control costs. That's because all cost inefficiencies of the Transportation Division would get passed along as part of the actual full-cost transfer price.

Using full-cost-based transfer prices requires an allocation of each subunit's fixed costs to products. Full-cost transfer pricing raises many issues. How are indirect costs allocated to products? Have the correct activities, cost pools, and cost-allocation bases been identified? Should the chosen fixed-cost rates be actual or budgeted? The issues here are similar to the issues that arise in allocating fixed costs. Calculations of full-cost-based transfer prices using activity-based cost drivers can provide more-refined allocation of costs to products. Using budgeted costs and budgeted rates lets both divisions know the transfer price in advance. It overcomes the problem of inefficiencies in actual costs getting passed along to the buying division. That's because the transfer prices are based on budgeted (efficient) costs, not what the actual costs turn out to be. Also, variations in the total quantity of units produced by the selling division do not affect the transfer price.

Variable Cost Bases

Transferring 20,000 barrels of crude oil from the Transportation Division to the Refining Division at the variable cost of \$17 per barrel achieves goal congruence, as shown in the preceding section. The Refining Division would buy from the Transportation Division because the Transportation Division's variable cost (which is also the relevant incremental cost for Horizon Petroleum as a whole) is less than the \$21 price charged by outside suppliers. At the \$17 per barrel transfer price, the Transportation Division would record an operating loss. At the same time, the Refining Division would show large profits because it would be charged only for the variable costs of the Transportation Division. One approach to addressing this problem is to have the Refining Division make a lump sum transfer payment to cover fixed costs and generate some operating income for the Transportation Division while the

Transportation Division continues to make transfers at variable cost. The fixed payment is the price the Refining Division pays for using the capacity of the Transportation Division. The income earned by each division can then be used to evaluate the performance of each division and its manager.

Prorating the Difference Between Maximum and Minimum Transfer Prices

An alternative cost-based approach is for Horizon Petroleum to choose a transfer price that splits, on some fair basis, the \$4 difference between the \$21 per barrel maximum transfer price the Refining Division is willing to pay and the \$17 per barrel minimum transfer price the Transportation Division is willing to charge. Suppose Horizon Petroleum allocates the \$4 difference on the basis of the budgeted variable costs of the Transportation Division and the Refining Division for a given quantity of crude oil. Using the data in Exhibit, the variable costs are as follows:

Transportation Division's variable costs to transport	
100 barrels of crude oil	100
Refining Division's variable costs to refine	
100 barrels of crude oil and produce	
50 barrels of gasoline	400
	<u>\$500</u>

Of the \$4 difference in transfer prices (\$21 - \$17), the Transportation Division gets to keep $(\$100 + \$500) \times \$4.00 = \0.80 , and the Refining Division gets to keep $(\$400 + \$500) \times \$4.00 = \3.20 . That is, the transfer price between the Transportation Division and the Refining Division would be \$17.80 per barrel of crude oil (\$16 purchase cost + \$1 variable cost + \$0.80 that the Transportation Division gets to keep). This approach is a budgeted variable-cost-plus transfer price. The *plus* indicates the setting of a transfer price above variable cost.

To decide on the \$0.80 and \$3.20 allocation of the \$4.00 contribution to total company operating income per barrel, the divisions must share information about their variable costs. In effect, each division does not operate (at least for this transaction) in a totally decentralized manner. Because most organizations are hybrids of centralization and decentralization anyway, this approach deserves serious consideration when transfers are significant. Note, each division has an incentive to overstate its variable costs to receive a more-favorable transfer price.

Dual Pricing

There is seldom a single cost-based transfer price that simultaneously meets the criteria of goal congruence, management effort, subunit performance evaluation, and subunit autonomy. As a result, some companies choose dual pricing, using two separate transfer pricing methods to price each transfer from one subunit to another. An example of dual pricing arises when the selling division receives a full-cost-based price and the buying division pays the market price for the internally transferred products. Assume Horizon Petroleum purchases crude oil from Gulfmex in Matamoros at \$16 per barrel. One way of recording the journal entry for the

transfer between the Transportation Division and the Refining Divisions.

1. Debit the Refining Division (the buying division) with the market-based transfer price of \$21 per barrel of crude oil.
2. Credit the Transportation Division (the selling division) with the 110% of full cost transfer price of \$22 per barrel of crude oil.
3. Debit a corporate cost account for the \$1 (\$22 - \$21) per barrel difference between the transfer prices.

The dual-pricing system promotes goal congruence because it makes the Refining Division no worse off if it purchases the crude oil from the Transportation Division rather than from the outside supplier at \$21, per barrel. The dual-pricing system gives the Transportation Division a corporate subsidy. The effect of dual pricing is that the operating income for Horizon Petroleum as a whole is less than the sum of the operating incomes of the divisions.

Dual pricing is not widely used in practice even though it reduces goal incongruence associated with a pure cost-based transfer-pricing method. One concern with dual pricing is that it leads to problems in computing the taxable income of subunits located in-different tax jurisdictions, such as in our example, where the Transportation Division is taxed in Mexico while the Refining Division is taxed in the United States. A second concern is that the manager of the supplying subunit does not have sufficient incentive to control costs with a dual-pricing system because the supplying division records revenues based on actual costs. A third concern is that dual pricing insulates managers from the frictions of the marketplace because costs, not market prices, affect the revenues of the supplying division.

Negotiated Transfer Prices

Negotiated transfer-prices result from a bargaining process between selling and buying subunits. Consider again a transfer price between the Transportation and Refining divisions of Horizon Petroleum. The Transportation Division has unused capacity it can use to transport oil from Matamoros to Houston. The Transportation Division will only purchase oil from Gulfmex and sell oil to the Refining Division if the transfer price equals or exceeds \$17 per barrel of crude oil that's its variable cost. The Refining Division will only buy crude oil from the Transportation Division if the price does not exceed \$21 per barrel—that's the price at which the Refining Division can buy crude oil in Houston.

From the perspective of Horizon Petroleum as a whole, operating income is maximized if the Refining Division purchases crude oil from the Transportation Division rather than from the Houston market (incremental cost per barrel of \$17 versus \$21). Both divisions would be interested in transacting with each other (thereby achieving goal congruence) if the transfer price is set between \$17 and \$21. For example, a transfer price of \$19.25 per barrel will increase the Transportation Division's operating income by $\$19.25 - \$17 = \$2.25$ per barrel. It will increase the Refining Division's operating income by $\$21 - \$19.25 = \$1.75$ per barrel because the Refining Division

can now buy the crude oil for \$19.25 internally rather than for \$21 in the outside market.

Where between \$17 and \$21 will the transfer price per barrel be set? Under a negotiated transfer price, the answer depends on several things: the bargaining strengths of the two divisions; the information the Transportation Division has about the demand for its services from outside refineries; and the information the Refining Division has about its other available sources of crude oil. Negotiations become particularly sensitive because Horizon Petroleum can now evaluate each division's performance on the basis of division operating income. The price negotiated by the two divisions will, in general, have no specific relationship to either costs or market price. But cost and price information are often useful starting points in the negotiation process. A negotiated transfer price strongly preserves division autonomy because the transfer price is the outcome of negotiations between division managers. It also has the advantage that each division- manager is motivated to put forth effort to increase division-operating income. Its disadvantage is the time and energy spent on the negotiations.

A General Guideline for Transfer-pricing Situations

The exhibit given summarizes the properties of the different transfer-pricing methods using the criteria described in this chapter the exhibit indicates, there is no transfer-pricing method that meets all the criteria. Market conditions, the goal of the transfer-pricing system, and the criteria of goal congruence, management effort, subunit performance evaluation, and subunit autonomy (if desired) must all be considered simultaneously. The transfer price a company will eventually Choose depends on the economic circumstances and the decision at hand. The following general guideline (formula) is a helpful first step in setting a minimum transfer price in many situations:

$$\text{Minimum Transfer Price} = \begin{matrix} \text{Incremental cost per unit} \\ \text{Incurred up to the point} \\ \text{of transfer} \end{matrix} + \begin{matrix} \text{opportunity cost per unit} \\ \text{to the selling subunit} \end{matrix}$$

Criteria	Market price	Cost-Based	Negotiated
Achieves goal congruence	Yes, when markets are competitive	Often, but not always	Yes
Useful for evaluating subunit performance	Yes, when markets are competitive	Difficult unless transfer price exceeds full costs	Yes, but transfer prices are affected by bargaining strengths
Motives management effort	Yes,	Yes, when based on budgeted costs; less incentive to control costs if transfers are based on actual costs	Yes
Preserves subunit autonomy	Yes, when markets are competitive	No, because it is rule-based.	Yes, because it is based on negotiations between subunits
Other factors	no,markets may exist or markets maybe imperfect or in distress	Useful for determining full cost of products and services; easy to implement	Bargining and negotiations take time and may need to be reviewed repeatedly as conditions change.

Incremental Cost

Incremental cost in this context means the additional cost of producing and transferring the products or services. Opportunity cost here is the maximum contribution margin forgone by the selling subunit if the products or services are transferred internally. For example, if the selling subunit is operating at capacity, the opportunity cost of transferring a unit internally rather than selling it externally is equal to the market price minus variable cost. That's because by transferring a unit internally, the subunit forgoes the contribution margin it could have obtained by selling the unit in the outside market. We distinguish incremental cost from opportunity cost because the financial accounting system typically records incremental cost but not opportunity cost. The guideline measures a *minimum* transfer price because the selling subunit will be motivated to sell the product to the buying subunit only if the transfer price covers the incremental cost the selling subunit incurs to produce the product and the opportunity cost it forges by selling the product internally rather than in the external market. We illustrate the general guideline in some specific situations using data from Horizon Petroleum.

1. A perfectly competitive market for the intermediate product exists, and the selling division has no idle capacity. If the market for crude oil in Houston is perfectly competitive, the Transportation Division can sell all the crude oil it transports to the external market at \$21 per barrel, and it will have no idle capacity. The Transportation Divisions incremental cost is \$13 per barrel (purchase cost of \$12 per barrel plus variable transportation cost of \$1 per barrel) for oil purchased under

the long-term contract or \$17 per barrel (purchase cost of \$16 plus variable transportation cost of \$1) for oil purchased at current market prices from Gulfmex. The Transportation Division's opportunity cost per barrel of transferring the oil internally is the contribution margin per barrel forgone by not selling the crude oil in the external market: \$8 for oil purchased under the long-term contract (market price, \$21, minus variable cost, \$13) and \$4 for oil purchased from Gulfmex (market price, \$21, minus variable cost, \$17). In either case,

Minimum transfer price =
 Incremental cost + Opportunity cost
 Per barrel per barrel

$$= \$13 + \$8$$

$$= \$21$$

or

$$= \$17 + \$4 = \$21$$

The minimum transfer price per barrel is the market price of \$21. Market-based transfer prices are ideal in perfectly competitive markets when there is no idle capacity in the selling division.

- An intermediate market exists that is not perfectly competitive, and the selling division has idle capacity.

In markets that are not perfectly competitive, capacity utilization can only be increased by decreasing prices. Idle capacity exists because decreasing prices is often not worthwhile- it decreases operating income.

If the Transportation Division has idle capacity, its opportunity cost of transferring the oil internally is zero because the division does not forgo any external sales or contribution margin from internal transfers. In this case,

$$\text{Minimum transfer price per barrel} =$$

$$\text{Incremental cost per barrel} =$$

\$13 per barrel for oil purchased under the long-term contract,
 or

\$17 per barrel for oil purchased from Gulfmex in Matamoros

Any transfer price above incremental cost but below \$21 - the price at which the Refining Division can buy crude oil in Houston - motivates the Transportation Division to transport crude oil to the Refining Division and the Refining Division to buy crude oil from the Transportation Division. In this situation, the company could either use a cost-based transfer price or allow the two divisions to negotiate a transfer price between themselves.

In general, when markets are not perfectly competitive, the potential to influence demand and operating income through prices complicates the measurement of opportunity costs. The transfer price depends on constantly. Changing levels of supply and demand. There is not just one transfer price. Rather, a transfer-pricing schedule presents the transfer prices for various quantities supplied and demanded, depending on the incremental costs and opportunity cost of the units transferred.

- No market exists for the intermediate product.

This situation would occur for the Horizon Petroleum case if the crude oil, transported by the Transportation Division could be used only by the Houston refinery (due to, say, its high tar content) and would not be wanted by outside parties. Here, the opportunity cost of supplying crude oil internally is, zero because the inability to sell crude oil externally means no contribution margin is forgone. For the Transportation Division of Horizon Petroleum, the minimum transfer price under the general guideline is the incremental cost per barrel (either \$13 or \$17). As in the previous case, any transfer price between the incremental cost and \$21 will achieve goal congruence.

Summary

Define transfer process and identify their purpose:

In large companies with many different segments, products or services are often provided by one segment to another. Deciding on the amount to be charged for these transfers is difficult, various types of transfer-price bases are used. The overall purpose of transfer is to motivate managers to act in the best interest of the company, not just the segment.

Identify the relative advantages and disadvantages of basing transfer prices on total costs, variable costs and market prices.

While there are no general rules that dictate what type of transfer to use in a particular decision situation, each type of price has its own advantages and disadvantages. Cost-based prices are readily available but if actual costs are used, the receiving segment manager does not know the cost in advance, which makes cost planning difficult. When a competitive market exists for the product or services, using market-based transfer prices usually leads to goal congruence and optimal decisions. When idle capacity exists in the segment providing the product or service, the use of variable cost as the transfer price leads to goal congruence.

Identify the factors affecting multinational transfer prices.

In multinational organizations, transfer prices are used as means of minimizing worldwide income taxes, import duties, and tariffs.

Which method can be used to calculate transfer prices?

Transfer prices can be (a) market-based (b) cost-based (c) negotiated. Different transfer-pricing methods produce different revenues and costs for individual subunits, and hence, different operating incomes for them.

Assignment Material

- "Transfer pricing is confined to profit to profit center". Do you agree? Explain
- What are three methods for determining transfer prices?
- What properties should transfer-pricing systems have?
- "All transfer-pricing methods give the same division operating income". Do you agree? Explain.
- Under what conditions is a market-based transfer price optimal.

LESSON 23: BEHAVIOURAL ASPECT OF CONTROL

Learning Objective:-

This lesson will introduce you to

- *The concept of group or social control.*
- *Behavioral theories relating to control*
- *Some behavioral implications of control through budgets.*
- *Selection of proper control strategy.*

Management Control

Control, as we have seen in the earlier lesson is management action to assure conformity with a plan. Management control is similar to the control operation of a thermostat. The temperature at which the thermostat is set is the standard. The actual room temperature is monitored by the thermostat, which takes remedial action as needed, by turning on either the heating or air-conditioning units. Similarly, when one rides a bicycle, the corrections of steering and weight shifting constitute the activity of control.

Group or Social Control

While the thermostat and the bicycle examples illustrate technical control, members of a group experience what is referred to as group or social control. When people are “chided” or rebuked about their behavior by members of a group (whose membership is highly valued), they may adjust (control) their behavior in order to continue the association with the group in good standing. The group member whose behavior is rebuked is experiencing group or social control. Both these aspects of control which affect the behavior of a member of the group are powerful and common in influencing the quality and direction of our day-to-day experience. Group or social control is a very important aspect of the management of an” organization.

Assumptions about Human Behavior

In this chapter, we will discuss assumptions about human behavior in order to understand their implications for management and their importance in reporting systems for control. Reference will be made to two different strategies of control, namely external control and internal motivation. For example, external control is present in a closely supervised work situation in which the subordinate is directed to perform work determined by the supervisor. Internal motivation on the other hand is present in a situation in which managers and employees can best achieve their personal goals by directing their efforts towards the success of the organization. This common direction of goals towards organizational benefit is referred to as goal congruence.

Let us now take a brief look at some behavioral theories relating to control.

McGregor’s Theory X

The application of external controls is consistent with one set of assumptions about human nature and behavior, which was called Theory X by Douglas McGregor. Much of what constitutes management control today has implicit in it the following assumptions concerning peoples behavior with respect to their work.

The average human being has an inherent dislike of work and will avoid it if he can.

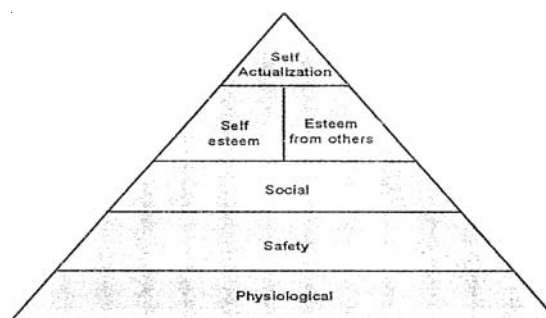
Because of this human characteristic of dislike of work, most people must be coerced, controlled, directed “and threatened with punishment to get them to put forth adequate effort towards the achievement of organizational objectives.

- The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition, wants security above all.

The above theory views the worker as a machine automatically doing what he is required to do out of fear of punishment, totally unenthusiastic and de-motivated. This was a very extreme theory. Other behavioral scientists have demonstrated rather conclusively that what people expect to be true about others seems to impel or motivate those others towards the very same expectations. McGregor himself propounded another Theory Y based on the principles of human motivation as revealed by Abraham Maslow.

Maslow’s Hierarchy of Human Needs

Maslow set forth a hierarchy of human needs. Each individual is at some level of this hierarchy and he will be motivated by his needs at that level. At the lowest



level we have the physiological needs - need for food, clothing and shelter. One will rarely be bothered about esteem, prestige, social standing and intellectual satisfaction if he has to worry where his next square meal will come from! When one is fed regularly and well, hunger ceases to be the compelling need or motivating factor. A profoundly significant fact is that, a satisfied need is not a motivator of behavior. Therefore, when physiological needs are satisfied, the individual moves on to the next level in the need hierarchy, the need for safety. Till this need of safety is satisfied, his behavior will be motivated by the desire to fulfill this need - the need for protection against

danger, threat and deprivation. As long as safe work conditions exist and an employee feels fairly treated by the organization so that arbitrary termination, salary cuts etc., are highly unlikely, safety needs of the worker are satisfied. The complete hierarchy of needs is presented in Figure above.

Satisfaction of social needs —the need for belonging, for acceptance by one's acquaintances, for giving and receiving friendship and love, can go far towards creating a cohesive work group. Groups may be far more effective in achieving organizational goals than individuals.

Once the social needs are satisfied and the individual feels he has gained acceptance, he moves on to the esteem needs. Esteem needs can be of two kinds:

Those, which relate to one's self-esteem needs for self-respect and self-confidence, autonomy, achievement, competence, knowledge etc.

Those, which relate to esteem from others - needs for status, recognition, appreciation and respect of others.

These needs are rarely satisfied in full. Once they have become important to an individual, they become indefinite and constant needs. Conventional methods of organizing production-line work give only limited opportunities for realizing satisfaction of these needs.

The climate at lower levels of the organization often reinforces behaviors associated with the assumptions underlying McGregor's Theory X. At higher levels there are ample opportunities for satisfaction of esteem needs if top management does not create any barriers.

At the apex of the hierarchy is self-actualization or self-fulfillment needs. These needs related to realizing one's full human potential through continued self-development and regular, spontaneous creativity. The conditions of industrial organization today are only beginning to become congenial to the satisfaction of these needs.

This distinction between basic (physiological and safety) needs and higher needs should act as a guide to management in choosing between control systems featuring external controls or internal motivators.

Herzberg's Two-Factor Theory

In developed countries, research shows that management has succeeded rather well in satisfying the physiological and safety needs of its employees. In these countries, motivational emphasis has therefore shifted to the social and esteem needs. Fredrick Herzberg shows that the factors which led to job satisfaction differ from the factors which lead to job dissatisfaction. Further, since the factors are independent, the opposite of job satisfaction is not job dissatisfaction, but no job satisfaction, while the opposite of job dissatisfaction is no job dissatisfaction. The reason these two factors are treated separately is that two completely different sets of human needs are involved. First, to avoid dissatisfaction, the physiological, safety, and some of the social needs are involved. Second, in order to produce job satisfaction, the primary needs to be satisfied are esteem needs, with a particular emphasis on achievement need-satisfaction.

To the extent that an item extends to the left of center it is shown to be a factor of the job, which leads to extreme dissatisfaction. To the extent that it extends to the right of center, it is shown to be a factor of the job, which leads to extreme satisfaction. The significance of the chart is that the various factors tend to be either on one side or the other and have relatively little carryover on both sides.

The need satisfiers relating to esteem needs, called motivators are concerned primarily with job content. These growth or motivator factors intrinsic to the job are achievement, recognition for achievement, the work itself, responsibility, and growth or advancement Herzberg calls hygiene (maintenance) factors the ones which are external to the job itself but a part of the job environment, such as company policy and administration, working conditions, salary, status and job security, all safety need factors. Additional hygiene factors, which can cause job dissatisfaction, are supervision and interpersonal relationships, social need factors.

The sum of Herzberg's two-factor analysis is this. By taking great care to avoid dissatisfiers (or to support hygiene factors) superiors can minimize job dissatisfaction among their subordinates. If opportunities are not provided for satisfaction of the higher needs, the motivators, people will remain deprived and will reflect that deprivation in minimum effort, passivity, indolence, unwillingness to accept responsibility, resistance to change, and willingness to follow the demagogue. Mere provision of rewards will not be sufficient, and threat of punishment will be inevitable. In other words, by not exercising motivators, the esteem-need satisfiers, Theory X seems valid.

McGregor's Theory Y

It seems that there must be a set of assumptions about human behavior, which would relate to the full range of needs (to the extent that they are not satisfied for a particular individual) rather than just relying on the physiological and safety needs, as does Theory X.

McGregor posited just such a set of assumptions and called it Theory Y. The assumptions of Theory Y are as follows:

- The expenditure of physical and mental effort in work is as natural as play or rest. The average human being does not inherently dislike work.
- External control and threat of punishment are not the only means of bringing about effort toward organizational objectives. Man will exercise self-direction and self-control in the service of objectives to which he is committed.
- Commitment to objectives is a function of the rewards associated with their achievement. The most significant of such rewards, e.g., the satisfaction of ego and self-actualization needs, can be direct products of efforts directed towards organizational objectives.
- The average human being learns, under proper conditions, not only to accept but to seek responsibility.
- The capacity to exercise a relatively high degree of imagination, ingenuity, and creativity in the solution of organizational problems is widely, not narrowly distributed in the population.

- Under the conditions of modern industrial life, the intellectual potentialities of the average human being are only partially utilized.

These assumptions indicate the possibility of human growth and development as a part of the organizational mission. They suggest that control should be directed toward helping employees and esteem-need satisfaction in ways, which are congruent with organizational objectives.

Theory Y suggests that managers are responsible for creating work situations in which subordinates may satisfy needs. If employees show signs of deprivation, management's methods of organization and control may need remedying. Conditions should be created such that members of the organization can best achieve their personal goals by directing their efforts toward the success of the organization. In other words, goal-congruence is required. The organization's needs and the individual's needs must both be recognized if goal congruence is to exist. When a sincere joint effort to create such congruence takes place, it is highly likely that a satisfactory solution will be found.

Positive Reinforcement

Another approach to achieving commitment to organizational objectives, largely through external controls, emphasizes the rewarding of "desirable" performance, or positive reinforcement. This is an application of operant conditioning, which is based on the work of B.P. Skinner.

According to Skinner, behavior is shaped and maintained by its consequences. These consequences (or reinforcers) can be either positive or negative. Behavior, which leads to positive consequences (rewards) tends to be repeated, while behavior which leads to negative consequences does not. Researches shows that positive reinforce are usually far more effective than negative reinforces in changing and maintaining behaviors.

In choosing positive reinforces, managers may look to Maslow's hierarchy to decide what is relevant to the individual, bearing in mind, of course, that what is rewarding to one individual or group may not be to another.

Once the manager has discovered the reward value of a variety of consequences to his subordinates, these consequences can be used to improve subordinates' performance. First the manager discovers which reinforces have the most impact on maintaining performance-directed behavior. Second, only desired performance achieved increases. An application of positive reinforcement theory to reporting for control would be to give positive recognition to behaviors, which move toward alleviating unfavorable variances, and to behaviors, which produce favorable variances.

Assumptions about Budgets

There are three kinds of assumptions about budgets to be discussed.

- First is the assumption that the goals expressed in the budgets are the ones, which the managers of various units will strive to achieve.

- Second are the varying assumptions about how variances from the budget will be handled.
- The third important assumption is that the unit manager can control or change the actual expense for which he or she is assigned responsibility

Let us take a look at the first assumption.

Are Budgetary Goals, Managers Real Goals?

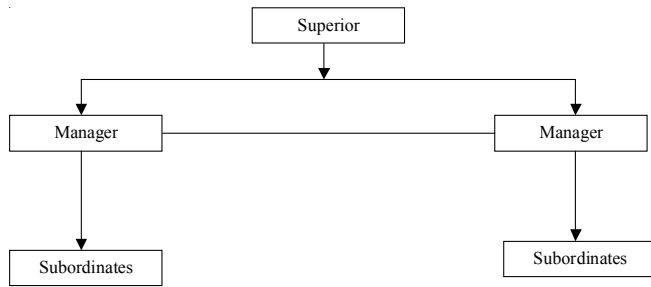
There is an assumption in budget making that the amounts shown in the final budget are the amounts, which a subordinate will strive to achieve. The validity of this assumption depends on how agreement was reached on the budget. Was the budget imposed by the manager? Was it proposed by the subordinate and agreed to by the manager? Was a budget originally proposed by the manager as a point for discussion, and another-budget mutually agreed to after negotiation?

Whether the manager actually intends to achieve the budget is based primarily upon the manager's perception of, his or her own needs, not someone else's perception. If those needs would be satisfied best by achieving the budget, then one is said to be motivated to achieve it. If the subordinate has decided that he or she wants to achieve the budget; then the budget or goal is said to have been internalized. An individual's internalised goal is known as his or- her aspiration -level, whether or not it is congruent with organizational goals.

Standards are goals incorporated into the budget. Generally, technically attainable standards are desirable if the company and its reward systems are organized in such a way that the managers serve their personal goals by meeting the expense control target established for their department. If the standards or targets for expense control are set as an engineering ideal and are unattainable, the manager of the department may recognize that inspite of everyone's best efforts it will not be possible to meet the budget or attain the standard. The standard may then have little effect on raising aspiration levels or encouraging expense control efforts, since regardless of performance the standard cannot be met. If, on the other hand the standard is set at the level of past performance, there is very little motivation for the manager to improve expense control. The manager may not aspire to better control of work or to improvement of methods, because the plan can be met by merely continuing as in the past.

The management accountant, therefore, ought not to assume that just because a standard appears in the budget, the manager is motivated to achieve it. In relationships with managers, the accountant might best view his or her role solely as a supportive. Non-judgmental information provider, or as report designer and interpreter. How the management accountant behaves can facilitate an understanding the budget as an instrument for planning and performance measurement.

The complexity of the manager's role in the organisation can be seen from figure below.



Position of the Manager in the Organization

The way in which the superior conducts budget dealings with the managers will have an impact on goal congruence. If managers perceive themselves to have a satisfactory influence in the determination of budget goals, and if the superior is showing a tendency toward flexibility in goal determination, there is a higher probability of goal congruence. Both the superior and the manager can adjust toward goal congruence. If however, the difference between the budget which the manager wants to accept and the budget that the superior feels is acceptable is too great, goal congruence is unlikely unless something else influences the superior and/or the manager. This influence can come from peer managers or from subordinates. If peer managers are accepting budget goals which appear to be similarly difficult to achieve, this may influence the manager to accept the goal being suggested by the superior's or if, the manager's subordinates are a cohesive group and supportive of accepting a challenging goal, this may overcome the manager's resistance so that he or she would internalize (really accept) a tighter budget goal.

Although there is some evidence to suggest that motivation to goal attainment is highest when standards are difficult but not impossible, goal levels are sufficiently individual that the superior needs to seek just the right level in determining the optimum budget.

While the foregoing reasons support participative budget preparation, fully participative styles are not always best in the short run, sometimes, for example, more democratic styles of management fail because subordinates are accustomed to authoritarian managers, haven't tried participation yet, and feel disoriented during the period of change.

How should Managers handle Budget Deviations?

Although the budget performance reporting system is neutral, there is sometimes an unintended outcome subordinates tend to think that it emphasizes any failure on their part, and only great successes come to the attention of top management. When this occurs, subordinates are apt to try to sabotage the system or continually challenge the appropriateness of the standards.

This is not a deficiency in the reporting system itself, unfavorable variances to criticize, punish, or rebuke subordinate managers, instead of viewing unfavorable variances as problems to be solved jointly, and as opportunities for individual growth for each.

Subordinate managers see periodic budget variance reports as means of controlling them. They see them as goods to produce greater effort. Much can be done to make them problem – solving reports by summarizing monthly reports into semi – annual or annual reports or performance which can be used for salary and promotion purposes. This lowers suspicion and promotes a helping relationship as seen by subordinate management. As this approach to using budget variances for problem solving and subordinate manager development finds credibility within the organization, mutual trust expands, aspiration levels rise, propensity for risk taking increases, group communication involving mutual counsel on problems to be solved increases, and group cohesiveness tends to improve. As a result, performance too should improve. This expression of the concept of the worker is very different from the one associated with Theory X.

Which Expenses should be Reported to the Manager?

It is usually assumed that only those assets, revenue, and expense items whose price or quantity the manager and subordinates are able to influence will appear in the manager's performance reports. There is little sense in assigning planning and operating responsibility to an individual who cannot take the management action necessary to develop or achieve the plan.

To say that a manager can control an item means that he or she can make decisions which will change the quantity or price of that item. Thus, when a budget for a certain department of the firm is formulated, that budget should contain only the items about which the manager can make decisions to bring the actual result into accordance with the plan. To include items which the manager cannot control is to clutter thinking with things over which the manager has no influence. To exclude items which the manager can control is to allow items to escape control at the level at which action can be taken. To the extent given a manager can take action to control an item, he or she will be expected

To take appropriate management action to ensure conformity with the unit's plan even though the control of the item is not absolute.

The Role of the Management Accountant

Faced with the diversity of assumptions about human behavior and of the role of budgets in the control process, how does the management accountant determine an appropriate role and an appropriate reporting system? Since the management accountant is only one member of the management team, he or she must be prepared to adopt management accounting role to the prevailing management philosophy in the most constructive way. This section is designed to assist with this task.

Management accounting does not imply merely the creation of variance reports, although they might well be meaningfully instruments for control. The philosophy being pursued by managers within the organization must be determined and the reporting system designed accordingly. To the degree that management is concerned about achieving internalized goals (goal congruence) among its people the management accountant cannot look upon accounting variance reports as sufficient

for the control of operations. Premises underlying Theory Y suggest that the accounting segment of the reporting system be devised to provide information in such a way as to facilitate a maximum of self-direction and self-control, a creative problem – solving orientation, and easy access to resources for help. Indeed, where a high degree of commitment to organizational goals exists, attention should be given to avoiding the production of superfluous reports, which might imply exertion of external controls and thus be self-defeating.

The Accountant and Management by Objectives
Management by objectives (MBO) is particularly useful in cases where performance is not reasonably subject to objectively recordable quantitative measurements. Within this system, each superior – subordinate pair would develop some six or eight major objectives on which both have agreed, usually first proposed by the subordinate (who is thought to know the needs of his or her responsibility better than anyone else). The superior and subordinate discuss and agree on priorities, set target dates for completion of the action explicitly worked out by the subordinate, and devise the method and frequency of measuring achievement. The management account can be very useful as a consultant to the pair in devising a measurement methods, either using the existing accounting system or directing them to other measures available from other functions within the organization.

The Need for Human Relations Skills

The management accountant must make it a point to establish relations with managers such that he can go directly to them, not over them, to help them solve their own problems. He should come to each manager as a information provider, facilitator of problem as an information provide, facilitator of problem solutions, a non – judgmental and accepting colleague.

Selecting a Control Strategy

Camman and Nadler suggest the following questions, which a manager should ask himself when choosing a control strategy.

1. In general, what kind of managerial style do I have?

Participative

I frequently consult my subordinates on decision, encourage them to disagree with my opinion share information with them, and let them make decision whenever possible.

Directive

I usually take most of the responsibility for a make most of the major decision, pass on only the most relevant job information, and provide detailed and close direction for my subordinates.

2. In general what kind of climate structure and reward system does my organization have?

Participative

Employees at all levels of the organization are urged of participate in decisions and influenced the course events. Managers are clearly rewarded for developing employee skills and decision making capacities.

Non – participate

Most important decisions are made by a few people at the top of the organization. Managers are not rewarded for

developing employee competence or for encouraging employees to participate in decision making

3. How accurate and reliable are the measures of key areas of subordinate performance?

Accurate

All major aspects of performance can be adequately measured. Changes in measures accurately reflect changes in performance and measures cannot be easily sabotaged or faked by subordinates.

Inaccurate

Not all critical aspects of a performance can be measured; measures often do not pick up on important changes in performance; good performance cannot be adequately defined in measurement terms; and measures can be easily sabotaged.

4. Do my subordinates desired to participate and respond well to opportunities to take responsibility for decision-making and performance?

High desire to participate

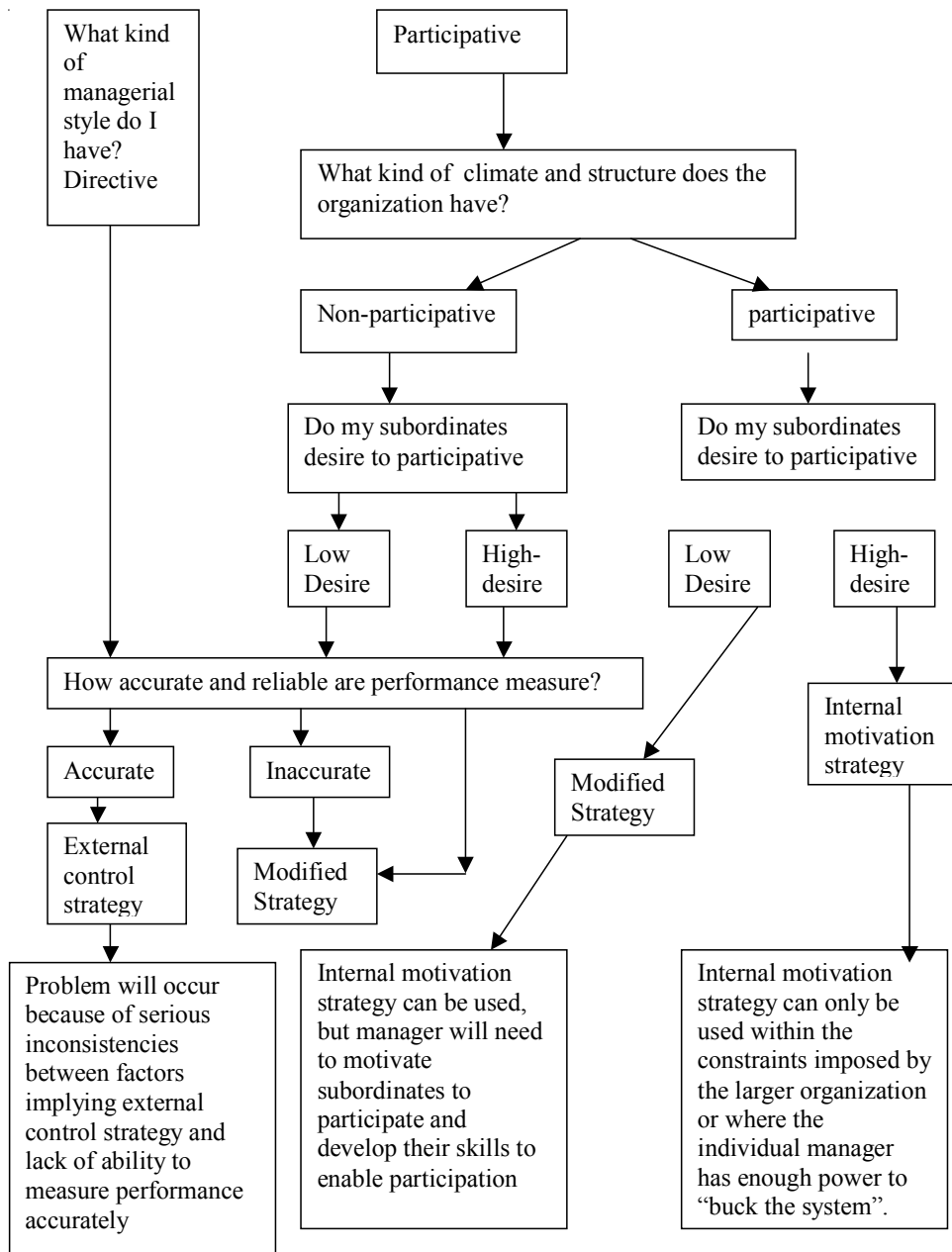
Employees are eager to participate in decisions are involved in the work itself can make a contribution to decision-making and want to take more responsibility.

Low desire to participate

Employees do not want to be involved in many decisions, do not want additional responsibility, have little to contribute to decisions being made, and are not very involved in the work itself.

Having ascertained answer to the above questions, Camman and Nadler suggest the following decision tree for choosing a control strategy.

A decision tree for choosing a control strategy



Exhibit

Although the above exhibits point toward a selection process for a control strategy, the human costs of selecting external controls, as means for controlling enterprise activity may be extremely high.

This consideration of both technical and human factors in management control is essential for effective performance.

Notes

LESSON 24-26 :

MANAGEMENT INFORMATION SYSTEM

Learning Objective: -

This lesson will introduce you to

- *Evolution of MIS*
- *Elements of MIS*
- *Misconception and myths related to MIS*
- *Characteristics of an effective MIS*
- *Assessment of information need in management process.*
- *Limitations of MIS*
- *Prerequisites of an effective MIS*
- *Approaches of MIS Development*

Introduction

Managers always have used information in performing their tasks. So the subject of management Information is not new. What is new about it is the recent availability of better information. The innovation that makes this possible is the electronic computer.

The computer is relatively a new tool for use in an organization. It became popular only about twenty years ago when it was first applied to business tasks; the tasks were mainly in accounting area. More recently, the value of the computer as a producer of management information has been recognized. The term management information system (MIS) is a popular one, and it can be assumed that all firms have some type of MIS.

The information systems of some firms are better than those of others. And some firms have computer based systems, while other use key-driven machines, punched card machines or manual methods. These two differences do *not* necessarily, relate to each other. The better systems are not always the computer based ones. The quality of the MIS is determined by the people who design it, the managers and computer professionals and not by the type of equipment.

“Management is the art and skill of taking the right decision at the appropriate moment from incomplete and sometimes incorrect, information available” is one of the many definitions of management. For the logical decision making process, relevant and reliable information's are essential. Collection of data and communication of information form integral parts of any organized human activity. Information necessary for the discharge of important management functions of planning, organizing, staffing, directing and controlling, are to be collected, processed, classified, interpreted, recorded and utilized by means of a network of communication channels which has to extend to every part of an organization and outside as well. Within the industrial and commercial sector, it is evident that even in the smallest organization, there is a need for a system of collecting and recording facts and for the retrieval and dissemination of information.

As organization expends problems associated with the data collection and recording and with information retrieval and its effective communication. Increase in proportion to the size of the organization. It is essential for an organization to develop and maintain a system of information flow which encompasses all the activities performed at various levels to achieve the objectives of the organization. A special system or agency has got to be instituted to ensure the flow of correct information at regular intervals to various hierarchical levels with the ultimate objective of arriving at the correct decision at the right moment. The emergence of relatively new technology and science of electronic data processing has provided the Impetus for research and development of more automated system of information storage and retrieval and to a new approach in the study of control, feedback system and communication channels in the industry termed as management information systems.

All armed forces in the world have a regular set-up for collecting intelligence about the military strength and intentions of all potential enemies and also of friendly countries. This is done even during peacetime and various contingent plants are drawn up accordingly. When there is a failure the damage may be very heavy; for example, the failure on the part of the U.S.A. to correctly gauge military preparations of Japan led to extremely heavy losses when Japan suddenly launched an attack on Pearl Harbour in December 1941. When war is imminent or when hostilities actually break out, the collection of intelligence about the enemy gains added importance and even a small mistake is costly. In one of the campaigns in North Africa. Rommel launched an attack against the British a few weeks earlier than anticipated and the result was very costly for the British. Needless to say, in addition to gathering full information about the enemy, full information about own forces, supplies, etc., must always be available. An industrial concern is in a similar way engaged in warfare, the weapons being product policies, sales promotion policies, pricing policies, etc. To survive, if not to do well, one must have full constant and up-to-date information about one's own state of affairs, about the competitors and the general environment in which the concern is placed. This task is so big and complex that it is now entrusted to experts and there is a regular department or a system to collect the information; process it and make available the information to the people concerned with making of decisions. This system is now known as the Management Information System.

Evolution of MIS

MIS is an old management tool. It was in use by business managers, well before the emergence of the computer, as a means for better management and scientific decision-making. In fact, during the eighteenth century business firms in U.S.A. were making use of the management information system, though the system then followed was not as complex as it is today. The

system at that time was required to take care of the environment and the need prevailing from time to time. The greater is the complexity of the environment, the lesser would be simplicity of a system. With the coming up of large business corporations in USA towards the end of the eighteenth century need was felt to enlarge the MIS to cater to the growing and diversified information needs of the corporations to deal with complex and multi-variant problems.

MIS provides for the identification of relevant information needs, the collection of relevant information, processing of the same to become useable by the business managers; and timely dissemination of processed information to the users of the information for properly managing the affairs of an enterprise by informed decision. For example, in a competitive market for products manufactured by an enterprise, its management needs of information on the pricing policy of the competitors, specialist of competing products sales techniques etc to effectively combat the effect of the competition. The design of MIS reflects not only a rational approach for optimization of benefits but takes due note of behavioral impacts on organizational decision-making.

The MIS should not be identified just as a computer system. Computer, like many other developments has enriched MIS and has made it more effective by enabling minute and accurate processing of massive information. But the system was there and it is there now largely based on computer. MIS in its present form has been evolved from the following disciplines in management.

1. Managerial Accounting
2. Management Science
3. Management Theory
4. Computers.

Managerial Accounting: - This branch of accounting is concerned with cost analysis and its behavior, which is useful for managerial decisions. Cost analysis is used in managerial accounting to determine the most relevant cost for decision making. It employs techniques such as capital budgeting, break-even analysis, transfer pricing etc. It is mainly oriented towards internal management and control and is therefore closely identified with MIS. Managerial accounting knowledge is of great help in ascertaining the information requirements, carrying analysis, in designing forms for procuring and providing information. In fact, a Managerial Accountant has a clear-cut knowledge about the relevant and specific information requirement of executives for performing functions in different departments. For example, to determine the break-even point the information required are about fixed cost, variable cost, and selling price of the product. He also knows the sources of information availability. All these facts known to Managerial Accountant's were utilized in the evolution of MIS. Thus one can say that MIS is an extension of managerial accounting.

Management Science: It means the application of scientific method and quantitative analysis techniques (or Operation Research Techniques) to management problems. The use of management science methods emphasizes on the use of systematic approach to problem solving and application of

scientific method to investigation. It utilizes mathematical models and mathematical and statistical procedures for analyzing problems. Finally, it aims at achieving optimal decision.

Management Science techniques were incorporated in the MIS design to make quantitative and analytical information available to the users of MIS. The information system so designed provided quantitative information and procedures to facilitate model building for future plans and activities and to simulate the real situation even before they occur.

Management Theory: There are several management theories behavioral, empirical, decision, qualitative and management process. Out of these, decision theory and management process are more relevant to us. According to decision theory, the most important task of managers is to make decisions.

The second theory known as 'Management Process' is the most widespread approach to management. Under this, management is defined in terms of what managers do. According to this management performs the functions of planning, organizing, staffing, directing and controlling.

The knowledge of these management theories enabled the MIS designers to ascertain the type of decisions made and functions performed by executives in business organizations.

Computers: Computers were not originally planned for processing but today this is the major use for which they are applied in business situations. The reason for this is the speed of processing, calculating and retrieval of data. In fact computer technology has been considered as a major factor in inducing MIS development. It has come as a significant tool of information processing and storage.

From the above discussion, it is quite apparent that MIS is an old management tool and has been evolved from various disciplines in management. It maintained and provided the necessary information to its executives for planning, controlling and decision making purposes. For example, control of inventory is an important management function. At the time when no integrated MIS was in use, perhaps the Inventory In charge managed the function based on the information emanating from his department like the information that certain items have been exhausted or are nearing exhaustion. He would then have taken steps to replenish the *stock* in the usual manner. However, with the development of the MIS in an integrated manner, his job is not that simple. He is not aware that for effecting control of inventories he has to equip himself with a number of relevant information generated by his own department and also other concerned departments. The information which he needs now include-cost of maintaining inventories, purchase schedule, economic order quantities, lead time, rate of consumption, etc.

In this approach of integrated MIS, the enrichment has been contributed by management theories and specially the financial management concepts. Further, when he has to manage a very large number of inventories involving number of variables, it is not possible for him to get the information processed and correlated manually. Here, he takes the aid of computer.

Elements of MIS

MIS is a system that aids management in making carrying out and controlling decisions. To understand the concept of Management Information System clearly, it is necessary to understand its three elements viz., Management, Information and System.

Management

It refers to a set of functions and processes designed to initiate and coordinate group efforts in an organized setting, directed towards promoting certain interests, preserving certain values and pursuing certain goals. It involves mobilization, combination; allocation and utilization of physical, human and other needed resources in a judicious manner by employing appropriate skills, approaches and techniques. It is a process of conceiving and converting certain worthwhile ideas into results by getting things done through people by offering them monetary and other inducement in return for their contributions.

The functions and processes of management are wide-ranging and closely interrelated. As creator and activator of productive organizations, the functions of management range all the way from design of the organization, formulation of organizational goals, strategies, policies and plans of actions determination of tasks and their distribution among the activity units, employment of personnel, installation of reward systems, communication and control system to ensure that what is planned is achieved facilitation of organizational change and adaptation, resolution of organizational conflict, and so on.

In short 'Management' may be thought of as the sum total of those activities which relate to the laying down of certain plans policies and purposes securing men, money, materials and machinery needed for their goal achievement; putting all of them into operation, checking their performance and providing material rewards and mental satisfaction to the men engaged in the operation.

Management Process:- It is a traditional approach of management. It views management as what managers do. Managers in business organization are concerned with the task of developing environment, suitable for the fulfillment of organizational goal and objectives. For the fulfillment of organizational goal, and objectives of a business organization, a manager may plan its activities staff it with requisite number of personnel, organize its personnel and their activities direct the operations of the organization and control the direction of the organization by evaluating, feedback and making necessary adjustments. In other words, the management process assumes, that the totality of, what managers do, can be divided into a set of inter-related functions. These functions are Planning; Organizing; Staffing; Directing and controlling. In order to perform these function functions efficiently they require an important resource viz, information along with other resources like men, money and machine.

Information

Importance of Information

The traditional management relied on formal organization, motivation and leadership for solving complex business

problems. In spite of reliance on these concepts, very often one comes across business managers asking questions like. "I do not know the value of my inventory in hand" or "I cannot find out what our manufacturing costs are". These and similar other questions reflect dependence of managers on information and illustrates importance of adequate information for decision-making.

When the business organizations were small, the proprietor was able to monopolies the information function and thereafter the decision making function. However as the business organization grew in size and complexity the need to gather, process and distribute information also grew. Additional equipment and specialists have been added to handle this function. The nature of equipment used has varied from use of simple accounting machines to use of second or third generation electronic computers.

Information is the substance on which business decisions are based. There fore, the quality of raw materials, that is the information determines the "quality of output. The management plays the part of converting the information into action through the familiar process of decision-making. Information has come to occupy a very important position in the survival of a business. Indeed, information, flows are important to the survival of a business as the flow of blood is to the life and survival of an individual. Information flow is important for good business decisions and it has been often said that a recipe of a good business is "90% information and 10% inspiration."

Information can be defined as "data that has been processed into a form that is meaningful to the recipient and is of real or perceived value in current or prospective decision". In other words information refers to an output of data processing which is organized and meaningful to the person who receive it. For example, data concerning sale may indicate the names of the sales men when a large number of such data elements is organized and analyzed. It may provide important information to a marketing director who is attempting to evaluate his sales force.

Some persons defines it as a catalyst of management and the ingredient that coalesces the managerial functions of planning operating and control.

Characteristics of Infomation

Important characteristics of useful and effective information are as follows:

Timeliness: It is a mere truism to say that information, to be of any use, has to be timely. To take an example, it is well known that the sugar industry often works on small margins and thus control has to be perfected if sugar mills are to show good profits. Losses in the process of manufacture are sizeable and even a small reduction in them will lead to a big increase in production and profits and vice versa. If recovery in a sugar mill crushing 20 lakh quintals of sugarcane can be raised from 10% to 10.01 %, 2,000 quintals of extra sugar will be produced. Production losses must be very carefully watched on a daily and continuous basis and analyzed to find means to minimize it. The MIS must be geared for this purpose. However, it is not

always necessary that information is required at such a short interval. Usually, as we proceed from the lower *levels* to higher levels of management, the time interval necessary for providing decision impelling information on a information at strategic levels is not needed to monitor the operations of the organization but it is required for deliberations. Therefore, it is not provided on a continuous basis but as and when desired.

Purpose

Information must have purposes at the time it is transmitted to a person or machine, otherwise it is simply data. Information communicated to people has a variety of purposes because of the variety of activities performed by them in business organizations. The basic purposes of information are to inform, evaluate, persuade, or organize other information. Creating new concepts, identifying problems, solving problems, decision making, planning, initiating, controlling and searching are just some of the purposes to which information is directed to human activity in business organizations.

Mode and Format

The modes of communicating information to humans are sensory (through sight, hearing, taste, touch and smell) but in business they are either visual or in written form.

Format of the information should be so designed that it assists in decision-making, solving problems, initiating planning, controlling and searching. Therefore, all the statistical rules of compiling statistical tables and presenting information by means of diagram, graphs, curves etc, should be considered and appropriate one followed. The reports should preferably be supplied on an exception basis to save the manager from an overload of information. Also, the data should only be classified into those categories as have relevance to the problem at hand. As indicated above, sales analysis could be conducted by several categories. But the records should be provided only on those that appear to be significant to decision making. Occasionally, the reports may be required in entirety, viz., for the auditors. Even in this case, the exceptional deviation or vacancies should be indicated by say, asterisks. It is also desirable to give the analysis of variance to assist the manager in initiating corrective action. Likewise, for such information as ROI not only the summary figures in the entire ROI hierarchy should be given. This would assist the manager to trace the causes for a rise or fall in ROI. Format of information dissemination is a matter of imagination and perception. It should be simple and relevant, should highlight important ones but should not be too cluttered up. Every space of the information format should have current relevance. Often unnecessary wastage of space is noticed in the information documents on information not required. This should be avoided.

Redundancy

It means the excess of information carried per unit of data. For example, 75% of the letters used in a phrase are usually redundant. However, in business situations redundancy may some time be necessary to safeguard against errors in the communication process. For example, the correspondence in contracts may carry figures like '4' followed by (FOUR).

Rate

The rate of transmission/ reception of information may be represented by the time required to understand a particular situation. Quantitatively, the rate for humans may be measured by the number of numeric characters transmitted per minute, such as sales reports from a district office. For machines, the rate may be based on the number of bits of information per character (sign) per unit of time.

Frequency

The frequency with which information is transmitted or received affects its value. Financial reports prepared weekly may show so little change that they have small value, whereas monthly reports may indicate changes big enough to show problems or trends.

Frequency has some relationship with the level of management also. Or it should be related to an operational need. For example, at the level of foreman it should be daily or weekly basis but, at the management control level, it is usually on a monthly basis.

Completeness

The information should be as complete as possible. The classical ROI or NPV models just provide a point estimate and do not give any indication of the range within which these estimates may vary. Hartz's model for investment decisions provides information on mean, standard deviation and the shape of the distribution of ROI and NPV. With this complete information, the manager is in a much better position to decide whether or not to undertake the venture.

Reliability

In statistical surveys, for example, the information that is arrived at should have an indication of the confidence level. Even otherwise also information should be reliable and external source relied upon indicated.

Cost Benefit Analysis

The benefits that are derived from the information must justify the cost incurred in procuring information. The cost factor is not difficult to establish. Using costing techniques, we shall have to find out the total as well as the marginal cost of each managerial statement but benefit are hard to quantify, i.e., they are usually intangibles. In fact the assessment of such benefits is very subjective and its conversion into objective units of measurement is almost impossible. However, to resolve this problem, we can classify all the managerial statements into many categories with reference to the degree of importance attached, say, (a) absolutely essential statements, (b) necessary statements, (c) normal statement (d) extra statements. The statements falling in the first category cannot be discontinued whatever the cost of preparing them. The second category statements may have a high cost but may be discontinued only in a very stringent circumstances. The normal statements may include those, which can be discontinued or replaced if their costs are too high. In the last category we may list those statements which may be prepared only if the benefits arising out of them are substantially higher than the costs involved.

Validity

It measures the closeness of the information to the purpose, which it purports to serve. For example, some productivity

measures may not measure, for the given situation, what they are supposed to do eg., the real rise or fall in productivity. The one suiting the organisation may have to carefully selected or evolved.

Quality

A study conducted by Adams a management expert, about management attitude towards information system, reveals that 75% managers treated quantity and quality investment as nearly identical in terms of job performance; yet given a choice, 90% preferred an improvement in quality of information over an increase in quantity. Quality refers to the correctness of information. Information is likely to be spoiled, by personal bias. For example, an over optimistic salesman may give rather too high estimates of the sales. This problem, however, can be circumvented by maintaining records of salesman's estimates and actual sales and deflating or inflating the estimates in the light of this. Errors may be the result of:

1. Incorrect data measurement and calculation methods.
2. Failure to follow correct processing procedures, and
3. Loss or non-processing of data, etc.

To get rid of the errors, internal controls should be developed and procedure for measurements prescribed.

Information should of course, be accurate otherwise it will not be useful; but accuracy should not be made a fetish. For example, the sales forecast for groups of products can well be rounded off to thousands of rupees.

Value of Information

It is defined as the value of the change in "decision behavior" caused by the information less the cost of the information. In other words, given a set of possible decisions, a decision maker may select one on the basis of the information at hand. If new information causes a different decision to be made, the value of the new information is the difference in value between the outcome of the old decision and that of the new decision, less the cost of obtaining the information.

System

According to Murdick & Ross; system is a set of two or more elements such as people, things, and concepts, which are joined together to attain a common objective. But C. Davis defines a physical system as a set of elements, which operate together to accomplish an objective. We can define a system as a group of inter-related components or parts, which function together to achieve a goal. Thus a system can be described by specifying its parts, the way in which they are related, and the goal, which they are expected to achieve. For example human body has a particular set of parts-a right arm, a left leg, a stomach, a head etc. these various body parts are related by means of connecting networks of blood vessels and nerves. This system has a main goal which we may call "living". Consider a school as a system. Its parts include classrooms students, teachers, the books, desks, the library etc. Now consider the ways in which these elements can be related to one another. Desks go to classrooms, as do teachers. Students go to their classes and books go in the library and classroom for use by both students and teachers. Students and teachers interact with one another in classroom, library and elsewhere. One can easily compile several sets of

components for such a system and perceive many relationships among them. The objective of a school system is imparting "Education" or "Learning".

System approach to Problem Solving

It is a formal means of problem solving. It makes use of a discipline or a procedure, which can be applied to any type of business problems. The procedure usually used to solve problem by systems approach involves the following six steps:

1. Defining of the problem.
2. Gathering and analyzing data describing the problem.
3. Identification of alternative solutions.
4. Evaluation of alternatives.
5. Selecting the best alternative.
6. Implementing the solution and follow up to assure that the solution is effective.

To understand, how the system approach to problem solving is applied, we consider, the problem of long delays between receipts of orders and delivery. To seek a solution for the problem by applying systems approach, we would make use of the aforesaid six steps.

(1) Defining of the Problem:

The problem involved here is of inordinate delay between the receipt of orders and their delivery. This problem affects the vendor in many ways, e.g. a bad reputation, loss of customers, reduction in profitability and even stoppage of due payments.

(2) Gathering and Analysing Data Concerning the Problem:

The problem of delay in meeting orders, in this case, say, arises due to the following reasons:

- a. Excessive orders in the hand of vendor,
- b. Shortage of power (fall in production due to shortage of power)

(3) Identification of Alternative Solutions:

To overcome the stated problem by system approach, suppose the following two solutions exist:

- i. Refusal of orders, in case the total size of the orders exceeds the plant capacity of one shift.
- ii. To run the plant in double shift, to meet the commitment in time. Any shortfall in power supply may be met by installing a generator.

(4) Evaluation of Alternative Solution:

Out of the two identified solutions under the preceding step, the second solution say accounts for an overall increase in the profitability of the concern after off-setting additional cost for the generator produced power. It also helps in retaining customers and growth of the concern.

(5) Selection of the Best Alternative:

Under this step, management more closely examines the alternatives and puts its stamp on the best possible alternative. In this case say the second alternative is finally chosen.

(6) Implementation of the Solution

The implementation of the solution requires the necessary policy changes. Besides this, the resources required to run the

plant in double shift and installation of a generator also are to be arranged. Finally, appropriate procedures are developed to exercise smooth production and timely supply to customers. The concerned officers are accordingly instructed.

Management Information System

A manager may be considered to perform the role of a center of communication who receives information, processes it takes action on it and finally transmits it to other concerned persons. The functions, which he performs, depend on the availability of information. The basic organizational activities of the manager are as follows:

- i. Determination of organizational objective and developing plans to achieve them.
- ii. Securing and organizing the human and physical resources so that the objectives could be accomplished.
- iii. Exercising adequate control over the functions.
- iv. Monitoring the results to ensure that accomplishment are proceeding according to plan.

The effectiveness and efficiency with which the manager can perform these functions are directly related to the relevance, quality and timeliness and other characteristics of the information at his disposal. Organized systems are necessary in today's Organizations to assure the provision of such information. The management Information system is the core of the modern organization, regardless of its type or objectives.

Definitions of MIS

Several definitions related to the information system concept are given as follows:

Canith defines MIS as: An approach that visualize the business organization as a single entity composed of various inter-related and inter-dependent sub systems looking together to provide timely and accurate information for management decision making, which leads to the optimization of overall enterprise goals.

Dicky: defines it "as an approach to information system design that conceives the business enterprises as an entity composed of inter dependent system and sub-systems, which with the use of automated data processing systems, attempts to provide timely and accurate management information which will permit optimum management decision making.

The definition presented by **Schwartz** is "a system of people equipment procedures, documents and communications that collects, validates, operates on transformers, stores, retrieves, and presents data for use in planning, budgeting, accounting, controlling and other management process".

Frederick B. Cornish states that a proper management Information System is "structured to provide the information needed when needed and where needed", further, the system "represents the internal communications network of the business providing the necessary intelligence to plan, execute and control.

The Management information Systems operating these days are based on the computer so much "that some authorities consider them as inseparable from computers **Thomas R. Prince** defines MIS as a "computer based network containing one or more operating systems, provides relevant data to management

for decision making purposes and also, contains the necessary mechanism for implementing changes of responses made by management in this decision making". Computers do assist greatly in operating MIS in big industrial or commercial concerns but it would be wrong to think that such a system cannot be operated without the help of computers. For if it were so, most industrial commercial or financial concerns in India would have closed down.

As **Coleman and Riley** states (in MIS : Management Dimensions), "an MIS (1) applies to all management levels ; (2) and is linked to an organizational subsystem; (3) functions to measure performance, monitor progress, evaluate alternatives or provide knowledge for-change or corrective action; and (4) is flexible both internally and externally.

G.B Davis -defines management information system as "an integrated man/ machine system for providing information to support the operations, management and decision making functions in an organization". The system utilizes computer hardware and software, manual procedures, management and decision models, and a database. According to him, managerial information structure must be of a pyramidal shape and It should be in conformity with the pyramidal pattern of the structure of the particular organization i.e., at higher levels, information needed is more filtered brief but meaningful where as lower the level the broader should be the information base.

According to **Jerome Kunter**, "MIS is a system that aids management in making, carrying out, and controlling decisions". Here MIS is a system that aids management in performing its job. MIS does not imply that it aids all levels of management. Frequently, a computerized MIS is taken to mean a system that reacts instantaneously to top management requests, pouring out data that shows the status of the Company at go-second intervals in graphic form on television screens. A company can employ MIS concept that focus on middle and operating management rather than top management.

Misconceptions or Myths about MIS

Let us clarify some of the misconceptions or "myths" about MIS:

1. The study of management information system is about the use of computers. This statement is not true. MIS may or may not be computer based, computer is just a tool, just take any other machine. Whether it should be used while installing an MIS depends largely on several factors-how critical is the response time required for getting an information; how big is the organization, and how complex are the needs of the information processing
2. More data in reports means more information for managers: This is a misapprehension. It is not the quantity of data, but its relevance, which is important to managers in the process of decision-making. Data provided in reports should meet information requirements of managers. It is the form of data and its manner of presentation, which is of importance to business manager. Unorganized mass of data brings confusion.

3. Accuracy in reporting is of vital importance: The popular belief is that accuracy in reporting should be of high order. At the operating level, it is true. Other examples, where accuracy is really important can be; the dispensing of medicine; the control of aircraft; the design of a bridge etc. Accuracy, however, is a relevant but not an absolute ideal. Higher levels of accuracy involve higher cost. At higher decision levels great accuracy may not be that required. The degree of accuracy is closely related to the decision problem. Higher management is concerned with broad decisions on principle and objective. A fairly correct presentation of relevant data often is adequate for top management decision. For a decision on a new project proposal top management is not interested in precise rupee terms the project cost. A project cost estimated at a fairly correct figure is all what it wants.

Classification of Information Systems

Things as complex and ill-defined as information systems are difficult to fit into neat classification. It is sometimes very difficult to delete mine the category to which a particular information system belongs. However, broadly the following types of information system have been identified in business organizations.

1. Manual Versus Automated Systems: Almost every information system combines automated and manual techniques in getting its work done. The extent of automation depends upon a number of factors including the speed with which the information is required, the quantum of information to be stored and processed, costs of automated system and value of information to the decision maker.
2. Size classification: One way of classifying information system is by its size. However, the definition of what constitutes a small size, a medium size or a large size is a matter of judgment. There are no well-defined lines of demarcation.
3. Centralized and Decentralized Systems: A centralized information system embraces all functions of information system at one place including data collection processing, storage and communication done by centralized system. A decentralized system on the other hand involves several partially autonomous information systems serving various functions, departments or sub organizations within the organization.
4. Data retrieval and Document retrieval systems: Data retrieval information system are the ones that store different types of data and manipulate it in a fashion so that the desired report can be obtained.- On the other hand, document retrieval systems produces a given document io total upon request with little or no manipulation of data.
5. Batch/ Real time systems: Most of the computer applications in our country today make extensive use of batch or sequential processing techniques. Under this technique data is collected and after lapse of certain time or accumulation of a certain quantum of' transactions, the data file is updated. In the case of real time systems transactions are processed as they occur.

Characteristics of an effective MIS

Important characteristic for an effective MIS are eight in number and are briefly discussed as below:

1. Management Oriented: It means that the development of the information system efforts should start from an appraisal of management needs and overall business objectives. Such a system is not necessarily for top management only; it may also meet the information requirements of middle level or operating levels of management as well.
2. Management directed: Because of management orientation of MIS, it is necessary that management should actively direct the system's development efforts. Their mere one time involvement is not enough. For system's effectiveness, it is necessary for management to devote their sufficient time not only at the stage of designing the system but for its review as well, to ensure that the implemented system meets the specifications of the designed system. In brief, management should be responsible for setting system specifications and it must play a key role in the subsequent trade off decisions that occur in system development.
3. Integrated: Developed system of information should be an integrated one. It means that all the functional and operational, information sub-system should be tied together into one- entity. An integrated information system has the capability of generating more meaningful information to management. The word integration here means taking a comprehensive view or a complete picture look at the inter locking sub-systems that operate within a company.
4. Common data flows: it means the use of common input, processing and output procedure's and media whenever possible or desirable. Data is captured by, system analysts only once 'and as close to its original source as possible. They then try to utilize a minimum of data processing procedures and sub-systems to process the data and strive to minimize the number of output documents and reports produced by the system. This eliminates duplication in data collection documents and procedures. It also avoids duplication, simplify operations and produces an efficient information system. However, some duplication is necessary in order to insure effective information systems.
5. Heavy planning element: An MIS usually takes 3 to 5 years and sometime even longer period to get established firmly within a company. Therefore, a heavy planning element must be present in MIS development. It means that MIS designer should keep in view future objectives and requirement of firm's information in mind. The designer must avoid the possibility of system obsolescence before the system gets into operation.
6. Sub system concept: Even though the information system is viewed as a single entity, it must broken down into digestible sub systems which can be implemented one at a time by developing phasing plan. The breaking down of MIS into meaningful sub-systems sets the stage for this phasing plan.
7. Common database: Database is the mortar that holds the functional systems together. It is defined as a "super file"

which consolidates and integrates data records formerly stored in many separate data files. The organization of a data base allows it to be accessed by several information sub systems and thus eliminates the necessity of duplication. In data storage, updating, deletion and protection. Although it is possible to achieve the basic objectives of MIS without a common data base, thus paying the price of -duplicate storage and duplicate file updating, more often than not the common data base is a definite characteristic of MIS.

8. Computerised: It is possible to have a MIS without using a computer. But its use increases the effectiveness of the system. In fact its use equips the system to handle a wide variety of applications by providing quickly their information requirement. Other necessary attributes of the computer to MIS are accuracy and consistency in processing data and reduction in clerical staff. These needs in management information system make the Computer a prime requirement.

Establishing the Information needs of Management Process

The establishment of information need in management process In fact means the establishment of Information requirement of its managers Broadly such information is necessary to managers for performing the functions of planning organizing and controlling The task of establishing the Information requirements for the aforesaid functions is usually performed by system analysts and system designers- They establish the information requirement by interviewing and analyzing the functions, which each executive in the organization is required to perform.

In general the planning information requirements of executives can be categorised into three broad categories viz, (a) environmental; (b) competitive and (c) internal.

- a. Environmental information: Comprises of the following;
 - i. Government policies- information: Information about concessions/benefits, government policies in respect of tax concessions or any other aspect, which may be useful to the organization in the future period.
 - ii. Factors of production: Information related with source, cost, location, availability, accessibility and productivity of the major factors of production viz , (i) labour; (ii) materials and parts and (iii) capital.
 - iii. Technological environment: Forecast of any technological changes in the industry and the probable effect of it on the firm.
 - iv. Economic trends: It includes information relating to economic indicators like consumer disposable income, employment, productivity) capital investment etc. Such information is valuable for those firms specially whose output is a function of these important variables.
- b. Competitive information: It includes the following information.
 - i. Industry demand: Demand forecast of the industry in respect of the product manufactured and in the area in which the firm would be operating

- ii. Firm demand: Assessment of the firm's product demand in the specified market. It also includes an assessment of firm's capability to meet firm's demand.
 - iii. The competitive data: Data of competing firms for forecasting demands and making decision and plans to achieve the forecast.
- c. Internal Information: Usually includes information concerning concern's (i) sales forecast; (ii) financial plan/ budget (iii) supply factors, and (iv) policies, which are vital for subsidiary planning at all levels in the organisation.

The function of organizing requires information for determining structure of work groups and for coordinating their activities. Specifically the information should be suitable for identifying, classifying and grouping activities before assigning them to different work groups. Other information required for the purpose of organizing includes future plans; plans of action, orders; budgets, operations, instructions, specifications etc. The information required for organizing the activities of the concern may be met mainly from internal sources.

Information required to exercise control function usually concerns the functional area, e.g, manufacturing; marketing, finance, personnel etc. Such information can also be made available from the internal sources. Specifically the information required to control manufacturing function includes the figures of products as per budget and actual operations, details of material, labour, overhead expenses, etc. Likewise the control information requirements of other functions can also be established.

Factors on which Information Requirements Depends

The factors on which information requirements of executives depend are:

1. Operational function
2. Level of management activity
3. Type of decision making.

Operational function: The, grouping or clustering' of several functional units on the basis of related activities into a sub-system is termed as operational function. For example, in a business enterprise, marketing is an operational function, as it is the clustering' of several functional units like market research, advertising, sales analysis and so on. Likewise, production finance, personnel etc., can all be considered as operational functions. Operational functions differ in respect of content and characteristics of information required by them.

Levels of management activity: Different levels of management activities in management planning and control hierarchy are - Strategic Planning; Management Control and Tactical Planning; Operational Control and planning.

Strategic planning: It is the process of deciding on the objectives of the organization, on changes in these objectives, on the resources used to attain these objectives and on the policies that are to govern the acquisition, use, and distribution of these resources.

Management Control: It is the process by which managers assure that resources are obtained and used effectively and

efficiently in the accomplishment of the organization's objectives.

Operational Control: It is the process of assuring that, specific tasks are carried out effectively and efficiently.

Tactical planning and Operational planning: It means the formulation of plans for meeting the organizational goals at management and operational control levels.

Type of decision-making: Organizational decisions can be categorized as programmed and non programmed ones.

Programmed decisions: Decisions which are of repetitive and routine nature are known as programmed decisions. For example, preparation of payroll and disbursement of pay through bank account. For taking such decisions guidelines and rules required are provided in the form of a procedure manual.

Non programmed decisions: Decisions which are unstructured, involve high consequence, complex or a major commitment are known as non-programmed decisions. For example, new product line, capital budgeting. Non-programmed decision-making has no pre-established decision procedure. Also, it is difficult to completely specify the information requirements for taking these decisions.

Information requirement Depends upon Operational Function

The information requirement of different operational functions vary not only in content but in Characteristics as well. In fact, the content of information depends upon the activities- performed under an operational function. For example, in the case of production, the information required may be about the production targets to be achieved, resources available and so on. Whereas in the case of marketing function, the content of information may be about the consumer behaviour, new product impact in the market etc.

The characteristics which must be possessed by a particular information too are influenced by an operational function. For example, the information required by accounts department for preparing payroll of the employees should be highly accurate.

Information requirement Depends upon the Level of Management Activity

The level of management activity also influences the information requirement and its characteristics. For example, strategic planning requires more of external information and information on behaviour of relevant and likely future events. The information- tends to be more of qualitative and. general in nature in many instances. Management Control, requires more accurate precise current and repetitive information. Operations level requires detailed information.

Information Requirement Depend upon Type of Decision Making

In the case of programmed decision, the decision is pre-specified. Such a decision clearly specifies the information requirement. For- example, in the case of an inventory item, the reorder level is fixed. For placing a fresh order for inventory replenishment in this case requires information about its present level.

Level of Management and their Information Requirements

There is no unanimity over the number of management levels. Keith Davis has classified various management levels as trusteeship management, general management, departmental management, and middle management and supervisory management. Piffner and Sherwood have classified, management levels into four parts-Corporate management, Top management, Middle management and Supervisory management. Many other experts, such as Koontz and O'donnell and Brech have classified these as top level, middle level and supervisory level. In fact, this last classification is preferred over the others by different management experts from analysis point of view. The division of management into three levels is carried out to distinguish the type of tasks, extent of authority and degree of accountability within the hierarchy.

Top Level (Strategic Level)

Top management is defined as a set of management positions which are concerned with the overall tasks of designing, directing and managing the organization in an integrated manner. The structure of top level normally consists of Chairman and members of the Board of Directors, Chief Executive Officer and the heads of the major departments of the company. In fact, this level consists of those executives, whose responsibilities relate to the whole organization or in other words, they are accountable for effectiveness and efficiency of the operations of the organization as a whole

Top management's main responsibility is in the direction of determining the overall goals and objectives of the business. It deals mainly with long term plans, policy matters and broad objectives of the company. Also, it establishes a budget framework under which the various departments will operate.

Top management needs information on the trends in the external environment (economic, technological, political and social) and on the functioning of the internal organizational sub-system. Apart from historical information, top management requires ongoing or current information also which is generated through forecasts of the future. Thus, mostly the information utilized by top management is futuristic and external in nature. Much of the information so generated for strategic planning purpose tends to be incomplete and not fully reliable. It may not be available on time. For control purposes, top management receives summary and 'exception reports' (for example on production, sales, cash, profits and' so on) from the middle management.

Middle Level (Tactical Level)

Middle management is defined as a group of management position, which tends to overlap the top and supervisory management levels in the hierarchy. Middle management positions consist of heads of functional departments and chiefs of technical staff and service units. Middle management, therefore, includes such people as the Manager of Sales, the Manager of Purchasing, Finance Manager, and the manager of Personnel etc.

Middle management may be viewed as administrative management in the sense that it is responsible for the elaboration, classification and operation of organization goals, strategies and

policies in terms of action programmes and norms of performance. Middle management is concerned with the task of formulating pragmatic operating policies and procedures for the guidance of supervisory management.

The nature of information required at the middle management level is less diverse and complex. Middle management is fed with information both from top management and supervisory management; Much of the information used by the middle management is internal in nature. Middle management does not require much futuristic information since its decisions are not Strategic and long range in nature. For example, the information needs of a sales manager are: Corporate sales goals and targets, strategies and policies for operationalising them, he also needs information on sales potential and trends in different market segments, geographical territories, competitive conditions and so on. Further, he needs information on weekly sales turnover from different zones and for different products, customer complaints, and delay in dispatches, finished goods inventory position and the like for the purposes of control.

Supervisory level: Supervisory management is defined as a team of management positions at the base of the hierarchy. It consists of Section Officers, Office Managers and Superintendents Foreman and Supervisors who are directly responsible for instructing and supervising the efforts of rank and file, clerical and 'blue-collar' employees and workers. . Supervisory management is also called 'operations management' in the sense that it is concerned with implementing operational plans, policies and procedures for purposes of conversion of inputs into outputs. At the supervisory level, managers, are responsible for routine, day-to-day decisions and activities of the organization which do not require much judgment' and discretion. The function and process of the supervisory management are standardized as far as possible. The perspective of supervisory management are generally short-range and insular. It functions in a relatively closed environment.

Supervisory management mostly needs internal information on operational aspects of the functioning of activity units. It in fact generates internal information for example, on purchases and sales, production use of inputs etc. at the operating level. It also receives information from the middle management level on operational plans and programmes. The nature of information is routine and structured. It tends to be reliable and relatively complete. There is little element of complexity of uncertainty involved in the information.

Characteristics of Different Management Levels

According to Jerome Kanter, the important characteristics of different levels of Management can be listed in the following-table:

Sl. No.	Characteristics	Top Management	Middle Management	Operating Management
1.	Focus of planning	Heavy	Moderate	Minimum
2	Focus Control on	Moderate	Heavy	Heavy
3	Time frame	One to five years	Upto a year	Day-to-day
4	Scope of activity	Extremely broad	Entire functional area	Single Sub function or subtask
5	Nature of activity	Relatively unstructured	Moderately structured	Highly structured
6	Level of complexity	Very Complex many variables	Less complex better defined variables	Straight Forward
7	Job measurement	Difficult	Less difficult	Relatively easy
8	Result of activity	Plans, Policies & Strategies	Implementation schedules, performance, Yardsticks	End product
9	Type of information utilized	Mostly external	Internal, more Accurate	Internal historical high level of accuracy
10	Mental attributes	Creative, innovative	Responsible,persuasive administrative	Efficient Effective
11	Number of People involved	Few	Moderate number	Many
12	Department/divisional interaction	Intra-divi-sion	Intra-department	Inter-department

Brief Discussion or above Stated Characteristics

Planning and control are two essential characteristics, which represent the essence of management. At top management level, planning content is quite heavy than at the middle management level. It is minimum at the operating level. Control exercise is heavy at middle and operating levels. But moderate at the top level.

The duration of activities dealt by top management ranges from one to five years. This in no way means that they ignore short term problems; rather it, Middle management's activities has a span of about a year or so. Operating management have specific tasks to accomplish and these accomplishments are measured on a short term basis. A week usually constitutes the time span.

Scope of top management level's responsibilities is quite broad in fact it relates to the whole organization. Middle management is concerned about the major functional areas, e.g. production planning and control. Operating management deals with individual sub-functions, the elements of which enable a function to be accomplished.

The nature of activity runs from an unstructured one at the top to a structured one at the bottom.

Top management's job is complex in nature because of their dependence on elements, which are complex in nature, e.g., market place; the competitive factors, the timing of product introduction in the market etc. The variable at the middle management's level are better defined they in fact, deal with events and activities that take place within the operating environment of the company. At the operating level, management's job is a straight forward one. .

The management of job/activities performed at top level is quite difficult but it is relatively less difficult at middle management and quite easy at operating level The output at top level is in the form of plans, and strategies involved for the future use of the firm and these should be consistent with the long range thinking of the firm. Middle management produces, the schedules and performance measurement to accomplish plans as their final output. The end product itself is the output of the operating levels.

Top management deals mainly with information which is external in nature, whereas the other two level depends heavily on internal and historical information.

To perform the job at top level it requires creativity, innovation and the ability to make decisions under varying degrees of uncertainty. Middle management's job involves a persuasiveness and motivational element for getting the job done. Operating management usually employs efficient and effective techniques to accomplish the job.

The pyramid cal structure of business organizations clearly reflects that few people are at the top and more at the bottom.

Lastly, top management deals at the divisional level to ensure that their plans are consistent with corporate goals and objectives. Middle managers of a department interact with management of other departments because of the interdependence of one department on other. Operational management's interaction can usually be confined to the department in which it operates.

Limitations of MIS

The main limitations of MIS are as follows:

1. The quality of the outputs of MIS is basically governed by the quality of inputs and processes.
2. MIS is not a substitute for effective management. It means that it cannot replace managerial judgment in making decisions in different functional areas. It is merely an important tool in the hands of executives for decision-making and problem solving.
3. MIS may not have requisite flexibility to quickly update itself with the changing needs of time, especially in a fast changing and complex environment.
4. MIS cannot provide tailor made information packages suitable for the purpose of every type of decision made by executives.
5. MIS takes into account mainly quantitative factors, thus it ignores the non-quantitative factors like morale, attitudes of members of the organization, which have an important bearing on the decision making process of executives.

6. MIS is less useful for making non-programmed decision-making. Such type of decisions is not of routine type and thus requires information, which may not be available from existing MIS to executives.
7. The effectiveness of MIS is reduced in organization, where the culture of hoarding information and not sharing with other holds.
8. MIS effectiveness decreases due to frequent changes in top management organizational structure and operational team.

Pre-requisites of an effective MIS

The main pre-requisites of an effective MIS are as follows:

- a. Data Base: It can be defined as a "super file" which consolidates data records formerly stored in many data files. The data in database is organized in such a way that access to the data is improved and redundancy is reduced. Normally the database is sub divided into the major information sub-sets needed to run a business. These sub-sets are (a) Customer and Sales File; (b) Vendor file; (c)Personnel file; (d) Inventory file; and (e) General Ledger Accounting file. The main characteristic of data base is that each sub-system utilizes same data and information kept in the same file to satisfy its information needs. The other important characteristics of data base are as follows:
 - i. It is users oriented.
 - ii. It act of being used as a common data source, to various users, helps in avoiding, duplication of efforts in storage and retrieval of data and information.
 - iii. It is available to authorised persons only.
 - iv. It is controlled by a separate authority established for the purpose, known as Data Base Management System.

The maintenance of data in database requires computer hardware, software and experienced computer's professionals. In addition it requires a good data collection system equipped with experts who have first-hand knowledge of the operations of the company and its information needs.

The data base structured on above lines is capable of providing/meeting information requirements of its executives which is necessary for planning organizing and controlling the operations of the business concern. But, it has been observed that such a database, meets the information needs of control to its optimum.

- b. Qualified Systems and Management Staff: The second pre-requisite of effective MIS is that qualified officers should man it. These officers (experts) should understand clearly the views of their fellow officers. For this, the organizational management base should comprise of two category of officers viz., (1) Systems and Computer experts, and (2) Management experts.

Systems and Computer experts in addition to their expertise in their subject area should also be capable of understanding management concepts to facilitate the understanding of problems faced by the concern. They should also be clear about the process of decision-making and information requirements for planning and control functions.

Management experts should also understand quite clearly the concepts and operations of a computer. This basic knowledge of computers will be useful to place them in a comfortable position, while working with systems technicians in designing or otherwise of the information system.

This pre-requisite is confronted with a problem viz., procurement of suitable experts. This problem is dealt by recruiting fresh candidates and developing them to meet specific requirements. Also, it is difficult to retain such experts on long-term basis as their scope in the job market is quite high.

c. Support of Top Management: For a management information system to be effective, it should receive the full support of top management. The reasons for this are as follows:

1. Subordinate managers are usually lethargic about activities, which do not receive the support of their superiors (top management).
2. The resources involved in computer-based information systems are large and are growing larger and larger in view of importance gained by management information system.

To gain the support of top management, the officers should place before top management all the supporting facts and state clearly the benefits, which will accrue from it to the concern. This step will certainly enlighten management, and will change their attitude towards MIS. Their wholehearted support and cooperation will help in making MIS an effective one.

d. Control and maintenance of MIS: Control of the MIS means the operation of the system as it was designed to operate. Sometime, users develop their own procedure or short cut methods to use the system Which reduces its effectiveness. To check such habits of users, the management at each level in the organization should device checks for the information systems control.

Maintenance is closely related to control. There are times when the need for improvements to the system will be discovered. Formal methods for changing and documenting changes must be provided.

e. Evaluation of MIS: An effective MIS should be capable of meeting the information requirements of its executives in future as well. This capability can be maintained by evaluating the MIS and taking appropriate timely action. The evaluation of M IS should take into account the following points.

1. Examining whether enough flexibility exist in the system, to cope with any expected or unexpected information requirement in future.
2. Ascertaining the views of users and the designers about the capabilities and deficiencies of the system.
3. Guiding the appropriate authority about the steps to betaken to maintain effectiveness of MIS.

Constraints in operating a MIS

Major constraints which came in the way of operating an information system are the following:

1. Non-availability of experts, who can diagnose fully the objective of the organization and give a described direction needed for operating information system.
2. The selection of sub-systems of MIS, to be desired and operated upon first.'
3. Absence of knowledge about the Source Of availability of expert's for running MIS effectively.
4. Due to varied Objectives of business concerns, the approach adapted by experts for designing, and implementing MIS is non-standardized one.
5. Non-availability of cooperation from staff.
6. Non-availability of financial resources required for running MIS effectively.
7. High turnover of experts.
8. The benefits of MIS, cannot be compared with cost, because the benefits cannot be quantified always.
9. Perceptual problems as its utility is not readily perceptible to many users.'

Approaches of MIS Development

For developing MIS following three approaches are used:-

Top down approach: The development of MIS under top down approach starts with the defining of the objectives of the organization, the kind of business it is in, and the constraints under which it operates. The activities or functions for which information would be required are also identified. The crucial strategic and tactical decisions are also defined and the decisions necessary to operate the activities are specified. From the activities or functions and the decisions to be made, the major information requirements are ascertained.

This approach develops' a model of information flow in the organization which acts as a guide far designing the information system. By using the model of information flows various information sub-systems may be defined. Each subsystem comprises of various modules. A module is a basic unit for information system's development. The selection of a module far developing system is made on the basis of the priority assigned to them. The various sub-systems and their modules are coordinated to achieve the Objective Of integration. The information system so developed is viewed as a total system fully integrated rather than as a Collection of loosely coordinated sub-systems.

As the name indicates, top management takes the initiative in formulating major objectives, policies and plans in a comprehensive manner and communicates them down the line to middle and supervisory management levels far translating them into performance results. Managers other than those at top levels have little role in planning , they have to only concentrate on implementation and day to day control.

Botom up Approach

The development of information system under this approach starts from the identification of life stream systems. Life stream

systems are those systems, which are essential for the day-to-day business activities. The examples of life stream systems include payroll, sales order, inventory control and purchasing etc the development of information system, for each life stream system starts after identifying their basic transactions, information file requirements and information processing programs.

After ascertaining the data/information requirements, files requirement and processing programs for each life stream system the information system for each is developed. The next step is towards the Integration of data kept in different data files of each information system. The data is integrated only after thoroughly examining various applications, files and records. The integrated data enhances the share ability and evolvability of the database. It also ensures that all programs are using uniform data. Integrated data also provides added capability for inquiry processing and ad hoc requests for reports.

The next development under bottom up approach may be the addition of decision models and various planning models for supporting the planning activities involved in management control. Further, these models are integrated to evolve model base. The models in the model base facilitate and support higher management activities. They are useful for analyzing different factors, to understand difficult situations and to formulate alternative strategies and options to deal them.

A comparison of top down and bottom up approaches reveals the following points.

1. Top management takes the main initiative in formulating major objectives, strategies and policies, for developing MIS under top down approach. In the bottom up approach it is the supervisory management who identifies the life streams systems for which MIS may be developed.
2. Middle and supervisory management levels has a little role in the development of system-under top approach. Under bottom up approach management refrains from guiding The development of system developed by supervisory level.
3. The information system developed under top down approach is more consistent with the systems approach and is also viewed as a total system which is fully integrated, The information system developed under bottom up approach is developed through an orderly process of transition, building upon transaction processing sub-system, this system may not be integrated.

Integrative Approach

This approach can overcome the limitations of the above two approaches when used objectively. Integrative approach permits managers at all levels to influence the design. Top management identifies the structure and design of MIS suitable to the concern. This design is further presented to lower level managers for their views and modification. The managers at the lower level are permitted to suggest to changes, additions, or deletions and return the design with their suggestions to the top level for approval. The revised design is drawn and evaluated by the top level and sent down again in a modified form for further consideration if required. This evaluation modification and approval process continues until a final design is achieved that is suitable for all levels.

Responsibility of running an MIS IN a Corporate Enterprises

An MIS can be run by different people depending upon the circumstances and the existing management philosophy. One of the main considerations in entrusting the responsibility of running an MIS is that the person should be in such a position that he has the maximum interaction with all the functional areas. The MIS in a corporate enterprise is usually entrusted to an officer who is designated as Chief of Management Information Department and he reports to the Chief Executive of the concern. To suggest who should succeed to this position in a corporate enterprise requires a thorough analysis of present state of MIS. The MIS presently may be in anyone of the following form.

- a. It may be a manual one.
- b. It may be a computerized one.
- c. It may be a manual one but is heading for computerizations.

Under a manual management information system in a corporate enterprise, the tasks of procuring, refining, analyzing, storing and retrieval of data/information are carried out by manual means. To carry out these functions a set of suitably designed forms is used. Each form of this set is used for a specific function.

To specify who has to collect specific information the necessary forms to be used, the frequency of collecting the information and all such related matters guidelines are provided by a manual, known as MIS manual. Such a system of information may be entrusted to a person who possesses the experience of working with several functional areas. Such a person may be either from finance or marketing department. This choice is suitable due to the following reasons:

1. The person entrusted with MIS knows quite clearly the type of decisions to be made by different executives on the basis of his experience and interaction with other departments.
2. Due to one association with functional heads, it is not difficult for the person to ascertain the information requirement of executives.
3. He can also perceive the frequency and the changing needs of information requirement of executives.
4. His familiarity with the behavior and ways of working of his colleagues also helps him in performing his task well.

In the case of a computerized management information system the information is collected manually and is transferred to a computer system for analysis, storage and retrieval. Such type of information system may be entrusted to a computer and system expert, who is well conversant with management concepts and the ways of working of business executives. This choice of entrusting MIS is supported by the following reasons:-

1. The head of management information system possesses the requisite capabilities which are necessary for developing various applications and guiding the smooth running of the system.

2. He can also foresee the changing information requirements of executives by analysing the decisions made and the problems, which may be faced in future.

Lastly, the system which involves the computerization of the present manual system may be entrusted to a project leader.

This project leader may not directly carry out the task of converting the system but may render an possible help to outside consultants. The help of outside consultants may be sought till the project leader gains the necessary confidence to run it independently.

The main reasons for this choice are the following:

1. Due to lack of experience of project leader in the area of computers, he may be assisted by outside consultants, till the development of the system is complete and he gains confidence of handling the system independently.
2. Since the project leader works closely with outside consultants, so he understands the system quite thoroughly than anyone else.

Effects of using Computers for MIS

The effect of applying computer technology to information systems can be listed as below:-

1. Speed of processing and retrieval of data increase:

Modern business situations are characterized by high degree of complexity, keen competition and high risk and reward factors. This invariably calls for systems capable of providing relevant Information with minimum loss of time. Manual systems howsoever well organized often fail to match the demand for information for decision-making. Computer with its unbelievably fast computational capability and systematic storage of information with random access facility has emerged as an answer to the problems faced in modern day management. Processing of data in relevant form and design and retrieval of them when needed in facts requires considerably less time and facilitate the management action and decision making. The speed of computer processing is in new range, i.e., an operation takes only billionth of a second. This characteristic of computer has accounted for as a major factor in inducing MIS development, Computers today are capable of meeting varied type of information requirements 'of executives.

2. Scope of use of information system has expanded:

The importance and utility of information system in business organizations was realized by most of the concerns, especially after the induction of computers for MIS development. Systems experts in business organizations developed areas and functions where computerized MIS could be used to improve the working of the concern. This type of applications hitherto not feasible under the manual system. For example, it was made possible by using an on line real time system to provide information to various Users sitting at a remote distance from a centrally located computer system.

3. Scope of analysis widened:

The use of computer can provide multiple type of information accurately and in no time to, decision makers.

Such information equips an executive to carry out a thorough analysis of the problems and to arrive at the final decision. Computer capable of providing various types of sales reports for, example; Area wise sales; Commission of each Salesman; Product- wise sales etc. These reports are quite useful in analyzing the sales department working and to ascertain their weaknesses so that adequate measures may be taken in time. In this way, the use of computer has widened the scope of analysis.

4. Complexity of system design and operation increased:

The need for highly processed and sophisticated information based on multitudes of variables has made the designing of the system quite complex. During the initial years, after the induction of computer for MIS development, systems experts faced problems in designing systems and their operations. The reason at that time was the non-availability of experts required for the purpose. But these days the situation is better. The computer manufactures have developed some important programmes (softwares) to help their users. Besides some private agencies is also there who can perform the task of developing programmes, to cater to the specialized needs of their customers, either on consultancy basis or on contract.

5. Integrates the working of different information sub-systems:

A suitable structure of management information system may be a federation of information sub-system. Viz., production, material, marketing, finance, engineering and personnel. Each of these sub-systems is required to provide information to support operational control, management control and strategic planning. Such information may be made available from a common-data-base. This common data base may meet out the information requirements of different information sub-system by utilizing the services of computers for storing, processing, analyzing and providing such information as and when required. In this way, computer technology is useful for integrating the day-to-day working of different information sub-systems.

6. Increases the effectiveness of Information system:

Information received in time is of immense value and importance to a concern. Prior to the use of computer technology for information purposes, it was difficult to provide the relevant information to business executives in time even after incurring huge expenses. The use of computer technology has overcome this problem. Now, it is not difficult to provide timely, accurate and desired information for the purpose of decision making. Hence, we can conclude, that the use of computer has increased the effectiveness of information system also,

7. More comprehensive information:

The use of computer for MIS, enabled systems expert to provide more comprehensive information to executives on business matters.

Impact of Computers and MIS on different levels of Corporate Management

Top level of Corporate Management spends mostly its time for business planning, resource and capacity analysis, setting of profit and budget goals and in general establishing the business objectives of the company. It is thus apparent that there is a heavy planning and lesser control element in the work domain of top level management.

Presently, the impact of Computers and MIS on the working of this level is minimum. The reasons for lesser computer effect on top level are:

- i. Unstructured nature of data
- ii. Slow acceptance and use of operations research techniques.
- iii. Non-availability of suitable systems and computer experts
- iv. Reliance on intuitive abilities.

The potential impacts on top-level management may be quite significant. An important factor which may account for this change is the fast development in the area of computer science. It is believed that in future computers would be able to provide simulation models to assist top management in planning their work activities. For example, with the help of a computer it may be possible in future to develop a financial model by using simulation technique, which will facilitate executives to test the impact of ideas and strategies formulated on future profitability and determining the needs for funds and Physical resources. By carrying sensitivity analysis with the support of computers, it may be possible to study and measure the effect of variation of individual factor to determine final results. Also the availability of a new class of experts will facilitate effective communication with computers. Such experts may also play a useful role in the development and processing of models. In brief, potential impact of computers would be more in the area of planning and decision making.

Futurists believe that in future top management will realize the significance of techniques like simulation, sensitivity analysis and management science. The application of these techniques to business problems with the help of computers would generate accurate reliable, timely and comprehensive information to top management. Such information will be quite useful for the purposes of managerial planning and decision-making. Computerized MIS will also influence in the development, evaluation and implementation of a solution to a problem under decision-making process.

The impact of Computers and MIS on middle management level is moderate. This level of management translates the management's objectives into plans, arranges resources to achieve such objectives and goals as laid down by top management. Also it reviews the result of operations. Performed at the supervisory level. It thus, act as a bridge between the other two levels. The information provided by computers serves only limited purpose to middle management. Such

Information is quite effective for carrying out an analysis of the operations but has little impact on the formulation of organizational plan.

Potential impact of Computers and MIS on middle management level will be significant. It will bring a marked change in the process of decision-making. At this level most of the decisions will be programmed and thus will be made by the

computer, thereby drastically reducing the number of middle level managers requirement. For example, in the case of inventory control system computer will carry records of all items, in respect of their purchase, issue and balance. The reorder level, reorder quantity etc. for each item of material will also be stored in computer after its predetermination. Under such a system as soon as the consumption level of a particular item of material will touch reorder level, computer will inform for its purchase immediately. The futurists also foresee the computer and the erosion of middle management as the vehicles for a major shift to recentralisation. The new information technology will enable management to view an operation as a single entity whose effectiveness can only be optimized by making decisions that take into account the entity and not the individual parts.

The impact of Computers and MIS today at supervisory management level is maximum. At this level managers are responsible for routine, day-to-day decision and activities of the organization, which do not require much judgment and discretion. In any case, supervisory managers job is directed more towards control functions, which are highly receptive to computerization. For control, such managers are provided with accurate, timely, comprehensive and suitable reports. A higher percentage of information requirements of executives is met out at this level.

Potential impact of Computers and MIS on Supervisory Level will completely revolutionize the working at this level. Most of the controls in future will be operated with the help of computers. Even the need of Supervisory managers for controlling the operations will be substantially reduced. Most of the operational activities now performed manually will be either fully or partially automated.

In future MIS would provide highly accurate, precise and desired information to control operations with the support of computers.

Structure of a MIS

Structure of a MIS can be described in the following three forms:

- a. Functional form
- b. 3- tiers of MIS
- c. Comprehensive Structure of MIS (Synthesis of functional and 3-tier structure of MIS)

Functional Form

Under functional form, the structure of MIS may be viewed as divided by functions such as marketing, production, purchasing, technical, finance and accounting. In other words each of these functional areas has its own information system to cater to its need of information.

The 3 tiers of MIS in an organisation are:

1. Strategic information tier.
2. Tactical information tier.
3. Operational information tier.

1. Strategic Information

This tier is concerned with determining, maintaining and Supplying Information required by top level management

LESSON 27 : INTRODUCTION TO AUDIT

Learning Objective: -

This lesson will introduce you to

- *ABC of audit*
- *Difference between auditing and research*
- *How to carry out an Audit*
- *Writing up your audit project*

ABC of Audit

Definition

Audit is the process used by health professionals to assess, evaluate and improve care of patients in a systematic way in order to enhance their health and quality of life.

Audit is a latin word meaning “he hears” . in its modern sense, an audit is process whereby the accounts of business entities, including charities, trusts and professional firms, are subjected to security in such details as will enable the auditors to form an opinion as to their accuracy, truth and fairness. This opinion is embodied in an audit report.

Before conducting the audit, the auditor should examine the relevant books, statements and records. He should call for explanation on different aspects, ask for such information as he deems fit. He should then apply his judgment in the light of all these available material. After going through all records, he will be able to certify that the cost is correct, true and fair.

Is there a Difference between Auditing and Research?

Yes!

Research	Audit
Discovers the right thing to do	Determines whether the right thing is being done
A series of 'one-off' projects	A cyclical series of reviews
Collects complex data	Collects routine data
Experiment rigorously defined	Review of what clinicians actually do
Often possible to generalize the findings	Not possible to generalize from the findings

Why do Audit?

- It is compulsory for Summative Assessment.
- It improves quality of care as both an outcome and by the process of performing the audit.

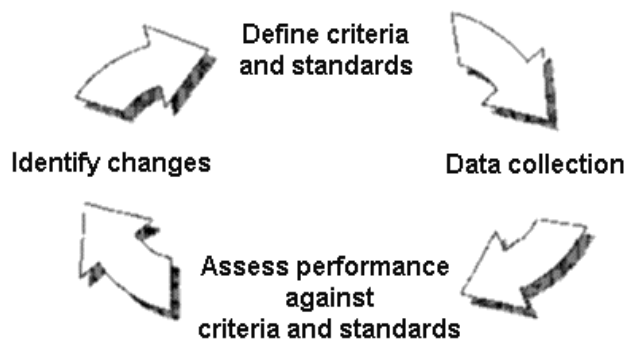
- It is an aid to continuing medical education.
- There is a sense of personal and professional achievement. It may lead to a publication and can improve a CV.

The Educational benefit from Audit

- Audit allows a critical review of current information (keeping up to date).
- Audit highlights the need for specific knowledge/ information, the acquisition of new skills and the development of existing ones.
- Audit improves communication skills and enables attitudes to be modified when working with other members of the Primary Care Team.
- Audit enables ‘self evaluation’.
- Audit promotes learning by answering the following questions:
 - What am I doing?
 - How am I doing it?
 - Why am I doing it in that way?
 - Can I do it better or differently?

How to Carry out an Audit

The Audit Cycle



The four main features of the audit cycle can be analyzed to a greater depth.

1. Identify the need for Change

This may come from personal experience. A problem may be identified from every day practice, and following this there is a feeling that something could or should have been done better. Problems can be identified in 3 basic areas of Practice work:

- **Structure:** This refers to the input of care such as manpower, premises and facilities. Eg. ‘Are the numbers of emergency appointments enough to cope with demand?’

- **Process:** This refers to the provision of care (looking at what is done and how it is done) Eg. 'Are all patients on ACEI having urea & electrolytes checked?'
- **Outcome:** This refers to the result of clinical intervention. Eg. 'Are patients on lipid reducing regimes achieving target cholesterol levels?'

2. Setting criteria and standards

This is where you can say what should be happening.

- A **Criterion** is an item of care or some aspect of care that can be used to assess quality. The criterion is written as a statement. Below are three criteria one relating to an audit in structure, one an audit in process and one an audit in outcome.
 - All patients requesting an urgent appointment will be seen that day.
 - All patients with epilepsy should be seen at least once a year.
 - All patients on Warfarin should have their INR within the recommended limits.
- Criteria can be defined from recent medical literature, and the best experience of clinical practice these are called 'Normative criteria'.
- To make the criteria (statement) useful the **Standard** needs to be defined. A Standard describes the level of care to be achieved for any particular criteria. Eg. A standard may state: 98% of patients requesting urgent appointments will be seen the same day. 90% of patients with epilepsy should be seen at least once a year. 100% of patients on warfarin will have their INR within the recommended limits.
- Standards must be set. The level of standard can often be controversial. There are basically 3 options:
 - **A minimum standard.** This describes the lowest acceptable standard of performance. Minimum standards are often used to distinguish between acceptable and unacceptable practice.
 - **An ideal standard** describes the care it should be possible to give under ideal conditions, with no constraints. Such a standard by definition cannot usually be attained.
 - **An optimum standard** lies between the minimum and the idea. Setting an optimum standard requires judgment discussion and consensus with other members of the primary care team. Optimum standards represent the standard of care most likely to be achieved under normal conditions of practice.

3. Collecting data on performance

Identify what data needs to be collected, how and in what form it needs to be collected, and who is going to collect it. Remember only collect information that is absolutely essential.

4. Assess performance against criteria and standards

With the information collected analysis is possible, and identification of any area of care below the predetermined standard of the criteria can be made. The results can then be

used to develop an action plan ie what needs to be done, how it needs to be done, who is going to do it and when is it going to be done.

5. Identify need for change

The audit cycle is now almost complete, but without re-evaluating the care the practice is giving it is impossible to see if recommendations have been implemented and the level of care improved.

Remember: When Constructing Criteria and Standards

- Make unambiguous statements
- Keep the task focused on the audit project
- Refer to the literature indicating current practice
- Choose criteria and standards in line with current practice
- Ensure the criteria and standards are based on fact;

Carrying out Audit for Summative Assessment

- The choice of audit where possible should be chosen with guidance from your trainer.
- The audit should not have been performed before in that practice.
- Teamwork is a prerequisite for the summative assessment audit, and must be explicit in the writing up of the audit. Teamwork can be shown in data collection, literature searches, and standard setting.
- It is hoped you will begin to form ideas within the first 2 months in of a general practice attachment. Allowing you time to review the literature, collect the data, analyse and write up the audit project within the next 4 months. It should be possible to complete the Audit project in the first 6-month practice attachment.

Writing up your Audit Project

The submission should be typed in English, and normally be between 1500-3000 words. The work needs to have each page numbered and identified by your unique summative assessment code number. A word count is required at the end of the submission.

The following marking schedule is used to mark summative assessment audits. Each element must be present in the audit for it to pass.

Question	Criterion
Why was the audit done?	Reasons for choice (a) Should be clearly defined and reflected in the title (b) Should include potential for change
How was the audit done?	(a) Criteria chosen a. Should be relevant to the subject of the audit b. Should be justified eg. literature (b) Preparation and planning should show appropriate teamwork and methodology in carrying out the audit (c) If standards are set they should be appropriate and justified
What was found?	Interpretation of data (A) Should use all relevant data to allow appropriate conclusions to be drawn
What next?	(a) Detailed proposals for change Should show explicit details of proposed change

If the answers to the questions in the table above are all in the positive, you will pass the audit section of summative assessment. Hopefully these notes will help clarify some of the areas of audit over which people 'fall down'.

Main Features

The essential features of auditing are:

- Critical review of the systems and procedure in an organization
- Making such tests and enquiries as the auditor may consider necessary to form an opinion
- Expressing the opinion
- Ensuring that all necessary aspects have been taken into account.

Types of Audits

Cost Audit

The CIMA (London), define cost audit as the verification of cost records and accounts and a check on adherence to the prescribed cost accounting procedures and their continuing relevance". Thus cost audit is a critical review undertaken for the purpose of (a) verification of correctness of cost accounts and (b) checking that cost accounting plans is adhered to.

If cost audit is introduced based on the provision of a statute, it is called statutory cost audit. The ICWAI defines statutory cost audit as a "system of audit introduced by the government of India for the review, examination and appraisal of the cost accounting records and added information required to be maintained by the specific industries.

Cost audit may also be conducted by an internal or external agency on the instance of management to ascertain the product performance of a particular product from the given product profile of a company. In this case, it will not be statutory cost audit.

Efficiency Audit

Efficiency audit is the audit, which ensures that every rupee invested yields optimum results. The main purpose of efficiency audit is to ensure that (i) there is most profitable utilization of investment and (ii) that investment is channeled in most profitable lines. It is pertinent here to differentiate between efficiency and effectiveness. Effectiveness denotes accomplishment of objectives and efficiency denotes fulfillment of objectiveness with minimum sacrifice of available resources. Viewed from these angles, accomplishment of objectives is line function, but higher management is always keen on efficiency aspects and therefore "efficiency audit" becomes staff function and its successful implementation depends on the formation of organizational set up identifying their roles and responsibilities. Efficiency audit also indicates towards appraisal or security of actual performance with reference to expected efficient standards. The parameters based on which efficiency audit is conducted are (i) return on capital (ii) capacity utilization (iii) optimum utilization of men, machine and material (iv) export performance and import substitution (v) liquidity position (vi) Pay – back period.

Propriety Audit

The term 'propriety' means that which meets the tests of the public interest, commonly accepted customs and standards of conduct. Propriety audit refers to an audit in which the various actions and decisions are examined to find out whether they are in public interest and whether they meet the standards of conduct. Thus in conducting a propriety an auditor does not confine his concern to evaluate the evidence supporting a transaction. He attempts to examine regularly, prudence and impact of various actions and decisions.

The auditor, while conducting the propriety audit, should ensure compliance to the following 'cannons of financial propriety':-

- The expenditure should not be more than the occasion demands.
- The authority, which has power to sanction the expenditure, should not pass order to its own advantages directly or indirectly.
- Public money should not be utilized for the benefit of a particular person or section of community.
- It should be so arranged that allowances are not on the whole source of profit to the recipient.

Social Audit.

A lot of work is being done these days to develop techniques to measure the contribution, that an enterprise makes to the society. It is increasingly realized that business entities have a social responsibilities and their performance should be viewed from this point of view. Every business action, if traced with sufficient care will be found to have both economic and social consequences. Social audit has received serious serious consider-

LESSON : 28

AUDIT & ITS TYPES

Learning Objective:-

This lesson will introduce you to

- *The objectives of management audit*
- *Different types of audit.*
- *Procedure of conducting Management Audit.*

Management Audit

Introduction

Management audit is an independent appraisal activity. It attempts to determine, how management is doing, what it is required to do, so that organizational functions are discharged efficiently for the accomplishment of organizational objectives. The Management Audit can be defined as under:

“Management Audit may be defined as a comprehensive and constructive examination of an organization structure of a company, institution or branch of Government, or of any component thereof, such as a division or department, and its plans and objectives, its means of operation and its use of human and physical facilities.” (William P. Leonard’s -”Management Audit”)

“Management Audit may be more specifically defined as being an investigation of a business from the higher level downwards in order to ascertain whether sound management prevails throughout, thus, facilitating the most effective relationship with the outside world and the most efficient organization and smooth running internally.” (Leslie Howard)

“Management Audit is performed with the object of examining the efficacy of the information control system, management procedures towards the achievement of enterprise goals.”

(Churchil and Cyert-An Experiment in Management Auditing)

“Management Audit can be defined as objective and independent appraisal of the effectiveness of managers and the effectiveness of the corporate structure in the achievement of company objectives and policies. Its aim is to identify existing and potential management weaknesses within an organisation and to recommend ways to rectify these weaknesses.” (CIMA Terminology)

Following discussion relating to above definition will clarify the concept of Management audit.

- a. Organizational objectives. An organization is established for the accomplishment of certain objectives. The objective clause of the memorandum of association deals with these objectives in detail. Organizational objectives are rather ultimate targets towards which all activities in an organization are directly or indirectly focused.
- b. Organisational functions. Based on Fayol’s identification of Organizational activities. following functions can be referred to as organizational functions:

- (i) Production. (i) Distribution. (iii) development (iv) Accounts and Finance (v) Legal and Secretariat, and (v) personnel and Industrial Relations.

These six organisational functions represent responsibilities of management for accomplishment of organisational objectives.

- c. How management is doing, what it is required to do: This refers to management process or functions of management. Management functions should not be confused with organizational functions. While production distribution and development. etc. (refer to point b) are six organizational functions basic functions or process of management are identified such as (z) Planning. (ii) Organization. (m) Directing. (iv)Control.

Following chart will help to develop an idea about the relationship between management functions and organisational functions:

Organisational Function

Management Functions	Production	Distribution	Development	Accounts & Finance	Legal & Secretarial	Personnel & Industrial Relations
Planning						
Organising						
Directing						
Controlling						

Inter Relationship of Management Functions and Organizational Functions.

Management ensures through management processes that organizational functions are discharged efficiently for the accomplishment of organizational

The main points of difference are summarized as below:

1. Financial audit is confined to examination of historical records of past performance. Management audit appraises past and simultaneously make a future-oriented approach.
2. Financial audit reports whether financial statements show a true and fair view of state of affairs of a company on a particular date. Management audit reports about performance of management during a particular period
3. Management auditor’s work begins where the work of financial auditor ends.
4. Financial audit is primarily concerned with financial aspect Management audit involves critical examination of

organizational structure, manufacturing processes, production planning and scheduling, etc.

5. Financial audit looks at the history of financial transactions. Management audit goes beyond the financial records.
6. While financial audit is a statutory obligation, management audit in an optional exercise.

Objectives of Management Audit

Management audit is carried out to:

1. Appraise the managerial performance at all levels;
2. Spotlight the decisions or activities that are not in conformity with organizational objectives;
3. Ascertain that objectives are properly understood at all levels;
4. Ascertain that controls provided at different levels are adequate and effective in accomplishing management objectives or plans of operations;
5. Evaluate plans which are projected actions to meet objectives;
6. Review the company's organisational structure, *i.e.*, assignment of duties and responsibilities and delegation of authority.

Scope of Management Audit

There is no, agreement on how far a management audit may go.

The scope of management audit may be as broad as the management process itself. A representative list of major management areas to be reviewed under management audit is given below:

1. **Appraisal of Objectives.** Objectives are goals towards which any function or organization is guided. Organizational objectives should be referred to as primary objectives. The objective clause of the Memorandum of Association deals in details with primary objectives of an organization. Functional objectives should be referred to as subordinate objectives and are set for accomplishment of organizational objectives. Management audit should consider the following points for appraisal of company objectives and functional objectives:
 - a. **Company Objective.** These objectives are rather fixed targets, which are mentioned in the Memorandum of Association. These are not changed. The review of management audit can make limited contribution in this area. The comments of the management audit may call for review of company's objectives for better presentation. However, following points may be worth consideration in this connection:
 - i. Objectives are clear and understandable;
 - ii. Objectives are reasonable and properly reflect company's responsibility towards shareholders, employees, community and Government;
 - iii. Objectives are not changed frequently.
 - b. **Functional Objective.** The review of the management audit can make substantial contribution in this area. These objectives are set for accomplishment of company's objectives. The main concern of management audit will be to determine "transactional approach" of target setting

in the organization. Following points should be considered in this connection:

- i. The objectives are clear and understandable.
- ii. The objectives are sufficiently divided and sub-divided. For accomplishment of company's objectives, functional objectives may be divided and subdivided as follows:
 - a. Output goal
 - b. System goal
 - c. Product characteristic goal, and
 - d. Subsidiary goal.

The emphasis of management audit will be to determine that sub-division of objectives is efficient enough to promise accomplishment of company's objectives.
- iii. The objectives are documented.
- iv. The objectives are sufficiently communicated to proper operating level.
- v. The objectives must be compatible to each other.
- vi. The objectives must be in proper balance with each other.
- vii. The objectives aid in motivating the persons engaged in different Sections/departments.

2. Appraisal of Organizational Structure.

Organizational structure is a part of the means by which the management controls the operations of an organization. Assignment of duties and responsibilities and delegation of authority offers a very important area for review of management audit. Following points should be noted in the appraisal of organizational structure:

- i. The organizational structure is in harmony with objectives of company, division, department or unit.
- ii. Clear lines of responsibility have been established extending from the top of the organization to the lowest level of supervision.
- iii. The structure enables authority to commensurate with responsibility.
- iv. The structure provides for reasonable span of management, *i.e.*, span of management should be neither too big nor too small.
- v. The structure should provide for unity of command, *i.e.*, a person should not report to more than one supervisor.
- vi. The structure clearly defines responsibility for every management person in organization.
- vii. The structure has proper balance, *i.e.*, no function should be excessively weak or excessively dominant
- viii. The organizational structure should permit flexibility to suit to the changing conditions.
- ix. The structure should be as simple and as economical as possible.

- x. The structure should provide for perpetuation of management by replacing persons in training for every management person in organization.
- xi. The structure should assign operating responsibilities to individual managers rather than to groups and committees.
- xii. The structure should provide for proper delegation of authority.

3. Appraisal of Planning Process and Plans.

Planning is an economic and motivational necessity. It is a beginning of the order. It provides basis for decision-making. It aims at designing tomorrow. It is a call for action. Plans are the measures devised within the guidelines laid down by policies, to attain an objective. Management auditor should note the following points for appraisal of planning process and plans:

- i. The planning process is efficient enough to anticipate trouble spots.
- ii. The planning process existing in the organization capitalizes the abilities and ideas of individuals working in the organization.
- iii. The planning process aids in building up morale for successful attainment of objectives.
- iv. The subject-matter is important enough to have a formal plan.
- v. The plans are compatible with company objectives.
- vi. The plans permit proper delegation of responsibilities.
- vii. The benefits of plans are more than the cost of making them.
- viii. The plans are properly communicated to operating personnel.
- ix. The plans are made subject to measurement to determine their success or failure.

4 Appraisal of Control.

Control assures attainment of objective. It compels events to conform to plans. There are two important aspects of control:

- i. Measurement of accomplishment against standard; and
- ii. Correction of deviations.

In this area, the activities of management audit should be directed to determine whether controls provided are adequate and are providing effectively for accomplishment of management objectives and plans of operation. The auditor examines and reports directly on control involved in various spheres.

Here the emphasis of management audit should be to identify deficiency that permitted the performance to go out of control in a particular sphere. Auditor is also inquisitive to determine the efficacy of practices followed for effecting control. Following points are of concern to management auditor:

- i. Whether good managerial practices were followed.
- ii. Scientific decision making techniques were employed to the extent possible. .

- iii. Whether management getting information relevant to decision and action.
- iv. Whether management is using the information and techniques necessary to evaluate rationally the various alternatives that exist
- v. System provides for control mechanism in the implementation of decision. .
- vi. There exists a system for proper feed-back to determine, whether or not a particular decision was correct. The focus will be on the process and the results.

The concern of management auditor will be to identify the management practices and policies requiring improvement and further detailed study for failure to have control element.

5. Appraisal of Organizational Functions.

Management audit is not confined to critical appraisal of management functions alone (*i.e.*, Planning, Organization and Control, etc. It has to be subject to its review organizational functions (*i.e.*, Production, Distribution, Personnel, etc.) Management functions influence organizational functions. Planning is a management function and production is an organizational function. If planning is defective, it will lead to unwanted holds-up and uncalled for blockage of money in inventory. Management audit appraises the organizational function to determine that they are efficiently discharged to ensure accomplishment of organizational objective. How an activity is performed is more important to management audit than the result of the activity. This explains the basic attitude of management audit. Following discussion will take up the points to be considered by management auditor in appraisal of organizational functions:

A. Appraisal of Production

For appraisal of production, management will have to review a number of activities like:

- a. Buying,
- b. Planning,
- b. Processes,
- d. Storage and
- e. Inspection.

Following is the representative list of points to be noted by management auditor in appraisal of production.

- a. Management auditor should see that purchase of right specifications in the right quantities are made at the right time and at the right place. The emphasis will be to review the methods, procedures and routines followed to determine 'right specifications', 'right time' and 'right place, etc.
- b. Optimum utilization of available capacity is ensured by the organizational procedures.
- c. Procedures related to inventory control would be thoroughly scrutinized to spotlight the areas for improvement. Control techniques used to avoid disproportionate amount being used in inventory are

appraised. Procedures relating to following points will be appraised:

- i. Storage
- ii. Issue routines
- iii. Slow moving and obsolete items
- iv. Valuation of stock and work-in-progress
- v. Examination of general organization in production function so as to fix lines of responsibilities.
- vi. Appraisal of system used for Production control.
- vii. Simplification, standardization and specialization -in product line.
- viii. System of integration of production with other functions of organisation.
- ix. Methods, procedures and routines relating to budgetary control, standard costing, cost control and cost reporting are efficient and effective.

A. Appraisal of Purchase Function

Following points are taken care of:

- a. Organization of purchase function.
- b. Purchase policy should be seen, collating the various clauses.
- c. It should be examined whether purchase Procedure necessitates that the purchase requirements should be dependent on production schedule and level of inventories.
- d. Does the company ensure regular and dependable supplier?
- e. Method of selection of supplier should attract proper attention.
- f. How is latest market information collected?
- g. Are the prices properly analyzed?
- h. Is there an inbuilt mechanism in the purchase procedure-against misutilization of purchase powers?
- l. What is the system of follow-up of orders?
- j. What is the system of emergent purchases?

B. The Appraisal of Distribution

- i. Sales Records.
- ii. Sales policy
- iii. Service to customer
- iv. Publicity.

Each activity is examined in detail. Following are the main points to be kept in mind by management auditor:

- i. Whether adequate and efficient sales records are maintained.
- ii. The procedures related to market survey, sales forecast and distribution policy are adequate and efficient
- iii. Methods relating to product pricing discount and credit policy.
- iv. How well the various channels of sales and distribution are managed.

- v. The procedure adopted for publicity.

C. Appraisal of Development

A sum is either advancing or retiring. It is either becoming more efficient or becoming less efficient. There is not stationary condition in an industry. Under this area, management auditor appraises adequacy and efficiency of:

- i. Product Development. Here the management auditor should try to find out the attempts made to ensure that existing selling lines of company are continuously developed and improved from technical and commercial aspects. Emphasis remains to determine the justification of activities made for product development. This important function is often neglected in, busy concerns.' Management auditor tries to find out whether company officials are allowing themselves to be controlled by circumstances or they are controlling the circumstances. Effort is made to determine whether activities made for product development are sufficient and effective.
- ii. Market Research. Under this function, efforts are made to investigate the sales outlet. Market research activities should be considered in relation to company's activities and competitor's activities. Market research officers should remain in constant touch with firm's order book, production position and trading position of the company. The working arrangements of market research officer are of special attention to management auditor.

D. Accounts and Finance. Here management auditor should not criticize the technical accountancy of the company: That is the subject of financial auditor. Management auditor may point out, if necessary, statistical information, which may have bearing on decision-making in the organization. Following points are of concern to management auditor in this area:

- i. Adequacy and effectiveness of financial analysis being submitted by management
- ii. Adequacy and efficacy of procedures and practices followed in cost accounting department, i.e., methods of collecting material cost, labor cost, overhead, operation of budgetary control, standard costing and reporting of variances. Investigative efforts of management auditor should be directed to determine the operational efficiency of control devices.
- iii. Adequacy and efficiency of management information system.
- iv. Adequacy of internal audit procedures.
- v. Methodology adopted for financial proposal, investment plans and project decisions.
- vi. Adequacy of chart dealing with delegation of financial powers. Management audit approach in this area will be different from cost audit and financial audit approach. Management auditor will see the things from manager's point of view and not from the point of view of accountant

E. Legal and Secretarial Practice. Here management auditor critically reviews the system relating to office organization. An effort will be made to determine whether the activities and

LESSON 29 : MANAGEMENT AUDIT

Introduction

Dear students we have already studied various aspects of management audit. Now in this lesson we will further study the uses of MA, preliminaries to management audit, and the organization necessary to do a management audit.

Uses of Management Audit

1. Management audit is useful in synthesizing, accounting, economic and other data required by management in constructing basic policy framework.
2. Management audit assists in establishing, reviewing and improving the planning system.
3. Management audit makes substantial contribution to system of goal setting in the organization.
4. Management audit ascertains whether management is getting the adequate information for correct decisions.
5. Management audit ascertains whether management is properly using the information that it is getting.
6. Management audit aids in the design and maintenance of adequate authority structure.
7. It helps in the improvement of management information system to expedite flow of information among responsibility centers.
8. It substantially contributes for improvement of entire communication system.
9. It helps management in pin-pointing key functions or operations in the profit-mapping process.
10. It helps management in establishing better criterion for measuring results.
11. It helps management to avoid wasteful, unnecessary and extravagant use of resources.

Preliminaries to Management Audit

Management audit cannot be a “switch-on” and “switch-off” mechanical device. A successful management audit requires reflective thinking, planning and scientific approach: Following are the preliminaries for conducting management audit

1. Preliminary survey of organization. In order to identify areas and scope of its audit it is necessary for management auditor to become familiar with following aspects of the organization:
 - a. Formal organizational relationship
 - b. Personnel inter-relationship
 - c. Policies,
 - d. procedures,
 - e. Information system,
 - f. Decision centres, and
 - g. Degree of compliance with established objectives.

2. Review of internal documentation. This can be a very useful source of collecting information for preliminary survey. Flow charts, organizational charts, staff memos, all manuals should be collected by management auditor at very early stage of assignment. Management auditor can collect useful information by studying the minutes of the meetings of the Board of Directors with reference to objective clause of the Memorandum of Association.
3. Processing of Questionnaires. Company may be asked to fill in the standard questionnaires designed to collect the primary data required for detailed management audit programme.
4. Considering the criteria for Management Audit. Management Audit is primarily an appraisal activity. Therefore, specification of standard against which the performance will be judged is an important part of planning process relating to management audit. Identification of standards against which managerial performance will be judged is not, by any means an easy exercise. It will require a lot of ingenuity, experience, knowledge and reflective thinking. At the same time, this exercise is to be completed before finalizing management audit programme. Here, reference should be made to two types of standards, *i.e.*,
 - i. Standards of efficiency, and
 - ii. Standards of effectiveness.

For identification of standards to be followed, management auditor should see whether standards have already been set. If so, he can evaluate the standards to determine, whether they are relevant, sufficient and reliable. The auditor can compare the standards established in the organization with the standards available for industry, if it is possible. Management auditor cannot take the standard for granted. He has to see critically how standards have been established.

After determining the efficacy of standards, management auditor should see how effective standards have been, when used. The concern of management auditor will not cease at the point of determining the effectiveness of standards. The most important part of his duties comes in the last. He has to see, whether these standards are useful for post mortem review of management audit.

Conducting Management Audit

Management audit is primarily concerned with evaluation of management functions and organizational functions. Keeping in view the overall organizational objectives should be conducted by a team of experts from different disciplines with variety of skill in different spheres. It will be ideal, if the team of management auditors consists of an accountant, operational research specialist, industrial engineer and social scientist. All these members should have one necessary qualification: Ability to think like managers. It is only by thinking like managers that they can truly serve the management.

Each audit is to be designed giving regard to specific needs of each situation. Following is the representative list of techniques to be used by management audit:

1. Enquiry. Management auditor collects most of the information, by asking questions. For this purpose, management auditor can make use of standard questionnaire, which may be specifically designed for specified purposes.
2. Examination. Examination of documents or records may be resorted to if enquiry leads to a situation, where examination of original source is necessary for classification in view of management audit.
3. Direct observation. It is another productive source of information for management audit. The auditor who consciously observes will become aware of many problems that are not recorded or are incapable of analysis through data.
4. Review of Management Reports. The review of management reports may lead to identification of possible problem areas.
5. Review of internal audit and inspection reports. These reports can also be a valuable source of information on problem areas. management auditor should evaluate the report to form his own opinion.
6. Physical inspection. Sometimes physical inspection of organization's activities and resources can be a useful way of identifying inefficiencies that should be given management auditor's, attention.
7. Test examination of some transactions. This is a very useful way of gaining insight into the efficacy of procedures in vogue. Management auditor selects some transactions of different nature. These transactions are studied completely from initiation to the final disposal. This kind of testing will provide useful information about:
 - a. Existing transactional approach.
 - b. Usefulness pertinence, efficacy and effectiveness of prescribed procedures.
 - c. Capabilities of operating personnel in operating phases.
 - d. Weaknesses in procedures or practices, which cause ineffective or inefficient performance.
8. Discussion with officials and employees. The management auditor can obtain valuable information on problem areas warranting audit attention through discussion with responsible officials in the organization and employees concerned with operations being examined'
9. Testing procedures and practices. During the course of preliminary review work, an auditor may find area, which can be identified as problem area in view of the management auditor. The management auditor probes into this area by testing the adequacy, efficacy and effectiveness of procedures and practices involved with it.

Management Auditing Procedures

Audit procedures should be tailored to the specific needs "of each situation examined. The general approach in a management audit may be outlined as follows:

1. A preliminary survey of the activity being examined should be made to obtain necessary background and other working information for use in making the audit.
2. The basic charter or assignment of responsibility for the activity being examined (applicable laws and related legislative history in the case of a government activity) should be studied to ascertain the authorized purposes and related authorities of the activity and any applicable restrictions or limitations.
3. Pertinent parts of the system of management control, should be reviewed by studying the policies established to govern the activities under examination, testing the effectiveness of specific operating and administrative procedures and practices followed, and fully exploring all significant weaknesses encountered.
4. Reports on results of the audit work performed should then be prepared and submitted to those responsible for receiving or acting on the auditor's findings and recommendations.

Identification of problem areas. Some of the techniques by which the auditor can identify problem areas warranting more penetrating examination are as follows:

Identification possible control weakness by survey. During the preliminary survey work through which practical working information is obtained on how the activity is supposed to function and on how control procedures are supposed to work, key features or aspects can usually be identified which appear to be difficult to control effectively or to be susceptible to abuse. In a purchasing organization, for example, the key points in the purchasing process may well be

1. the determinations made of the quantities and the quality of materials to be purchased,
2. the procedures followed in obtaining the best prices, and
3. the methods for determining whether the correct quantities and quality are actually received.

If, in relation to the total purchasing operation, the auditor concludes that these processes are the most critical from the standpoint of the need for good performance, he would be justified in concentrating his testing work on them.

Review of management reports. The auditor's review of internal reports which the management itself regularly uses to obtain information on progress, status, or accomplishment of work can be valuable sources of information on possible problem areas suggesting audit attention.

Review internal audit or inspection reports. These reports can also be a valuable source of information on problem areas. Of particular interest to the management auditor are those reports which bring to light significant findings on which the management has taken no action. Inquiry into the reasons and justification for inaction in such cases and and valuation by the management auditor should be made, since these circumstances could throw light on weaknesses in the management system that have not previously been referred to the top management for resolution.

Physical inspections. Physical inspections of the organization's activities and resources can be a useful way of (identifying

possible inefficiencies that should be given audit attention. Examples are apparently excess accumulations of equipment or material, idle or little used equipment, employee idleness, rejections of product by inspectors (or customers), extensive rework operations, or disposal of apparently, useful materials or equipment.

Test examination of transactions. A very useful way to obtain a practical working insight into the efficacy of procedures is to pursue a number of transactions pertaining to the organization operations completely from initiation to final disposition. This kind of testing will provide the auditor with valuable information on the way the organization's business, is actually transacted, on the usefulness (or pertinence) of prescribed procedures, on the capabilities of personnel involved in the various operating phases, and on possible weaknesses in procedure or practices which could represent an unnecessary drain on the organization's resources (i.e. ineffective or inefficient performance).

Discussions with officials and employees. The management auditor and obtain valuable information on problem areas warranting audit attention through discussion with responsible officials in the organization and other employees concerned with the operations being examined. The degree of success in obtaining useful information in this way is in large part dependent on the auditor's reputation for independent and constructive inquiry. If he is regarded with fear because of overly critical reporting in the past, this source of information may not be productive.

Testing Procedures and Practices: Testing procedures and practices first requires some preliminary review work to obtain information on how they actually work and an insight into their effectiveness and usefulness. On the basis of such review, specific matters may be identified as problem areas on weaknesses needing further probing. The general factors to be considered by the auditor in his, preliminary review work on management controls are:

- Whether the policies of the organization comply with its basic charter or grant of authority.
- Whether the system of procedures and management controls is designed to carry out those policies and result in activities being conducted as desired by the top management, and in an efficient and economical manner.
- Whether the system of management controls provides adequate control over the organization's resources, revenues, costs and expenditures.

Specific factors which may well be considered by the auditor in assessing the management control system and identifying problem areas warranting more detailed audit include:

The use by management of standards or goals in judging accomplishment productivity efficiency, or use of goods or services.

Lack of clarity in written procedures resulting in misunderstandings or inconsistent interpretations in the organization

- Capabilities of personnel
- Failures to accept responsibility

- Duplication of effort
- Improper or imprudent use of funds
- Cumbersome or extravagant organizational patterns
- Ineffective or wasteful use of employees and physical resources Work back logs.

This listing is indicative of the kinds of factors that an alert management auditor must keep in mind in all his work. The knowledge gained in preliminary- review that is conducted in recognition of these kinds of factors provides a solid basis for more detailed examination work that can lead to constructive improvements in the management system.

Development of Audit Findings. If, during the auditor's preliminary review apparently adverse conditions or results of practices or procedures are observed, further examination will usually be warranted. Specific cases, transactions or other units of operation should then be examined in depth to the extent deemed necessary to reach valid conclusions, to report fairly on results, and to support satisfactorily any recommendations made.

Developing specific findings is the core of this type of audit. Essentially this process involves obtaining as much pertinent, significant information about each finding as is practicable and evaluating it in terms of cause effect and possible courses of corrective action.

After a specific problem area is identified for more detailed examination a program should be developed by the auditor for use in making a thorough systematic examination into the matter. In the development of his specific findings and conclusions the auditor will need to:

Identify specially what the problem is, ie., what is deficient, defective, in etc

Determine whether the condition is isolated or widespread.

Determine the significance of the deficiency in terms of cost, adverse performance, or other pertinent effects.

Ascertain the cause or causes for the condition.

Identifying persons in the organization responsible for the deficiency.

Determine possible lines of corrective or preventive action as a basis for constructive recommendations.

Wherever practicable, the auditor should review his work and his findings with management officials responsible for the area being examined so that he can obtain as much information as possible bearing on the problem and consider, their views of the findings. He can then formulate his conclusions and recommendations for the audit report.

Standards for Judging Performance. The general standards which may be used in judging most kinds of management performance are effectiveness, efficiency and economy. Particularly in government organizations, these are applicable because, except as tempered by special requirements imposed by law or pursuant to law that contribute to a contrary effect, the conduct of the public's business effectively, efficiently, and economically is an implicit responsibility of those charged with its management. In reviewing pertinent parts of the

management control system, the auditor should first ascertain how management officials themselves determine whether prescribed policies are being followed, whether authorized and prescribed procedures are effective, and whether they are being applied in an efficient and economical manner.

In addition, if the management has developed, as part of its control system, techniques for measuring or evaluating performance against internally predetermined objectives or criteria, the auditor should use such standards as a starting point in reviewing performance. However, the auditor must be satisfied as to the basis on which such standards are established and their validity as a basis for judgment. If specific measures of internal performance are not available, the auditor has a much more difficult job of appraisal. He must then develop his own methods of examination and evaluation, utilizing all available pertinent facts and factors, in arriving at supportable opinions, conclusions, and recommendations. Over and above the broad standards of effectiveness efficiency and economy, in reviewing management performance the requirements of applicable laws have to be considered. A basis for independent appraisal of performance in relation to such requirements is provided. However where only, general guidance is provided by law or related policy declaration, the independent review has to be more comprehensive and penetrating because of the greater degree of latitude granted to the management in its efforts to accomplish its objectives.

Often, under these circumstances, instead of trading to measure performance against precise standards, the auditor's job resolves itself into ascertaining whether any wasteful or uneconomical operations are performed. He will like to determine if a less costly or more effective alternative is practicable in such cases. Management auditing which is carried out with this objective can be a highly useful and constructive part of any management system. Where, 'the possibility of wasteful, unnecessary, or extravagant use of resources exists, several factors may have to be considered in arriving at independent judgments on the quality and effectiveness of performance. Some of these are very closely interrelated. For example:

- Prudence in the use of resources
- Cost consciousness in using the organization's funds
- Effective coordination of work or procedures
- Good planning
- Efficient procedures
- Competent and diligent employees
- Effective supervision of performance
- Arrangements for detecting incompetence or irregularity

Anyone or a combination of factors such as these may be found in a problem area being probed. The auditor may find, for example, that funds are not being prudently managed because spending decisions are being made that result in acquiring goods and services that may not really be needed, by the, organization or, the procedures followed in determining whether materials and supplies are needed may be faulty and may produce inaccurate or otherwise unreliable information. This may lead to decisions to buy unnecessarily large quantities

that cannot be effectively used except over a long period. In this case storage and handling costs as well as risks of obsolescence and deterioration are unnecessarily incurred.

The auditor must consider all pertinent factors in appraising performance where there may be several criteria or other measures of adequacy of performance to be considered. Objective judgments, under these circumstances are particularly difficult to make where some of the factors to be considered may have contradictory values. Fairness, objectivity, and realism also require that the auditor avoid making judgments and conclusions on performance based solely on hindsight.

If all significant factors are appropriately considered, reasonable recommendations can be offered by the auditor concerning the discharge of specific kinds of management responsibilities, which can be of value in promoting improvements in management performance. They can also be useful to third parties in connection with their evaluations of such performance.

Organisation necessary to do a Management Audit

Management audit is primarily concerned with determining how a management does what it is required to do. It is a key activity, which is directly related with 'nerve center' (management) of the organization. For success of this activity, it is necessary that it should be properly organized. Following discussion gives an idea about the type of organization necessary to do a management audit:

1. Management Audit, if it is to be successful, must receive enthusiastic support of top management. If top management is not interested in setting an independent appraisal of "its activities, programme" will not go very far to 'be successful. The success of management audit will result when there exists in the organization proper climate for exchange/appraisal of independent views.
2. The head of management audit cell/department should have senior rank in the organizational hierarchy. Management audit deals with appraisal of management functions and functional heads will be reluctant to bear that their work should be appraised by someone junior to them. Besides, the head of department of Management Audit Group will not be able to bring about rapport, with other executives if he is not himself holding a senior post.
3. The head of management Audit should report direct to the highest level of the arrangement. It should not necessarily be subject to control of the functional head, whose work he appraises.
4. In organizational chart, the position of Management Audit Department should be clearly shown as given below:

LESSON 32: TARGET COSTING

Learning Objectives:

Upon completion of this Lesson, you should be able to:

- Explain the concept of Target Costing
- Compare the Target Costing and Cost Plus Pricing
- Indicate briefly about usage of Target Costing with Activity Based Costing

Introduction

You will learn about the Target Costing in this session.

Let Us consider a situation where the management of a company has to decide whether to develop and market a new product. In evaluating the feasibility of the new product, management must determine both the price it can charge and the expected cost. As we have seen, both the price and cost of the new product are affected by market conditions and actions of management. The degree that price and cost can be affected by management actions determines the most effective approach to use for pricing and cost management purposes. Cost-plus pricing is used for products where management actions (for example, advertising) can influence the market price. Although cost management is important in this case, there is a strong focus on marketing and the revenue side of the profit equation.

But what you will do if the market conditions are such that management cannot influence prices? If management's desired profit is to be achieved, the company must then focus on the product's cost. What management needs is an effective tool to reduce costs without reducing value to the customer. Many companies faced with this situation are adopting Target Costing.

The target costing approach, a form of life cycle costing, has recently assumed importance due to the hyper competitive marketing environment. Marketing managers first estimate the performance characteristics and market price requirements in order to achieve a desired market share for a proposed product. A standard profit margin is then subtracted from the projected selling price to arrive at the target cost for the product. The product development team must then, through its product and process design decisions, attempt to reach the product's target cost.

This procedure is just the opposite of that followed by many companies today in which the product is designed with little regard either to the manufacturing process or to its long-run manufacturing cost. With this traditional procedure of first designing the product and then giving the design to process engineers and cost analysts, the product cost is developed by applying standard cost factors to the materials and processes specified for the design. Frequently, this cost may be well above that which can be sustained by market prices and the product is either aborted or, if marketed, fails to achieve desired profitability levels.

You will realize that with the target cost approach, the new product team, consisting of product designers, purchasing specialists, and manufacturing and process people, works together to jointly determine product and process characteristics that permit the target cost to be achieved. The target cost approach is especially powerful to apply at the design stage, since decisions made at this stage have high leverage to affect long-run costs.

You should understand that Target Costing is a cost management tool for making cost reduction a key focus throughout the life of a product. A desired, or target cost is set, before the product is created or even designed. Managers must then try to reduce and control costs so that the product's cost does not exceed its target cost. Target costing is most effective at reducing costs during the product design phase when the vast majority of costs are committed. For example, the costs of resources such as new machinery, materials, parts, and even future refinements are largely determined by the design of the product and the associated production processes. These costs are not easily reduced once production begins. So, the emphasis of target costing is on proactive, up-front planning throughout every activity of the new product development process.

Once the product is released into production, it becomes much harder to achieve significant cost reductions. Figure 11-3 shows that the majority of costs become committed or locked in much earlier than the time at which the major cash expenditures are made.

Target Costing and New Product Development

Based on the existing technology and related cost structure, the product has three parts, requires direct labor, and has four types of indirect costs. The first step in the target costing process is the determination of market price. The market sets this price. Management sets the gross margin for the new product. The difference between the gross margin and the market price is the target cost for the new product. The existing cost structure for the product is determined by building up costs on an individual component level. This product has two components. Component 1 consists of parts A and B. Component 2 consists of part C. Direct labor is needed for both components and final assembly. The indirect costs are associated with activities necessary to plan and process the product.

You may sometimes think that marketing department may have a limited role in target costing because the price is set by competitive market conditions. Actually, market research from the marketing department at the beginning of the target costing activity guides the whole product development process by supplying information on customer demands and requirements. In fact, one of the key characteristics of successful target costing is a strong emphasis on understanding customer demands.

Have you heard of *Kaizen costing*, which is the Japanese word for continuous improvement during manufacturing? How is kaizen costing applied? Kaizen goals are established each year as part of the planning process. Examples include the continual reduction in setup times and processing times due to employee experience. In total, target costing during design and kaizen costing during manufacturing enables the achievement of the target cost over the product's life.

You should appreciate that accurate cost information is critical to these cost-reduction methods. Activity-Based Costing (ABC) provides this information. Activity-Based Management (ABM) is then used to identify and eliminate non-value-added activities, waste, and their related costs. ABM is applied throughout both the design and manufacturing stages of the product's life.

Illustration of Target Costing

We may now consider the target-costing system used by IIT AUTOMOTIVE of USA — One of the world's largest automotive suppliers. The company designs, develops, and manufactures a broad range of products, including brake systems, electric motors, and lamps. Also, the company, is the worldwide market leader in anti-lock braking systems (ABS), producing 20,000 such systems a day. Because these ABS are computerized, IIT Automotive actually ships 30% more computers daily than does Compaq!

You may wonder as to what pricing approach does IIT Automotive use for the ABS? The pricing process starts when one of IIT's customers, say Mercedes-Benz, sends an invitation to bid. The market for brake systems is so competitive that very little variance exists in the prices that companies can ask (bid). A target costing group is formed and charged with determining whether the price and costs allow for enough of a profit margin. This group is made up of engineers, cost accountants, and sales personnel. Factors considered in determining the feasibility of earning the desired target profit margin include competitor pricing, inflation rates, interest rates, and potential cost reductions during both the design (target costing) and production stages (Kaizen Costing) of the ABS product life. IIT purchases many of the component parts that make up the ABS. Thus, the target costing group works closely with suppliers. After product and process design improvements are made and commitments from suppliers are received, the company has the cost information needed for deciding the price for the bid.

You would be glad to know that the Target Costing system has worked well at IIT Automotive. The company's bid for the ABS resulted in Mercedes-Benz U.S. International selecting IIT Automotive as the developer and supplier of ABS for the automaker's M-Class All-Activity Vehicle.

Target Costing, and Cost-Plus Pricing Compared

Objective: Use target costing to decide whether to add a new product

You know that the successful companies understand the market in which they operate and use the most appropriate pricing approach. To see how target costing and cost-plus pricing can

lead to different decisions, suppose that IIT Automotive receives an invitation to bid from Ford on the ABS to be used in a new model car.

Let's us assume the following data apply:

- The specifications contained in Ford's invitation lead to an estimated current manufacturing cost (component parts, direct labor, and manufacturing overhead) of Rs.154.
- IIT Automotive had a desired gross margin rate of 30% on sales, which means that actual cost should make up 70% of the price.
- Highly competitive market conditions exist and have established a sales price of Rs.200 per unit

If cost-plus pricing were used to bid on the ABS, the bid price would be Rs.220 (Rs.154 / 0.7). Ford would most likely reject this bid because the market price is only Rs.200. IIT Automotive's pricing approach would lead to a lost opportunity.

Suppose that managers at IIT Automotive recognize that the market conditions dictate a set price of Rs.200. If a target-costing system were used, what would the pricing decision be? The target cost is Rs.140 (that is, Rs.200 X .7), so a required cost reduction of Rs.14 per unit is necessary. The target-costing *group* would work with product and process engineers and suppliers to determine if the average unit cost could be reduced by Rs.14 over the product's life. Note that it is not necessary to get costs down to the Rs.140 target cost before production begins. The initial unit cost will likely be higher, say Rs.145. Continuous improvement over the product's life will result in the final Rs.5 of cost reductions. If commitments for cost reductions are received, the managers will decide to bid Rs.200 per unit. Note that if the bid is accepted, IIT Automotive must carry through with its focus on cost management throughout the life of the product.

You may be aware that the Target Costing originated in Japan. However, many companies now use it worldwide, including Chrysler, Mercedes-Benz, Proctor & Gamble, Caterpillar, and IIT Automotive. Even some hospitals use target costing.

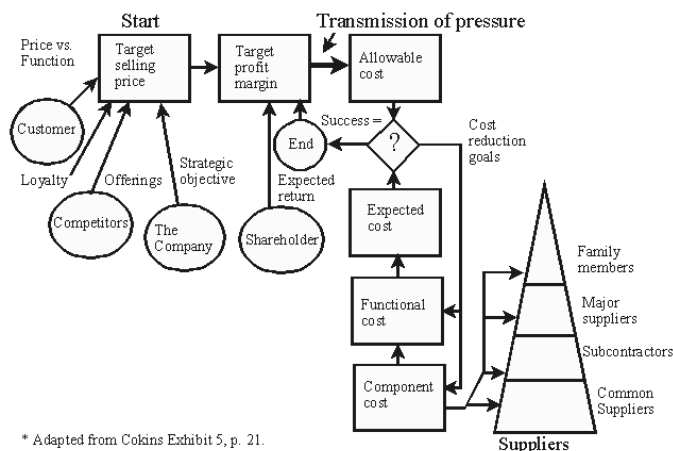
Why the increasing popularity of target costing? With increased global competition in many industries, companies are more and more limited in influencing market prices. Cost management then becomes the key to profitability. Target costing forces managers to focus on costs to achieve the desired profits.

Target Costing Steps

Target costing is a cost modeling technique that determines what price consumers are willing to pay for a product, and then works backwards to determine profit margins and allowable costs. This planned target cost becomes a calculated number that the operating costs cannot exceed once the product design is released. Therefore, target costing is applied at the beginning of a product's life cycle during the concept and design phase. This technique is in contrast to the traditional cost-plus markup method that is commonly used by manufacturers. It is easier and much less expensive to design costs out of a product rather than figure out how to eliminate them after the product is in production

1. Determine target selling price – As the first step, the company determines what the market is willing to pay for a product. Three main players are taken into consideration: customers, competitors, and a company's senior management. The company must understand the customer's perceived value of a product as well as their attitude for purchasing products. The company must take into account competitors alternative and substitute products. This is because customers are shoppers and will shop around for the best price and value. Senior management must define and adjust strategies to meet the company's objectives.
2. Determine target profit margin – Profit margins must be set to satisfy the expectations of both the company and its investors. Two approaches can be used to determine the desired profit margin: baseline experiences and capital budgeting using lifecycle analysis.
3. Calculate the allowable product cost – The maximum allowable product cost is calculated as the net difference between the target selling price and the target profit margin. In order for target costing to work, the maximum allowable product cost must not be exceeded. If the maximum allowable product cost is exceeded there will be undesirable outcomes. First, the company will increase the price of the product in order to maintain the desired profit margin. This will decrease sales volume and the optimal sales-price combination will not be achieved. Second, investors will be dissatisfied. See the illustration below for a graphic view of the target costing concept.

Target Costing Pressures on New Products*



* Adapted from Cokins Exhibit 5, p. 21.

Target Costing, and Service Companies

You may please note that many companies use target costing together with an activity-based-costing (ABC) system. Target costing requires a company to first determine what a customer will pay for a product and then work backwards to design the product and production process that will generate a desired level of profit. ABC provides data on the costs of the various activities needed to produce the product. Knowing the costs of activities allows product and production process designers to be able to predict the effects of their designs on the product's cost. Target costing essentially takes activity-based costs and uses them for strategic product decisions.

For example, Culp Inc., a North Carolina textile manufacturer, uses target costing and ABC to elevate cost management into one of the most strategically important areas of the firm. Culp found that 80% of its product costs are predetermined at the design stage, but earlier cost control efforts had focused only on the other 20%. By shifting cost management efforts to the design stage and getting accurate costs of the various activities involved in production, cost management at Culp evolved into a process of cutting costs when a product is being designed, not identifying costs that are out of line after the production is complete.

You have just now learnt that the basic goal of target costing is to reduce costs before they occur. After all, once costs have been incurred they cannot be changed. Such a strategy is especially important if product life cycles are short. Because most product life cycles are shrinking, use of target costing is expanding. Target costing focuses on reducing costs in the product design and development stages-when costs can really be affected. For example, Chrysler's design of the low-priced Neon was heavily influenced by the company's use of target costing, and Procter & Gamble's CEO credits target costing for helping eliminate costs that could cause products to be priced too high for the market.

As you would have guessed, the Target costing has generally been applied in manufacturing companies. However, its use in service and nonprofit companies is growing. For example, a process nearly identical to target costing is being used in some hospitals. Development of treatment protocols-the preferred treatment steps for a patient with a particular diagnosis-is the "product design" phase for a hospital. Treatment protocols have short life cycles because of rapid advances in medical technology and knowledge. Therefore, with increased attention to cost containment in health care, it is important to consider the costs of the various activities in a treatment protocol at the time of designing the protocol.

Measuring the costs of a particular treatment protocol after it is in use was the best that could be done until recently, even in the most cost-conscious hospitals. But identifying cost overruns after the fact, although better than never measuring them, did not lead to good cost control. By using target costing techniques, that is, identifying the maximum amount that would be paid for a treatment, protocols can be designed to avoid potential cost overruns before a treatment begins. Cost containment is then focused on the patient level, where most decisions are made, not at the department level, where identifying the causes of cost overruns is more difficult.

Target Costing

Summary Problems for your Review

Problem-1

Manu Offset Press is a printing firm that bids on a wide variety of design and printing jobs. The Proprietor of the firm, Manu Sharma, prepares the bids for most jobs. His cost budget for the year 2004 is as follows:

Factor	Rs.	Amount (Rs.)
Materials		350,000
Labor		250,000
Prime Cost (Materials + Labor)		600,000
Overhead		
Variable	300,000	
Fixed	150,000	450,000
Total production cost of jobs		1,050,000
Selling and administrative expenses*		
Variable	75,000	
Fixed	125,000	200,000
Total costs		1,250,000

*(These expenses include costs of all value-chain functions other than production).

Manu Sharma has a target profit of Rs. 250,000 for the year 2004.

You are required to compute the average target mark up percentage for setting prices as a percentage of:

1. Prime costs (materials plus labor)
2. Variable production cost of jobs
3. Total production cost of jobs
4. All variable costs
5. All costs

Solution-1

You should understand that the purpose of this problem is to emphasize that many different approaches to pricing might be used and when they are properly employed, would achieve the same target selling prices.

To achieve a target profit of Rs. 250,000, after meeting the total costs of Rs. 1,250,000, the targeted **Income** for the year 2004 should be:

$$\text{Rs. } 1,250,000 + \text{Rs. } 250,000 = \mathbf{\text{Rs. } 1,500,000}.$$

The target markup percentages are worked-out as follows:

1. Percent of prime cost = $\frac{(\text{Rs. } 1,500,000 - \text{Rs. } 600,000)}{(\text{Rs. } 600,000)} = 150\%$
2. Percent of variable production cost of Jobs = $\frac{(\text{Rs. } 1,500,000 - \text{Rs. } 900,000)}{(\text{Rs. } 900,000)} = 66.7\%$
3. Percent of total production cost of Jobs = $\frac{(\text{Rs. } 1,500,000 - \text{Rs. } 1,050,000)}{(\text{Rs. } 1,050,000)} = 42.9\%$
4. Percent of all variable costs = $\frac{(\text{Rs. } 1,500,000 - \text{Rs. } 975,000)}{(\text{Rs. } 975,000)} = 53.8\%$
5. Percent of all costs = $\frac{(\text{Rs. } 1,500,000 - \text{Rs. } 1,250,000)}{(\text{Rs. } 1,250,000)} = 20\%$

Problem -2 : Target Costing

Mehta Electrical Motors (MEM) makes small electric motors for a variety of home appliances. MEM sells the motors to appliance makers, who assemble and sell the appliances to retail outlets. MEM makes dozens of different motors. But MEM

does not currently make the motor to be used in garage-door openers. The firm's market research department has discovered a sizeable market for such a motor.

The market research department has indicated that a motor for garage-door openers would likely to sell for Rs. 3200. A similar motor currently being produced has the following manufacturing costs:

	Rs.
Direct Materials	1800
Direct Labor	900
Overheads	800
Total	3500

MEM management desires a gross margin of 18% of the manufacturing cost.

You are required to work out the solutions for the following questions:

1. Suppose Memphis used cost-plus pricing, setting the price 15% above the manufacturing cost. What price would be charged for the motor? Would you produce such a motor if you were a manager at Memphis? Explain.
2. Suppose Memphis uses target costing. What price would the company charge for a garage-door-opener motor? What is the highest acceptable manufacturing cost for which Memphis would be willing to produce the motor?
3. As a user of target costing, what steps would Memphis managers take to try to make production of this product feasible?

Problem - 3 : Target Costing Over Product Life Cycle

Sunder Utility Equipments (SUE) makes a variety of motor-driven products for the home and small businesses. The market research department recently identified power lawn mowers as a potentially lucrative market. As a first entry into this market, SUE is considering a riding lawn mower that is smaller and less expensive than those of most of the competition. Market research indicates that such a lawn mower would sell for about Rs. 9,950 at retail and Rs. 8,500 wholesale. At that price, SUE expects life cycle sales as follows:

Year	Sales (Nos.)
1	2,000
2	6,000
3	9,000
4	12,000
5	10,000
6	8,000
7	5,000

The production department has estimated that the variable cost of production will be Rs. 4,800 per lawn mower, and annual fixed costs will be Rs. 850,000 per year for each of the 7 years. Variable selling costs will be Rs. 450 per lawn mower and fixed

selling costs will be Rs. 350,000 per year. In addition, the product development department estimates that Rs. 45,00,000 of development costs will be necessary to design the lawn mower and the production process for it.

1. Compute the expected profit over the entire product life cycle of the proposed riding lawn mower.
2. Suppose SUE expects pretax profits equal to 12% of sales on new products. Would SUE undertake production and selling of the riding lawn mower?
3. SUE uses a target costing approach to new products. What steps would management take to try to make a profitable product of the riding lawn mower?

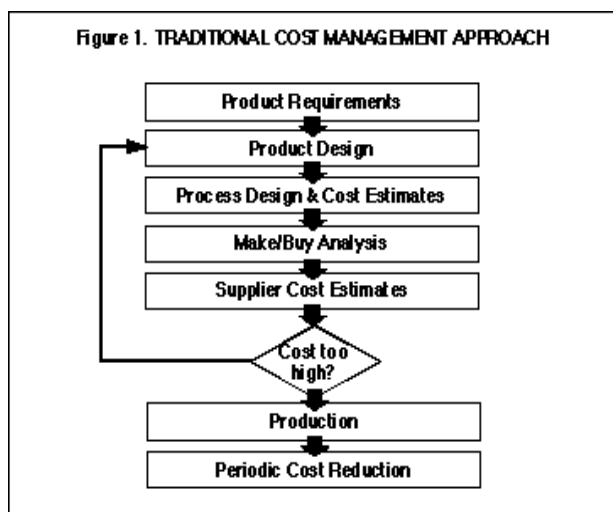
Case Study

A Target Costing

There are two basic approaches to product costing, market-based and cost-based. This exercise focuses on one type of market-based costing called target costing.

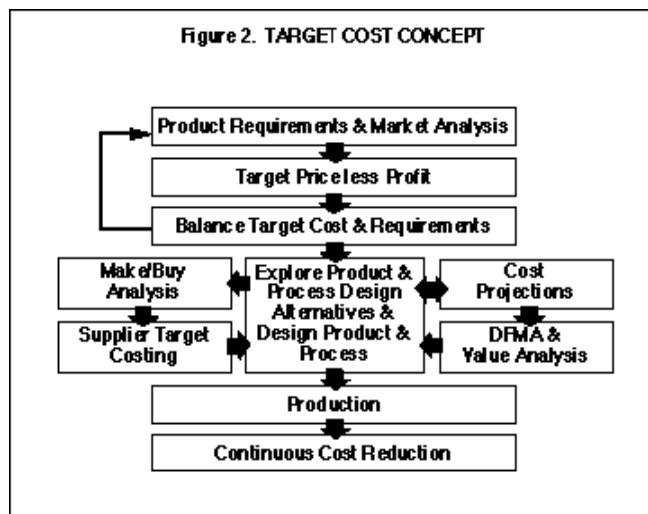
As totally new product and its industry develop, it starts to compete based on its new technology, concept, and/or service. Competitors emerge and the basis for competition evolves to other areas such as cycle time, quality, or reliability. As an industry becomes mature, the basis of competition typically moves to price. Profit margins shrink. Companies begin focusing on cost reduction. However, the cost structure for existing products is largely locked in and cost reduction activities have limited impact. As companies begin to realize that the majority of a product's costs are committed based on decisions made during the development of a product, the focus shifts to actions that can be taken during the product development phase.

Until recently, engineers have focused on satisfying a customer's requirements. Most development personnel have viewed a product's cost as a dependent variable that is the result of the decisions made about a products functions, features and performance capabilities. Because a product's costs are often not assessed until later in the development cycle, it is common for product costs to be higher than desired. This process is represented in Figure 1.



Target costing represents a fundamentally different approach. It is based on three premises:

1. Orienting products to customer affordability or market-driven pricing,
2. Treating product cost as an independent variable during the definition of a product's requirements, and
3. proactively working to achieve target cost during product and process development. This target costing approach is represented in Figure 2.



Target costing builds upon a design-to-cost (DTC) approach with the focus on market-driven target prices as a basis for establishing target costs. The target costing concept is similar to the cost as an independent variable (CAIV) approach used by the U.S. Department of Defense and to the price-to-win philosophy used by a number of companies pursuing contracts involving development under contract.

The following ten steps are required to install a comprehensive target costing approach within an organization.

1. Re-orient culture and attitudes. The first and most challenging step is re-orient thinking toward market-driven pricing and prioritized customer needs rather than just technical requirements as a basis for product development. This is a fundamental change from the attitude in most organizations where cost is the result of the design rather than the influencer of the design and that pricing is derived from building up a estimate of the cost of manufacturing a product.
2. Establish a market-driven target price. A target price needs to be established based upon market factors such as the company position in the market place (market share), business and market penetration strategy, competition and competitive price response, targeted market niche or price point, and elasticity of demand. If the company is responding to a request for proposal/quotation, the target price is based on analysis of the price to win considering customer affordability and competitive analysis.
3. Determine the target cost. Once the target price is established, a worksheet (see example below) is used to calculate the target cost by subtracting the standard profit margin, warranty reserves, and any uncontrollable corporate

allocations. If a bid includes non-recurring development costs, these are also subtracted. The target cost is allocated down to lower level assemblies of subsystems in a manner consistent with the structure of teams or individual designer responsibilities.

TARGET COST CALCULATION WORKSHEET

Sign	Price/Cost Element	Estimate	% Factor	Per Unit Factor	Amount
	Manufacturer's Suggested Retail Price				\$ 495.00
-	Standard Dealer Margin		30%	\$ -	\$(148.50)
=	Cost to Retailer				\$ 346.50
-	Shipping/Distribution Cost to Retailer		0%	\$ 15.00	\$(15.00)
=	Selling Price to Retailer				\$ 331.50
-	Distribution Cost/Mark-up		15%	\$ -	\$(49.73)
-	Shipping/Logistics Cost to Distribution Center		0%	\$ 17.00	\$(17.00)
=	Manufacturer's Selling Price				\$ 264.78
-	Profit Margin		8%	\$ -	\$(21.18)
-	Warranty Cost		2%	\$ -	\$(5.30)
-	Corporate Allocations		10%	\$ -	\$(26.48)
-	Business Unit Selling, General & Administrative		12%	\$ -	\$(31.77)
	Non-Recurring Development Cost	1200000			
	Estimated Production Volume	200000			
-	Allocated Non-Recurring Development Cost			\$ 6.00	\$(6.00)
=	Business Unit Target Cost				\$ 174.05
-	Overhead		45%	\$ -	\$(78.32)
=	Direct Target Cost (Labor & Material)				\$ 95.73

- Balance target cost with requirements. Before the target cost is finalized, it must be considered in conjunction with product requirements. The greatest opportunity to control a product's costs is through proper setting of requirements or specifications. This requires a careful understanding of the voice of the customer, use of conjoint analysis to understand the value that customers place on particular product capabilities, and use of techniques such as quality function deployment to help make these tradeoff's among various product requirements including target cost.
- Establish a target costing process and a team-based organization. A well-defined process is required that integrates activities and tasks to support target costing. This process needs to be based on early and proactive consideration of target costs and incorporate tools and methodologies described subsequently. Further, a team-based organization is required that integrates essential disciplines such as marketing, engineering, manufacturing, purchasing, and finance. Responsibilities to support target costing need to be clearly defined.
- Brainstorm and analyze alternatives. The second most significant opportunity to achieve cost reduction is through consideration of multiple concept and design alternatives for both the product and its manufacturing and support processes at each stage of the development cycle. These opportunities can be achieved when there is out-of-the-box or creative consideration of alternatives coupled with structured analysis and decision-making methods.
- Establish product cost models to support decision-making. Product cost models and cost tables provide the tools to evaluate the implications of concept and design alternatives. In the early stages of development, these models are based on parametric estimating or analogy techniques. Further on in the development cycle as the product and process become more defined, these models are based on industrial engineering or bottom-up estimating techniques. The models need to be comprehensive to address all of the proposed materials, fabrication processes, and assembly

process and need to be validated to insure reasonable accuracy. A target cost worksheet can be used to capture the various elements of product cost, compare alternatives, as well as track changing estimates against target cost over the development cycle.

- Use tools to reduce costs. Use of tools and methodologies related to design for manufacturability and assembly, design for inspection and test, modularity and part standardization, and value analysis or function analysis. These methodologies will consist of guidelines, databases, training, procedures, and supporting analytic tools.
- Reduce indirect cost application. Since a significant portion of a product's costs (typically 30-50%) are indirect, these costs must also be addressed. The enterprise must examine these costs, re-engineer indirect business processes, and minimize non-value-added costs. But in addition to these steps, development personnel generally lack an understanding of the relationship of these costs to the product and process design decisions that they make. Use of activity-based costing and an understanding of the organization's cost drivers can provide a basis for understanding how design decisions impact indirect costs and, as a result, allow their avoidance.
- Measure results and maintain management focus. Current estimated costs need to be tracked against target cost throughout development and the rate of closure monitored. Management needs to focus attention of target cost achievement during design reviews and phase-gate reviews to communicate the importance of target costing to the organization
 - According to the author, target costing is based on three premises. What are they and how do they affect locked-in costs?
 - List the ten steps required to install a comprehensive target costing approach within an organization.
 - Which of the above steps is likely to be the most difficult?
 - What factors will be considered when establishing a market-driven target price?
 - Once the target price is established, how is the target cost calculated?
 - What recommendations are given to reduce indirect cost application (the ninth step)?

Notes

LESSON 33 : RESPONSIBILITY ACCOUNTING

Topics Covered

Introduction, Definition, Steps Involved in Responsibility Accounting, Responsibility Centres, Advantages of Responsibility Accounting, Cost Centres vs. Responsibility Centres

Learning Objectives:

Upon completion of this Lesson, you should be able to:

- Define the Responsibility Accounting
- Identify the Steps Involved in Responsibility Accounting
- Describe the Advantages of Responsibility Accounting
- Differentiate between Cost Centres vs. Responsibility Centres

Introduction

Hello Friends.

In this session, we will discuss about the Responsibility Accounting and Responsibility Centres.

The previous chapters have presented many important tools of management accounting. Tools such as Activity-Based Costing, Budgeting, and Variance Analysis are each useful by themselves. They are most useful, however, when they are parts of an integrated system—an orderly, logical plan to coordinate and evaluate all the activities of the organization's value chain. Managers of most organizations today realize that long-run success depends on focusing on cost, quality, and service - three components of the competitive edge.

The systems of costing, like standard costing and budgetary control, are useful to management for controlling the costs. In those systems the emphasis is on the devices of control and not on those who use such devices. Responsibility Accounting is a system of control where responsibility is assigned for the control of costs. The persons are made responsible for the control of costs. Responsibility Accounting implies a system of accounting whereby the performance of various people is judged by assessing how far they have achieved the pre-determined targets set for the divisions, departments or sections for which they are responsible. Each person is responsible for his area of operation.

Responsibility Accounting is similar to any other system of cost, such as standard costing or budgetary control, but with greater emphasis towards fixing of the responsibility of the persons entrusted with the execution of specific job. For example, if Mr. A has prepared the cost budget of his department, he will be made responsible for keeping the costs under control. Mr. A will be supplied with detailed information of actual costs incurred by his department. In case the costs are more than budgeted costs, then A will try to find out the reasons and take corrective measures. 'A' will be personally responsible for the performance of his department.

Definition

Responsibility Accounting is a system under which managers are given decision-making authority and responsibility for each activity occurring within a specific area of the company. Under this system managers are made responsible for the activities of segments. These segments may be called departments or divisions.

Eric Kohier defines Responsibility Accounting as “a method of accounting in which costs are identified with persons assumed to be capable of controlling them, rather than with products or functions. It differs from activity accounting, in that it does not in itself require an organizational grouping by activities and sub-activities or provide a systematic criterion of system design.”

Charles T. Homgreen defines “Responsibility Accounting is a system of accounting that recognizes various responsibility centres throughout the organization and reflects the plans and actions of each of these centres by assigning particular revenues and costs to the one having the pertinent responsibility. It is also called profitability accounting and activity accounting”.

Institute of Cost and Works Accountants of India defines Responsibility Accounting as a system of management accounting under which accountability is established according to the responsibility delegated to various levels of management and management information and reporting system instituted to give adequate feedback in terms of the delegated responsibility. Under this system, divisions or units of an organization under a specified authority in a person are developed as responsibility centres and evaluated individually for their performance.”

David Fanning defines Responsibility Accounting as a system or mechanism for controlling the wider freedom of action ‘that executives - decision centre manager in other words - are given by senior management and for holding those executives responsible for the consequences of their decisions.’

Robert Anthony defines Responsibility Accounting as “that type of management accounting that collects and reports both planned and actual accounting information in terms of responsibility centres.”

Responsibility Accounting focused main attention on responsibility centres. The managers of different activity centres are responsible for controlling the costs of their centres. Information about costs incurred for different activities is supplied to the persons in charge of various centres. The performance is constantly compared to the standards set and this process is very useful in exercising cost controls. Responsibility Accounting is different from cost accounting in the sense that the former lays emphasis on cost control whereas the latter lays emphasis on cost ascertainment.

Responsibility Accounting is a system, which makes every-one conscious and responsible: for the job that is entrusted to him by his supervisor, i.e. a control by delegating and locating responsibility for cost. Each supervisory area in the organization is charged only with the cost for which it is responsible or over which it has control. Not only the costs but also the revenues are assigned. That is why it is defined as “a system of accounting that recognizes various responsibility centres throughout the organization and that reflects plans and actions of each of these centres, by assigning particular revenues and cost to one having pertinent responsibility. This system defines the specific responsibility of the departmental supervisor as well as functional managers, which should be performed. Practically it is the management that has to chalk out the plan and control the activities relating to the responsibility centre. It follows the basic principle like any other control system, such as Standard Costing or Budget. The only difference is that the fixation of responsibility lies in the hands of individuals or departments.

The following inferences can be made from the above definitions:

1. Responsibility Accounting stresses on communication of information in general and accounting information in particular to various decisional centres.
2. Responsibility Accounting lays greater emphasis on persons (human resources management)
3. Responsibility Accounting is tailored to the organizational structure so that the process of communication of information follows principles of organization.
4. It is an accounting system, which collects and report both planned and actual accounting data in terms of sub-units, which are recognized as responsibility centres.

Steps Involved in Responsibility Accounting

Responsibility Accounting is used as a control device. Following steps are necessary to effect control through the Responsibility Accounting:

1. The organization is divided into various responsibility centres. Each responsibility centre is put under the charge of a responsibility manager.
2. The targets or budgets of each responsibility centre are set in consultation with the manager of responsibility centre, so that he may be able to give full information about his department. The manager of responsibility centre should know as what is expected of him - each centre should have a clear set of goals. The responsibility and authority of each centre should be well defined.
3. Managers are charged with the items and responsibility, over which they can exercise a significant degree of direct control.
4. Goals defined for each area of responsibility should be attainable with efficient and effective performance.
5. The actual performance is communicated to the managers concerned. If it falls short of the standards, the variances are conveyed to the top management. The names of persons responsible for the variances are also conveyed so that responsibility may be fixed.

6. The performance reports for each centre should be prepared highlighting the variances and items requiring management's attention. The corrective measures are suggested or taken and communicated to the concerned managers of the centres.

The purpose of all these steps is to assign responsibility to different individuals so that their performance is improved and costs are controlled. The personal factor in Responsibility Accounting is most important. The management may prepare the best plan or the budget and put up before its staff, but its success depends upon the initiative and the will of the workers to execute it. The essence of Responsibility Accounting is to communicate the right information to the right person at the right time. Responsibility Accounting provides a means of control, it cannot control. Control is a personalized affair. The people do control, not the reports. Responsibility Accounting will certainly act as a control device and it will help in improving the overall performance of the business.

Responsibility Centres

A responsibility centre is a set of activities assigned to a manager, a group of managers, or other employees. A set of machines and machining tasks, for example, may be a responsibility centre for a production supervisor. The full production department may be a responsibility centre for the department head. Finally, the entire organization may be a responsibility centre for the president. In some organizations, management responsibility is shared by groups of employees to create wide “ownership” of management decisions, allow creative decision making, and prevent one person's concern (or lack of concern) for risks of failure to dominate decisions.

An effective management control system gives each lower-level manager responsibility for a group of activities and objectives and then monitors and reports on (1) the results of the activities and (2) the manager's influence on those results. Such a system has innate appeal for most top managers because it helps them delegate decision-making and frees them to plan and control. Lower-level managers appreciate the autonomy of decision-making they inherit. Thus system designers apply responsibility accounting to identify what parts of the organization have primary responsibility for each objective, develop performance measures and targets to achieve, and design reports of these measures by organization subunit or responsibility centre. Responsibility centres usually have multiple objectives that the management control system monitors.

Responsibility Accounting focuses attention on responsibility centres. A responsibility centre is a sub-unit of an organization under the supervision of a manager who has the responsibility for the activities of that responsibility centre. Each sub-unit has certain activities to perform and its manager is assigned the responsibility and/or authority to carry out those activities. Responsibility centre is the segment of business with reference to which information will be communicated to pin point responsibilities. In the words of Anthony and Rases, “A responsibility centre is like an engine in that it has inputs, which are physical quantities of material, hours of various types of labour, and a variety of services; it works with these resources usually; working capital and fixed assets are also required. As a result of this work, it produces output, which are classified

either as goods, if they are tangible or as services, if they are intangible. These goods or services go either to other responsibility centre; within the company or to customers in the outside world.”

Responsibility centres, for planning and control purposes, are classified into the following cases:

A. **Expense Centre:** An expense centre or a cost centre, is a responsibility centre in which inputs, but not outputs, are measured in monetary terms. A cost centre is a responsibility centre in which a manager is accountable for costs only. Its financial responsibilities are to control and report costs only. An entire department may be considered a single cost centre, or a department may contain several cost centres. For example, although one manager may supervise an assembly department, it may contain several assembly lines and regard each assembly line as a separate cost centre. Likewise, within each line, separate machines or test equipment may be regarded as separate cost centres. The determination of the number of cost centres depends on cost benefit considerations - do the benefits of smaller cost centres (for planning, control, and evaluation) exceed the higher costs of reporting?

Responsibility Accounting is based on financial information relating to input (costs) and outputs (revenues). In an expense centre of responsibility, the accounting system records only the cost incurred in / by the centre or unit, but revenues earned (output) are excluded. In case of certain responsibility centres, it is neither possible nor necessary to measure the output in terms of monetary units. Most of the service departments come in this category. For example, it is almost impossible to measure the monetary value of the finance or the account department's contribution to the company. The accounting system, therefore, records the cost incurred in respect of these centres but not the revenue incurred. The performance of the responsibility centre managers is evaluated by comparing the costs incurred with the budgeted costs. Management focuses its attention on cost variances for control purposes.

B. **Revenue Centre:** A revenue centre is a segment of the organization, which is primarily responsible for generating sales revenue. A revenue centre manager does not possess control over cost, investment in assets, but usually has control over some of the expenses of the marketing department. The performance of a revenue centre is evaluated by comparing the actual revenue with budgeted revenue. The marketing manager of a product line is an example of revenue centre.

C. **Profit Centre:** A responsibility centre is called a profit centre when the manager is held responsible for both costs (inputs) and revenues (outputs) and thus for profit. Despite the name, a profit centre can exist in nonprofits organizations (though it might not be referred to as such) when a responsibility centre receives revenues for its services. A profit centre is a big segment of activity for which both revenues and costs are accumulated: A centre whose performance is measured in terms of both - the expense it incurs and revenue it earns, is termed as a profit centre. The

output of a responsibility centre may either be meant for internal consumption or for outside customers. In the latter case, the revenue is realized when the sales are made. That is, when the output is meant for outsiders, then the revenue will be measured from the price charged from customers. If the output is meant for other responsibility centre, then management takes a decision whether to treat the centre as profit centre or not. In fact, any responsibility centre can be turned into a profit centre by determining a selling price for its outputs. For instance, in case of a process industry, the output of one process may be transferred to another process at a profit by taking into account the market price. Such transfers will give some profit to that responsibility centre. Although such transfers do not increase the Company's assets, they help in management control process.

D. **Investment Centre:** An investment centre goes a step further than a profit centre does. Its success is measured not only by its income but also by relating that income to its invested capital, as in a ratio of income to the value of the capital employed. In practice, the term *investment centre* is not widely used. Instead, the term *profit centre* is used indiscriminately to describe centres that are always assigned responsibility for revenues and expenses, but may or may not be assigned responsibility for the capital investment.

It is defined as a responsibility centre in which inputs are measured in terms of cost / expenses and outputs are measured in terms of revenues and in which assets employed are also measured. A responsibility centre is called an investment centre, when its manager is responsible for costs and revenues as well as for the investment in assets used by his centre. He is responsible for maintaining a satisfactory return on investment i.e. asset employed in his responsibility centre. The investment centre manager has control over revenues, expenses and the amounts invested in the centre's assets. The manager of an investment centre is required to earn a satisfactory return. Thus, return on investment (**ROI**) is used as the performance evaluation criterion in an investment centre. He also formulates the credit policy, which has a direct influence on debt collection, and the inventory policy, which determines the investment in inventory. The Vice President (Investments) of a mutual funds company may be in charge of an Investment Centre.

In the Investment Centre, the manager in charge is held responsible for the proper utilization of assets. He is expected to earn a satisfactory return on the assets employed in his responsibility centre. Measurement of assets employed poses many problems. It becomes difficult to determine the amount of assets employed in a particular responsibility centre. Some of the assets are in the physical possession of the responsibility centre while for some assets it may depend upon other responsibility centres or the Head Office of the company. This is particularly true of cash or heavy plant and equipment. Whether such assets should be included in the figure of assets employed of the responsibility centre and if included, at how much value, is a difficult question. On account of these difficulties, investment centres are generally used only for relatively large units, which have independent divisions, both manufacturing and marketing, for their individual products.

Advantages of Responsibility Accounting

Management uses Responsibility Accounting as a control device. The aim of Responsibility Accounting is to help management in achieving organizational goals. It is an invaluable support to modern management. It contributes to the firm's management by providing relevant information on a continuous basis. The following are some of the advantages of Responsibility Accounting:

1. It introduces sound system of control - a system of closer control.
2. Each and every individual in the organization is assigned some responsibility and they are accountable for their work.
3. Everybody knows what is expected of him. Nobody can shift responsibility to anybody else if something goes wrong.
4. It is effective tool of cost control and cost reduction applied with budgetary control and standard costing.
5. It facilitates the management to set realistic plans and budgets.
6. It is not only a control device but also facilitates decentralization of decision-making.
7. It measures the performance of individuals in an objective manner.
8. It fosters a sense of cost-consciousness among managers and their subordinates.
9. It helps the management to make an effective delegation of authority and required responsibility as well.
10. Under the system of Responsibility Accounting, detailed information is collected about costs and revenues, on a continuous basis and the data is helpful in planning for future costs and revenues.
11. Timely corrective action can be taken and better control over costs can be achieved.

Cost Centres vs. Responsibility Centres

A cost centre is "a location, person or item of equipment (or group of these) for which costs may be ascertained and used for purposes of cost control". Thus, cost centre is used as a means of assembling items of cost, so that they can be assigned to goods and services. In the case of cost centre, emphasis is more on products, jobs or processes whose costs are to be ascertained. Thus here the emphasis is not on the persons who may be managing a level or product or process.

Responsibility centres, on the other hand, are established on the basis of responsibility delegated to responsible personnel of the organization with a view to identify costs which can be controlled by each one of them. However, cost centres sometimes may be used as responsibility centres too. In that case cost reports are prepared both cost wise-wise and responsibility - centre- wise.

Development of Measures of Performance

Because most responsibility centres have multiple objectives, only some of these objectives are expressed in financial terms, such as operations budgets, profit targets, or required return on

investment, depending on the financial classification of the centre. Other objectives, which are to be achieved concurrently, are non-financial in nature. For example, many companies list environmental stewardship and social responsibility as key objectives. The well-designed management control system functions alike for both financial and non-financial objectives to develop and report measures of performance.

Good performance measures will:

1. Relate to the goals of the organization
2. Balance long-term and short-term concerns
3. Reflect the management of key results and activities
4. Be affected by actions of managers and employees
5. Be readily understood by employees
6. Be used in evaluating and rewarding managers and employees
7. Be reasonably objective and easily measured
8. Be used consistently and regularly

Both financial and non-financial performance measures are important. Sometimes accountants and managers focus too much on financial measures such as profit or cost variances because they are readily available from the accounting system. Managers, however, can improve operational control by also considering non-financial measures of performance. Such measures may be more timely and more closely affected by employees at lower levels of the organization, where the product is made or the service is rendered. Non-financial measures are often easier to quantify and understand. Hence, employees can be easily motivated toward achieving performance goals. For example, AT&T Universal Card Services, which was awarded the prestigious Baldrige National Quality Award (presented by the U.S. Department of Commerce), uses 18 performance measures for its customer inquiries process. These measures include average speed of answer, abandon rate, and application processing time (three days compared to the industry average of 34 days).

Often the effects of poor non-financial performance (quality, productivity, and customer satisfaction) do not show up in the financial measures until considerable ground has been lost. Financial measures often are lagging indicators that arrive too late to help prevent problems and ensure the organization's health. What is needed are leading indicators. As a result, many companies now stress management of the activities that drive revenues and costs rather than waiting to explain the revenues or costs themselves after the activities have occurred. Superior financial performance usually follows from superior non-financial performance.

The Balanced Scorecard

There are several approaches to performance reporting. Each approach attempts to link organizational strategy to actions of managers and employees. One popular approach to performance reporting is the balanced scorecard. A balanced scorecard is a performance measurement and reporting system that strikes a balance between financial and operating measures, links performance to rewards, and gives explicit recognition to the diversity of organizational goals. Companies such as Champion

LESSON 34-35 : INFLATION ACCOUNTING

Objectives

Upon completion of this Lesson, you should be able to:

- Pinpoint the limitations of Historical Accounting
- Compute the monetary values as per CPP Method
- Compute the monetary values as per CCA Method
- Outline the merits and demerits of Inflation Accounting

Introduction

Accounting is based on the traditional concept of cost and revenue. Money is the yardstick for measuring profits and losses and financial health of the business - operating results and financial position. The basic objective of accounting is the preparation of financial statements in a way that they give a true and fair view of the business. That is, the income statement should disclose the true profit or loss made by the business during a particular period while the balance sheet must show a true and fair view of the financial position of the business on a particular date. Financial statements are prepared in monetary units i.e., rupee. The medium of expression is the money value. The value of money is itself fluctuating; any measurement with an unsteady scale cannot be finite and comparable. The recording of business transactions under the assumption that monetary unit is stable is known as historical accounting. However, it has been our experience that over a period of time, the prices have not remained stable. There have been inflationary as well as deflationary tendencies. Rise in general price level, termed inflation erodes the intrinsic value of money, conversely, fall in general prices called deflation, raises its purchasing power. Inflation is a concept which every human being is not only aware of, but also painfully experiencing. The direct effect of inflation is the erosion in the purchasing power of money. The root cause of the problem is the change in the value of money. Monetary unit is never stable and all types of countries have been experiencing high rates of inflation. The prices change as a result of various economic and social forces and such changes bring about a change in the purchasing power of money. Unless the necessary adjustments are made, price level changes produce distortions in the financial statements and suffer serious limitations. Financial statements, prepared according to conventional or historical accounting system, do not reflect current economic realities. The assumption of stable money value subject to which the financial statements are prepared is fallacious in the context of rising prices. By Inflation, we mean a rise in general price level and a fall in the value of money. Because historical rupee is not comparable to the present day rupee. Unlike physical units, such as kilogram, metre etc. is stable units in measuring weight and distance, monetary units i.e., rupee is an unstable unit of exchange value.

Consider the following example:

Capital Employed	8,00,000	Fixed Assets	8,00,000
Current Liabilities	2,00,000	Less: Depreciation	2,00,000
			6,00,000
		Current Assets	4,00,000
	10,00,000		10,00,000

Profit after tax @ 50% and depreciation of Rs. 80,000 (10 % of the original cost of assets), the profit is Rs. 2,00,000. The replacement cost of the fixed asset is Rs. 15,00,000 due to inflation. In the above example, the rate of return on capital employed is 25%, i.e. $(2,00,000 / 8,00,000 \times 100)$ under historical accounting system.

But when the profit is compared to the real value of the fixed assets, being used i.e., Rs. 15,00,000, it would be clear that the rate of return on capital employed is not 25% as shown below:

Net Profit

Add: 10% depreciation on Rs. 8,00,000	Rs 2,00,000
Add: Tax @ 50% of profit before tax	80,000
Profit before charging depreciation and tax:	
Less: 10% of depreciation on replacement cost of asset: Rs 15,00,000	<u>2,00,000</u> 4,80,000
Less: Tax @ 50%	<u>1,50,000</u>
Profit on the basis of price level accounting	3,30,000
Capital employed on the basis of replacement cost:	<u>1,65,000</u> <u>1,65,000</u>
Fixed Assets	Rs 15,00,000
Less: Depreciation (as in historical accounting system)	<u>3,75,000</u> 11,25,000
Add: Current Assets	<u>4,00,000</u> 15,25,000 <u>2,00,000</u>
Less: Current Liabilities	
Capital Employed	<u>13,25,000</u>
Rate of Return on Capital Employed	
<u>Rs. 1,65,00</u> x 100	12.45%
Rs.13.25, 000	

Thus it is clear that the profit is over-stated and the fixed assets are under-stated, when the effect of inflation is ignored. In this example, when the asset has to be replaced, larger funds are required on account of inflationary conditions. The asset purchased for Rs. 8,00,000 and its life was expected to be 10 years, a sum of Rs 80,000 (10%) would be charged as depreciation every year. If after 10 years, the asset can be purchased for Rs. 13,00,000, the firm may have to face serious problems

because of insufficiency of funds. Hence, the need for inflation accounting.

Limitations of Historical Accounting

In order to trace the impact of inflation on the financial statements, it becomes necessary to pinpoint the limitations of the conventional statements conveying historical financial information for end-users within an organisation and also outsiders.

1. Changes in the price level are not taken into account. The financial statements prepared under the conventional system are merely statements of historical facts. They fail to give realistic and correct picture of the state of affairs of a concern. Monetary unit is never stable under inflationary conditions. This instability has resulted in a number of distortions in the financial statements and is the most serious limitation of historical accounting.
2. Fixed assets are shown in the position statement at the cost at which they were acquired. Further purchase of assets at different points of time is clubbed together as additions to the existing assets, without any regard to change in the purchasing power of rupee. For example, we constructed a building at a cost of Rs. 1,00,000 in 1990 and constructed a similar building in 2000 at a cost of Rs 2,50,000. The rupee value in 1990 is not the same as in 2000. The value is significantly less in 2000. These buildings are shown as follows:

Building (1990)	Rs. 1,00,000
Building (2000)	Rs. <u>2,50,000</u>
	Rs. <u>3,50,000</u>

Current Purchasing Power Method (CPP)

Institute of Chartered Accountants in England and Wales recommended that changes in the price level should be reflected in the financial statements through the current purchasing power method (CPP). For measuring changes in the price level and incorporating the changes in the financial statements we use index numbers, which may be considered to be a barometer meant for the purpose. Under this method any established and approved general price index is used to convert the values of various items in the Balance Sheet and Profit and Loss Account. This method takes into consideration the changes in the value of items as a result of the general price level, but it does not account for changes in the value of individual items. For example, a particular machine may have become cheaper over the last few years, whereas the general price level may have risen; the value of the machine will also be raised in accordance with general price index. Thus general price level adjustment restates financial data by bringing past rupee amounts in line to current rupee purchasing power by general index multiplier.

The preparation of the financial statements according to CPP method, needs understanding of the following steps:

(i) Conversion Factor

CPP method involves the restatement of historical figures at current purchasing power. For this purpose, historical figures must be multiplied by conversion factors and the formula for the calculation of conversion factor is:

$$\text{Conversion Factor} = \frac{\text{Price Index at the date of revaluation}}{\text{Price Index at the date of existing figures}}$$

Illustration 1

A Company purchased a machine on 1.1.2000 for Rs. 60,000. The retail price index on that date stood at 150. You are required to restate the value of the machine according to CPP method on 31.12.2000 when the price index stood at 200.

Solution

$$\text{Conversion Factor} = \frac{\text{Price Index at the date of revaluation}}{\text{Price Index at the date of existing figures}} = \frac{200}{150} = \frac{4}{3}$$

Value of machine on 31 sty December 2000 = Existing Value
 Conversion Factor = Rs. 60,000 x 4 / 3 = Rs. 80,000

In case, one desires to know only the difference between existing value and the converted value of an item, it can directly be known by applying the following formula:

$$\begin{aligned} \text{Difference} &= \text{Existing Value} \times (\text{Conversion Factor} - 1) \\ &= \text{Rs. } 60,000 \times ((4 / 3) - 1) = \text{Rs. } 60,000 \times 1 / 3 \\ &= \text{Rs. } 20,000 \end{aligned}$$

Methods of Accounting for Changing Prices

The following are the generally accepted methods of accounting for price level changes:

1. Current Purchasing Power Method (or) General Purchasing Power Method (CPP or GPP Method)
2. Current Cost Accounting Method (CCA Method)
3. Hybrid Method i.e. mixture of CPP and CCA Methods.

(ii) Mid-Period Conversion

In case of transactions occurring throughout a period, it will be advisable to convert them according to the average index of the period. Such transactions generally include revenue items such as sales and purchases of goods, payment of expenses etc. In case the information regarding average index is not available, it may be calculated by taking the average of the index numbers at the beginning and at the end of the period.

(iii) Monetary and Non-Monetary Items

Monetary items are those assets and liabilities the amount of which are fixed by contract or otherwise, and expressed in units of money, regardless of changes in general price level. These cover cash, bank, bills receivable, bills payable, debtors, creditors, outstanding ex-penses, pre-paid expenses etc., represent specific monetary claim which is receivable or pay-able in specified number of rupees regardless of price level changes. For example, a person lends to a company a sum of Rs. 10,000 on 1st Jan. 2000 and payable on 31st Dec. 2000. The price index on 1st Jan. 2000 was 100 while it is 150 on 31st Dec. 2000. If the creditor is to be compensated for loss in purchasing power on account of increase in the price level, he should be paid:

$$\text{Rs. } 15,000 \times (\text{Rs. } 10,000 \times 150 / 100)$$

However, he will be paid as per contract only a sum of Rs. 10,000. Similarly the company is gaining Rs. 5,000 while the lender is losing Rs. 5,000. Monetary items need no conversion

since they are already stated in current rupees at the end of the period to which the accounts relate.

Contrary to monetary items, non-monetary items denote such assets and liabilities that do not represent specific monetary claims and include land, buildings, machinery, investments, stocks, etc. For example, a land costing Rs. 50,000 in 1998 may sell for Rs. 1,00,000 in 2000. This is due to change in the general price level. The non-monetary items do not carry a fixed value like monetary items. Therefore, under CPP method, all such items are to be restated to represent current general purchasing power.

Monetary assets lose their value during a period of inflation since they are expressed in fixed monetary value: similarly, there is a gain in holding monetary liabilities. Accordingly, the loss by holding monetary assets is offset to a little extent by the gain on monetary liabilities. The difference between the loss and gain indicates the extent to which the concern is exposed to inflation.

Illustration 2

Compute the net monetary result of X Company Ltd. as at 31st Decem-ber 2000. The relevant data are given below:

	1.1.2000	31.12.2000
	Rs.	Rs.
Cash	5,000	10,000
Book Debts	20,000	25,000
Creditors	15,000	20,000
Loan	20,000	20,000
Retail price index numbers:		
1st January	200	
31st December	300	
Average for the year	240	

(B.Com. (Hons) Delhi)

Solution

Statement showing the Net Monetary Result on account of Price Level Changes

	Rs.
Monetary liabilities as on 1st Jan. 2000 should have gone up with increase in price indices (Rs. 35,000 x 1.5)	52,500
Increase in monetary liabilities during 2000, which should have gone up with increase in price indices (Rs. 5,000 x 1.25)	<u>6,250</u>
Monetary liabilities on 31st Dec. 2000 should have stood at:	58,750
However the liabilities on 31 st Dec. 2000 stood at	40,000
Gain on holding of monetary liabilities	
Monetary assets ₹IS on 1st Jan. 2000 should have gone up with increase in price indices (Rs. 25,000 x 1.5)	37,500
	18,750

Increase in monetary assets during 2000 should have gone up with increase in price indices (Rs. 10,000 x 1.25)	12,500
Monetary assets on 31 st Dec. 2000 should have stood at	50,000
However the monetary assets on 31 st Dec. 2000 stood at	35,000
Loss on holding monetary assets	
Net gain on monetary items	<u>15,000</u>
Working Notes: Conversion Factor:	3,750

For items as on 1st Jan. 2000 $300 / 200 = 1.5$

For items arising during 2000 $300 / 240 = 1.25$

Increase in monetary assets and liabilities during 2000:

	as on 1.1.2000 Rs.	as on 31.12.2000 Rs.	Increase during the year Rs.
a. Monetary assets	25,000	35,000	10,000
b. Monetary Liabilities	35,000	40,000	5,000

It is not necessary to find out monetary gain or loss for each item separately.

iv. Cost of Sales and Inventories

Cost of sales and inventory value vary according to cost flow assumptions, i.e., FIFO or LIFO. Under FIFO method cost of sales comprise the entire opening stock and current purchases less closing stock. And closing stock is entirely from current purchases.

Under LIFO method cost of sale comprise current purchases only. However, if the current purchases are less than cost of sales, a part of the opening inventory may also become a part of cost of sales. And closing stock comprises purchases made in the previous year.

The following indices are used under CPP method for restating the historical figures:

- For current purchases: Average index of the year.
- For opening stock: Index at the beginning of the year.
- For purchases of the previous year: Average indices for the year.

Illustration 3

From the following data calculate (a) cost of sales and cost of inventory under CPP method presuming that the firm is following LIFO method for inventory valuation:

	Rs.
Inventory as on 1.1.2000	8,000
Purchases during 2000	48,000
Inventory as on 31.12.2000	12,000
Price Index as on 1.1.2000	100
Price Index as on 31.12.2000	140
Average Price Index for 2000	125

(B. Com. (Hon). Delhi)

Solution

Cost of Sales and Closing Inventory (LIFO)

	Historical Cost	Conversion Factor	Converted Amount under CPP
	Rs.		Rs.
Determination of Profit			
Inventory as on 1.1.2000	8,000	140/100	11,200
Add: Purchases	<u>48,000</u>	140/125	<u>53,760</u>
	56,000		<u>64,960</u>
Less: Closing Inventory (b)			
From opening inventory	8,000	140/100	11,200
From current purchase	4,000	140/125	4,480
Cost of goods sold (a)	44,000		49,280

Under Current Purchasing Power Method, the profit can be determined in two ways:

Net Change Method

This method is based on the normal accounting principle that profit is the change in equity

during an accounting period. In order to determine this change the following steps are taken:

- Opening Balance Sheet prepared under historical cost accounting method is converted into CPP terms as at the end of the year. This is done by application of proper conversion factors to both monetary as well as non-monetary items. Equity share capital is also converted. The difference in the balance sheet is taken as reserves. Alternatively, the equity share capital may not be converted and the difference in balance sheet be taken as equity.
- Closing Balance Sheet prepared under historical cost accounting is also converted. Of course, monetary items are not restated, as explained earlier. The difference between the two sides of the balance sheet is put as reserves after converting the equity capital. Alternatively, the equity capital may not be restated in CPP terms and the balance be taken as equity.
- Profit is equivalent to net change in reserves (where equity capital has also been converted) or net change in equity (where equity capital has not been restated).

Conversion or Restatement of Income Statement Method

In case of this method, the income statement prepared on historical cost basis is restated in CPP terms, generally on the basis:

- Sales and operating expenses are converted at the average rate applicable for the year.
- Cost of sales is converted as per cost flow assumption (FIFO or LIFO) as explained in the preceding pages.
- Fixed assets are converted on the basis of the indices prevailing on the dates they were purchased. The same applies to depreciation.

- Taxes and dividends paid are converted on the basis of indices that were prevalent on the dates they were paid.
- Gain or loss on account of monetary items should be calculated and stated separately in Restated Income Statement to arrive at the overall figure of profit or loss. Illustration 12.4 Following is the comparative Balance Sheet of a Company as on 31st December 1999 and 2000.

	1999	2000
	Rs.	Rs.
Assets:		
Cash and Receivables	2,00,000	2,60,000
Inventories (FIFO)	1,50,000	1,30,000
Land	40,000	40,000
Equipments	2,10,000	2,70,000
Less: Accumulated Depreciation	(Nil)	(24,000)
	6,00,000	6,76,000
Liabilities and Capital:		
Current Liabilities	80,000	90,000
Long term Liabilities	1,00,000	1,16,000
Equity Share Capital (Rs. 10)	1,40,000	1,40,000
Share Premium	2,80,000	2,80,000
	6 00 000	6,67,000

The income statement of the company for the year 2000 disclosed the following information:

Income Statement for the year ended 31st Dec. 2000

Net Sales		8,00,000
Less: Cost of goods sold:		
Opening Inventories (FIFO)	1,50,000	
Purchases (Net)	<u>5,00,000</u>	
	6,50,000	
Less: Closing Inventory (FIFO)	1,30,000	<u>5,20,000</u>
Gross Profit		2,80,000
Less: Operating expenses	96,000	
(excluding depreciation) Depreciation	24,000	<u>1,20,000</u>
Profit before tax		1,60,000
Less: Income Tax		<u>70,000</u>
		90,000
Less: Dividends paid		<u>40,000</u>
Retained Earnings		<u>50,000</u>

Equipment costing Rs. 60,000 was acquired on 1st July 2000 when the general price index was 157.5. The amount of depreciation has been calculated as follows:

10% on Rs 2,10,000	Rs 21,000
10% on Rs. 60,000 (for 6 months)	<u>3,000</u>
	<u>24,000</u>

Sales, purchases, operating expenses (excluding depreciation) took place evenly throughout the year. Inventories are priced according to first-in-first-out method. Goods in closing inventories were acquired evenly throughout the year. The

dividend of Rs. 40,000 was declared and paid at the end of 2000. Income Tax accrued evenly throughout the year.

You are required to recast the above statement taking into account the price level adjustments under CPP method. The general price indices are as follows:

At the end of 1999/beginning of 2000	150
Average for the year 2000	157.5
At the end of the year 2000	163.8

Solution

Conversion factors for restating the figures under CPP Method:

For items to which Price Index in the beginning of 2000 is applicable

$$= 163.8 / 150 = 1.092$$

For items to which Average Index is applicable

$$= 163.8 / 157.5 = 1.04$$

For items to which Price Index at the end of 2000 is applicable

$$= 163.8 / 163.8 = 1.00$$

Income Statement for the year ended 31st Dec. 2000

	As per historical basis Rs.	Conversion factor	Restated under CPP Method Rs.
Sales (A)	8,00,000	1.04	8,32,000
Cost of goods sold:			
Opening inventory	1,50,000	1.092	1,63,800
Add: Purchases	5,00,000	1.040	5,20,000
Goods available for sale	6,50,000		6,83,800
Less: Closing Inventory	1,30,000	1.04	1,35,200
Cost of Goods sold (B)	5,20,000		5,48,600
Gross Profit (C); (A) - (B)	2,80,000		2,83,400
Operating Expenses	96,000	1.04	99,840
Depreciation	24,000	Rs. 21,000 x 1.092 Rs. 3,000 x 1.040)	26,052
Total Operating Expenses (D)	1,20,000		1,25,892
Net Profit before			
General Price level gain or loss (C) - (D)	1,60,000		1,57,508
General price level Loss			4,800
Net Profit after General Price level loss			1,52,708
Less: Income Tax	70,000	1.04	72,800
Net Profit	90,000		79,908
Less: Dividends paid	40,000	1.00	40,000
Retained earnings at the end of 2000	50,000		39,908

Computation of General Price Level Gain or Loss for the year ended 31st Dec. 2000

Net monetary items on 1.1.2000	2,00,000		
Cash and Receivables			
Less: Current liabilities	80,000		
Long Term Liabilities	1,00,000	1,80,000	
		20,000	1.092 21,840
Add: Source of Net monetary items during 2000:			
Sales	<u>8,00,000</u>	1.04	<u>8,32,000</u>
Total Sources	8,20,000		8,53,840
Uses of net monetary items during 2000:			
Purchases	5,00,000	1.04	5,20,000
Operating expenses	96,000	1.04	99,840
Income Tax	70,000	1.04	72,800
Dividends Paid	40,000	1.04	40,000
Purchase of Equipments	<u>60,000</u>	1.04	<u>62,400</u>
Total uses	7,66,000		7,95,040
Net monetary items as should have been if there were no general price levels gain or loss			
Net monetary items actually existing as on 31.12.2000:	2,60,000		
Cash and Receivables			
Less: Current liabilities	90,000		
Long Term Liabilities	<u>1,16,000</u>	2,06,000	54,000
General Price level loss during 2000 (Rs. 58,800 - Rs. 54,000)			4,800

Comparative Balance Sheet

	As on 31st Dec. 1999			As on 31st Dec. 2000		
	Historical	Conversion	CPP	Historical	Conversion	CPP Method
	Cost Basis	Factor	Method	Cost.	Factor	
				Basis		
	Rs.		Rs.	Rs.		Rs.
Assets:						
Cash and	2,00,000	1.092	2,18,400	2,60,000	-	2,60,000
Receivables						
Inventories	1,50,000	1.092	1,63,800	1,30,000	1.04	1,35,200
Land	40,000	1.092	43,680	40,000	1.092	43,680
Equipment	2,10,000	1.092	2,29,320	2,70,000	1.092	2,91,720
Less Accumulated	-			(24,000)	(21,000 x	
Depreciation					1.092+	(26,052)
					3,000 x	
					1.04)	
	6,00,000	-	6,55,200	6,76,000	-	7,04,548
Liabilities and Capital:						
Current Liabilities	80,000	1.092	87,360	90,000	-	90,000
Long term	1,00,000	1.092	1,09,200	1,16,000	-	1,16,000
Liabilities						
Equity Share Capital	1,40,000	1.092	1,52,880	1,40,000	1.092	1,52,880
Share Premium	2,80,000	1.092	3,05,760	2,80,000	1.092	3,05,760
Retained Earnings	-			50,000	'	39,908
	6,00,000		6,55,200	6,76,000		7,04,548

The net profit for 1991 will be the excess of Reserves in 1991 over that in 1990 as stated in CPP terms as shown below:

	Rs.
Assets in CPP terms as on 31.12.2000	7,04,548
Add: Dividends paid on 31.12.2000	<u>40,000</u>
	7,44,548
Less: Liabilities in CPP terms as on 31.12.2000	<u>6,64,640</u>
Reserves as on 31.12.2000	79,908
Less: Reserves (Opening)	<u>Nil</u>
Net Profit for 2000 (after tax but before dividends)	79,908

Current Cost Accounting Method

The current cost accounting method is an alternative to the current purchasing power method. Price changes may be general or specific. Changes in the general level of prices which occur as a result of a change in the value of the monetary unit, are measured by index numbers. Specific price changes occur if prices of a particular asset held change without any general price movements. Under this method, assets are valued at current cost. Current cost is the cost at which the assets can be replaced as on a date. While the current purchasing power method is known as the general price level approach, the current cost accounting method is known as the specific price level approach or replacement cost accounting.

The Sandilands Committee of U.K has suggested this method. The Sandilands Committee published its report in September 1975 recommending the adoption of current cost accounting for dealing with the problem of inflation accounting. In this method, historic values of items are not taken into account; rather current values of individual items are taken as the basis for preparing profit and loss account and balance sheet. Thus items are not adjusted as a result of the change in the general price level as they are adjusted in the CPP method.

Features of CCA System

The following are the important features of the CCA Method:

- Fixed Assets are to be shown in the Balance Sheet at their value to the business and not at historical cost as reduced by depreciation. That is assets are shown in terms of what such assets would currently cost.
- Similarly, inventories are shown in the Balance Sheet at their value prevailing on the date of the Balance Sheet. These are not shown at cost or market price whichever is lower, as in case of historical accounting.
- Depreciation is to be computed on the current value of fixed assets.
- The cost of goods sold during the year has to be ascertained on the basis of prices prevailing at the date of consumption and not at the date of purchase.

- e. The difference between the current values and the depreciated original cost of fixed assets and of stocks, the increased requirements for monetary working capital and the under provision of depreciation in the past years may be adjusted through Revaluation Reserve Account.
- f. The fixed assets are shown at their “value to the business”. The “value to the business” can be defined in one of the following three ways:
 - i. Replacement cost is the estimated cost of acquiring new asset of the same productive capacity at current prices adjusted for estimated depreciation since acquisition.
 - ii. Net Realisable value is the estimated selling price in the ordinary course of business less reasonably predictable costs of completion and disposal.
 - iii. Economic value is the sum of the discounted future cash flows expected from the use of an asset during its useful life.

Current Cost Operating Profit

Three main adjustments to trading account, calculated on the historical cost basis before interest, are required to arrive at current cost operating profit. These are called the Depreciation Adjustment, Cost of Sales Adjustment and Monetary Working Capital Adjustments.

Depreciation Adjustment

The depreciation adjustment allows for the impact of price changes when determining the charge against revenue for the part of fixed assets consumed in the period. It is the difference between the value to the business of part of fixed assets consumed during the accounting period and the amount of depreciation charged on historical cost basis. The resulting total depreciation charge thus represents the value to the business of the part of fixed assets consumed in earning the revenue of the period.

Illustration 5

A plant was purchased on 1st Jan. 1996 for Rs. 2,00,000 and is depreciated at 10% p.a. on straight line basis. By the end of 2000, the price of the same went upto Rs. 4,00,000. Show how the plant account would appear in the Balance Sheet as at 31st Dec. 2000.

Solution

	Historical Cost Rs.	Current Cost Rs.
Plant	2,00,000	4,00,000
Less: Depreciation for five years	<u>1,00,000</u>	<u>2,00,000</u>
	<u>1,00,000</u>	<u>2,00,000</u>

The increase in the value *i.e.* Rs. 2,00,000 less increased depreciation *i.e.* Rs. 1,00,000 = Rs.1,00,000 would be shown on the liability side of the Balance Sheet as Current Cost Reserve.

Cost of Sales Adjustment

The important principle to be remembered is that current costs must be matched with current revenues. As far as sales is concerned, it needs no adjustment as it is a current revenue. One of the features of current cost accounting is to show inventories

in the Balance Sheet on the basis of their value to the business, and not at cost or market price, whichever is lower. If there are stocks, certain adjustment are to be made to cost of sales. If there are no stocks, then cost of sales will comprise only current purchases and cost of sales adjustment is not necessary.

Illustration 6

From the following information calculate the Cost of Sales under Historical and Current Cost Accounting System:

Opening Stock of materials on 1.1.2000	30,000
(1,000 kilos @ Rs 30 per kilo)	Nil
Purchases during the year 2000	Nil
Materials consumed during the year 2000	800 kilograms
Price of materials on 1.1.2000	Rs 35 per kilo
Average price during 2000	Rs 40 per kilo
Price of materials on 31.12.2000	Rs 45 per kilo

Solution

Historical Cost Accounting system:

Cost of Sales (800 kilos x Rs 30)	Rs 24,000
Closing Stock (200 kilos x Rs 30)	Rs 6,000

Current Cost Accounting System:

Cost of Sales (800 kilos x Rs 40)	Rs 32,000
Closing Stock (200 kilos x Rs 45)	Rs 9,000

The increase in stock of Rs 3,000 in CCA method over Historical Cost basis will be credited to Current Cost Account Reserve. The closing stock in Balance Sheet will be shown at Rs. 9,000. The cost of Sales Adjustment amounting to Rs. 8,000 (Rs. 32,000 - Rs. 24,000) will be charged to Profit and Loss Account and credited to Current Cost Accounting Reserve.

Monetary Working Capital Adjustment

Most businesses have other working capital besides stock involved in their day-to-day operating activities. For example, when sales are made on credit the business has funds tied up in debtors. Conversely, if the suppliers of goods and services allow a period of credit, the amount of funds needed to support working capital is reduced. This monetary working capital is an integral part of the net operating assets of the business. Thus, the standard provides for an adjustment in respect of monetary working capital when determining current cost operating profit. This adjustment should represent the amount of additional (or reduced) finance needed for monetary working capital as a result of changes in the input prices of goods and services used and financed by the business.

In a business, which holds stocks, the monetary working capital adjustment (MWCA) complements the COSA and together they allow for the impact of price changes on the total amount of working capital used by the business in its day-to-day operations. For example, the relationship between the MWCA made in respect of trade debtors and trade creditors and the COSA is as follows:

- a. When sales are made on credit the business has to finance the changes in its input prices until the sale results in a receipt of cash. The part of the MWCA related to trade debtors, in effect, extends the COSA to allow for this; and

b. Conversely, when materials and services are purchased from suppliers who offer trade credit, price changes are financed by the supplier during the credit period. To this extent extra funds do not have to be found by the business and this reduces the need for a COSA and in some cases for a MWCA on debtors. The part of the MWCA related to trade creditors reflects this reduction.

Gearing Adjustment

The net operating assets shown in the Balance Sheet have usually been financed partly by borrowing and the effect of this is reflected by means of a gearing adjustment in arriving at current cost profit attributable to shareholders. No gearing adjustment arises where a company is wholly financed by shareholders' capital. While repayment rights on borrowing are normally fixed in monetary amount, the proportion of net operating assets so financed increases or decreases in value to the business. Thus, when these assets have been realized, either by sale or use in the business, repayment of borrowing could be made so long as the proceeds are not less than the historical cost of those assets.

Illustration 7

From the data given below calculate the gearing adjustment required under CCA method:

Current Cost	Opening	Closing
	Rs.	Rs.
Convertible Debentures	1,00,000	1,20,000
Bank Overdraft	60,000	80,000
Cash	10,000	20,000
Paid up Share Capital	1,50,000	2,00,000
Reserves	30,000	50,000
COSA	Rs. 20,000	
MWCA	15,000	
Depreciation	<u>5,000</u>	
	40,000	

Solution

Calculation of net borrowing:	Opening	Closing
	Rs.	Rs.
Convertible Debentures	1,00,000	1,20,000
Bank Overdraft	<u>60,000</u>	<u>80,000</u>
Total of the borrowing	1,60,000	2,00,000
Less: Cash which does not enter MWCA	<u>10,000</u>	<u>20,000</u>
Net borrowings (L)	<u>1,50,000</u>	<u>1,80,000</u>
Shareholders funds (S)	<u>1,80,000</u>	<u>2,50,000</u>
Total of borrowings and shareholders funds (L + S)	<u>3,30,000</u>	4,30,000

The gearing adjustment is calculated by the application of the formula:

$$\text{Gearing Adjustment} = L / (L + S) \times A$$

L = Average net borrowing

S = Average shareholders interest

A = Total of the current cost adjustments.

The gearing equation is = $(1,50,000 + 1,80,000) / (3,30,000 + 4,30,000) = 43.5\%$

$$\text{Gearing Adjustment} = 43.5\% \times \text{Rs. } 40,000 = \text{Rs. } 17,400$$

Merits of Inflation Account

1. Since assets are shown at current values, Balance Sheet exhibits a fair view of the financial position of a firm.
2. Depreciation is calculated on the value of assets to the business and not on their historical cost - a correct method. It facilitates easy replacement.
3. Profit and Loss Account will not overstate business income.
4. Inflation accounting shows current profit based on current prices.
5. Profit or loss is determined by matching the cost and the revenue at current values, which are comparable - a realistic assessment of performance.
6. Financial ratios based on figures, adjusted to current value, are more meaningful.
7. Inflation accounting gives correct information, based on current price to the workers and shareholders. In the absence of this, workers may claim for higher wages and shareholders too claim for higher dividends.

Demerits

1. The system is not acceptable to Income tax authorities.
2. Too much calculations make complications.
3. Changes in prices are a never ending process.
4. The amount of depreciation will be lower in times of deflation.
5. The profit calculated on the system of price level accounting may not be a realistic profit.

Miscellaneous

Illustration: 12.8

Mr. X purchased a machine in 1991 for Rs. 1,00,000 when the general price index was 180. He sold the machine in 2000 for Rs. 1,65,000 when the general index was 270. Calculate the profit or loss on the sale of the machine, keeping aside the price level changes. (B. Com. Madurai)

Solution

Purchase price of the machine	Rs. 1,00,000 (1991)
Sales price in 2000	<u>Rs. 1,65,000 (2000)</u>
Profit	Rs. 65,000

The converted value of the machine at 2000 = $\text{Rs. } 1,00,000 \times 270 / 180 = \text{Rs. } 1,50,000$

Therefore, Profit is = $\text{Rs. } 1,60,000 - \text{Rs. } 1,50,000 = \text{Rs. } 15,000$

Illustration 12.9

A company has the following transactions at the given dates and price indices for the first quarter of 2000.

		Price Index
Opening Balance (Jan. 1)	Rs. 6,000	100
Cash Sale (Feb. 1)	Rs. 17,500	105
Payment to Creditors (Mar. 1)	Rs. 12,000	108
Cash Purchase (Mar. 1)	Rs. 2,000	108
Payment of Expenses (Mar. 31)	Rs. 2,000	110
Closing Balance (Mar. 31)	Rs. 7,500	110

(B. Com. Madras)

Solution

Statement of Cash

	Conventional Accounting	Conversion Factor	Converted Values
	Rs.		Rs.
Opening Balance	6,000	110/100	6,600
Add: Cash Sales	17,500	110/105	18,333
(A)	23,500		24,933
Less: Payments:			
Creditors	12,000	110/108	11,481
Purchases	2,000	110/108	2,037
Expenses	2,000	110/110	2,000
(B)	16,000		16,259
Closing Balance	7,500		8,674
(A) - (B)			

Expected Balance	Rs. 8,674
Actual Balance	Rs. 7,500
Monetary Loss:	Rs. 1,174

Illustration 10

The information given below relates to monetary account of Ram and Company. Compute the general price level of gain or loss :

	As on 1.1.2000	As on 31.12.2000
	Rs.	Rs.
Monetary Assets	80,000	1,00,000
Monetary Liabilities	1,00,000	1,00,000
Retail Price Index	200	300

Average Index for the year = 240

(M. Com. Madras)

Solution

- a. Computation of Monetary gain on account of holding monetary liabilities: Converted value of Monetary liabilities on 1.1.2000 :

$$\text{Rs. } 1,00,000 \times \frac{200}{300} = \text{Rs. } 1,50,000$$

Less: Historical value of liabilities on 31.12.2000	Rs. 1,00,000
Gain on holding monetary liabilities:	50,000
b. Computation of Monetary loss on account of holding of monetary assets:	
Converted value of monetary assets on 1.1.2000 = Rs. 80,000 x 300 / 200 = Rs. 1,20,000	
Add: Converted value of monetary assets = Rs. 20,000 x 300 / 240 =	Rs. 25,000
	1,45,000

Less: Historical value of monetary assets on 31.12.2000

$$\frac{1,00,000}{45,000}$$

- e. Net Monetary Gain i.e. (a) - (b)

That is, Rs. 50,000
Rs. 45,000
Rs. 5,000

Illustration 12.11

A summary of Balance Sheet of Sun Ltd is given below:

Cash and Accounts Receivable	Rs. 13,00,000
Plant and machinery (Net of Depreciation)	Rs. 14,00,000
Current Debts	Rs. 27,00,000
Long-term Debts	Rs. 6,00,000
Owner's Equities'	Rs. 10,00,000
	Rs. 11,00,000
	Rs. 27,00,000

The current price index is 280. The plant and machinery and Long-term debt were acquired when the price index was at 180.

You are required to revise the summary Balance sheet to restate assets and equities in terms of current rupees. How will you treat the monetary gain or loss, if any?

(M. Com. Delhi)

Solution

Balance Sheet

Liabilities	Historical	Conversion	Current	Assets	Historical	Conversion	Current
	Values	Factor	Values		values	Factor	Values
	Rs.		Rs.		Rs,		Rs.
Current Debts	6,00,000	280/280	6,00,000	Cash & Accounts Receivable	\3,00,000	280/280	13,00,000
Debts Long-term	10,00,000	280/280	10,00,000				
Owner's Equity	11.00,000	280/280	17,11,111	Plant & machinery	14.00,000	280/180	21.77.778
Gain (balancing figure)	-	-	1,66,667				
	27,00,000		34,77,778		27,00,000		34,77,778

Monetary gain is to be added to owner's equity. Rs. 17,11,111 + Rs. 1,66,667 = Rs.18,77,778

Theoretical Questions

1. Discuss the shortcomings of conventional accounting based on historical cost during inflation.
2. Distinguish between holding gain and operating gain.
3. What do you mean by Inflation Accounting?
4. What are the limitations of historical accounting in a period of inflation?

Practical Problems

1. Mr. X purchased a piece of land for Rs. 40,000 when the general price index was 120. Five years later he sold this piece of land for Rs. 60,000 when the price index stood at 200. Find out the profit or loss on this transaction.

[Ans : Loss Rs. 6,667]

2. A company had the following monetary items on 1st January.

	Rs.		Rs.
Debtors	50,000	Bills Payable	12,000
Bills Receivable	15,000	Creditors	23,000
Cash	<u>15,000</u>		
	80,000		35,000

The transactions affecting monetary items during the years were:

- a. Sales of Rs. 1,98,000 made evenly throughout the year.
- b. Purchases of goods of Rs. 1,32,000 made evenly during the year.
- c. Operating expenses of Rs. 33,000 were incurred evenly throughout the year. (d) One machine was sold for Rs. 24,000 on 1st July
- e. Dividend of Rs. 13,000 declared on 31st Dec.

The general price index was as follows:

On 1st January	90
----------------	----

Average for the year	110
On 1st July	120
On 31st December	120

You are required to compute the general purchasing power gain or loss for the year stated in terms of the current year and rupee.

[Ans: Purchasing power loss Rs 18,000]

3. Following information has been extracted from the financial statements of a company.

Plant and machinery	Rs 36,000	
Less: Accumulated Depreciation	<u>6,000</u>	30,000
Buildings	1,00,000	
Less: Accumulated depreciation	40,000	60,000
		90,000

The plant was purchased when the general price index was 120 and building was acquired when it was 100. Restate the amount of the assets when the present price index is 150. [Arts. Plant & Machinery Rs 37,500; Buildings 90,000]

4. A Company held shares in X Company which it bought for Rs 10,000 in 1996 when index of the general level of price stood at 110. At the end of 1999, the market price of the shares were Rs 8,000 and the index 132. At the end of 2000, the market price of the shares was Rs. 9,000 and index 145.2.
 - i. Calculate the CPP value of the shares at the end of 1999 and 2000.
 - ii. Under CPP accounting what gain or loss would be shown in respect of the shares? (iii) What, in fact, was the gain or loss of purchasing power in respect of the shares during 2000.

(M. Com. Delhi)

- [Ans. (i) CPP value; 1999; Rs 12,000 and 2000 : Rs 13,200
 (ii) 1999 (Loss) Rs 4,000 2000 Rs 4,200
 (iii) Gain Rs 200 in terms of 2000]

LESSON 36 :

ACTIVITY BASED COSTING (ABC)

Topics Covered

Introduction, Emergence of ABC, Design and implementation of ABC, Implications of ABC

Objectives

Upon completion of this Lesson, you should be able to:

- Outline the emerging concept of ABC
- Describe the benefits of ABC
- Describe the implementation and implications of ABC

Introduction

In this lesson we look at accounting for overhead costs. We saw many of the aspects of what we called traditional overhead analysis and then went on to look at more modern aspects of overhead cost analysis. In this chapter we will look in detail at activity-based costing (ABC) and activity-based costing management (ABCM). We know ABC is not new. We see in that ABC has been discussed under different names for at least two decades now. We also appreciated that the concepts on which ABC is based are probably centuries old. Nevertheless, ABC has led to a change of mindset for many management accountants. In our through several cases where the management accrument went through the equivalent of the conversion on the road to Damascus. There are a few review points that are worthwhile looking at before moving forward with the ABC debate.

ABC does not solve all of the management accountant's overhead assignment problems: 'Costs may still require some element of arbitrary apportionment, for example, where they represent resources shared by more than one product and where joint ness exists in the use of cost drivers' (Mitchell 1994: 266). Mitchell goes on to discuss, however, why such assignments are not necessarily a bad thing allocation can provide a means of rationing shared resources. Overhead rates represent a set of taxes on the use of these resources . . . cost allocation can reduce prerequisite [sic; surely perquisite?] consumption by managers. ABC can contribute directly here by strengthening the monitoring capacity of the costing system' through the visibility which it brings to the 'hidden factory' of overhead services. ABC also provides a direct control link between providers of activities and the users of their output. The existence of cost driver rates provides the mechanism for the cross charging of costs which will initiate the type of monitoring behavior described above.

This view, as given by Mitchell, probably clarifies many to the accusations that ABC is not wholly new. The assignment of overheads still takes place, first, because it is necessary for ABC to work, and secondly, because it does provide some useful functions, such as we see from Mitchell's work.

Background to ABC: the generation of reliable cost information

There are three key areas of ABC:

1. Product cost differentiation.

2. Activities and their cost drivers.

3. Identification of non-value added cost improvement opportunities

In the early days of the history to cost accounting, from the middle of the nineteenth century to the mid-1970s, management accountants who needed to would happily allocate and apportion overhead costs on bases that were considered fair at the time. Studies of cost accounting techniques from this period will reveal that the kind of apportionment bases we discussed in Chapter 6 were widely applied. Several studies have shown that organizations were quite happy to recover their overheads by using a single plant-wide overhead absorption rate. A survey reported in 1988 the in the United States almost one-third of companies canvassed used a single plant-wide overhead absorption rate. A similar study of UK management accounting practice revealed that small business organizations tended to *use* a single plant-wide overhead absorption rate, as did some larger organizations with high overhead costs.

The product and service costs derived from traditional allocation and apporportionment methods were used, even though they may have been inappropriate, for a number of reasons:

- Overheads were relatively unimportant, as a proportion of total costs.
- When organizations were labour intensive, rather than capital intensive, the direct labour hour rate basis of apportionment of overheads was a sufficiently appropriate method to use.
- Before the advent of computerization and office automation, ABC could only have meant an even more massive bureaucracy than before. . .
- All organizations were behaving the same way, so it was unnecessary to develop such Innovations as ABC.
- Competition, if it existed, was relatively regional, not global, so detailed cost knowledge was not vitally important.
- Organizations were much less diversified than they are now, so there was little impetus to increase management s cost awareness.

Whilst these reasons will not be applicable to all organizations, they do indicate the nature of the need for ABC. In an increasingly automated, globally competitive, environment an organization's management must have reliable cost information: 'Unreliable cost information is an open invitation to disaster

Reliable cost information is now considered by many to help with an organization's competitive advantage. In the same way that the application of information and computer technology has given many organizations a competitive advantage, the reliability of cost information also gives an organization a leading edge over other organizations whose cost information is not so reliable. The organisation that depends only on

unreliable cost information must be in a weaker position than the organisation that has reliable cost information. If cost information is unreliable, it is also difficult to control. There is evidence to suggest that, in the case of the automobile manufacturing industry, only 15% of direct costs are controllable by management; even variable costs are not controllable in the short term. However, comparable overhead costs amount to 27% of total product costs.

In the service sector of an economy, of course, the gains to be made can be significantly greater. This will be true when overhead costs account for as much as 60%, or more, of total costs. In the case of overheads, therefore, there is much more scope to influence total costs through monitoring and controlling overhead costs than there is in trying to control the direct costs. ABC is, rightly, concerned largely with monitoring and controlling overhead costs.

The Benefits of 'ABC: Diversity and Complexity

A simple example will show how ABC generates more accurate product and service costs. ABC recognizes that it is activities that cause costs to change, and that the cost of these activities should be based on such activities. For example, this means that if a forklift truck is being used to move raw materials from one area of a warehouse to another, the costs of using that forklift truck must be indemnified with such movement, and not simply calculated on an arbitrary basis. Identifying costs with their activity bases means more than ever that the management accountant has to understand the nature of the production and service process, whether his or her organisation is a manufacturing or service organisation.

Worked Example

Product Zed passes through a variety of stages when being converted from raw materials to finished product. Throughout the production process, 4 direct labour hours are needed to carry out the conversion process in making 50 units; and quality control will spend 30 minutes on attempting to ensure that the product meets the strict requirements of the organization's customers. The quality control overheads are absorbed at the rate of either 50 per quality control hour or 65 per direct labour hour.

Required

Using the direct labour hour basis (conventional costing) and the ABC method, determine the overhead costs of the product. We need, first, to determine the activity from which the quality control overheads are derived. Under the conventional costing system, the implication here is that the direct labour hour basis would have been used to recover (absorb) the quality control overheads. Using ABC, we would say that the reason for the existence of the quality control overheads is the act of quality control: that is, the need to check to ensure that what the customer gets is what he or she wants. In this case, the activity base of quality control is the time spent on controlling quality. The solution to this problem is therefore as follows:

	Traditional Costing	ABC
	Direct labour	Quality control
	Hour basis	Hour basis
Over heads	4 dlh x 65 per dlh	½ qch x 50 per qch
Absorbed	=260	= 25
Overheads		
Absorbed	260 + 50 units	25 , 50 units
	= 5.2	= 0.5

Dlh = direct labour hours; a

Chi = quality control hours.)

A simplified example, but it does illustrate the possible distortion that the conventional costing system can lead to. If an inappropriate overhead absorption basis is used to calculate product or service costs, the costs reported will be unreliable. Using ABC, we have an overhead cost of 0.50 per unit of output rather than the 5.20 per unit under the traditional cost accounting system. We should be able to agree that ABC is giving us the more realistic view of the costs. The realistic view comes from using the correct cost driver; that is, we have identified the reason behind the existence of the activity being undertaken (quality control). The activity is driving the cost. Without the cost driver, there would be no cost to worry about. A cost driver is

'An activity, which generates cost' (CIMA 1991). The conclusion drawn from a complex situation is that costs vary with the range of items produced, not with the volume of items produced. Cooper and Kaplan give the following example to illustrate this point:

Plant A	Plant B
Makes 100,000 of A	Makes 1 million of A + 900,000 of 199 similar products
Simple environment, Few set-ups, Stock movements, etc.	Complex: 200 products, frequent Set-ups, stock movements, etc.

The reasoning here is quite straightforward, in that when 100,000 of the product are made, together with the other 199 products, the infrastructure required to manage this diverse range, may be more complex than in the situation where only one product is made. The diversity of 200 products will involve many machine setups and startups, stock movements, supervision and inspection problems, and so on. They problem however, that a traditional cost accounting view does not appreciate the significance of diversity. For example, as Cooper and Kaplan point out, if a product with a production run of 800 units is made, it will be allocated 0.08% of the production overheads (assuming a units of output overhead absorption rate), whereas a run of 100,000 units of a product would be allocated the same proportion of production overheads, 100/0 in this example. Relatively, both the 800 units and the 100,000 units are being charged with the same overheads, but they are not driving the overheads equally. The benefits of ABC, then, are that it addresses the issues of where costs come from, any doing so, it also addresses the issue of diversity and complexity of the production/service structure.

Introduced a meriting example into the discussion on production complexities. When discussing complexity in the automobile industry the question was asked: ‘how long would it take in the minimum efficient scale assembly plant to produce one of every possible end unit combinations for the automobile company?’ The answers were:

Honda	45 minutes
Toyota	1 day
Chrysler	220,000 years
General Motors	7,800,000,000,000,000 years
	36 trillion years for anyone model.
	There were 200 different models under production at the time.

Shank and Govindarajan (ibid.) record that: ‘whatever advantages GM enjoyed in economies of scale, technology, experience and vertical scope, they more than lost in the. Diseconomies of product line complexity.’ The minimum efficient scale assembly plant they refer to produces one car per minute for 16 hours a day, 250 days a year.

As a side issue, to some extent, an interesting debate took place over the period September 1990 to March 1991 between two British based academics, Eiper and Walleye, and Cooper, one of the leaders in ABC development. Although the debate became a little personalized at one stage, it did raise the issue of whether ABC does indeed succeed as a result of costs resulting from activities. Piper and Walley (1990) maintain. That it is decisions and not activities that cause costs. They opened the debate in September 1990 and Cooper (1990)

Replied in the following November. There and Walley (1991) had the final word in March of the following year. A reading of the three articles will help with the understanding of the usefulness of ABC and ABCM.

Why Organizations use ABC Systems

Bailey (1991) carried out a survey into the implementation of ABC by ten UK companies. This survey gives a reasonable insight into how ABC can or cannot help with the issues we have been discussing. Although Bailey did report problems with ABC implementation, he concluded that respondents felt the benefits outweighed the problems (see Table 7.1).

Benefits	% of sample	Probably leading to:
Greater accuracy in product costing	100	Improved pricing, make –or– buy decision
Greater involvement of production managers	90	Improvement cost awareness, feeling of ownership, interaction.
Improved management	70	Greater awareness of departmental managers, better product design, strategy improved, management control, and quality management

Bailey also reported on the perceived benefits at ABC (see Table 7.2).

	Motivation to consider ABC (%)	Resulting benefits reported (%)
More accurate product costing	80	100
Better management information	50	70

Having set the scene for ABC, we can now turn our attention to a more detailed view of How ABC works overall. 1

ABC: Design and Implementation

Cooper (1990) outlined five steps that need to be identified for an ABC system:

1. Aggregate actions into activities.
2. Report the cost of activities.
- 3 Identify activity centers.
4. Select first-stage cost drivers.
5. Select second-stage cost drivers.

An action is any process that we might carry out - switching on machinery, securing a wheel to a car, programming a computer, are all actions. Actions become activities when we take a series of actions and make them into a complete whole, such as a complete job or a complete stage of a job. Similarly, the aggregation of activities leads to their being centres. An activity centre is a segment of an organisation or production process for which management wants to report the cost of activities performed separately.

Cost drivers are, as we agreed above, the activities that determine, or help us to determine, why a cost arose. Most of the ABC literature shows that cost drivers are found in two stages of the ABC process:

1. First-stage cost drivers trace the costs of inputs into cost pools in each activity centre. Each cost pool represents an activity performed in that centre
2. Second-stage cost drivers trace the costs of cost pools into product costs. Keys (1994: 34), however, advocates a three-stage ABC process:

Stage 1: assign the cost to the year in which the cost produces benefit.

Stage 2: assign the current year’s cost to activities (ABC system) or departments (traditional system).

Stage 3: assign each activity cost or each department cost to products or customers.

He makes the indisputable argument that if this stage 1 procedure is not followed properly: ‘inaccuracy of assigning in one stage tends to be cumulative in later stages’ (ibid.).

The kinds of costs that Keys sees as often being attributed to the wrong year include management salaries, depreciation, planning and designing new products, start-up costs of new methods, and training costs. Given the concepts and conventions of financial accounting, we should realize that there is nothing new in what Keys is saying; the matching or accruals concept takes care of this assignment problem. However, Keys

is probably the first writer to overtly link matching expenditure to benefit received in the context of ABC. Whether we accept that ABC is a two-stage or three-stage process, there are further fundamental questions that need resolution - problems facing designers of ABC systems.

Some of the problems facing the designers of an ABC system in an organisation are:

- How many activity centres should there be?
- How many cost pools should there be?
- Which cost drivers should we use?

As we should expect with a system as product- and organisation-specific as ABC, there are no ready solutions to these questions. General guidance, however, says that the solutions to these questions depend on such matters as:

- Product diversity
- The relative costs of the activities aggregated. Batch size diversity
- The ease of obtaining cost derived data
- The behavior induced by the cost driver.

Each of these matters will vary according to the organisation being dealt with. The solution for my organisation may well be entirely different to the solution for your organisation.

There is no simple, general, guidance that can be given to answer the question of how many activity centres and cost pools an organisation should install within its ABC system. However, as far as possible, common sense should prevail! Taking the definition of an activity centre literally might lead us to draw the conclusion that our organisation has 200 activity centres. Imagine the bureaucracy surrounding 200 activity centres, with each centre subdivided into one or more cost pools. Most organizations installing an ABC system have to arrive at a compromise - the trade-off between accuracy and precision. Accuracy means providing information that is acceptably legitimate - it may be 900/0 of the truth. Precision means that the information is 100% legitimate.

Setting up a realistic ABC system and accepting the accuracy/precision trade-off, activity centres will often consist of several activity areas being added together or aggregated. Rather than 200 activity centres, therefore, there will only be, say, 30. Similarly with cost pools. There is no theoretical answer or formula that will allow us to derive how many cost pools an organisation should have. The management accountant must have an eye for a sensible level of aggregation in his or her acceptance of the trade-off between accuracy and precision, in the same way that he or she has for activity centres. There is a problem with the aggregation of activities into activity centres, of course, namely, that the number of activities is potentially infinitely large across an organisation. To overcome this problem, many actions will need to be aggregated. Such aggregations may be so arbitrary that they tend to lead to the arbitrary allocation of overheads. If this becomes the case ABC may lose many of its benefits. These problems are common to both traditional and activity-based costing.

Cost drivers tell the management accountant why an activity has been carried out, and the level of effort required to carry out that activity. Examples of cost drivers include:

- The number of production runs;
- The number of goods received transactions;
- The number of quality control inspections;
- The number of patients admitted hospital;
- The number of punctures repairs

Although we know what a cost driver is, we still have the difficulty of agreeing precisely how to choose one. In some cases, a cost driver will suggest it very easily. In the case of a puncture repairing service, the number of punctured tires repaired will almost certainly be one of the cost drivers (if not the only one). In other cases, it may not be so obvious at all. In such circumstances, the management accountant will have to liaise with colleagues and collect perhaps several series of data for analysis in order to determine what the driver should be. This means that, in some cases, there will be instances where direct labour hours; view of cost accounting in any case still has, and will continue to have, a significant impact on a management accountant's view on life. The other aspect of traditional cost accounting methods is that they will continue to be of direct relevance to non-financial managers too.

How ABC works

We are now able to discuss the way that ABC works in reality. The best way to see how ABC works is to consider an example that compares the traditional cost accounting approach with the ABC approach. When the necessary calculations are completed, we will be able to make a much better judgment of the appropriateness of ABC in any given situation.

Worked Example

This example is very similar to the example in Drury's (1989) article. Although it is lengthy both to read and to work through, it does illustrate many of the points that need to be appreciated for the work of this chapter and subject. There are some significant differences between Drury's explanations and the ones given here. The information in provides details of the costs, volume and transaction cost drivers for a period in respect of XYZ Ltd.

Table Details of the costs, volume and transaction cost drivers for a period for XYZ Ltd.				
Product	A	B	0	C
Sales and Production (Units)	90,000	30,000	15,000	135,000
Raw materials Usage (unit)	10.00	7.0	14.0	1,320,000
Direct materials Cost (£)	30.0	40.0	15.0	4,125,000
Direct labour hour	2.5	3.0	1.5	337,500
Machine hours	5.0	3.0	7.5	652,500
Direct labour cost (£)	20.0	30.0	10.0	2,850,000
Number of production runs	5.0	10.0	50.0	65
Number of deliveries	18.0	7.0	50.0	75
Number of production orders	50.0	70.0	700.0	820
Overhead costs				£
Setup				75,000
Machines				1,000,000
Receiving				900,000
Packing				650,000
Engineering				750,000
				3,375,000

The Implications of the ABC Method

Most writers on ABC, when discussing the advantages of the system, record the following as the principal advantages:

- Product cost accuracy is enhanced.
- Cost data is more comprehensive.
- Greater information is provided for managerial decision-making.

These advantages should be appreciated when we consider that ABC attempts to address all to the shortfalls that we addressed in Chapter 6. Management Accountants are often accused of not knowing what is happening in their organizations in terms of materials flow, storage, production systems and so forth. This has to be one of the most important advantages of the implementation of systems such as ABC, namely, that the management accountant is working with his or her colleagues to. Provide them with what they need. Looking at the example we have just worked through in the previous section, there are serious implications for the organisation involved under each of the three advantages listed above. This is so because, for example, product A now seems to have a true unit cost of £62.89 per unit as opposed to the traditionally calculated £105 per unit; similarly, product C's cost has gone from £45 to £139.74 per unit. Similarly, King *ET al.*'S (1994: 149-50) study into ABC implementation in the NHS in the United Kingdom showed that information generated through ABC can help hospital management in a number of ways:

- Measuring and improving departmental efficiency.
- Promoting activity provider, activity receiver links.
- Managing costs and strategic planning decision making

ABC: Design and Implementation

Assuming that selling prices are based on costs, what does the organisation in our example do now? Does it reduce the prices of product A and increase the price of product C? A simplistic view says that they should, of course, but the evidence coming out of research into ABC practice is that even though costs are being re-evaluated, prices sometimes do not change - not in the short to medium term at least. The reason why prices are not being changed can be complicated, and include such factors as marketing policies, competitors maintaining their prices at the 'old' levels, and so on. There is, perhaps, a more serious aspect to the resistance to changing selling prices that is discussed by Bhimani and Piggott (1992: 130):

Sales managers did not understand or appreciate the reasons for product cost changes since they had not taken part in developing the ABC system. Their resentment nevertheless tended to diminish once the logic of ABC was explained and the rationale for cost changes indicated.

In order to convince one's colleagues to the worth of one's work, one needs to educate and involve him or her: that is, participation. Along the lines of much of modern management practice and thought, even the management accountant is not always and only concerned with things financial. Mitchell (1994: 272) states:

In addition to new cost data, ABC generates sets of non-financial measures through the cost driver data, which is needed for its implementation in output costing. They typically represent activity output measures and so can provide an indication of throughput, which facilitates performance measurement and assessment particularly at an operational level.

A theory of costs should always be built upon a corporate model of the physical and technical production relationships as the main design framework . . . Any cost accounting model therefore should be designed in such a fashion that it can supply any cost information necessary for attaining an optimal situation.

The management accountant needs to look to his engineering and technical colleagues to help him or her understand his or her environment. We have made this kind of comment at various stages throughout this text.

Furthermore Boons *et al.* paint rather a cynical view of the management accountant: ABC starts with aggregating tasks into actions then activities and finally into activity centres. It does so without questioning the present methods of producing/ servicing i.e., its design starts from the assumption that the status quo is perfect and contains no inefficiencies or structural flaws. Such problems are consequently built into the ABC Seabed. 114)

This is rather a cynical view in that it presupposes that the management accountant simply translates his or her existing imperfect system into a more advanced inflexible system. This ABC is a developing idea - but it is not new. We have admitted that ABC is merely an extension of existing cost accounting techniques and methods. However, there is, with ABC, a mindset that traditional cost accounting does not have. With ABC we have to be prepared to accept arguments and inputs from

LESSON 37: QUALITY COSTING

Learning Objective:-

You will learn about

- *Measuring Quality Costs*
- *Total Quality Control*

The benefits from increased product quality come in lower costs for reworking discovered defective units and from more satisfied customers who find fewer defective units. The cost of lowering the tolerance for defective units results from the increased costs of using a better production technology. These costs could be due to using more highly skilled and experienced workers, from using a better grade of materials, or from acquiring updated production equipment.

A quality costing system monitors and accumulates the costs incurred by a firm in maintaining or improving product quality.

The quality costs discussed here deal with costs associated with quality of conformance as opposed to costs associated with quality of design. Quality of design refers to variations in products that have the same functional use.

Quality of Conformance refers to the degree with which the final product meets its specifications. In other words, quality of conformance refers to the product's fitness for use. If products are sold and they do not meet the consumers' expectations, the company will incur costs because the consumer is unhappy with the product's performance. These costs are one kind of quality costs that will be reduced if higher-quality products are produced. Thus higher quality may mean lower total costs when quality of conformance is considered.

The costs associated with quality of conformance generally can be classified into four types: prevention costs, appraisal costs, internal failure costs, and external failure costs. The prevention and appraisal costs occur because a lack of quality of conformance can exist. The internal and external failure costs occur because a lack of quality of conformance does exist.

Prevention Costs are the costs incurred to reduce the number of defective units produced or the incidence of poor-quality service. Prevention costs begin with the designing and engineering of the product or service. Designers and engineers should work together to develop a product that is easy to assemble with a minimal number of mistakes.

Appraisal Costs are the costs incurred to ensure that materials, products, and services meet quality standards. Appraisal costs begin with the inspection of raw materials and part from vendors. Further inspection costs are incurred throughout the production process. Quality audits and reliability tests are performed on products and services to determine if they meet quality standards. Appraisal costs also occur through field inspections at the customer site before the final release of the product.

Internal Failure Costs are the costs associated with materials and products that fail to meet quality standards and result in manufacturing losses. These defects are identified before they are shipped to customers. Scrap and the costs of spoiled units that cannot be salvaged are internal failure costs. The cost of analyzing, investigating, and reworking defects are also internal failure costs. Defects create additional costs because they lead to down time in the production process.

External Failure Costs are the costs incurred when inferior-quality products or services are sold to customers. These costs begin with customer complaints and usually lead to warranty repairs, replacement, or product recall.

The problem management faces is choosing the desired level of product quality. If all the costs can be measured accurately, then the desired level of product quality occurs when the sum of prevention, appraisal, and failure costs is minimized. Quality costs are minimized at a specific percentage of planned defects.

The magnitude of quality costs has prompted many companies to install quality-costing systems to monitor and help reduce the costs of achieving high-quality production. Several examples follow.

- Quality at Bavarian Motor Works (BMW)
- Quality Costs in Banking
- Reducing Quality Costs at TRW
- Cost of a faulty electrical component at Hewlett-packard

Although the concepts of quality costing are easy to understand the cost measurement of many quality efforts is difficult. Many of the cost are not isolated in a traditional cost accounting system, and some costs are opportunity costs that are not part of a historical cost accounting system.

Quality cost reports provide management with only a partial picture of the costs of quality. Management would also like to know the potential trade –off among the different types of quality costs relating to new technologies. Cost trade –offs are not part of a historical cost accounting system and estimates of these cost trade-offs must be made.

Typical Quality Cost Report

	Current month cost (Rs.)	Percentage total %
Prevention cost		
Quality training	2000	1.3
Reliability engineering	10000	6.5
Pilot studies	5000	3.3
System development	8000	5.2
Total prevention	25000	16.3
Appraisal costs		

Material inspection	6000	3.9
Supplies inspection	3000	2.0
Reliability testing	5000	3.3
Laboratory	25000	16.3
Total appraisal	39000	25.5
Internal cost failure		
Scrap	15000	9.8
Repair	18000	11.8
Rework	12000	7.8
Downtime	6000	3.9
Total internal failure	51000	33.3
External failure cost		
Warranty costs	14000	9.2
Offwarranty repairs and replacement	6000	3.9
Customer complaints	3000	2.0
Product liability	10000	6.5
Transportation losses	5000	3.3
Total external failure	38000	24.9
Total quality costs	153000	100.0%

Notes

Total Quality Control

Total quality control (TQC) is a management process based on the belief that quality costs are minimized with zero defects. The phrase *quality is free* is commonly advocated by proponents of TQC, who argue that the reduction of failure costs due to improved quality outweigh additional prevention and appraisal costs.

It is not surprising, then, that U.S. Auto Manufacturer have recently become leaders in advocating TQC.

TQC begins with the design and engineering of the product. Designing a product to be resistant to workmanship defects may not be incrementally more costly than the present design process, but the reduction in other quality costs can be substantial.

TQC is often associated with just-in-time (JIT) manufacturing. Under JIT each worker is trained to be a quality inspector. Therefore teams specializing in quality inspection become unnecessary. With suppliers delivering high-quality parts and materials, a company can substantially reduce if not eliminate appraisal costs.

Total quality control is sometimes referred to as **total quality management** (TQM) because a completely new orientation must be taken by management to make TQC successful. New performance measures that reinforce quality improvements must be initiated. Standard cost variance such as the materials price variance and labor efficiency variance tend to emphasize price and quantity rather than quality and should not be used to reward employees. The productivity measures described in the next section are more useful in motivating workers to achieve both quality and productivity.

LESSON 38 :

HUMAN RESOURCES ACCOUNTING

Objectives:-

Upon completion of this Lesson, you should be able to:

- Explain the relevance of Human Resources Accounting
- Describe the Models of HRA
- Outline the Implications of HRA

Relevance of Human Resource Accounting:

Dear students, I believe by this time the prime object of the management accounting is to optimum utilization of resources. You should find that Human resource is the vital resource for success of any organization. As you are interestingly learning all managerial tools for, perhaps it will enrich your knowledge. Let us discuss the same.

Human beings are considered central to achievement of productivity, well above equipment, technology and money. Human Resource Accounting (HRA) is an attempt to identify, quantify and report investment made in human resources of an organization that are not presently accounted for under conventional accounting practice. The committee of HRA of the American Accounting Association defined HRA as the process of identifying and measuring data about human resources and communicating this information to interested parties. However Resources are not yet recognized as 'assets' in the Balance Sheet. The measures of the net income, which are provided in the conventional financial statement, do not accurately reflect the level of business performance. Expenses relating to the human organization are charged to current revenue instead of being treated as investments to be amortized over the economic service life, with the result that the magnitude of net income is significantly distorted.

The necessity of HRA arose primarily as a result of the growing concern for human relations management in industry since the sixties of the last century. Behavioral scientists (like R. Likert, 1960), concerned with management of organizations pointed out that the failure of accountants to value human resources was a serious handicap for effective management.

Many social scientists are of the opinion that it is difficult to value human resources. Some others have cautioned that people are sensitive to the value others place on them. A machine never reacts to an over or under valuation of its capacity, but an employee will certainly react to such distortion. Conventionally, human resources are treated just as any other services purchased from outside the business firm. As a result conventional Balance Sheet fail to reflect the value of human assets and hence distort the value of the business. The treatment of human resources as assets is desirable with a view to ensuring compatibility and completeness' of financial statements and more efficient allocation of funds as well as providing more useful information to management for decision-making purpose.

Introduction

Until recent years, the 'value' of an enterprise as measured within traditional balance sheets, e.g. buildings, production plant, etc., was viewed as a sufficient reflection of the enterprise's assets.

However, with the emergence of the 'knowledge economy', this traditional valuation has been called into question due to the recognition that human capital is an increasingly dominant part of an enterprise's total value. This has raised two important questions: how to assess the value of human capital in addition to an enterprise's tangible assets, and how to improve the development of human capital in enterprises. The emergence of methods for accounting human resources (methods aimed at measuring, developing and/or managing the human capital in an enterprise) can thus be said to reflect the need to improve measuring and accounting practices and human resource management. Hermansson (1964) was the first to attempt to include figures on human capital in the balance sheet, which became known as human resource accounting. *Human resource accounting as an approach* was originally defined as the process of identifying, measuring and communicating information about human resources in order to facilitate effective management within an organisation. It is an extension of the accounting principles of matching costs and revenues and of organising data to communicate other information in financial terms.¹ It involves measuring the costs incurred by business firms and other organisations when they recruit, select, train and develop human assets. It also involves measuring the economic value of people to organisations.

According to Gröjer and Johansson, the accounting of human resources is as much a question of philosophy as of technique,³ which is one reason for the variety of approaches. This is underlined by the wide range of uses to which accounting human resources can be put:⁴

- as a **political tool**, used to demonstrate mismanagement of human resources, and therefore to argue more strongly for more investment/better management;
- as a **pedagogical instrument** for analysing and structuring, and thus better understanding, personnel problems from an applied perspective, and thus being better able to balance applied values against other values;
- as a **decision-making aid** to ensure that decisions on human resources are more rational from the management point of view

However, providing adequate and valid information on human capital in figures and within traditional balance sheets has proved extremely difficult; consequently, new approaches such as social accounting and human resource auditing (see Section 2) take into account the fact that human capital and tangible assets

are different in nature by introducing broader perspectives into human resource accounting.

In this paper, HRA will be used to refer to the various approaches, terms and definitions used to identify, measure and provide information about human capital in enterprises, where human capital will be defined as the knowledge that individuals acquire during their lives and use to produce goods, services or ideas in market or non-market circumstances.⁵ Further, HRA will be defined as encompassing three elements: 1) identification and measurement of human capital in figures, 2) identification and measurement of human capital, including non-figure terms, and 3) provision of information internally and/or externally on human capital.

Thus, without a generally accepted definition, HRA can be narrowed down to one focal point, i.e. measuring and accounting human capital. This is being intensively examined and tested by enterprises, researchers, interest groups, national authorities and international organisations, mainly in the United States and northern Europe.

It is important to be aware of the fact that HRA is not only about putting figures on human capital; it is also about supporting human resource development/management.

Furthermore, increasing pressure will encourage or force enterprises to report on human capital and to enlarge the perspective from serving mainly the interests of investors to including the interests of other stakeholders, notably governments, trade unions and employees. This process is being further reinforced as stakeholders come to realise the potential of HRA not only as an accounting system but also as a means of establishing new structures across interests and policies.

The main stakeholders, which include governments, trade unions, investors, enterprises and employees, are increasingly formulating policies on HRA in order to influence the design of HRA.

Consequently, there will be a gradual transformation in the tendency to see HRA as either a management tool or an information system, and so as primarily a matter for manager and investors.

However, the search for a standard human resource account has led many researchers to focus on accounting problems and the design of individual accounts in enterprises, and it has generally failed to link the rise of HRA to the processes of change in the labour market and in society in general.

Thus, the existing literature and research focus mainly on the technical problems of measuring intangibles and on generating framework models to be used for implementing HRA. The models being developed for individual enterprises, on the other hand, tend to be more pragmatic and oriented towards specific enterprise-based objectives of the enterprise, perspectives which are generally focused less on technicalities and more on human resource management than is generally acknowledged among researchers.

Whether a standard human resource account is required or even achievable is the next question for stakeholders and researchers alike.

Since most effort has been devoted to the measurement aspects of HRA or model building, there is no consensus neither among researchers nor among companies about the exact content of HRA exactly. Furthermore, since HRA is considered to be primarily a management tool or an accounting technique, there is a tendency to overlook the different and potentially conflicting interests surrounding HRA. Thus, this paper has four aims:

1. to describe the background to the emergence of HRA
2. to provide a systematised overview of HRA
3. to present and discuss the main stakeholders' interests in HRA
4. to present case studies which exemplify different approaches

Regarding point 4, the cases studied include a private production enterprise, a public service

provider, a private service provider, a public administrative organisation and a private production

and retail enterprise. These case studies were chosen in order to bring out the variety of HRA tools

being used and to underline that most of the HRA models being developed in enterprises focus on

human-resource development rather than on merely putting figures on the human capital.

Section 1: The Rationale for the Emergence of HRA (Human Resource Accounting)

The development of HRA can be seen as a part of and a response to the changes and developments at macro level (societal) and the micro level (enterprises), to which enterprises must adjust. Furthermore, the increased importance of intangible assets, which now contribute more to the creation of global wealth than tangible assets, poses both theoretical and practical problems, which both stakeholders and researchers address using HRA. This section presents briefly some macro and micro perspectives which have fuelled the development of HRA.

1.1 The Macro Level

This section highlights some of the macro level changes which have influenced the revival and further development of HRA, such as

- the change in production patterns, work organisation and employment patterns
- the changing roles of governments, enterprises and individuals

1.1.1 The Change in Production Patterns, Work Organisation and Employment Patterns

Modern economies are changing fast; services, information and technology are increasingly important and innovation is taking place at a rapid rate. This on going transformation has already changed production patterns, work organisation and employment practices and has thus underlined the need for adequate responses.

The shift from traditional industrial manufacturing to intangible knowledge production has led to a dramatic increase in

immaterial production, and some analyses show that 'total intangible investment had passed physical investment in Germany, Sweden and the UK by 1987.

In short, labour-market development is shifting from production-based economic units to learning based economic units,⁸ emphasising the shift from traditional production factors to knowledge as a primary input in production processes and, hence, in output.⁹

Further, new forms of work organisation such as self-organising work groups and quality circles seem to be gradually replacing tayloristic production methods based on work division. This 'business process re-engineering' aims at a vertical integration of all production processes and a new division and organisation of work within and beyond enterprises, and it implies 'changing demands on the competences and skills of workers when taking over a broader variety of tasks and responsibilities.'

Both the supply side and the demand side of the labour market will be affected, since there will be a gradual change from permanent, stable employment, to individualised flexible employment patterns. This can be exemplified by the dilemma between security and flexibility in employment, which may be viewed differently by employees and by firms: 'Middle and lower-end labour may well want much *more* job security than these high-tech firms (in Silicon Valley, ed.) want to give, while highly-skilled workers want *less* job security than is optimal for the firms.'¹¹ Consequently, in order to retain highly-skilled workers, firms will 'try to design compensation and training schemes that will reduce turnover - thus in effect trying to make the highly skilled labour force less flexible.'

Nevertheless, the shift from long-term employment to flexible employment is clear and can be seen in the development in part-time work: from 1979 to 1990 part-time work increased by 100% in The Netherlands, 70% in Belgium, 59% in Ireland, 46% in France and 33% in the United Kingdom, and the European Commission states that part-time jobs accounted for all net job creation in the EU from 1990 to 1996.

The above examples indicate the variety of the new and more complicated problems created by a more unstable labour market.

1.1.2 The Changing Roles of Governments, Enterprises and Individuals

Economic and social change, combined with a need to minimise public spending while optimizing public services, have put pressure on governments' abilities to sustain and develop a large range of formerly institutionalised public services.

The persistent and increasing public sector debt in most Member States of the European Union, which began in the early 1970s and has continued until the late 1990s, has underlined the limitations of the public sector's being the sole provider of social security systems and of other public goods such as social stability, a clean environment, etc.

Rising unemployment has been seen in part as a consequence of inflexible labour markets, which resulted in a massive loss of especially low-paid and unskilled jobs as well as a loss of

international competitiveness. However, with the experience we have today it can be argued that the loss of competitiveness and of low-skilled jobs was equally due to the failure of enterprises and the labour force to adapt to the new situation, where knowledge and, consequently, the continuous updating of knowledge are the main impetus for remaining competitive, both for individuals and enterprises. Many factors contribute to the changing role of enterprises: the globalisation of markets, increased competition, the relocation of enterprises to low-wage countries, the need for ever faster product development and innovation, the faster rate at which of knowledge becomes outdated and the changing role of governments which, generally, generates change for enterprises. Those changes can be exemplified by the formation of local partnerships, witnessed in many countries, aimed at combating unemployment, poverty and social exclusion. The participants in these local partnerships include national, regional and local governments, the social partners, non-governmental organisations, local communities and the excluded groups themselves.¹⁵ To some degree, this can be seen as one way of establishing what Coleman defined as social capital, i.e. the networks, norms and relationships which enable the development of human capital. Other phenomena are the arrival of the political consumer and, generally, a change of values in society; either through regulation or through direct consumer action, these phenomena have put pressure on enterprises which have not already adjusted to the new situation to develop policies and strategies encompassing more than economic considerations.

The notion of the political consumer as been accompanied by individualisation as another phenomenon in society, and in the labour market in particular, which must be incorporated into the innovative strategies of enterprises. In addition, labour markets in the European Union are gradually returning to a situation of low unemployment, especially within the knowledge sectors of the economy, thereby leading to increased competition for the qualified workforce. The latter trend is being reinforced by the demographic development of the ageing of the population, which may lead to a shortage of qualified labour in the future.

At the macro level, HRA reflects socio-economic developments emphasising the changing distribution of responsibilities among individuals, enterprises and the public sector, and a change in expectations and demands among the various actors. This is exemplified throughout this report and by the case studies presented in Section 5.

1.2 The Micro Levels

The micro level perspectives are directly linked to HRA which, again, could be developed both for internal and external use. For internal use HRA can be considered a management tool, and for external use, a tool for profiling the enterprise/organisation.

The following reasons for developing HRA are often cited:

- To improve human resource management
- To overcome problems arising from the valuation of intangible assets

- To overcome the difficulties in providing sufficient information to investors in traditional balance sheets
- To focus on employees as assets To redistribute social responsibilities between the public and the private sector
- To profile the enterprise and improve its image
- To retain qualified labour force
- To attract future employees

Very often management focuses on only one or two of the reasons mentioned above. But it is obvious that there is a strong connection between external and internal HRA. They are not mutually exclusive; sometimes one may even be a prerequisite for the other. If, for example, an enterprise decides to prepare and publish a social report, they will have to measure the indicators included in the social report. By measuring these indicators, management obtains greater knowledge about its own organisation. In this process management will very often identify areas which could be improved. That is human resource management.

1.2.1 Reasons for Developing HRA for Internal Purposes

1.2.1.1 To Improve Human Resource Management

So far human resource management (HRM) has often been carried out on the basis of strategies, plans and goals which have been defined and managed without simultaneous definition of specific targets, indicators, measurements, etc. Informal management systems and the intuition of the management have been sufficient to ensure that human resource management projects have been successful. Increased focus on human resource management and improved information technology have now led to the adoption of the saying: 'what you cannot measure, you cannot manage'.

The circle describes the Human Resource Management System as a whole. In the lower and left part of the circle, it appears that registrations, procedures and internal and external reporting should take place. This covers the basic elements in HRA.

From the literature and experience we know that enterprises and organisations register up to

variables on each employee.¹⁷ These data present a tremendous potential for developing measures, performance indicators, etc. But very often the data are collected only for specific use (for example, reporting to authorities) and not for aggregation, analysis and reporting to management. If management were to focus on data already available in their organisation to set up management reporting systems, much would be gained, and it is only a small step from reporting periodically to management on key human resource indicators in a standardised way to setting up management systems. It requires management to: set goals and targets for key performance indicators; decide what action should be taken to meet the goals; implement the action; measure and report on the results of the action, and adjust the goals and targets, etc. A virtuous circle would then be established.

1.2.1.2 To Focus on Employees as Assets

Until recent years, management's main concern was whether production equipment and buildings were well maintained and

functioning; the focus was on fixed assets, and employees were considered as overheads. The development of technology was rather slow, and the enterprise's ability to change and to be innovative was less crucial. Nowadays, technological development is fast and new products have to be developed in order to meet market demands and competition. Consequently, the enterprise's ability to manage change and to be more innovative than its competitors is critical.

The shift in focus from fixed assets to employees still depends largely on the specific business sector. In this connection human resource accounting, knowledge accounting, measurement of intellectual capital, balanced scorecards, etc., are important tools for management. Employees are considered not as overheads but as assets, as it is the employees and not the outdated buildings and production equipment, who will carry the enterprise into the future.

1.2.1.3 To Retain Qualified Labour Force

Years ago many employees, e.g. in factories, were low-skilled and received only the absolute minimum of training needed to carry out their jobs. Now enterprises and organisations have to invest huge amounts in training, updating the labour-force's education and qualifications, etc., in order to meet market demands. At the same time, enterprises and organisations have to convince employees that their present job and employer are more attractive than those on offer in the market, as qualified labour is now a scarce resource in many Western countries. This means that management has to invest in employees while also ensuring that the enterprise or organisation maintains a reputation as a good place to work, i.e. maintaining a high profile on social and ethical issues, etc.

This investment in human capital encourages management to measure and to collect data on human resources and to manage those resources as an important asset for the enterprise. HRA is also about making these investments more efficient from a strategic point of view as well as from a cost/benefit point of view.

1.2.2 Reasons for Developing HRA both Internally and Externally

1.2.2.1 To overcome Problems Deriving from Valuation of Intangible Assets

Usually most of the intangible assets of an enterprise, such as goodwill, patents and licences, research and development, human capital, etc., are not included in the net book value of the enterprise. Costs are entered in the profit and loss account as an expense at the time they are incurred. Key performance indicators for many areas within HRA are now recognised, but there is still no generally accepted accounting practice for assessing the financial value of these assets; although the value of a highly-skilled, well-performing and highly-motivated workforce is 'nil' in financial statements, the increasing profit from these factors will be entered in the accounts.

Further, a company's good name will be determined by the market position of the products, its production and distribution network, customer lists and marketing rights and the market expectations of employees' qualifications, innovative abilities, motivation, etc.

It is therefore crucial that not too many negative events be linked to the name of an enterprise. If the goodwill in general terms is positive it means that:

- customers will be attracted
- people working for the enterprise will be proud, which will attract new employees
- investors will be attracted
- other enterprises may be attracted to the enterprise, for example through mergers and takeovers or new alliances.

Other assets deriving from excellent human resource performance are patents, licences and innovative ability, especially in science-intensive businesses. Usually research and development expenditure is included in the profit and loss account. Costs related to purchase of patents, licences and similar rights can be capitalised and thus included in the net book value of the enterprise.

As most expenses are included in the profit and loss account, the enterprise must communicate information about new inventions, new products, human capital, etc., by other means.

1.2.2.2 To Redistribute of Social Responsibilities between the Public and the Private sector

In recent years we have seen within the EU a tendency among enterprises and organisations to take over more and more social responsibility from the public sector. Local and international industrial networks, union leaders, etc., argue that enterprises and organisations should be seen as an integral part of society and thus accept their share of responsibility. At the same time, EU and national governments encourage such initiatives;¹⁸ for example, an industrial network in Denmark - 'Partnership for Social Cohesion' - launched at the initiative of the Ministry of Social Affairs, has been active for four years. Union leaders are realising that the time has come not only to demand higher salaries but also to go for better working conditions, better quality of living, etc. All these initiatives put pressure on the private sector to measure, monitor and report on human resources.

1.2.3 Reasons for Developing HRA Externally

1.2.3.1 To Overcome the Difficulties in Traditional Balance Sheets in Providing Sufficient Information to Investors

A lot of discussions and work are being done at present by accounting, financing, investors' and other non-governmental organisations (NGOs) in order to overcome the difficulties in providing this new type of information to investors. Organisations such as the International Accounting Committee (IAS) and Fédération des Experts Comptables Européens (FEE) are active in this area. The discussion particularly concerns companies listed on stock exchanges.

SustainAbility - an NGO that periodically carries out a benchmark survey on company environmental reporting for the United Nations - concluded in its 1997 survey that the enterprise of the future will have to report a triple bottom line: the triple bottom line includes financial, environmental and social performance. This concept has already been adopted by companies such as Shell, The Body Shop and Novo Nordisk. On the basis of their analysis of environmental reporting all

over the world, SustainAbility is considering a 10-transition development as follows:

The 10 Transitions Established Focus > Emerging Focus

1. One-way passive communication -> Multi-way, active dialogue
2. Verification as option -> Verification as standard
3. Single company progress reports -> Benchmarkability
4. Management systems -> Life-cycles, business design, strategy
5. Inputs and outputs -> Impacts and outcomes
6. Ad-hoc operating standards -> Global operating standards
7. Public relations -> Corporate governance
8. Voluntary reporting -> Mandatory reporting
9. Company-determined boundaries -> Boundaries set by stakeholder dialogue
10. Environmental performance -> Triple bottom line performance

It appears that organisations have realised that it will be impossible to have all relevant information translated into financial data expressed in terms of money and included in their financial statements. The transition in corporate reporting will mean, in the short run, that enterprises adopting these concepts will issue a number of reports each year, covering different aspects of the enterprise's performance. In the long run, this information is expected to be summed up in annual reports covering all aspects. At the same time enterprises will make more use of the Internet, CD-ROMs, etc., in communicating with their stakeholders.

The transition from reporting on only financial performance to reporting on triple-bottom-line

performance will dramatically increase the need for HRA because HRA is an important basis for and an integral part of social reporting, which includes a description of a number of employee-related aspects in the reporting enterprise.

1.2.3.2 To Create and Improve the Company Image through Presentation of HRA

HRA is already be a way of profiling enterprises and organisations and it will certainly continue to be so in the future, even though human capital is not included in the net book value. This is especially the case for listed companies with a wide circle of owners/investors, where management will focus on reporting on intangible assets in order to improve the reputation of the enterprise. This being the case, management will focus on increasing the market value of the enterprise, even though the net book value does not reflect this in the short run. The market value of the enterprise reflects the net present value of the expected future cash flow of the enterprise. In the private sector the difference between the net book value of the enterprise and its market value depends largely on the line of business of the enterprise, as is shown in an analysis from 1995:

1.2.3.3 To Attract Future Employees

In the Western world we now face a period where the number of young people entering the labour market will decrease. At the same time, many young people demand honest work, want

to work for a well-respected enterprise and want to be able to have a decent life outside working hours, etc. All of these are quite new requirements; into the past, high salaries were the most important factor. This new trend puts pressure on enterprises and organisations that want to attract these young employees; employers have to focus more on their employees than they did in the past, and this requires better HRA, since HRA is an important external reporting tool which allows the enterprise to document its investment in its employees.

Key Issues

Is HRA, after all, just old wine in new bottles? The answer is both yes and no.

Yes, in the sense that HRA was introduced in the early sixties and most of the elements of HRA are well-known and found in many methods, tools and analytical frameworks relating to human resources. No, in the sense that it combines internal and external information needs vis-à-vis costs/benefits of investments, human resource management and the relationship between various stakeholders' interests in enterprises in an environment which is a more transparent and rapidly developing than ever.

In spite of all its diverse elements, HRA can be viewed as having two connected dimensions: the first is accounting, measuring and describing, which includes improved cost/benefit analyses of investment in human resources, notably vocational education and training; the second dimension is the policies or programmes which must be established and implemented in order to alter or improve a current situation at the level of the enterprise, the sector and society. In establishing HRA and the consequent strategies, it is crucial to decide whether HRA is considered to be about improving balance sheets or supplementing traditional balance sheets. The former leads to a focus on measuring techniques and converting information on human resources into figures to be placed in the balance sheet, whereas the latter leads to a focus on human resource development and innovation in broader terms. These two views are not necessarily mutually exclusive, but will strongly affect the actual design of HRA and, consequently, have different levels of stakeholder involvement and consequences.

In supplementing balance sheets with HRA information, it may prove difficult to properly define and demarcate HRA in such a way that it becomes a regular concept alongside, for instance, green accounting, especially because the stakeholders have different perspectives on HRA. This issue is reflected in the grouping of different HRA approaches presented in this paper, a systematization which is necessary in order to establish an overview of the current practices.

Nevertheless, despite the advantages of the multiplicity of approaches to HRA in the initial phases, one of the future imperatives will be that of establishing standards of international reporting practices, even if this means adopting a minimalist approach upon which enterprises can develop individual models. Expanding the use of HRA depends primarily on the development of a standardised reporting framework. In this process, it is crucial that the standard report should address all of the primary stakeholders; i.e., it must not be limited to, for example the investors' need for information.

Thus it must:

- incorporate the need for both general regulation and specific information
- incorporate the information needed by all the main stakeholders
- be as much an enterprise-specific tool as a standard human resource account; i.e. it must be applicable to both internal and external purposes

The actual development of a standard reporting framework will depend on whether the stakeholders start formulating clear policies on HRA; Scandinavian governments and social partners in particular have generally begun to adopt a broad definition of HRA.

So far, however, research into HRA has focused mainly on the aspect of providing information to investors; less research has been carried out into the broader objectives expressed by other stakeholders, even though many enterprise-initiated projects have those objectives, as emerges from some of the case studies presented in Section 5 of this report.

Another research approach in HRA is human resource management seen primarily as a management tool. The stakeholder analysis, however, reveals that even though this is one of the main reasons for initiating HRA in enterprises, it too will be influenced by stakeholders both inside and beyond the specific enterprise. Governments, trade unions and employees, in particular, will hold strong views on the actual design of such human-resource management tools.

The initiating stakeholder, the enterprise, may have a number of objectives, but these objectives can only be seen in conjunction with changes in the labour market and in society and, as such, in conjunction with the expressed or perceived objectives of other stakeholders'. Limiting HRA to only one relationship of objectives, say between enterprises and investors (which is the relationship advocated most), will seriously hamper the design of more complex human-resource strategies and place limitations on the tools currently being developed.

This becomes even more evident as legislation on human-resource reporting or social reporting is becoming more widespread, notably in the Scandinavian countries, although other countries, such as France, have established regulations on social reporting.

The complexity of the stakeholders' interests is best illustrated by linking key issues, stakeholders and HRA since developments in the labour market specifically and in society in general indicate that new structures will be formed; these structures are very much reflected in by HRA systems, albeit to a varying degree, depending on the stakeholder in question.

Models of HRA

Quite a few models have been suggested from time to time for the measurement and valuation of human assets. Some of these models are briefly discussed below:

A. Cost Based Models

1. Capitalization of Historical Costs: R. Likert and his associates at R. G. Barry Corporation in Ohio, Columbia, USA, developed this model in 1967. It was first adopted for

managers in 1968 and then extended to other employees of R. G. Barry Corporation.

The method involves capitalizing all costs related with making an employee ready for providing service – recruitment training, development etc. The sum of such costs for all the employees of the enterprise is taken to represent the total value of human resources. The value is amortised annually over the expected length of service of individual employees. The unamortised cost is shown as investment in human assets. If an employee leaves the firm (i.e. human assets expire) before the expected service life period, the net asset value to that extent is charged to current revenue.

The model is simple and easy to understand and satisfies the basic principle of matching cost and revenues. But historical costs are sunk costs and are irrelevant for decision-making. This model was severely criticized because it failed to provide a reasonable value to human assets. It capitalizes only training and development costs incurred on employees and ignores the future expected cost to be incurred for their maintenance. This model distorts the value of highly skilled human resources. Skilled employees require less training and therefore, according to this model, will be valued at a lesser cost. For all these reasons, this model has not been totally rejected.

2. Replacement Cost: The Flamholtz Model (1973):

Replacement cost indicates the value of sacrifice that an enterprise has to make to replace its human resource by an identical one. Flamholtz has referred to two different concepts of replacement cost viz. ‘individual replacement cost’ and ‘positional replacement cost’. The ‘individual replacement cost’ refers to the cost that would have to be incurred to replace an individual by a substitute who can provide the same set of services as that of the individual being replaced. The ‘positional replacement cost’, on the other hand, refers to the cost of replacing the set of services required of any incumbent in a defined position. Thus the positional replacement cost takes into account the position in the organization currently held by an employee and also future positions expected to be held by him.

However, determination of replacement cost of an employee is highly subjective and often impossible. Particularly at the management cadre, finding out an exact replacement is very difficult. The exit of a top management person may substantially, change the human assets value.

B. Economic Value Models

1. Opportunity Cost: The Hekimian and Jones Model (1967):

This model uses the opportunity cost, that is the value of an employee in his alternative use, as a basis for estimating the value of human resources. The opportunity cost value may be established by competitive bidding within the firm, so that in effect, managers must bid for any scarce employee. A human asset, therefore, will have a value only if it is a scarce resource, that is, when its employment in one division denies it to another division.

One of the serious drawbacks of this method is that it excludes employees of the type, which can be ‘hired’ readily from outside the firm, so that the approach seems to be concerned with only one section of a firm’s human resources, having special skills within the firm or in the labour market. Secondly, circumstances in which managers may like to bid for an employee would be rare, in any case, not very numerous.

2. Discounted wages and salaries: The Lev and Schwartz Model (1971): This model involves determining the value of human resources as the present value of estimated future earnings of employees (in the form of wages, salaries etc.) discounted by the rate of return on investment (cost of capital). According to Lev and Schwartz, the value of human capital embodied in a person of age is the present value of his remaining future earnings from employment. Their valuation model for a discrete income stream is given by the following:

$$V_t = \sum_{t=R}^T \frac{I(t)}{(1+r)^{t-r}}$$

Where,

V_t = the human capital value of a person t years old

$I(t)$ = the person’s annual earnings up to retirement.

R = a discount rate specific to the person

T = retirement age.

However, the above expression is an ex-post computation of human capital value at any age of the person, since only after retirement can the series $I(t)$ be known. Lev and Schwartz, therefore, converted their ex-post valuation model to an ex-ante model by replacing the observed (historical) values of $I(t)$ with estimates of future annual earnings denoted by $I^*(t)$. According, the estimated value of human capital of a person t years old is given by:

$$V_t = \sum_{t=R}^T \frac{I^*(t)}{(1+r)^{t-r}}$$

Lev and Schwartz again pointed out the limitation of the above formulation in the sense that the above model ignored the possibility of death occurring prior to retirement age. They suggested that the death factor can be incorporated into the above model with some modification and accordingly they recommended the following expression for calculating the expected value of a person’s human capital:

$$E(V^*t) = \sum_{t=R}^T \mathfrak{R}(t+1) \sum_{I=t}^t \frac{I^*}{(1+r)^{t-r}}$$

Where $\mathfrak{R}(t)$ is the probability of a person dying at age ‘ t ’.

Lev and Schwartz have shown in the form of a hypothetical example the method of computing the firm’s value of human capital. Age groups and degrees of skill have decomposed employees of the hypothetical firm and the average annual earnings for each age and skill group have

been ascertained. Finally the present values of future earnings for each group of employees have been calculated on the basis of a capitalization rate. The sum of all such present value of future earnings was taken as the firm's value of human capital.

In this model, wages and salaries are taken as surrogate for the value of human assets and therefore it provides a measure of future estimated cost. Although according to economic theory, the value of an asset to a firm lies in the rate of return to be derived by the firm from its employment. Lev and Schwartz model surrogated wages and salaries of the employees for the income to be derived from their employment. They felt that income generated by the workforce is very difficult to measure because income is the result of group effort of all factors of production.

However, this model is subject to the following criticisms:

- a. A person's value to an organization is determined not only by the characteristics of the person himself (as suggested by Lev and Schwartz) but also by the organisational role in which the individual is utilized. An individual's knowledge and skill is valuable only if these are expected to serve a means to given organisational ends.
- b. The model ignores the possibility and probability that the individual may leave an organization for reasons other than death or retirement. The model's expected value of human capital is actually a measure of the expected 'conditional value' of a person's human capital – the implicit condition is that the person will remain in an organization until death or retirement. This assumption is not practically social.
- c. It ignores the probability that people may make role changes during their careers. For example, an Assistant Engineer will not remain in the same position throughout his expected service life in an organization.

In spite of the above limitations, this model is the most popular measure of human capital both in India and abroad.

3. **Stochastic process with service rewards:** Flamholtz (1971) Model: Flamholtz (1971) advocated that an individual's value to an organization is determined by the services he is expected to render. An individual moves through a set of mutually exclusive organisational roles or service states during a time interval. Such movement can be estimated probabilistically. The expected service to be derived from an individual is given by:

$$E(s) = \sum_{I=1}^n S_i P(S_i)$$

Where S_i represents the quantity of services expected to be derived in each state and $P(S_i)$ is the probability that they will be obtained.

However, economic valuation requires that the services of the individuals are to be presented in terms of a monetary equivalent. This monetary representation can be derived in one of the two ways:

- a. By determining the product of their quantity and price, and

- b. By calculating the income expected to be derived from their use.

The present worth of human capital may be derived by discounting the monetary equivalent of expected future services at a specified rate (e.g. interest rate)

The major drawback of this model is that it is difficult to estimate the probabilities of likely service states of each employee. Determining monetary equivalent of service states is also very difficult and costly affair. Another limitation of this model arises from the narrow view taken of an organization. Since the analysis is restricted to individuals, it ignores the added value element of individuals operating as groups.

1. **Valuation of group basis:** Jaggi and Lau Model: Jaggi and Lau realized that proper valuation of human resources is not possible unless the contributions of individuals as a group are taken into consideration. A group refers to homogeneous employees whether working in the same department or division of the organization or not. Individuals expected service tenure in the organization is difficult to predict but on a group basis it is relatively easy to estimate the percentage of people in a group likely to leave the organization in future. This model attempted to calculate the present value to all existing employees in each rank. Such present value is measured with the help of the following steps:

- i. Ascertain the number of employees in each rank
- ii. Estimate the probability that an employee will be in his rank within the organization or terminated/promoted in the next period. This probability will be estimated for a specified time period.
- iii. Ascertain the economic value of an employee in a specified rank during each time period.
- iv. The present value of existing employees in each rank is obtained by multiplying the above three factors and applying an appropriate discount rate.

Jaggi and Lau tried to simplify the process of measuring the value of human resources by considering a group of employees as valuation base. But in the process they ignored the exceptional qualities of certain skilled employees. The performance of a group may be seriously affected in the event of exit of a single individual.

Implications of Human Capital Reporting

The relevance of the human resource information lies in the fact that it concerns organisational changes in the firm's human resources. The ratio of human to non-human capital indicates the degree of labour intensity of the enterprise. Reported human capital values provide information about changes in the structure of labour force. Difference between general and specific values of human capital is another source for management analysis – the specific value of human capital is based on firm's wages scale while the general value is based on industry wise wage scale. The difference between the two is an indicator of the level of the firm's wages scale as compared to the industry.

HRA in India

HRA is a recent phenomenon in India. Leading public sector units like OIL, BHEL, NTPC, MMTC, SAIL etc. have started reporting, 'Human Resources' in their Annual Reports as additional information from late seventies or early eighties. The Indian companies basically adopted the model of human resource valuation advocated by Lev and Schwartz (1971). This is because the Indian companies focused their attention on the present value of employee earnings as a measure of their human capital. However, the Indian companies have suitably modified the Lev and Schwartz model to suit their individual circumstances. For example BHEL applied Lev and Schwartz model with the following assumptions:

- i. Present pattern of employee compensation including direct and indirect benefits;
- ii. Normal career growth as per the present policies, with vacancies filled from the levels immediately below;
- iii. Weightage for changes in efficiency due to age, experience and skills;
- iv. Application of a discount factor of 12% per annum on the future earnings to arrive at the present value.

OIL, on the other hand, used a discount factor of 10.5% per annum for the year 1985-86 and increased the discount factory to 15% per annum from the year 1986-87.

However, the application of Lev and Schwartz model by the public sector companies has in many cases, led to over ambitious and arbitrary value of the human assets without giving any scope for interpreting along with the financial results of the corporation. For example, in the case of MMTC over a period of three years (1984-85 to 1986-87), the value of human assets increased by more than 46%, whereas during the same period the book value of all other assets increased only by about 3%. On the other hand in the case of Oil India Ltd. (OIL) the value of human assets had actually decreased over a three-year period from 1985-86 to 1987-88. The human assets accounted for 49.38% of total resources (including investment in HR) as on 31st March 1986. But it came down to 38.01% on 31st March 1988.

In the Indian context, more particularly in the Public Sector, the payment made to the employees are not directly linked to productivity. The fluctuations in the value of employee's contributions to the organization are seldom proportional to the changes in the payments to employees. All qualitative factors like the attitude and morale of the employees are out of the purview of Lev and Schwartz model of human resource valuation.

Illustration

From the following information in respect of Exe Ltd. Calculate the total value of human capital by following Lev and Schwartz model:

Distribution of employees of Exe Ltd.

Age	Unskilled		Semi – skilled		Skilled	
	No.	Av. Annual Earnings (Rs. '000)	No.	Av. annual earnings (Rs. '000)	No.	Av. Annual Earnings (Rs. '000)
30-39	70	3	50	3.5	30	5
40-49	20	4	15	5	15	6
50-54	10	5	10	6	5	7

Apply 15% discount factor

Solution

The present value of earnings of each category of employees is ascertained as below:

A. Unskilled employees:

Age group 30-39. Assume that all 70 employees are just 30 years old.

Present Value	Rs.
Rs.3, 000 p.a. for next 10 years	15.057
Rs.4, 000 p.a. for years 11 to 20	4,960
Rs.5, 000 p.a. for years 21 to 25	<u>1,025</u>
	<u>21.042</u>

Age group 40-49. Assume that all 20 employees are just 40 years old.

Present Value	Rs.
Rs.4, 000 p.a. for next years	20,076
Rs.5, 000 p.a. for years 11 to 15	<u>4,140</u>
	<u>24.216</u>

Age group 50-54. Assume that all 10 employees are just 50 years old.

Rs.5, 000 p.a. for next 5 years	<u>16,760</u>
---------------------------------	---------------

Similarly, present value of each employee under other categories will be calculated.

B. Semi-skilled employees: Age group 30-39

Present Value	Rs.
Rs.3, 500 p.a. for next 10 years	17.567
Rs.5, 000 p.a. for years 11 to 20	6,200
Rs.6, 000 p.a. for years 21 to 25	<u>1,230</u>
	<u>24.997</u>

Age group 40-49.

Present Value	Rs.
Rs.5, 000 p.a. for next 10 years	25,095
Rs.6, 000 p.a. for years 11 to 15	<u>4,968</u>
	<u>30,063</u>

Age group 50-54.

Rs.6, 000 p.a. for next 5 years	<u>20,112</u>
---------------------------------	---------------

C. Skilled employees:

Age group 30-39	Rs.
Rs.5, 000 p.a. for next 10 years	25.095
Rs.6, 000 p.a. for years 11 to 20	7.440
Rs.7, 000 p.a. for years 21 to 25	<u>1,435</u>
	<u>33,970</u>
Age group 40-49.	
Rs.6, 000 p.a. for next 10 years	30,114
Rs.7, 000 p.a. for years 11 to 15	<u>5,796</u>
	<u>35,910</u>
Age group 50-54.	
Rs.7, 000 p.a. for next 5 years	<u>23,464</u>

Total Value of Human Capital

Age	Unskilled		Semi – skilled		Skilled		Total	
	No	Av.annual Earnings (Rs.'000)	No.	Av. Annual Earnings (Rs.'000)	No.	Av. Annual Earnings (Rs.'000)	No.	Av. Annual Earnings (Rs.'000)
30-39	70	14,72,940	50	12,49,850	30	10,19,100	150	37,41,890
40-49	20	4,94,320	15	4,50,945	15	5,38,650	50	14,73,915
50-54	10	1,67,600	10	2,01,120	5	1,17,320	25	4,86,040
	100	21,24,860	75	19,01,915	50	16,75,070		57,01,845

The central problem in HRA is not what kind of resources should be treated, but rather when the resources should be recognized. This timing issue is particularly important because human resources are not owned by the firm, while many physical resources are. However, the firm also uses many services from physical resources, which it does not own. The accounting treatment for such services should, therefore, be the same as the treatment used for human resources. Traditional accounting involves treatment of human capital and non-human capital differently. While non-human capital is represented by the recorded value of assets, the only reference to be found in financial statement about human resources are entries in the income statement in respect of wages and salaries, directors fees etc. But it should be kept in mind that measuring and reporting the value of human assets in financial statements would prevent management from liquidating human resources or overlooking profitable investments in human resources in a period of profit squeeze. But while valuing human assets one should not lose sight of the fact that human beings are highly sensitive to external forces and human, skills in an organization do not remain static. Skill formation, skill obsolescence or utilization may take a continuous process. Besides employee attitude, loyalty commitment, job satisfaction etc. may also influence the way in which human resource skills are utilized. Therefore human resources should be valued in such a way so to cover the qualitative aspects of human beings. As human beings are highly susceptible to certain behavioral factors (unlike physical assets) any human resource valuation model without behavioral features can hardly present the value of human assets in an objective manner. However while attaching respective weight age to behavioral factors, care should be taken to avoid excessive subjectiveness.

Project Activity

Dear friends, Human Resource Accounting (HRA) has recently gained immense importance across the globe. All the professional accountants all over the world are of the view that human resource is the most valuable asset of any corporate. Conversion of raw materials into finished products is practically impossible without the assistance and active involvement of human resource. Even if a corporate goes for 100% automation, one personnel is required to switch on and switch off the machine. It is a matter of regret that the asset like furniture and fixture are disclosed on the face of the balance sheet of a company but valuation and disclosure human resource has not been practiced and implemented in the philosophy and corporate culture. For last 10 years or more the human resource accounting has been considered to be made one of the essential ingredients of the assets of the corporate. Human resource accounting has gained its relevance as a new branch of management accounting. There are different models of human resources accounting developed by various social scientists and accountants with which you are well familiar as we had interactive sessions on the referred subject. Please take a note that the corporate like TISCO, HLL AND Reliance group of companies are working immensely to the cause of human resource valuation and disclosure of the same in the annual reports for the information of various parties outside the company as well as internal agents like unions, welfare associations and last but not least to the management.

Friends please take up a few projects on the applicability of the various models developed for human resource accounting. Every organization has different personnel in different hierarchy in concerned departments. Qualifications, age and tenure of job experience as well as cultural and social status of the employees are the important factors, which have tremendous influence to bring about appropriate valuation of human resource of an organization. Therefore collect necessary data, compile and analyze them to apply on a particular model of human resource valuation as has been discussed on earlier occasion. Please ensure that the project is submitted to the class facilitator for further discussion and interpretation of practical application of human resource accounting models.

5.1 Case Study 1

Novo Nordisk - employment rehabilitation policy

Novo Nordisk is a Danish-based international group, listed on the stock exchange in Copenhagen, Zurich, London and New York. Novo Nordisk develops, manufactures and markets pharmaceutical products and industrial enzymes, and has approximately 14 000 employees. As part of the company's staff policy, Novo Nordisk several years ago adopted the following rehabilitation policy: "Those of Novo Nordisk's employees who, for reasons of ill health, are unable to manage their current job are, in so far as possible, to be guaranteed continued employment with Novo Nordisk."

Guidelines have been laid down for the handling of rehabilitation cases establishing, for instance, that cases are to be handled as close to the employee's department as possible; which budget centre is to take on the rehabilitation costs; and what is to be

LESSON 39 : VALUE ADDED ACCOUNTING

Objectives:-

Upon completion of this Lesson, you should be able to:

- Outline the need and importance of Value Added Accounting
- Prepare the value added statement
- Apply the concept of Value Addition

Historical Background

Dear learners, today we will discuss the new dimension of management accounting concept. Interestingly value addition is a vital part of any commercial establishments for growth and development. Let us look into the concept in detail.

The concept of value added is considerably old. It originated in the USA. Treasury in the

18th Century and periodically accountants have deliberated upon whether the concept should be incorporated in financial accounting practice. But actually, the value added statement has come to be seen with greater frequency in Europe and more particularly in Britain. The discussion paper “Corporate Report” published in 1975 by the then Accounting Standard Steering committee (now known as Accounting Standards Board) of the U.K. advocated the publication of value added statement along with the conventional annual corporate report. In 1977, the Department of Trade, U.K. published ‘The Future of Company Report’ which stated that all substantially large British companies should include a value added (V.A.) statement in their annual reports. Also a few companies in the Netherlands include V.A. information in their annual reports, but the disclosures often fall short of being a full V.A. statement and also the method of arriving at V.A. is grossly non-standardized. In India Britannia Industries Limited and some other prepare value added statement as supplementary financial statement in its annual report.

Definitions

Value Added (V.A.): VA is the wealth a reporting entity has been able to create through the collective effort of capital, management and employees. In economic terms, value added is the market price of the output of an enterprise less the price of the goods and services acquired by transfer from other firms. VA can provide a useful measure in gauging performance and activity of the reporting entity.

Gross Value Added (GVA): GVA is arrived at by deducting from sales revenue the cost of all materials and services, which were brought in from outside suppliers. We know that the retained profit of a company for a given accounting year is derived as below:

$$R = S - B - \text{Dep} - W - I - T - \text{Div} \quad \dots (1)$$

Where R= Retained profit, S= Sales revenue, B= Bought in cost of materials and services, Dep= annual depreciation charge, W= Annual wage cost, I= Interest payable for the year T= Annual

Corporate tax and Div = Total dividend payable for the year. Rearranging the equation (1) we get GVA as below:

$$S - B = R + \text{Dep} + W + I + T + \text{Div} \quad \dots (2)$$

Each side of equation (2) represents GVA. However this is a very simple definition of GVA. In practice GVA includes many other things.

Besides sales revenue, any direct income, investment income and extraordinary incomes or expenses are also included in calculation of GVA. Including these items in the above equation No.2, we get

$$(S + \text{Di}) - B + \text{Inv} + \text{EI} = R + \text{Dep} + W + T + I + \text{Div} \quad \dots (3)$$

Where Di = Direct incomes, Inv = Investment incomes, EI= Extraordinary items.

The above equation can be shown by way of the following statement.

Gross Value added of a manufacturing company

Sales	X	
Add: Royalties and other direct income	X	
Less: Materials and Services used	<u>X</u>	
Value added by trading activities		X
Add: Investment Income	X	
Add/Less: Extraordinary items	X	X
Gross Value Added		X
Applied as follows :		
To employees as salaries, wages etc.	X	
To government as taxes, duties, etc.	X	
To Financiers as interest on Borrowing	X	
To Shareholders as dividends	X	
To retained earnings including depreciation	<u>X</u>	

Net Value Added (NVA): NVA can be defined as GVA less depreciation.

Rearranging the equation (1) we can get NVA as below:

$$S - B - \text{Dep} = R + W + I + T + \text{Div}$$

Reporting Value Added

The ‘Corporate Report’ of the U.K. advised the British companies to report Gross value Added (GVA). The ‘Report’ did not consider the possibility of the alternative Net Value Added (NVA). As a result the majority of British companies prefer to set forth their VA statement as a report on GVA, so that depreciation is an application of VA rather than a cost to be deducted in calculating VA. In India also GVA is more popular among reporting companies than NVA. The reasons for reporting GVA are as follows:

GVA can be derived more objectively than NVA. This is because depreciation is more

Prone to subjective judgment than are bought-in costs.

- a. GVA format involves reporting depreciation along with retained profit. The resultant sub-total usefully shows the portion of the year's VA, which has become available for re-investment.
- b. The practice of reporting GVA would lead to a closer correspondence between VA and national income figures. This is because economists generally prefer gross measures of national income to net one.

However, there are also valid reasons for reporting NVA. They are:

- a. Wealth Creation (i.e. VA) will be overstated if no allowance is made for the wearing out or loss of value of fixed assets, which occurs as new assets are created.
- b. NVA is a firmer base for calculating productivity bonus than is Gather productivity of a company may increase because of additional investments in modernization of plant and machinery. Consequently, the value added component may improve significantly. The employees of the company will naturally claim and be given some share of additional VA as productivity bonus. But if the share is based on GVA then no recognition is given to the need for an increased depreciation charge.
- c. The concept of matching demands that depreciation be deducted along with bought in costs to derive NVA GVA is inconsistent, for costs would be charged under the bought in heading if the item has a life of under one year. But if the item has a longer life it would be treated as a depreciable fixed assets and its cost would never appear as a charge while arriving at GVA.

From the above discourse it can be said that it is better to report on NVA rather than on GVA.

Why VA Statement?

The advantages claimed for the VA statement are considerable. The main thrust of financial accounting development in the recent decades has been in the area of 'how' we measure income rather than 'whose' income we measure. The common belief of the traditional accountants that net income or profit is the reward of the proprietors (shareholders in the case of a company) had been considered as a very narrow definition of income. In fact, proponents of the proprietary theory argued that the proprietor is the centre of interest. The assets were assumed to be owned by the proprietor and the liabilities were the proprietor's obligations. The notion of proprietorship was accepted and practiced so long as the nature of business did not experience revolutionary changes. The proprietary theory did hold good for a sole proprietorship or a partnership kind of business. But with the emergence of corporate entities and the legal recognition of the existence of business entity separate from the personal affairs and other interests of the owners led to the rejection of the proprietary theory and formulation of other theories like entity theory, enterprise theory and fund theory. The entity theory has its main application in the corporate form of business enterprise. The entity theory is

based on the basic accounting equation and it suggests that the net income of the reporting entity is generally expressed in terms of the net change in the stockholders' equity. It represents the residual change in equity position after deducting all outsiders' claims. The enterprise theory is a broader concept than the entity theory. For entity theory, the reporting entity is considered to be a separate economic unit operating primarily for the benefit of the equity shareholders, whereas in the enterprise theory, the reporting entity is a social institution, operating for the benefit of many interested groups. The most relevant concept of income in this broad social responsibility concept of the enterprise is the value added concept. Therefore, the origin of concept of value added lies in the enterprise theory. Proponents of VA argue that there are advantages in defining income in such a way as to include the rewards of a much wider group than just the shareholders.

The various Advantages of the VA Statement are as follows:

1. Reporting on VA improves the attitude of employees towards their employing companies this is because the VA statement reflects a broader view of the company's objectives and responsibilities.
2. VA statement makes it easier for the company to introduce a productivity linked bonus scheme for employees based on VA. The employees may be given productivity bonus on the basis of VA/Payroll ration.
3. VA based ratios (e.g. VA/Payroll, Taxation/VA, VA/Sales etc.) are useful diagnostic and predictive tools. Trends in VA ratios, comparisons with other companies and international comparisons may be useful. In India, the VA statement of Britannia Industries Limited for the two years 1992-93 and 1993-94 showed that almost 50% of the value addition is applied in payment of various taxes and duties. The employees and shareholders get almost and constant share of value added of 35% and 5% respectively. The value added as a percentage of sales revenue has increased from 23.8% to 25.6% over the two years period. However, it may be noted that the VA ratios can be made more useful if the ratios are based on inflation adjusted VA data.
4. VA provides a very good measure of the size and importance of a company. To use sales figures or capital employed figures as a basis for company rankings can cause distortion. This is because sales may be inflated by large bought in expenses or a capital intensive company with a few employees may appear to be more important than a highly skilled labour intensive company.
5. VA statement links a company's financial accounts to national income. A company's VA indicates the company's contribution to national income.
6. Finally VA statement is built on the basic conceptual foundations, which are currently accepted in balance sheets and income statements. Concepts such as going concern, matching, consistency and substance over form are equally applicable to the VA statement

Value Added Statement (VA Statement)

The VA statement shows the value added for a business for a particular period and how it is arrived at and apportioned to the following shareholders:

- The workforce – for wages, salaries and related expenses
- The financiers – for interest on loans and for dividends on share capital.
- The government – for corporation tax
- The business – for retained profits

A statement of VA represents the profit and loss account in different and possibly more useful manner.

The conventional VA statement is divided into two parts – the first part shows how VA is arrived at and the second part shows the application of such VA.

Illustration 1

Given below is the Profit & Loss Account of Creamco Ltd. Profit and Loss Account for the year ended 31st March 1999

		Amount (Rs.'000)
Income:		
Sales	1	28,525
Other income		<u>756</u>
		29,281
Expenditure		
Operating Cost	2	25,658
Excise duty		1,718
Interest on Bank overhead	3	93
Interest on 10% Debentures		<u>1,157</u>
		<u>28,616</u>
Profit before Depreciation		655
Less: Depreciation		<u>255</u>
Profit before tax		400
Provision for tax	4	<u>275</u>
Profit after tax		125
Less: Transfer to Fixed Asset Replacement Reserve		<u>25</u>
		100
Less: Dividend paid and payable		<u>45</u>
Retained profit		<u>55</u>

Notes:

This represents the invoice value of goods supplied after deducting discounts, returns and sales tax. Operating cost includes Rest. (‘000) 10,247 as wages, salaries and other benefits to employees. The bank overdraft is treated as a temporary source of finance. The charge for taxation includes a transfer of Rs. (‘000) 45 to the credit of deferred tax account.

You are required to:

Prepare a value added statement for the year ended 31st March 1999.

Reconcile total value added with profit before taxation.

Solution

**a. Creamco Ltd.
Value Added Statement**

For the year ended March 31, 1999

	Rs. (‘000)	Rs. (‘000)	%
Sales		28,525	
Less: Cost of bought in material and services			
Operating Cost	15,411		
Excise duty	1,718		
Interest on Bank Overdraft	<u>93</u>	<u>17,222</u>	
Value added by manufacturing and trading activities		11,303	
Add: Other Income		<u>756</u>	
Total value added		<u>12,059</u>	
Application of value added:			
To pay employees:			
Wages, salaries and other benefits	10,247	84.97	
To pay government:			
Corporation tax	230	1.90	
To pay providers of capital:			
Interest on 10% Debentures	1,157		
Dividends	<u>45</u>	1.202	9.98
To provide for the maintenance and expansion of the company:			
Depreciation		255	
Fixed Assets Replacement Reserve		25	
Deferred Tax Account		45	
Retained profit	<u>55</u>	<u>380</u>	<u>3.15</u>
	<u>12,059</u>	<u>100.00</u>	

b. Reconciliation between total value Added and Profit before Taxation

	Rs. (‘000)	Rs. (‘000)
Profit before tax		400
Add back:		
Depreciation	255	
Wages, salaries and other benefits	10,247	
Debenture interest	<u>1,157</u>	<u>11,659</u>
Total Value Added		<u>12,059</u>

Notes:

Deferred tax could alternatively be shown as a part of ‘To pay government’.

Bank overdraft, being a temporary source of finance, has been considered as the provision of a banking service rather than of capital. Therefore, interest on bank overdraft has been shown by way of deduction from sales and as a part of ‘cost’ of bought in material and services.

Limitation Value Analysis

It is argued that although the VA statement shows the application of VA of several interest groups (like employees, government, shareholders, etc.) the risks associated with the company is only borne by the shareholders. In other words, employees, government and outside financiers are only interested in getting their share on VA but when the company is in trouble, the entire risks associated therein is borne only by the shareholders. Therefore, the concept of showing value added as applied to several interested groups is being questioned by many academics. They advocated that since the shareholders are the ultimate risks takers, the residual profit remaining after meeting the obligations of outside interest groups should only be shown as value added accruing to the shareholders. However, academics have also admitted that from overall point of view value added statement may be shown as supplementary statement of financial information. But in no case can the VA statement substitute the traditional income statement (i.e. Profit & Loss Account.)

Another contemporary criticism of VA statement is that such statements are non-standardized. One area of non-standardization is the inclusion or exclusion of depreciation in the calculation of value added. Another major area of non-standardization in current VA practice is taxation. Some companies report only tax levied on profits under the heading of "VA applied to governments". Other companies prefer to report on extensive range of taxes and duties under the same heading. In the case of Britannia Industries Limited. it has shown taxes and duties paid under the heading "VA applied to Government". In the illustration given in Para 1.5-excise duty has been shown as a part of bought-in cost and deducted while calculating value added. Some academics argued that such excise duty should be shown as an application of VA. However, bringing out an accounting standard on value added can effectively eliminate this practice of non-standardization. Therefore, this criticism is a temporary phenomenon.

We have stated in Para 1.3, the reasons for preferring NVA to GVA. We prepare the NVA statement on the basis of the information given in illustration in Para 1.5. It can be mentioned here that in preparing VA statement on NVA basis excise duty has been shown as an application of VA.

a. Creamco Ltd.

Value Added Statement

For the year ended March 31, 1999

	Rs. ('000)	Rs. ('000)	%
Sales		28,525	
Less: Cost of bought in material and services			
Operating Cost	15,411		
Interest on Bank Overdraft	93	15,504	
Gross Value Added		13,021	
Less: Depreciation		255	
Net Value Added		12,766	
Add: Other income		756	
Available or application		13,522	

Applied as follows:

To pay employees:

Wages, salaries and other benefits 10.247 75.78

To pay government:

Corporation tax & excise duty 1.948 14.41

To pay providers of capital:

Interest on 10% Debentures 1.157

Dividends 45 1.202 8.89

To provide for the maintenance

And expansion of the company:

Fixed Assets Replacement Reserve 25

Deferred Tax Account 45

Retained profit 55 12 0.92

13,522 100.00

b. Reconciliation between total value Added and Profit before Taxation

	Rs. ('000)	Rs. ('000)
Profit before tax	400	
Add back:		
Excise duty	1,718	
Wages, salaries and other benefits 10.247		
Debenture interest	<u>1,157</u>	<u>13,122</u>
Total Value Added		<u>13,522</u>

We can see that VA based ratios have changed significantly particularly with respect to payments to employees and government (i.e. Payroll/VA and taxation /VA.) Taxation/VA ratio has increased from a meager 1.9% to a significant 14.41%, whereas payroll/VA ratio has come down from 84.97% to 75.78%. It suggests that although the employees are enjoying the major share of VA. Government's share has also increased significantly. As a result the retained profit of the company has significantly come down.

Illustration 2

Prepare a Gross Value Added statement from the following Profit and Loss Account of Strong Ltd. Show also the reconciliation between Gross Value Added and Profit before taxation.

Profit & Loss Account for the year ended 31st March, 1999

Income	Notes (Rs. In lakhs)	Amount (Rs. In lakhs)
Sales		610
Other Income		25
		635
Expenditure		
Production & Operational Expenses	1 465	
Administration Expenses	2 19	
Interest and other charges	3 27	
Depreciation		<u>14</u>
Profit before Taxes		525
Provision for Taxes		110
		16
		94
Balance as per Last Balance Sheet		<u>7</u>
		<u>101</u>
Transferred to:		
General Reserve	60	
Proposed Dividend	<u>11</u>	71
Surplus carried to Balance Sheet		<u>30</u>
		<u>101</u>

Notes:

1. Production & Operational Expenses	(Rs. In lakhs)	
Increase in Stock		112
Consumption of Raw Materials		185
Consumption of Stores		22
Salaries, Wages, Bonus & Other Benefits		41
Cess and Local Taxes		11
Other Manufacturing Expenses		94
		<u>465</u>

Administration expenses include inter-alia audit fees of Rs.4.80 lakhs, salaries & commission to directors Rs.5 lakhs and provision for doubtful debts Rs.5.20 lakhs.

Interest and other Charges:	(Rs. In lakhs)	
On working capital loans from Bank		8
On Fixed Loans from IDBI		12
Debentures		7
		<u>27</u>

Solution

**Strong Limited
Value Added Statement
For the year ended March 31, 1999**

	Rs. (‘000)	Rs. (‘000)	%
Sales		610	
Less: Cost of bought in material and services:			
Production and operational expenses	413		
Administration expenses	14		
Interest on working capital loans	8	435	
Value added by manufacturing and trading activities		175	
Add: Other Income		25	
Total Value Added		<u>200</u>	
Application of Value Added:			
To pay employees:			
Wages, salaries Bonus and other benefits	41		20.50
To pay Directors:			
Salaries and Commission	5		2.50
To pay Government:			
Cess and Local Taxes	11		
Income Tax	16	27	13.50
To pay providers of Capital			
Interest on Debentures		7	
Interest on Fixed Loans		12	
Dividend	11	30	15.00
To Provide for Maintenance and Expansion of the Company:			
Depreciation	14		
General Reserve	60		
Retained Profit (30-7)	23	27	48.50
	<u>200</u>	<u>100.00</u>	

Reconciliation between total value Added and Profit before Taxation

	Rs. (‘000)	Rs. (‘000)
Profit before tax		110
Add back:		
Depreciation	14	
Wages, salaries, Bonus & Other Benefits	41	
Directors’ Remuneration	5	
Cess and Local Taxes	11	
Interest on Debentures	7	
Interest on Fixed Loans	12	
Total Value Added	<u>90</u>	<u>200</u>

Interpretation of VA

While the absolute value of net VA and its proportion to gross output are very important, the factor components of value addition reveal more information. It is generally found that value addition is highest for service companies and lowest for a trading business. Consider a hypothetical situation. There are three companies A, B and C. Each sells the finished product for Rs.1, 000. Company A buys a lump of metal in the market for Rs.500 performs four operations on it – annealing, forging, trimming and polishing – and sells the finished product for Rs.1,000. Company B buys the semi finished product in the market for Rs.800, performs certain operations and sells the finished product at the said price of Rs.1000. Company C buys the finished product from another company for Rs.950 and sells it for Rs.1, 000.

Thus even though all the three companies have the same turnover, company A has added highest net value to its product and company C the least. As a percentage of the gross output, company A’s value addition is 50%, company B’s 20% and company C’s a meager 5%. At this point it appears that company A, having highest value addition, will give highest returns to shareholders. But if it so happens that out of total value addition of Rs.500 by company A, almost 90% goes out for meeting wage bill, the position is entirely different. Therefore, considering the ratio of net value added to gross output does not yield a complete picture .If much a company net value added comes from an unproductive labour force, there will be little leftover for future investments for addition to reserves. Hence, besides considering the ratio of net value addition to gross output, one must consider the contribution of various factor costs to the net value added.

Project Activity

Dear students you are now well familiar with the concept, meaning and practical applicability of the theory of value added accounting. You know that value added accounting is power full tool for performance measurement. Almost every Indian company has adopted value added accounting technique to measure the value added by the factors of production. You are there fore instructed to go through a few annual reports of the reputed companies like TATA group of companies, Reliance group of companies and study generally “10 Years Financial

LESSON 40 : LIFE CYCLE COSTING

Learning Objectives:-

On study of this lesson you will be conversant with

- *What is Life Cycle Costing?*
- *Process of LCC*
- *Product life cycle costing*
- *Project life cycle costing*

What is Life Cycle Costing?

Life Cycle Costing (LCC) also called Whole Life Costing is a technique to establish the total cost of ownership. It is a structured approach that addresses all the elements of this cost and can be used to produce a spend profile of the product or service over its anticipated life-span. The results of an LCC analysis can be used to assist management in the decision-making process where there is a choice of options. The accuracy of LCC analysis diminishes as it projects further into the future, so it is most valuable as a comparative tool when long term assumptions apply to all the options and consequently have the same impact.

This briefing provides general guidance on LCC. For guidance on the application of LCC to construction projects.

Why is it Important?

The visible costs of any purchase represent only a small proportion of the total cost of ownership. In many departments, the responsibility for acquisition cost and subsequent support funding are held by different areas and, consequently, there is little or no incentive to apply the principles of LCC to purchasing policy. Therefore, the application of LCC does have a management implication because purchasing units are unlikely to apply the rigours of LCC analysis unless they see the benefit resulting from their efforts.

There are 4 major benefits of LCC analysis:

- Evaluation of competing options in purchasing;
- Improved awareness of total costs;
- More accurate forecasting of cost profiles; and
- Performance trade-off against cost.

Option Evaluation. LCC techniques allow evaluation of competing proposals on the basis of through life costs. LCC analysis is relevant to most service contracts and equipment purchasing decisions.

Improved Awareness. Application of LCC techniques provides management with an improved awareness of the factors that drive cost and the resources required by the purchase. It is important that the cost drivers are identified so that most management effort is applied to the most cost effective areas of the purchase. Additionally, awareness of the cost drivers will also highlight areas in existing items which would benefit from management involvement.

Improved Forecasting. The application of LCC techniques allows the full cost associated with a procurement to be estimated more accurately. It leads to improved decision making at all levels, for example major investment decisions, or the establishment of cost effective support policies. Additionally, LCC analysis allows more accurate forecasting of future expenditure to be applied to long-term costings assessments.

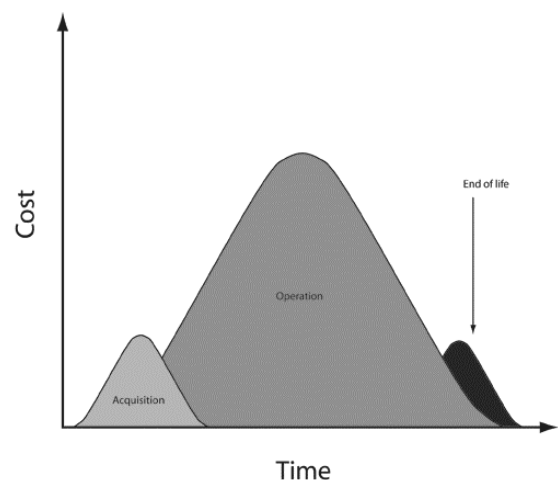
Performance Trade-off Against Cost. In purchasing decisions cost is not the only factor to be considered when assessing the options. There are other factors such as the overall fit against the requirement and the quality of the goods and the levels of service to be provided. LCC analysis allows for a cost trade-off to be made against the varying attributes of the purchasing options.

Who is Involved

The investment decision maker (typically the management board) is accountable for any decisions relating to the cost of a project or programme. The SRO is responsible for ensuring that estimates are based on whole life costs and is assisted by the project sponsor or project manager, as appropriate, together with additional professional expertise as required.

Principles

The cost of ownership of an asset or service is incurred throughout its whole life and does not all occur at the point of acquisition. The Figure below gives an example of a spend profile showing how the costs vary with time. In some instances the disposal cost will be negative because the item will have a resale value whilst for other procurements the disposal, termination or replacement cost is extremely high and must be taken into account at the planning stage.



- Acquisition costs are those incurred between the decision to proceed with the procurement and the entry of the goods or services to operational use
- Operational costs are those incurred during the operational life of the asset or service
- End life costs are those associated with the disposal, termination or replacement of the asset or service. In the case of assets, disposal cost can be negative because the asset has a resale value.

A purchasing decision normally commits the user to over 95 per cent of the through-life costs. There is very little scope to change the cost of ownership after the item has been delivered.

The principles of LCC can be applied to both complex and simple projects though a more developed approach would be taken for say a large PFI project than a straightforward equipment purchase.

For guidance on the application of Life Cycle Costing and cost management to property and construction projects.

The Process

LCC involves identifying the individual costs relating to the procurement of the product or service. These can be either “one-off” or “recurring” costs. It is important to appreciate the difference between these cost groupings because one-off costs are sunk once the acquisition is made whereas recurring costs are time dependent and continue to be incurred throughout the life of the product or service. Furthermore, recurring costs can increase with time for example through increased maintenance costs as equipment ages.

The types of costs incurred will vary according to the goods or services being acquired, some examples are given below.

Examples of one-off costs include:

- procurement;
- implementation and acceptance;
- initial training;
- documentation;
- facilities;
- transition from incumbent supplier(s);
- changes to business processes.
- withdrawal from service and disposal

Examples of recurring costs include:

- retraining;
- operating costs;
- service charges;
- contract and supplier management costs;
- changing volumes;
- cost of changes;
- downtime/non-availability;
- maintenance and repair; and
- transportation and handling.

The Methodology of LCC

LCC is based on the premise that to arrive at meaningful purchasing decisions full account must be taken of each available option. All significant expenditure of resources which is likely to arise as a result of any decision must be addressed. Explicit consideration must be given to all relevant costs for each of the options from initial consideration through to disposal.

The degree sophistication of LCC will vary according to the complexity of the goods or services to be procured. The cost of collecting necessary data can be considerable, and where the same items are procured frequently a cost database can be developed.

The following fundamental concepts are common to all applications of LCC:

- cost breakdown structure;
- cost estimating;
- discounting; and
- inflation.

Cost Breakdown Structure (CBS)

CBS is central to LCC analysis. It will vary in complexity depending on the purchasing decision. Its aim is to identify all the relevant cost elements and it must have well defined boundaries to avoid omission or duplication. Whatever the complexity any CBS should have the following basic characteristics:

- it must include all cost elements that are relevant to the option under consideration including internal costs;
- each cost element must be well defined so that all involved have a clear understanding of what is to be included in that element;
- each cost element should be identifiable with a significant level of activity or major item of equipment or software;
- the cost breakdown should be structured in such a way as to allow analysis of specific areas. For example, the purchaser might need to compare spares costs for each option; these costs should therefore be identified within the structure;
- the CBS should be compatible, through cross indexing, with the management accounting procedures used in collecting costs. This will allow costs to be fed directly to the LCC analysis;
- for programmes with subcontractors, these costs should have separate cost categories to allow close control and monitoring; and
- the CBS should be designed to allow different levels of data within various cost categories. For example, the analyst may wish to examine in considerable detail the operator manpower cost whilst only roughly estimating the maintenance manpower contribution. The CBS should be sufficiently flexible to allow cost allocation both horizontally and vertically.

Cost Estimating

Having produced a CBS, it is necessary to calculate the costs of each category. These are determined by one of the following methods:

- known factors or rates: are inputs to the LCC analysis which have a known accuracy. For example, if the Unit Production Cost and quantity are known, then the Procurement Cost can be calculated. Equally, if costs of different grades of staff and the numbers employed delivering the service are known, the staff cost of service delivery can be calculated;
- cost estimating relationships (CERs): are derived from historical or empirical data. For example, if experience had shown that for similar items the cost of Initial Spares was 20 per cent of the UPC, this could be used as a CER for the new purchase. CERs can become very complex but, in general, the simpler the relationship the more effective the CER. The results produced by CERs must be treated with caution as incorrect relationships can lead to large LCC errors. Sources can include experience of similar procurements in-house and in other organisations. Care should be taken with historical data, particularly in rapidly changing industries such as IT where can soon become out of date; and.
- expert opinion: although open to debate, it is often the only method available when real data is unobtainable. When expert opinion is used in an LCC analysis it should include the assumptions and rationale that support the opinion.

Discounting

Discounting is a technique used to compare costs and benefits that occur in different time periods. It is a separate concept from inflation, and is based on the principle that, generally, people prefer to receive goods and services now rather than later. This is known as 'time preference'. This guidance does not cover the topic in great detail as it is a procedure common to many cost appraisal methods and well understood by purchasing officers.

When comparing two or more options, a common base is necessary to ensure fair evaluation. As the present is the most suitable time reference, all future costs must be adjusted to their present value. Discounting refers to the application of a selected discount rate such that each future cost is adjusted to present time, i.e. the time when the decision is made. Discounting reduces the impact of downstream savings and as such acts as a disincentive to improving the reliability of the product.

The procedure for discounting is straightforward and discount rates for government purchases are published in the Green Book. Discount rates used by industry will vary considerably and care must be taken when comparing LCC analyses which are commercially prepared to ensure a common discount rate is used.

Inflation

It is important not to confuse discounting and inflation: the Discount Rate is not the inflation rate but is the investment "premium" over and above inflation. Provided inflation for all costs is approximately equal, it is normal practice to exclude inflation effects when undertaking LCC analysis.

However, if the analysis is estimating the costs of two very different commodities with differing inflation rates, for example oil price and man-hour rates, then inflation would have to be considered. However, one should be extremely careful to avoid double counting of the effects of inflation. For example, a vendor's proposal may already include a provision for inflation

and, unless this is noted, there is a strong possibility that an additional estimate for inflation might be included.

Life Cycle Costing

CAM-1 defines life-cycle costing as "the accumulation of costs for activities that occur over the entire life cycle of a product, from inception to abandonment by the manufacturer and the customer." Life-cycle analysis provides a framework for managing the cost and performance of a product over the duration of its life. The life-cycle commences with the initial identification of a consumer need and extends through planning, research, design, development, production, evaluation, use, logistics support in operation, retirement, and disposal.

Cost systems have focused primarily on the cost of physical production, without accumulating costs over the entire design, manufacture, market, and support cycle of a product. Resources committed to the development of products and the manufacturing process represent a sizeable investment of capital. The benefits accrue over many years, and under conventional accounting, are not directly identified with the product being developed. They are treated instead as a period expense and allocated to all products. Even companies which use life-cycle models for planning and budgeting new products do not integrate these models into cost systems. It is important to provide feedback on planning, effectiveness and the impact of design decisions on operational and support costs. Period reporting hinders management's understanding of product-line profitability and the Potential cost impact of long-term decisions such as engineering design changes. Life-cycle costing and reporting provide management with a better picture of product profitability and help managers to gauge their planning activities.

Product Life Cycle Costing:

The cycle begins with the identification of new consumer need and the invention of a new product and is often followed by patent protection and further development to make it saleable. This is usually followed by a rapid expansion in its sales as the product gains market acceptance. Then competitors enter the field with imitation and rival products and the distinctiveness of the new product starts diminishing. The speed of degeneration differs from product to product. The innovation of a new product and its degeneration into a common product is termed as the 'life cycle of a product'.

Characteristics

The major characteristics of product life-cycle concept are as follows:

- The products have finite lives and pass through the cycle of development, introduction, growth, maturity, decline and deletion at varying speeds.
- Product cost, revenue and profit patterns tend to follow predictable courses through the product life cycle. Profits first appear during the growth phase and after stabilizing during the maturity phase, decline thereafter to the point of deletion.
- Profit per unit varies as products move through their life cycles.

- iv. Each phase of the product life-cycle poses different threats and opportunities that give rise to different strategic actions.
- v. Products require different functional emphasis in each phase - such as an R&D emphasis in the development phase and a cost control emphasis in the decline.

Activities in Product Life Cycle

Typically the life cycle of a manufactured product will consist of the following activities:

- Market research
- Specification
- Design
- Prototype manufacture
- Development of the product
- Tooling
- Manufacturing
- Selling
- Distribution
- Product support through after sales-service
- Decommissioning or Replacement.

Phases in Product Life-Cycle

There are five distinct phases in the life cycle of a product as shown.

Introduction phase - The Research and engineering skills lead to product development and when the product is put on the market and its awareness and acceptance are minimal. Promotional costs will be high, sales revenue low and profits probably negative. The skill that is exhibited in testing and launching the product will rank high in this phase as critical factor in securing success and initial market acceptance. Sales of new products usually rise slowly at first.

Despite little competition profits, are negative or low. This is owing to high unit costs resulting from low output rates, and heavy promotional investments incurred to stimulate growth. The introductory stage may last from a few months to a year for consumer goods and generally longer for industrial products.

Growth phase - In the growth phase product penetration into the market and sales will increase because of the cumulative effects of introductory promotion, distribution. Since costs will be lower than in the earlier phase, the product will start to make a profit contribution. Following the consumer acceptance in the launch phase it now becomes vital to secure wholesales/retailer support. But to sustain growth, consumer satisfaction must be ensured at tills stage. If the product is successful, growth usually accelerates at some point, often catching the innovator by surprise.

Profit margins peak during this stage as 'experience curve' effects lower unit costs and promotion costs are spread over a larger volume.

Maturity phase - This stage begins after sales cease to rise exponentially. The causes of the declining percentage growth rate the market saturation eventually most potential customers have tried the product and sales settle at a rate governed by population growth and the replacement rate of satisfied buyers.

In addition there are no new distribution channels to fill. This is, usually the longest stage in the cycle, and most existing products are in this stage. The period over which sales are maintained depends upon the firm's ability to stretch the cycle by means Of market segmentation and finding new uses for it Profits decline in this stage because for the following reasons.

- The increasing number of competitive products.
- The innovators find market leadership under growing pressure.
- Potential cost economics are used up.
- Prices begin to soften as smaller competitors struggle to obtain market share in an increasingly saturated market .

Sales growth continues but at a diminishing rate because of the diminishing number of potential customers who remain last of the unsuccessful competing brands will probably withdraw from the market For this reason sales are likely to continue to rise while the customers for the withdrawn brands are mopped up by the survivors. In this phase there will be stable prices and profits and the emergence of competitors. There is no improvement in the product but changes in selling effort are common. Profit margin slip despite rising sales.

Saturation phase - As the market becomes saturated, pressure is exerted for a new product and sales among with profit begin to fall Intensified marketing effort may prolong the period of maturity, but only by increasing costs disproportionately.

Decline phase - Eventually most products and brands enter a period of declining sales. This may be caused by the following factors:

- Technical advances leading to product substitution.
- Fashion and changing tastes.
- The average length of the product life cycle is tending to shorten as a result of economic, technological and social change.

Turning Point Indices in Product Life Cycle

The following checklist indicates some of the detailed information necessary to identify turning points in the product life cycle:

- Market saturation
 - Is the growth rate of sales volume declining?
 - What is the current level of ownership compared to potential?
 - Are first time buyers a declining proportion of total sales?
- Nature of competition
 - How many competitors have entered or plan to enter?
 - Is long-term over capacity emerging?
 - Are prices and profit margins being cut?
 - Are advertising and promotional elasticities declining and price elasticity increasing?
- Alternative products and technologies
 - Are new products being created in this industry or others which may meet consumer needs more effectively?

LESSON 41 : VALUE CHAIN ANALYSIS

Learning Objectives:-

After studying this chapter you should be able to understand

- Porters Generic Value Chain
- Cost Advantage and the Value Chain
- Linkages Between Value Chain Activities
- Outsourcing Value Chain Activities

To better understand the activities through which a firm develops a competitive advantage and creates shareholder value, it is useful to separate the business system into a series of value-generating activities referred to as the **value chain**. In his 1985 book *Competitive Advantage*, Michael Porter introduced a generic value chain model that comprises a sequence of activities found to be common to a wide range of firms. Porter identified primary and support activities as shown in the following diagram:

Porter's Generic Value Chain

Inbound > Operations > Outbound > Marketing
 Logistics Logistics & Sales
 > Services > Margins

Firm infrastructure
HR Management
Technology Development
Procurement

The goal of these activities is to offer the customer a level of value that exceeds the cost of the activities, thereby resulting in a profit margin.

The primary value chain activities are:

- Inbound Logistics: the receiving and warehousing of raw materials, and their distribution to manufacturing as they are required.
- Operations: the processes of transforming inputs into finished products and services.
- Outbound Logistics: the warehousing and distribution of finished goods.
- Marketing & Sales: the identification of customer needs and the generation of sales.
- Service: the support of customers after the products and services are sold to them.

These primary activities are supported by:

- The infrastructure of the firm: organizational structure, control systems, company culture, etc.
- Human resource management: employee recruiting, hiring, training, development, and compensation.
- Technology development: technologies to support value-creating activities.

- Procurement: purchasing inputs such as materials, supplies, and equipment.

The firm's margin or profit then depends on its effectiveness in performing these activities efficiently, so that the amount that the customer is willing to pay for the products exceeds the cost of the activities in the value chain. It is in these activities that a firm has the opportunity to generate superior value. A competitive advantage may be achieved by reconfiguring the value chain to provide lower cost or better differentiation.

The value chain model is a useful analysis tool for defining a firm's core competencies and the activities in which it can pursue a competitive advantage as follows:

- **Cost advantage:** by better understanding costs and squeezing them out of the value-adding activities.
- **Differentiation:** by focusing on those activities associated with core competencies and capabilities in order to perform them better than do competitors.

Cost Advantage and the Value Chain

A firm may create a cost advantage either by reducing the cost of individual value chain activities or by reconfiguring the value chain.

Once the value chain is defined, a cost analysis can be performed by assigning costs to the value chain activities. The costs obtained from the accounting report *may* need to be modified in order to allocate them properly to the value creating activities.

Porter identified 10 cost drivers related to value chain activities:

- Economies of scale
- Learning
- Capacity utilization
- Linkages among activities
- Interrelationships among business units
- Degree of vertical integration
- Timing of market entry
- Firm's policy of cost or differentiation
- Geographic location
- Institutional factors

A firm develops a cost advantage by controlling these drivers better than do the competitors.

A cost advantage also can be pursued by reconfiguring the value chain. Reconfiguration means structural changes such as a new production process, new distribution channels, or a different sales approach. For example, FedEx structurally redefined express freight service by acquiring its own planes and implementing a hub and spoke system.

Differentiation and the Value Chain

A differentiation advantage can arise from any part of the value chain. For example, procurement of inputs that are unique and not widely available to competitors can create differentiation, as can distribution channels that offer high service levels.

Differentiation stems from uniqueness. A differentiation advantage may be achieved either by changing individual value chain activities to increase uniqueness in the final product or by reconfiguring the value chain.

Porter identified several drivers of uniqueness:

- Policies and decisions
- Linkages among activities
- Timing
- Location
- Interrelationships
- Learning
- Integration
- Scale (e.g. better service as a result of large scale)
- Institutional factors

Many of these also serve as Cost drivers. Differentiation often results in greater costs, resulting in tradeoffs between cost and differentiation.

There are several ways in which a firm can reconfigure its value chain in order to create uniqueness. It can forward integrate in order to perform functions that once were performed by its customers. It can backward integrate in order to have more control over its inputs. It may implement new process technologies or utilize new distribution channels. Ultimately, the firm may need to be creative in order to develop a novel value chain configuration that increases product differentiation.

Technology and the Value Chain

Because technology is employed to some degree in every value creating activity, changes in technology can impact competitive advantage by incrementally changing the activities themselves or by making possible new configurations of the value chain.

Various technologies are used in both primary value activities and support activities:

1. Inbound Logistics Technologies

- Transportation
- Material handling
- Material storage
- Communications
- Testing
- Information systems

2. Operations Technologies

- Process
- Materials
- Machine tools
- Material handling
- Packaging
- Maintenance

- Testing
- Building design & operation
- Information systems

3. Outbound Logistics Technologies

- Transportation.
- Material handling
- Packaging
- Communications
- Information systems

4. Marketing & Sales Technologies

- Media
- Audio/video
- Communications
- Information systems

5. Service Technologies

- Testing
- Communications
- Information systems

Note that many of these technologies are used across the value chain. For example, information systems are seen in every activity. Similar technologies are used in support activities. In addition, technologies related to training, computer-aided design, and software development frequently are employed in support activities.

To the extent that these technologies affect cost drivers or uniqueness, they can lead to a competitive advantage.

Linkages Between Value Chain Activities

Value chain activities are not isolated from one another. Rather, one value chain activity often affects the cost or performance of other ones. Linkages may exist between primary activities and also between primary and support activities. Consider the case in which the design of a product is changed in order to reduce manufacturing costs. Suppose that inadvertently the new product design results in increased service costs; the cost reduction could be less than anticipated and even worse, there could be a net cost increase.

Sometimes however, the firm may be able to reduce cost in one activity and consequently enjoy a cost reduction in another, such as when a design change simultaneously reduces manufacturing costs and improves reliability so that the service costs also are reduced. Through such improvements the firm has the potential to develop a competitive advantage.

Analyzing Business Unit Interrelationships

Interrelationships among business units form the basis for a horizontal strategy. Such business unit interrelationships can be identified by a value chain analysis.

Tangible interrelationships offer direct opportunities to create a synergy among business units. For example, if multiple business units require a particular raw material, the procurement of that material can be shared among the business units. This sharing of the procurement activity can result in cost reduction.

Such' interrelationships may exist simultaneously in multiple value chain activities.

Unfortunately, attempts to achieve synergy from the interrelationships among different business units often fall short of expectations due to unanticipated drawbacks. The cost of coordination, the cost of reduced flexibility, and organizational practicalities should be analyzed when devising a strategy to reap the benefits of the synergies.

Outsourcing Value Chain Activities

A firm may specialize in one or more value chain activities and outsource the rest. The extent to which a firm performs upstream and downstream activities is described by its degree of vertical integration.

A thorough value chain analysis can illuminate the business system to facilitate outsourcing decisions. To decide which activities to outsource, managers must understand the firm's strengths and weaknesses in each activity, both in terms of cost and ability to differentiate. Managers may consider the following when selecting activities to outsource:

- Whether the activity can be performed cheaper or better by suppliers.
- Whether the activity is one of the firm's core competencies from which stems a cost advantage or product differentiation.
- The risk of performing the activity in-house. If the activity relies on fast changing technology or the product is sold in a rapidly changing market, it may be advantageous to outsource the activity in order to maintain flexibility and avoid the risk of investing in specialized assets.
- Whether the outsourcing of an activity can result in business process improvements such as reduced lead-time, higher flexibility, reduced inventory, etc.

A firm's value chain is part of a larger system that includes the value chains of upstream suppliers and downstream channels and customers. Porter calls this series of value chains the **value system**, shown conceptually below:

The Value System

> Supplier > Firm > Channel > Buyer
Value Chain Value Chain Value Chain Value Chain

Linkages exist not only in a firm's value chain, but also between value chains. While a firm exhibiting a high degree of vertical integration is poised to better coordinate upstream and downstream activities, a firm having a lesser degree of vertical integration nonetheless can forge agreements with suppliers and channel partners to achieve better coordination. For example, an auto manufacturer may have its suppliers set up facilities in close proximity in order to minimize transport costs and reduce parts inventories. Clearly, a firm's success in developing and sustaining a competitive advantage depends not only on its own value chain, but on its ability to manage the value system of which it is a part.

SelecTech Case Study

Background

SelecTech, Inc. was formed in 1994 with the objective of becoming an integrated, low cost manufacturer of injection molded plastic parts using post-consumer and postindustrial, feedstock. SelecTech is achieving its objectives using a combination of proprietary preprocessing and injection molding technology that allows it to economically convert dirty feedstock into high quality products. The processes and business decisions through which SelecTech has been able to turn previously valueless feedstock into valuable consumer and industrial products illustrate effective business planning, marketing, and operational strategies. SelecTech has grown to 30 employees and three main product lines in seven years, and saves over 1,250 tons of plastic from being dumped in landfills each year.

Developing a Recycled Product Business Opportunity

Incorporating Recycled Content:

Using recyclable materials for manufacturing feedstock requires flexibility when identifying potential business opportunities, as the variable quality of some recyclable materials makes highly precise measurements and colors more difficult to create compared to virgin materials. The limitations of recycled materials are not necessarily a liability, as SelecTech's strategy reveals. SelecTech chose to focus on products with three basic characteristics that overcame these limitations: bigger and heavier, robust, and crude. Incorporating these types of characteristics into product designs minimized the need for exact precision that may be challenging to maintain with impure plastics source materials. This manufacturing leeway in turn lowers costs and increases manufacturing throughput.

The "less refined" nature of SelecTech's target product characteristics led to three product lines: outdoor products (planters, timbers), traffic control (speed bumps, parking blocks), and industrial floor tiles. All of these products are large, strong and unbreakable, and do not require exact properties and color specifications compared to precision mechanical parts or other consumer products.

Lesson: using recyclable materials will play a defining role in identifying product opportunities and business prospects.

Identifying Competitive Advantage

Several criteria drive SelecTech's business opportunities:

1. Target markets must be large in size, have growth potential, and have an identifiable niche for SelecTech's competitive advantage (cost, performance, etc.). Emphasis on industrial applications and mass retail channels to take advantage of volume and lower selling costs.
2. Product lines should be able to maintain high profit margins.
3. Waste materials should provide a cost and technological competitive advantage.

4. Products must provide an attractive return on investment (ROI) taking into account development and market entry costs.
5. Limited market entry costs due to
 - ability to sell through existing sales channels
 - ability to partner with a sales organization to obtain sales channel
 - ability to use lower cost public relations to gain market awareness. This is dependent on having an interesting story that is “press-worthy.”

SelecTech’s product lines not only effectively utilize product characteristics associated with recycled plastic, but also provide value for both end-users and SelecTech. To the end user, SelecTech’s planters, timbers, speed bumps and blocks, and flooring products offer strength, durability throughout the seasons, attractive appearance, and longevity, all at prices as good or better than competitive products. The planters, for example, are less expensive than clay and will not break in freezing temperatures, or when they are dropped or fall on the ground. From SelecTech’s perspective, the products tap into high growth markets, and can be produced with significant cost savings compared to traditional manufacturers because of the ability to use “dirty” and commingled plastic. The home and garden industry is rapidly growing; customers across the country will likely be purchasing multiple planters. The cost savings available through using imperfect recycled plastics help provide a competitive advantage for SelecTech, above and beyond other product characteristics.

While the planters provide advantages to the buyer, as noted above, internally, the ability to overlook exact color sensitivity and other specifications leads to cost advantages compared to other manufacturers. A significant part of the cost advantage also lies with SelecTech’s injection molding technology, which is unique in the United States and currently proprietary. The technology is especially designed to handle unclean plastic sources, eliminating the need to wash, grind, or pelletize the plastic scrap.

Lesson: competitive advantage based on recycled content is different for the buyer and producer. The buyer’s primary interest is quality (not recycled), while the producer wants to provide this quality at a lower cost. Recycled content can be a key competitive advantage for producers because the cost of material input is lower, enabling a competitive price advantage in the marketplace.

Analyzing Market Potential

SelecTech’s niche provides a competitive advantage based on quality and cost (driven by recycled content). Did the market also fulfill demand requirements to move forward with production? SelecTech used a variety of sources to analyze and refine this competitive advantage through understanding market potential and financial opportunity. The goal was to determine and understand three key areas:

1. Cost structure.
2. Product scope.
3. Current holes in the marketplace.

Marketplace and product scope analysis included learning pricing structures in SelecTech’s target areas. This meant looking at existing products by store walkthroughs and product/pricing surveying. What were SelecTech’s product relationships to existing options, such as type, quality, and utility, and what were the resulting price ramifications for SelecTech? The company looked at competitor company characteristics to understand potential weaknesses. SelecTech also utilized market data, extensive spreadsheet and sensitivity analysis, and sales partner data. SelecTech took advantage of all possible sources and contacts, whether point of purchase data, suppliers, and buyers, to help understand the complexities of the market opportunities that were potentially available to SelecTech.

A key aspect on the cost side was analyzing recycled plastic supply sources. In order to maintain a stable competitive advantage through cost structure, SelecTech needed to find a non-competitive materials source to avoid exposure to price fluctuations of raw materials. The company found that 50 million tons of waste wire casings are deposited in landfills yearly, as the plastics are difficult to work with and impure by normal manufacturing standards. To SelecTech, this material source was important in establishing their main competitive advantage over companies offering similar products: a lower cost structure enables SelecTech to compete on price terms as well as quality.

Lesson: determining market potential for recycled product introduction involves analyzing many different areas, from revenue opportunities to supplier costs and industry structure. Financial opportunity is driven by sales potential as well as beneficial cost structure on the supply side.

Financing and Fund Raising

SelecTech’s business model based on non-traditional production strategies (incorporating recycled content), and position as a start-up within a perceived “low-tech” industry with modest growth potential, were liabilities for the company when approaching various investor sources. SelecTech needed to pursue a number of funding sources to start the business and roll out new products. SelecTech found more success contacting investors and groups interested in socially responsible business, such as the Sustainable Jobs Fund and Boston Community Capital. SelecTech also took advantage of grants available through various government agencies, such as the Massachusetts Department of Environmental Protection, which administers the Recycling Industries reimbursement Credit grant program, and the Chelsea Center for Recycling and Economic Development, which sponsored a demonstration project of SelecTech’s timbers to assess construction techniques. Government programs have accounted for about 3% of SelecTech’s total funding. As always, cash flow is key when approaching funding sources, even socially driven investors. SelecTech has also found other creative means to finance growth. For example, it pays sales representatives on commission, minimizing costs until cash has already been received from customers. Imaginative business practices like this can help free cash resources that would otherwise be tied up in operational costs. Still, SelecTech has not been able to grow the company as

quickly as desired because of difficulties obtaining sufficient investment funds.

Lesson: pursue a variety of funding sources that may be overlooked by traditional companies. Socially responsible funds and angel groups will often be excited about green products companies, and at the least provide contacts or further ideas. Government grants, although usually on the small side, can provide much needed cash to buy capital equipment or train employees, without relinquishing company equity.

Managing the Value Chain Supply

SelecTech looked for recycled plastic supply sources with two main criteria: high volume availability and plastic waste with problems. In other words, find a plastics source that no one else can use that is also easily available. SelecTech found that tens of millions of tons of wire casing waste is destined for landfills every year. This plastic waste comes in all sorts of colors, sizes, and shapes (not pelletized), making the materials undesirable for most plastics manufacturers. Other plastics sources that were identified contained cork waste.

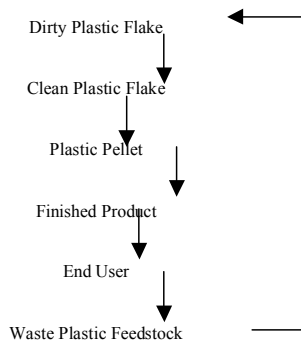
SelecTech has consistently found sources that are good for SelecTech and bad for everyone else. This situation protects SelecTech from supply price competition as suppliers have few other buyers if any, and helps to support SelecTech’s competitive advantage based on cost. Using crude plastic sources immediately results in 50% cost savings over using virgin materials.

Lesson: recycled plastics afford unique supply opportunities that can differentiate a recycled product manufacturer from competitors.

Manufacturing:

SelecTech constructed manufacturing operations to take advantage of plastic waste most companies deem to be unusable. SelecTech found a European injection molding technology that enables manufacturing with impure plastics and dirt. As the technology was not currently in use in the United States, SelecTech was able to negotiate a contract giving the company exclusive rights for the injection molding capability, contingent on continued business growth and future equipment purchases. SelecTech created manufacturing operations fundamental to maintaining a competitive advantage. In addition, while other companies pay higher costs associated with cleaning and pelletizing waste plastic, SelecTech is able to bypass these operations, thereby lowering its costs of goods produced, as portrayed in Figure 1.

Figure 1: SelecTech Process



SelecTech incorporates other manufacturing operations as well to become more vertically integrated to strengthen its competitive advantage. For example, SelecTech is searching for new ways to handle dirty plastics, creating new “recipes” of plastic blends, incorporating non-clean or even non-plastics debris. As mentioned above, SelecTech looks to cleaning and other pre-manufacturing processes normally associated with plastics manufacturing. The net effect of this effort is essentially expanding the company vertically, enabling the company to handle all aspects of manufacturing and processing.

SelecTech purchases the raw materials, prepares them for manufacturing internally, and does not have to rely on other vendors who may specialize in cleaning or creating pellets for injection molding. Other efforts to become more vertically integrated involve taking non-recyclable products (or currently expensive to process) and transforming them into material inputs, such as carpet backing and plastic wrapping material. SelecTech’s efforts to become more vertically integrated, based on unique handling and processing abilities of recycled plastics, helps protect the supply chain from external influence and price pressures, provides new potential sources of raw materials, and maintains internal cost advantages. SelecTech has also taken advantage of recycled plastics by choosing to make product lines that are consistent with the 80/20 rule, meaning that fulfilling most of the important design requirements rather than 100% results in satisfactory quality products

for the marketplace. Small imperfections, such as minor color variations, in the final product are not a quality liability. This quality latitude is much easier to handle than exact color matching each production run. Finally, SelecTech is always striving to improve its internal operations, finding new efficiencies. For example, a new operations specialist was brought on to organize material workflow and processing schedules. With limited funding, Tom Ricciardelli, SelecTech’s president said “We focus on what we have, making it run better.”

Lesson: manufacturing efficiency involves many different functional areas, from material processing to product creation. While recycled materials pose challenges for some manufacturers, ingenuity and thinking outside standard industry practices can result in new sources of value and competitive advantage.

Brand Management and Distribution

Recycled product manufacturers face additional challenges in convincing potential buyers that the product contains as much value as traditional alternatives. Green products can often be perceived as a negative to the end-user. To overcome this issue, SelecTech’s marketing message stresses premium quality, lower cost, and superior function. SelecTech sells features and function, and does not emphasize recycled content. For example, product literature does not contain the recycled “chasing arrows” symbol.

Still, all things being equal, green product attributes are a plus according to SelecTech. Taking advantage of the green label often depends on the end user and the marketing message must be selective. Most customers searching through Home Depot are not likely to be looking specifically for products with

recycled content. In this case, point of purchase advertising such as labels and displays should emphasize product quality and function. There are specific green retailers, however, who attract customers based on the environmental theme. Depending on the target buyer and location, the marketing message must be customized to effectively utilize the various product attributes, both green and non-green, that may affect the purchasing decision. “It is easy to underestimate the selling process,” according to Tom Ricciardelli. Beyond the intricacies of brand management with respect to recycled products, SelecTech also found that the selling process was much more difficult than initially estimated. At first, SelecTech felt that, “better quality will result in people buying the product.” However, the selling process did not turn out that way. Convincing buyers of quality required effective marketing. This was challenging for a company that was technology driven; marketing was a tangential issue to the product development process that SelecTech was founded on. As a result, management had to devote much more time and energy to marketing functions, developing a variety of distribution channels. Hiring marketing consultants was too expensive, so SelecTech used guerilla marketing techniques such as partnership development and attending trade shows in specific industry sectors, to minimize marketing costs. Partnerships included private branding and selling through sales representatives within industry sectors. For example, SelecTech began selling products through independent sales representatives or “selling companies,” who specialize in supplying garden centers or playground equipment providers. The sales function is currently about 80% outsourced, which limits exposure from complete reliance on selling companies who may change focus or limit resources. Establishing these selling relationships and distribution outlets has been a significant challenge for SelecTech. Print advertising has been limited because of the high expense. When placing print ads, SelecTech has focused on trade magazines in their target sectors to reach higher volume buyers, as opposed to retail advertising. Attending trade shows for particular industries has also been effective, such as park and recreation expos. Green trade shows are useful for networking within the environmental community but have not been an effective selling mechanism for SelecTech, as serious buyers are usually looking for value rather than green products, and would probably not be attending an environmental Expo.

Lesson: brand management must be focused on product quality and attributes, buyers are looking for product value over green content. Selling and distribution channel development will probably take more time than expected, even with a superior product.

Customer Relationship Management

SelecTech maintains contact with customers during and after the sales process for two main reasons: product development ideas and industry knowledge. SelecTech builds customer relationships to gain their feedback and learn what they are saying. For larger customers, SelecTech sometimes modifies certain features if deemed valuable for other existing or potential customers, and incorporates changes into standard manufacturing molds. SelecTech even helped with installations of its plastic timbers to

learn more about the strengths and weaknesses of the product, and further refine the product design to eliminate problems. SelecTech also solicits feedback from its selling partners and distributors to learn more about the competitive landscape. Actively communicating with customers can lead to valuable knowledge of competitors’ product offerings and industry trends. While this type of intelligence gathering can be difficult in a retail setting when interacting with thousands of disparate customers, SelecTech’s selling strategies enable the company to gain end-user data via a limited number of intermediaries through which SelecTech does most of its direct selling. These partners interact directly with the end-users whether selling to earn commissions or privately branding SelecTech products.

Lesson: business development takes place beyond the sales cycle, and involves creating communications channels to refine current product offerings and generate future business.

Internal Organization

SelecTech has evolved over its seven-year existence, from a start-up environment to a more stabilized business striving to expand its revenue base. In the early stages, operations would change on the fly but as production volumes increased, it became necessary to put standards in place and tighten operational control for production consistency and efficiency. Specific steps to improve operations included talking with manufacturing operations employees to figure out ways to lower cost and increase efficiency, and hiring staff specialized in designing workflows to maximize throughput capabilities. Persistent efforts to analyze and re-work operations led to overall cost reductions of 30% and a reduction in monthly break-even time by 25%. While increasing standardization to reduce waste and make operations more systematic, SelecTech also wished to maintain the creativity that drove the company’s initial phases. There is still time set aside to “play” with new plastic mixes, testing new sources of recycled plastics and developing materials, even experimenting with new products or product attributes. For example, SelecTech could expand its customer base for floor tiles by providing new appearances beyond the current industrial look and feel.

Within the systematic structure of SelecTech’s operations, there is also a deliberate effort to innovate and try new techniques and recycled materials. Finally, SelecTech has faced a steep learning curve from a senior management perspective. One aspect has been changing general management priorities and activities as the company has grown and developed from being a startup. For example, Tom Ricciardelli has a business and engineering background, and in the beginning stages of the company was directly involved with product development and manufacturing operations. As the company grew, other management activities such as marketing and day-to-day oversight required that he delegate more responsibility to the manufacturing operations he first designed. Learning to delegate tasks and responsibilities was a significant growth related issue, and one that still poses difficulties. In addition, senior management at first underestimated the level of interaction needed with employees to make sure everyone was working towards the same goals. Constant communication, “management by walking around,” and face-

“The lesson content has been compiled from various sources in public domain including but not limited to the internet for the convenience of the users. The university has no proprietary right on the same.”



EIILM UNIVERSITY
S I K K I M

Jorethang, District Namchi, Sikkim- 737121, India
www.eilmuniversity.ac.in