CHAPTER 3

FINANCIAL ANALYSIS AND PLANNING– RATIO ANALYSIS

LEARNING OUTCOMES

- Discuss Sources of financial data for Analysis
- Discuss financial ratios and its Types
- Discuss use of financial ratios to analyse the financial statement.
- Analyse the ratios from the perspective of investors, lenders, suppliers, managers etc. to evaluate the profitability and financial position of an entity.
- Describe the users and objective of Financial Analysis:- A Birds Eye View
- Discuss Du Pont analysis
- State the limitations of Ratio Analysis

CHAPTER OVERVIEW

RATIO ANALYSIS

- Types of Ratios
  - Liquidity Ratios/Short-term solvency ratios
  - Leverage Ratio/Long term solvency Ratios
  - Activity Ratios/Efficiency Ratios/Performance Ratios/Turnover ratios Profitability Ratios
- Application of Ratio Analysis in decision making
- Relationship of Financial Management with other disciplines of accounting.

3.1 INTRODUCTION

The basis for financial analysis, planning and decision making is financial statements which mainly consist of Balance Sheet and Profit and Loss Account. The profit & loss account shows the operating activities of the concern and the balance sheet depicts the balance value of the acquired assets and of liabilities at a particular point of time.

However, the above statements do not disclose all of the necessary and relevant information. For the purpose of obtaining the material and relevant information necessary for ascertaining the financial strengths and weaknesses of an enterprise, it is necessary to analyse the data depicted in the financial statement.

The financial manager has certain analytical tools which help in financial analysis and planning. One of the main tool is Ratio Analysis. Let us discuss the Ratio Analysis.

3.2 RATIOS AND RATIO ANALYSIS

Let us first understand the definition of ratio and meaning of ratio analysis

3.2.1 Definition of Ratio

A ratio is defined **as "the indicated quotient of two mathematical expressions and as the relationship between two or more things."** Here ratio means financial ratio or accounting ratio which is a mathematical expression of the relationship between accounting figures.

3.2.2 Ratio Analysis

The term financial ratio can be explained by defining how it is calculated and what the objective of this calculation is

a. Calculation Basis (Basis of Calculation)

- A relationship expressed in mathematical terms;
- Between two individual figures or group of figures;
- Connected with each other in some logical manner; and
- Selected from financial statements of the concern

b. Objective for financial ratios is that all stakeholders (owners, investors, lenders, employees etc.) can draw conclusions about the

- Performance (past, present and future);
- Strengths & weaknesses of a firm; and
- Can take decisions in relation to the firm.

Ratio analysis is based on the fact that a single accounting figure by itself may not communicate any meaningful information but when **expressed relative to some other figure**, it may definitely provide some significant information.

Ratio analysis is not just comparing different numbers from the balance sheet, income statement, and cash flow statement. It is comparing the number against previous years, other companies, the industry, or even the economy in general for the purpose of financial analysis.

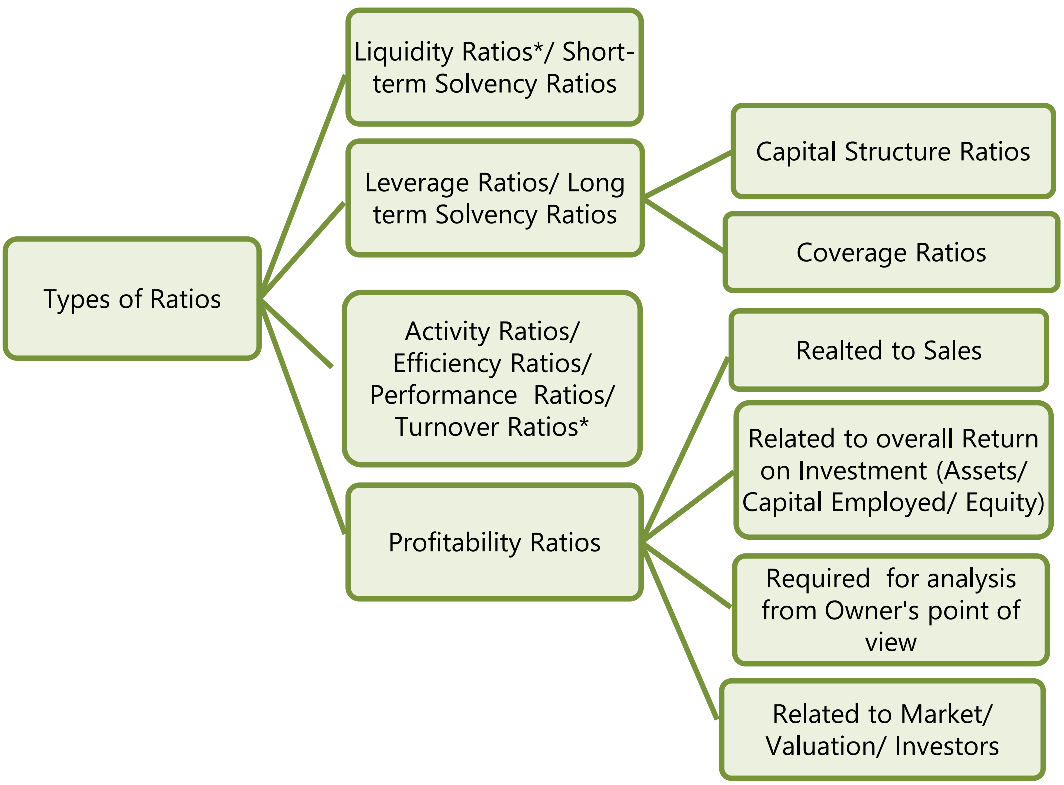
3.2.3 Sources of Financial Data for Analysis

The sources of information for financial statement analysis are:

1. Annual Reports

2. Interim financial statements
3. Notes to Accounts
4. Statement of cash flows
5. Business periodicals.
6. Credit and investment advisory services

3.3 TYPES OF RATIOS



Classification of Ratios

**Liquidity ratios should be examined taking relevant turnover ratios into consideration.*

3.3.1 Liquidity Ratios

The terms **'liquidity' and 'short-term solvency'** are used synonymously.

Liquidity or short-term solvency means ability of the business to pay its short-term liabilities. Inability to pay-off short-term liabilities affects its credibility as well as its credit rating. Continuous default on the part of the business leads to commercial bankruptcy. Eventually such commercial bankruptcy may lead to its sickness and dissolution. Short-term lenders and creditors of a business are very much interested to know its state of liquidity because of their financial stake. Both lack of sufficient liquidity and excess liquidity is bad for the organization.

Various Liquidity Ratios are:

(a) Current Ratio

(b) Quick Ratio or Acid test Ratio

(c) Cash Ratio or Absolute Liquidity Ratio

(d) Basic Defense Interval or Interval Measure Ratios

(e) Net Working Capital Ratio

(a) Current Ratio: The Current Ratio is one of the best known measures of short term solvency. It is the most common measure of short-term liquidity.

The main question this ratio addresses is: **"Does your business have enough current assets to meet the payment schedule of its current debts with a margin of safety for possible losses in current assets?"**

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Where,

Current Assets	=	Inventories + Sundry Debtors + Cash and Bank Balances + Receivables/ Accruals + Loans and Advances + Disposable Investments + Any other current assets.
Current Liabilities	=	Creditors for goods and services + Short-term Loans + Bank Overdraft + Cash Credit + Outstanding Expenses + Provision for Taxation + Proposed Dividend + Unclaimed Dividend + Any other current liabilities.

The main question this ratio addresses is: "Does your business have enough current assets to meet the payment schedule of its current debts with a margin of safety for possible losses in current assets?"

Interpretation

A generally acceptable current ratio is 2:1. But whether or not a specific ratio is satisfactory depends on the nature of the business and the characteristics of its current assets and liabilities.

(b) Quick Ratio: The Quick Ratio is sometimes called the **"acid-test"** ratio and is one of the best **measures of liquidity**.

$$\text{Quick Ratio or Acid Test Ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}}$$

Where,

Quick Assets	=	Current Assets – Inventories – Prepaid expenses
Current Liabilities	=	As mentioned under Current Ratio.

The Quick Ratio is a much more conservative measure of short-term liquidity than the Current Ratio. It helps answer the question: "If all sales revenues should disappear, could my business meet its current obligations with the readily convertible quick funds on hand?"

Quick Assets consist of only cash and near cash assets. Inventories are deducted from current assets on the belief that these are not 'near cash assets' and also because in times of financial difficulty inventory may be saleable only at liquidation value. But in a seller's market inventories are also near cash assets.

Interpretation

An acid-test of 1:1 is considered satisfactory unless the majority of "quick assets" are in accounts receivable, and the pattern of accounts receivable collection lags behind the schedule for paying current liabilities.

(c) Cash Ratio/ Absolute Liquidity Ratio: **The cash ratio measures the absolute liquidity of the business.** This ratio considers only the absolute liquidity available with the firm. This ratio is calculated as:

$$\text{Cash Ratio} = \frac{\text{Cash and Bank balances} + \text{Marketable Securities}}{\text{Current Liabilities}}$$

Or,

$$\frac{\text{Cash and Bank balances} + \text{Current Investments}}{\text{Current Liabilities}}$$

Interpretation

The Absolute Liquidity Ratio only tests short-term liquidity in terms of cash and marketable securities/ current investments.

(d) Basic Defense Interval/ Interval Measure:

$$\text{Basic Defense Interval} = \frac{\text{Cash and Bank balances} + \text{Marketable Securities}}{\text{Opearing Expenses} \div \text{No. of days (say 360)}}$$

Or

$$\text{Interval Measure} = \frac{\text{Current Assets - Inventories}}{\text{Daily Operating Expenses}}$$

$$\text{Daily Operating Expenses} = \frac{\begin{array}{c}\text{Cost of Goods Sold} + \text{Selling Administartion and other}\\ \text{General expenses - Depreciation and other non cash expenditure}\end{array}}{\text{No. of days in a year}}$$

Interpretation

If for some reason all the company's revenues were to suddenly cease, the Basic Defense Interval would help determine the number of days for which the company can cover its cash expenses without the aid of additional financing.

(e) Net Working Capital Ratio: Net working capital is more a measure of cash flow than a ratio. The result of this calculation must be a positive number. It is calculated as shown below:

Net Working Capital Ratio = Current Assets-Current Liabilities (Excluding short-term bank borrowing)

Interpretation

Bankers look at Net Working Capital over time to determine a company's ability to weather financial crises. Loans are often tied to minimum working capital requirements.

3.3.2 Long-term Solvency Ratios /Leverage Ratios

The leverage ratios may be defined as those financial ratios which measure the **long term stability and structure of the firm**. These ratios indicate the mix of funds provided by owners and lenders and assure the lenders of the long term funds with regard to:

(i) Periodic payment of interest during the period of the loan and

(ii) Repayment of principal amount on maturity.

Leverage ratios are of two types:

1. **Capital Structure Ratios**
    - (a) Equity Ratio
    - (b) Debt Ratio
    - (c) Debt to Equity Ratio
    - (d) Debt to Total Assets Ratio
    - (e) Capital Gearing Ratio
    - (f) Proprietary Ratio
2. **Coverage Ratios**
    - (a) Debt-Service Coverage Ratio (DSCR)
    - (b) Interest Coverage Ratio
    - (c) Preference Dividend Coverage Ratio
    - (d) Fixed Charges Coverage Ratio

3.3.2.1 Capital Structure Ratios

These ratios provide an insight into the financing techniques used by a business and focus, as a consequence, on the **long-term solvency position**.

From the balance sheet one can get only the absolute fund employed and its sources, but only capital structure ratios show the relative weight of different sources.

Various capital structure ratios are:

(a) Equity Ratio:

$$\text{Equity Ratio} = \frac{\text{Shareholders' Equity}}{\text{Capital Employed}}$$

This ratio indicates proportion of owners' fund to total fund invested in the business. Traditionally, it is believed that higher the proportion of owners' fund lower is the degree of risk.

(b) Debt Ratio:

$$\text{Debt Ratio} = \frac{\text{Total outside liabilities}}{\text{Total Debt} + \text{Net worth}}$$

Or,

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Net Assets}}$$

Total debt or total outside liabilities includes short and long term borrowings from financial institutions, debentures/bonds, deferred payment arrangements for buying capital equipment, bank borrowings, public deposits and any other interest bearing loan.

Interpretation

This ratio is used to analyse the long-term solvency of a firm.

(c) Debt to Equity Ratio:

$$\text{Debt to Equity Ratio} = \frac{\text{Total Outside Liabilities}}{\text{Shareholders' Equity}} = \frac{\text{Total Debt}^{*}}{\text{Shareholders' Equity}}$$

Or,

$$= \frac{\text{Long-term Debt}^{**}}{\text{Shareholders' equity}}$$

*Not merely long-term debt.

** Sometimes only interest-bearing, long term debt is used instead of total liabilities (exclusive of current liabilities)

The shareholders' equity is equity and preference share capital + post accumulated profits (excluding fictitious assets etc).

Interpretation

A high debt to equity ratio here means less protection for creditors, a low ratio, on the other hand, indicates a wider safety cushion (i.e., creditors feel the owner's funds can help absorb possible losses of income and capital). This ratio indicates the proportion of debt fund in relation to equity. This ratio is very often referred in capital structure decision as well as in the legislation dealing with the capital structure decisions (i.e. issue of shares and debentures). Lenders are also very keen to know this ratio since it shows relative weights of debt and equity. Debt equity ratio is the indicator of firm's financial leverage.

(d) Debt to Total Assets Ratio: This ratio measures the **proportion of total assets financed with debt** and, therefore, the extent of financial leverage.

$$\text{Debt to Total Assets Ratio} = \frac{\text{Total Outside Liabilities}}{\text{Total Assets}}$$

Or,

$$= \frac{\text{Total Debt}}{\text{Total Assets}}$$

(e) Capital Gearing Ratio: In addition to debt-equity ratio, sometimes capital gearing ratio is also calculated to show the proportion of fixed interest (dividend) bearing capital to funds belonging to equity shareholders i.e. equity funds or net worth.

$$\text{Capital Gearing ratio} = \frac{(\text{Preference Share Capital} + \text{Debentures} + \text{Other Borrowed funds})}{(\text{Equity Share Capital} + \text{Reserves \& Surplus} - \text{Losses})}$$

(f) Proprietary Ratio:

$$\text{Proprietary Ratio} = \frac{\text{Proprietary Fund}}{\text{Total Assets}}$$

Proprietary fund includes Equity Share Capital + Preference Share Capital + Reserve & Surplus. Total assets exclude fictitious assets and losses.

Interpretation

It indicates the proportion of total assets financed by shareholders.

3.3.2.2 Coverage Ratios

The coverage ratios measure the **firm's ability to service the fixed liabilities**. These ratios establish the relationship between fixed claims and what is normally available out of which these claims are to be paid. The fixed claims consist of:

(i) Interest on loans

(ii) Preference dividend

(iii) Amortisation of principal or repayment of the instalment of loans or redemption of preference capital on maturity.

The following are important coverage ratios:

(a) Debt Service Coverage Ratio (DSCR): Lenders are interested in **debt service coverage to judge the firm's ability to pay off current interest and instalments.**

$$\text{Debt Service Coverage Ratio} = \frac{\text{Earnings available for debt services}}{\text{Interest + Instalments}}$$

Earning for debt service* = Net profit (Earning after taxes) + Non-cash operating expenses like depreciation and other amortizations + Interest +other adjustments like loss on sale of Fixed Asset etc.

*Fund from operations (or cash from operations) before interest and taxes also can be considered as per the requirement.

Interpretation

Normally DSCR of 1.5 to 2 is satisfactory. You may note that sometimes in both numerator and denominator lease rentals may be added.

(b) Interest Coverage Ratio: This ratio also known as **"times interest earned ratio"** indicates the firm's ability to meet interest (and other fixed-charges) obligations. This ratio is computed as:

$$\text{Interest Coverage Ratio} = \frac{\text{Earnings before interest and taxes (EBIT)}}{\text{Interest}}$$

Interpretation

Earnings before interest and taxes are used in the numerator of this ratio because the ability to pay interest is not affected by tax burden as interest on debt funds is deductible expense. This ratio indicates the extent to which earnings may fall without causing any embarrassment to the firm regarding the payment of interest charges. A high interest coverage ratio means that an enterprise can easily meet its interest obligations even if earnings before interest and taxes suffer a considerable decline. A lower ratio indicates excessive use of debt or inefficient operations.

(c) Preference Dividend Coverage Ratio: This ratio measures the **ability of a firm to pay dividend on preference shares** which carry a stated rate of return. This ratio is computed as:

$$\text{Preference Dividend Coverage Ratio} = \frac{\text{Net Profit / Earning after taxes (EAT)}}{\text{Preference dividend liability}}$$

Earnings after tax is considered because unlike debt on which interest is charged on the profit of the firm, the preference dividend is treated as appropriation of profit.

Interpretation

This ratio indicates margin of safety available to the preference shareholders. A higher ratio is desirable from preference shareholders point of view.

Similarly **Equity Dividend coverage ratio** can also be calculated taking (EAT – Pref. Dividend) and equity fund figures into consideration.

(d) Fixed Charges Coverage Ratio: This ratio shows how many times the cash flow before interest and taxes covers all fixed financing charges. This ratio of more than 1 is considered as safe.

$$\text{Fixed Charges Coverage Ratio} = \frac{\text{EBIT} + \text{Depreciation}}{\text{Interest} + \dfrac{\text{Repayment of loan}}{1 - \text{tax rate}}}$$

Notes for calculating Ratios:

1. EBIT (Earnings before interest and taxes) = PBIT (Profit before interest and taxes),

   EAT (Earnings after taxes) = PAT (Profit after taxes),

   EBT (Earnings before taxes) = PBT (Profit before taxes)

2. Ratios shall be calculated based on requirement and availability and may deviate from original formulae.

3. Numerator should be taken in correspondence with the denominator and vice-versa.

3.3.3 Activity Ratios/ Efficiency Ratios/ Performance Ratios/ Turnover Ratios

These ratios are employed to **evaluate the efficiency with which the firm manages and utilises its assets.** For this reason, they are often called 'Asset management ratios'. These ratios usually indicate the frequency of sales with respect to its assets. These assets may be capital assets or working capital or average inventory.

Activity Ratios/ Efficiency Ratios/ Performance Ratios/ Turnover Ratios:

(a) Total Assets Turnover Ratio

(b) Fixed Assets Turnover Ratio

(c) Capital Turnover Ratio

(d) Current Assets Turnover Ratio

(e) Working Capital Turnover Ratio

  (i) Inventory/ Stock Turnover Ratio

  (ii) Receivables (Debtors) Turnover Ratio

  (iii) Payables (Creditors) Turnover Ratio.

These ratios are usually calculated with reference to sales/cost of goods sold and are expressed in terms of rate or times.

Asset Turnover Ratios: Based on different concepts of assets employed, it can be expressed as follows:

(a) Total Asset Turnover Ratio: This ratio measures the efficiency with which the firm uses its total assets. This ratio is computed as:

$$\text{Total Asset Turnover Ratio} = \frac{\text{Sales / Cost of Goods Sold}}{\text{Total Assets}}$$

(b) Fixed Assets Turnover Ratio: It measures the efficiency with which the firm uses its fixed assets.

$$\text{Fixed Assets Turnover Ratio} = \frac{\text{Sales / Cost of Goods Sold}}{\text{Fixed Assets}}$$

Interpretation

A high fixed assets turnover ratio indicates efficient utilisation of fixed assets in generating sales. A firm whose plant and machinery are old may show a higher fixed assets turnover ratio than the firm which has purchased them recently.

(c) Capital Turnover Ratio/ Net Asset Turnover Ratio:

$$\text{Capital Turnover Ratio} = \frac{\text{Sales / Cost of Goods Sold}}{\text{Net Assets}}$$

Interpretation

This ratio indicates the firm's ability of generating sales/ Cost of Goods Sold per rupee of long term investment. The higher the ratio, the more efficient is the utilisation of owner's and long-term creditors' funds. Net Assets includes Net Fixed Assets and Net Current Assets (Current Assets – Current Liabilities). Since Net Assets equals to capital employed it is also known as Capital Turnover Ratio.

(d) Current Assets Turnover Ratio: It measures the efficiency using the current assets by the firm.

$$\text{Current Assets Turnover Ratio} = \frac{\text{Sales / Cost of Goods Sold}}{\text{Current Assets}}$$

(e) Working Capital Turnover Ratio:

$$\text{Working Capital Turnover Ratio} = \frac{\text{Sales / Cost of Goods Sold}}{\text{Working Capital}}$$

Interpretation

Working Capital Turnover is further segregated into Inventory Turnover, Debtors Turnover, and Creditors Turnover.

Note: Average of Total Assets/ Fixed Assets/ Current Assets/ Net Assets/ Working Capita also can be taken.

(i) Inventory/ Stock Turnover Ratio: This ratio also known as **stock turnover ratio establishes the relationship between the cost of goods sold during the**

year and average inventory held during the year. It measures the efficiency with which a firm utilizes or manages its inventory**.** It is calculated as follows:

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold / Sales}}{\text{Average Inventory *}}$$

$$\text{*Average Inventory} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$$

In the case of inventory of raw material the inventory turnover ratio is calculated using the following formula :

$$\text{Raw Material Inventory Turnover Ratio} = \frac{\text{Raw Material Consumed}}{\text{Average Raw Material Stock}}$$

Interpretation

This ratio indicates that how fast inventory is used or sold. A high ratio is good from the view point of liquidity and vice versa. A low ratio would indicate that inventory is not used/ sold/ lost and stays in a shelf or in the warehouse for a long time.

(ii) Receivables (Debtors) Turnover Ratio: In case firm sells goods on credit, the realization of sales revenue is delayed and the receivables are created. The cash is realised from these receivables later on.

The **speed with which these receivables are collected affects** the liquidity position of the firm. The debtor's turnover ratio throws light on the collection and credit policies of the firm. It measures the efficiency with which management is managing its accounts receivables**.** It is calculated as follows:

$$\text{Receivable (Debtor) Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$$

Receivables (Debtors') Velocity: Debtors' turnover ratio indicates the average collection period. However, the average collection period can be directly calculated as follows:

$$\text{Receivable Velocity/ Average Collection Period} = \frac{\text{Average Accounts Receivables}}{\text{Average Daily Credit Sales}}$$

Or,
$$= \frac{\text{12 months / 52 weeks / 360 days}}{\text{Receivable Turnover Ratio}}$$

$$\text{Average Daily Credit Sales} = \text{Average Daily Credit Sales} = \frac{\text{Credit Sales}}{\text{No. of days in year (say 360)}}$$

Interpretation

The average collection period measures the average number of days it takes to collect an account receivable. This ratio is also referred to as the number of days of receivable and the number of day's sales in receivables.

(iii) Payables Turnover Ratio: This ratio is calculated on the same lines as receivable turnover ratio is calculated. This ratio shows the velocity of payables payment by the firm. It is calculated as follows:

$$\text{Payables Turnover Ratio} = \frac{\text{Annual Net Credit Purchases}}{\text{Average Accounts Payables}}$$

A low creditor's turnover ratio reflects liberal credit terms granted by suppliers, while a high ratio shows that accounts are settled rapidly.

Payable Velocity/ Average payment period can be calculated using:

$$= \frac{\text{Average Accounts Payable}}{\text{Average Daily Credit Purchases}}$$

Or,

$$= \frac{\text{12 months / 52 weeks / 360 days}}{\text{Payables Turnover Ratio}}$$

In determining the credit policy, debtor's turnover and average collection period provide a unique guidance.

Interpretation

The firm can compare what credit period it receives from the suppliers and what it offers to the customers. Also it can compare the average credit period offered to the customers in the industry to which it belongs.

The above three ratios i.e. Inventory Turnover Ratio/ Receivables Turnover Ratio are also relevant to examine liquidity of an organization.

Notes for calculating Ratios:

1. Only selling & distribution expenses differentiate Cost of Goods Sold (COGS) and Cost of Sales (COS) in its absence, COGS will be equal to sales.
2. We can consider Cost of Goods Sold/ Cost of Sales to calculate turnover ratios eliminating profit part.
3. Average of Total Assets/ Fixed Assets/ Current Assets/ Net Assets/ Working Capital/ also can be taken in calculating the above ratios. Infact when average figures of total assets, net assets, capital employed, shareholders' fund etc. are available it may be preferred to calculate ratios by using this information.
4. Ratios shall be calculated based on requirement and availability and may deviate from original formulae.

3.3.4 Profitability Ratios

The profitability ratios **measure the profitability or the operational efficiency** of the firm. These ratios reflect the final results of business operations. They are some of the most closely watched and widely quoted ratios. Management attempts to maximize these ratios to maximize firm value.

The results of the firm can be evaluated in terms of its earnings with reference to a given level of assets or sales or owner's interest etc. Therefore, the profitability ratios are broadly classified in four categories:

(i) Profitability Ratios related to Sales

(ii) Profitability Ratios related to overall Return on Investment

(iii) Profitability Ratios required for Analysis from Owner's Point of View

(iv) Profitability Ratios related to Market/ Valuation/ Investors.

Profitability Ratios are as follows:

1. Profitability Ratios based on Sales

(a) Gross Profit Ratio

(b) Net Profit Ratio

(c) Operating Profit Ratio

(d) Expenses Ratio

2. Profitability Ratios related to Overall Return on Assets/ Investments

(a) Return on Investments (ROI)

(i) Return on Assets (ROA)

(ii) Return of Capital Employed (ROCE)

(iii) Return on Equity (ROE)

3. Profitability Ratios required for Analysis from Owner's Point of View

(a) Earnings per Share (EPS)

(b) Dividend per Share (DPS)

(c) Dividend Payout Ratio (DP)

4. Profitability Ratios related to Market/ Valuation/ Investors

(a) Price Earnings (P/E) Ratio

(b) Dividend and Earning Yield

(c) Market Value/ Book Value per Share (MVBV)

(d) Q Ratio

3.3.4.1 Profitability Ratios based on Sales

(a) Gross Profit (G.P) Ratio/ Gross Profit Margin: It measures the percentage of each sale in rupees remaining after payment for the goods sold.

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Sales}} \times 100$$

Interpretation

Gross profit margin depends on the relationship between price/ sales, volume and costs. A high Gross Profit Margin is a favourable sign of good management.

(b) Net Profit Ratio/ Net Profit Margin: It measures the relationship between net profit and sales of the business. Depending on the concept of net profit it can be calculated as:

(i) $$\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Sales}} \times 100 \text{ or } \frac{\text{Earnings after taxes (EAT)}}{\text{Sales}} \times 100$$

(ii) Pre-tax Profit Ratio = $\frac{\text{Earnings before taxes (EBT)}}{\text{Sales}} \times 100$

Interpretation

Net Profit ratio finds the proportion of revenue that finds its way into profits. A high net profit ratio will ensure positive returns of the business.

(c) Operating Profit Ratio:

Operating profit ratio is also calculated to evaluate operating performance of business.

$$\text{Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Sales}} \times 100$$

or,

$$\frac{\text{Earnings before interest and taxes (EBIT)}}{\text{Sales}} \times 100$$

Where,

Operating Profit = Sales – Cost of Goods Sold (COGS) – Expenses

Interpretation

Operating profit ratio measures **the percentage of each sale in rupees that remains after the payment of all costs and expenses except for interest and taxes**. This ratio is followed closely by analysts because it focuses on operating results. Operating profit is often referred to as earnings before interest and taxes or EBIT.

(d) Expenses Ratio: Based on different concepts of expenses it can be expresses in different variants as below:

(i) Cost of Goods Sold (COGS) Ratio $= \frac{\text{COGS}}{\text{Sales}} \times 100$

(ii) Operating Expenses Ratio $= \frac{\text{Administrative exp.} + \text{Selling \& Distribution OH}}{\text{Sales}} \times 100$

(iii) Operating Ratio $= \frac{\text{COGS} + \text{Operating expenses}}{\text{Sales}} \times 100$

(iv) Financial Expenses Ratio $= \frac{\text{Financial expenses}^*}{\text{Sales}} \times 100$

*It excludes taxes, loss due to theft, goods destroyed by fire etc.

Administration Expenses Ratio and Selling & Distribution Expenses Ratio can also be calculated in similar ways.

3.3.4.2 Profitability Ratios related to Overall Return on Assets/ Investments

(a) Return on Investment (ROI): ROI is the most important ratio of all. It is the **percentage of return on funds invested in the business by its owners**. In short, this ratio tells the owner whether or not all the effort put into the business has been worthwhile. It compares earnings/ returns/ profit with the investment in the company. The ROI is calculated as follows:

$$\text{Return on Investment} = \frac{\text{Return / Profit / Earnings}}{\text{Investment}} \times 100$$

Or,

$$= \frac{\text{Return / Profit / Earnings}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Investment}}$$

$$\frac{\text{Return / Profit / Earnings}}{\text{Sales}} = \text{Profitability Ratio}$$

$$\text{Investment Turnover Ratio} = \frac{\text{Sales}}{\text{Investments}}$$

So, **ROI = Profitability Ratio × Investment Turnover Ratio**. ROI can be improved either by improving Profitability Ratio or Investment Turnover Ratio or by both.

The concept of investment varies and accordingly there are three broad categories of ROI i.e.

(i) Return on Assets (ROA),

(ii) Return on Capital Employed (ROCE) and

(iii) Return on Equity (ROE).

We should keep in mind that investment may be Total Assets or Net Assets. Further funds employed in net assets are also known as capital employed which is nothing but Net worth plus Debt, where Net worth is equity shareholders' fund. Similarly the concept of returns/ earnings/ profits may vary as per the requirement and availability of information.

(i) Return on Assets (ROA): The profitability ratio is measured in terms of relationship between **net profits and assets employed** to earn that profit. This ratio measures the profitability of the firm in terms of assets employed in the firm. Based on various concepts of net profit (return) and assets the ROA may be measured as follows:

$$ROA = \frac{\text{Net Profit after taxes}}{\text{Average Total Assets}} \text{ or } \frac{\text{Net Profit after taxes}}{\text{Average Tangible Assets}} \text{ or } \frac{\text{Net Profit after taxes}}{\text{Average Fixed Assets}}$$

Here net profit is exclusive of interest. As Assets are also financed by lenders, hence ROA can be calculated as:

$$= \frac{\text{Net Profit after taxes} + \text{Interest}}{\text{Average Total Assets / Average Tangible Assets / Average Fixed Assets}}$$

Or,

$\frac{\text{EBIT}(1-t)}{\text{Average Total Assets}}$ {also known as **Return on Total Assets** (ROTA)}

Or,

$\frac{\text{EBIT}(1-t)}{\text{Average Net Assets}}$ {also known as **Return on Net Assets** (RONA)}

(ii) Return on Capital Employed (ROCE): It is another variation of ROI.

The ROCE is calculated as follows:

$$\text{ROCE (Pre-tax)} = \frac{\text{Earnings before interest and taxes (EBIT)}}{\text{Capital Employed}} \times 100$$

$$\text{ROCE (Post-tax)} = \frac{\text{EBIT}(1-t)}{\text{Capital Employed}} \times 100$$

Sometime it is calculated as

$$= \frac{\text{Net Profit after taxes (PAT / EAT)} + \text{Interest}}{\text{Capital Employed}} \times 100$$

Where,

Capital Employed = Total Assets – Current Liabilities

Or

= Fixed Assets + Working Capital

ROCE should always be higher than the rate at which the company borrows.

Intangible assets (assets which have no physical existence like goodwill, patents and trade-marks) should be included in the capital employed. But no fictitious asset should be included within capital employed. If information is available then average capital employed shall be taken.

(iii) Return on Equity (ROE): Return on Equity measures the **profitability of equity funds invested in the firm**. This ratio reveals how profitably of the owners' funds have been utilised by the firm. It also measures the percentage return generated to equity shareholders. This ratio is computed as:

$$\text{ROE} = \frac{\text{Net Profit after taxes} - \text{Preference dividend (if any)}}{\dfrac{\text{Net worth}}{\text{equity shareholders' fund}}} \times 100$$

Return on equity is one of the most important indicators of a firm's profitability and potential growth. Companies that boast a high return on equity with little or no debt are able to grow without large capital expenditures, allowing the owners of the business to withdraw cash and reinvest it elsewhere. Many investors fail to realize, however, that two companies can have the same return on equity, yet one can be a much better business. If return on total shareholders is calculated then Net Profit after taxes (before preference dividend) shall be divided by total shareholders' fund includes preference share capital.

Return on Equity using the Du Pont Model:

A finance executive at E.I. Du Pont de Nemours and Co., of Wilmington, Delaware, created the DuPont system of financial analysis in 1919. That system is used around the world today and serves as the basis of components that make up return on equity.

There are various components in the calculation of return on equity using the traditional DuPont model- the net profit margin, asset turnover, and the equity multiplier. By examining each input individually, the sources of a company's return on equity can be discovered and compared to its competitors.

(i) ***Profitability/Net Profit Margin****:* The **net profit margin is simply the after-tax profit a company generates for each rupee of revenue**. Net profit margin varies across industries, making it important to compare a potential

investment against its competitors. Although the general rule-of-thumb is that a higher net profit margin is preferable, it is not uncommon for management to purposely lower the net profit margin in a bid to attract higher sales.

$$\frac{\text{Profitability}}{\text{Net profit margin}} = \frac{\text{Profit}}{\text{Net Income}} \div \frac{\text{Sales}}{\text{Revenue}}$$

Net profit margin is a safety cushion; the lower the margin, the less room for error. A business with 1% margins has no room for flawed execution. Small miscalculations on management's part could lead to tremendous losses with little or no warning.

(ii) ***Investment Turnover/Asset Turnover/Capital Turnover***: The asset turnover ratio is a measure of **how effectively a company converts its assets into sales.** It is calculated as follows:

Investment Turnover/Asset Turnover/Capital Turnover

= Sales/Revenue ÷ Investment/Assets/Capital

The asset turnover ratio tends to be inversely related to the net profit margin; i.e., the higher the net profit margin, the lower the asset turnover. The result is that the investor can compare companies using different models (low-profit, high-volume vs. high-profit, low-volume) and determine which one is the more attractive business.

(iii) ***Equity Multiplier***: It is possible for a company with terrible sales and margins to take on excessive debt and artificially increase its return on equity. The equity multiplier, a measure of financial leverage, allows the investor to see what portion of the return on equity is the result of debt. The equity multiplier is calculated as follows:

Equity Multiplier = Investment /Assets /Capital ÷ Shareholders' Equity

Calculation of Return on Equity

To calculate the return on equity using the DuPont model, simply multiply the three components (net profit margin, asset turnover, and equity multiplier.)

Return on Equity = (Profitability/Net profit margin) (Investment Turnover / Asset Turnover / Capital Turnover) Equity Multiplier)

Example: XYZ Company's details are as under:

Revenue: ₹29,261; Net Income: ₹4,212; Assets: ₹27,987; Shareholders' Equity: ₹13,572. CALCULATE return on equity.

Solution

Net Profit Margin = Net Income (₹ 4,212) ÷ Revenue (₹ 29,261) = 0.14439, or 14.39%

Asset Turnover = Revenue (₹ 29,261) ÷ Assets (₹ 27,987) = 1.0455

Equity Multiplier = Assets (₹ 27,987) ÷ Shareholders' Equity (₹ 13,572) = 2.0621

Finally, we multiply the three components together to calculate the return on equity: (₹ 27,987)

Return on Equity = Net Profit Margin x Asset Turnover x Equity Multiplier

= (0.1439) x (1.0455) x (2.0621) = 0.3102, or 31.02%

Analysis: A 31.02% return on equity is good in any industry. Yet, if you were to leave out the equity multiplier to see how much company would earn if it were completely debt-free, you will see that the ROE drops to 15.04%. 15.04% of the return on equity was due to profit margins and sales, while 15.96% was due to returns earned on the debt at work in the business. If you found a company at a comparable valuation with the same return on equity yet a higher percentage arose from internally-generated sales, it would be more attractive.

3.3.4.3 Profitability Ratios Required for Analysis from Owner's Point of View

(a) Earnings per Share (EPS): The profitability of a firm from the point of view of ordinary shareholders can be measured in terms of earnings n per share basis. This is known as Earnings per share. It is calculated as follows:

$$\text{Earnings per Share (EPS)} = \frac{\text{Net profit available to equity shareholders}}{\text{Number of equity shares outstanding}}$$

(b) Dividend per Share (DPS): Earnings per share as stated above reflects the profitability of a firm per share; it does not reflect how much profit is paid as dividend and how much is retained by the business. Dividend per share ratio indicates the amount of profit distributed to equity shareholders per share. It is calculated as:

$$\text{Dividend per Share (DPS)} = \frac{\text{Total Dividend paid to equity shareholders}}{\text{Number of equity shares outstanding}}$$

(c) Dividend Payout Ratio (DP): This ratio measures the dividend paid in relation to net earnings. It is determined to see to how much extent earnings per share have been retained by the management for the business. It is computed as:

$$\text{Dividend payout Ratio} = \frac{\text{Dividend per equity share (DPS)}}{\text{Earning per Share (EPS)}}$$

3.3.4.4 Profitability Ratios related to market/ valuation/ Investors

These ratios involve measures that consider the market value of the company's shares. Frequently share prices data are punched with the accounting data to generate new set of information. These are (a) Price- Earnings Ratio, (b) Dividend Yield, (c) Market Value/ Book Value per share, (d) Q Ratio.

(a) Price- Earnings Ratio (P/E Ratio): The price earnings ratio indicates the **expectation of equity investors about the earnings of the firm**. It relates earnings to market price and is generally taken as a summary measure of growth potential of an investment, risk characteristics, shareholders orientation, corporate image and degree of liquidity. It is calculated as

$$\text{Price-Earnings per Share (P/E Ratio)} = \frac{\text{Market Price per Share (MPS)}}{\text{Earning per Share (EPS)}}$$

Interpretation

It indicates the payback period to the investors or prospective investors.

(b) Dividend and Earning Yield:

$$\text{Dividend Yield} = \frac{\text{Dividend} \pm \text{Change in share price}}{\text{Initial share price}} \times 100$$

Sometime it is calculated as

$$\frac{\text{Dividend per Share (DPS)}}{\text{Market Price per Share (MPS)}} \times 100$$

Interpretation

This ratio indicates return on investment; this may be on average investment or closing investment. Dividend (%) indicates return on paid up value of shares. But yield (%) is the indicator of true return in which share capital is taken at its market value. Earning Yield also can be calculated as

$$\text{Earnings Yield} = \frac{\text{Earnings per Share (EPS)}}{\text{Market Price per Share (MPS)}} \times 100$$

Also known as Earnings Price (EP) Ratio.

(c) Market Value /Book Value per Share (MVBV): It provides evaluation of how investors view the company's past and future performance.

$$\frac{\text{Market value per share}}{\text{Book value per share}} = \frac{\text{Average share price}}{\text{Net worth} \div \text{No. of equity shares}}$$

Or,

$$\frac{\text{Closing share price}}{\text{Net worth} \div \text{No. of equity shares}}$$

Interpretation

This ratio indicates market response of the shareholders' investment. Undoubtedly, higher the ratios better is the shareholders' position in terms of return and capital gains.

(d) Q Ratio: This ratio is proposed by James Tobin, a ratio is defined as

$$\frac{\text{Market Value of equity and liabilities}}{\text{Estimated replacement cost of assets}}$$

Notes for calculating Ratios:

1. EBIT (Earnings before interest and taxes) = PBIT (Profit before interest and taxes),

   EAT (Earnings after taxes) = PAT (Profit after taxes),

   EBT (Earnings before taxes) = PBT (Profit before taxes)

2. In absence of preference dividend PAT can be taken as earnings available to equity shareholders.

3. If information is available then average capital employed shall be taken while calculating ROCE.

3. Ratios shall be calculated based on requirement and availability and may deviate from original formulae.

4. Numerator should be taken in correspondence with the denominator and vice-versa.

3.4 USERS AND OBJECTIVE OF FINANCIAL ANALYSIS:- A BIRDS EYE VIEW

Financial Statement analysis is useful to various shareholders to obtain the derived information about the firm

S.No.	Users	Objectives	Ratios used in general
1.	Shareholders	Being owners of the organisation they are interested to know about profitability and growth of the organization	♦ Mainly Profitability Ratio [In particular Earning per share (EPS), Dividend per share (DPS), Price Earnings (P/E), Dividend Payout ratio (DP)]
2.	Investors	They are interested to know overall financial health of the organisation particularly future perspective of the organisations.	♦ Profitability Ratios ♦ Capital structure Ratios ♦ Solvency Ratios ♦ Turnover Ratios
3.	Lenders	They will keep an eye on the safety perspective of their money lent to the organisation	♦ Coverage Ratios ♦ Solvency Ratios ♦ Turnover Ratios ♦ Profitability Ratios
4.	Creditors	They are interested to know liability position of the organisation particularly in short term. Creditors would like to know whether the organisation will be able to pay the amount on due date.	♦ Liquidity Ratios ♦ Short term solvency Ratios/ Liquidity Ratios

5.	Employees	They will be interested to know the overall financial wealth of the organisation and compare it with competitor company.	♦ Liquidity Ratios ♦ Long terms solvency Ratios ♦ Profitability Ratios ♦ Return of investment
6.	Regulator / Government	They will analyse the financial statements to determine taxations and other details payable to the government.	Profitability Ratios
7.	Managers:-		
	(a) Production Managers	They are interested to know about data regarding input output, production quantities etc.	♦ Input output Ratio ♦ Raw material consumption ratio.
	(b) Sales Managers	Data related to units sold for various years, other associated figures and predicted future sales figure will be an area of interest for them	♦ Turnover ratios (basically receivable turnover ratio) ♦ Expenses Ratios
	(c) Financial Manager	They are interested to know various ratios for their future predictions of financial requirement.	♦ Profitability Ratios (particularly related to Return on investment) ♦ Turnover ratios ♦ Capital Structure Ratios
	Chief Executive/ General Manager	They will try to assess the complete perspective of the company, starting from Sales, Finance, Inventory, Human resources, Production etc.	♦ All Ratios

8.	Different Industry		
	(a) Telecom	Finance Manager /Analyst will calculate ratios of their company and compare it with Industry norms.	♦ Ratio related to 'call' ♦ Revenue and expenses per customer
	(b) Bank		♦ Loan to deposit Ratios ♦ Operating expenses and income ratios
	(c) Hotel		♦ Room occupancy ratio ♦ Bed occupancy Ratios
			♦ Passenger - kilometre ♦ Operating cost - per passenger kilometre.

3.5 APPLICATION OF RATIO ANALYSIS IN FINANCIAL DECISION MAKING

A popular technique of analysing the performance of a business concern is that of financial ratio analysis. As a tool of financial management, they are of crucial significance.

The importance of ratio analysis lies in the fact that it presents facts on a comparative basis and enables drawing of inferences regarding the performance of a firm.

Ratio analysis is relevant in assessing the performance of a firm in respect of following aspects:

3.5.1 Financial Ratios for Evaluating Performance

(a) Liquidity Position: With the help of ratio analysis one can draw conclusions regarding liquidity position of a firm. The liquidity position of a firm would be satisfactory if it is able to meet its obligations when they become due. 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.

(b) 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.

The leverage ratios, for instance, will indicate whether a firm has a reasonable proportion of various sources of finance or whether 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.

(c) Operating Efficiency: Ratio analysis 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.

(d) 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 overall 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.

(e) 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/comparison with industry averages.

A single figure of 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 relative position vis-a-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 the light, take remedial measures.

Ratios not only perform post mortem of operations, but also serve as barometer for future. Ratios have predictor value and they are very helpful in forecasting and planning the business activities for a future. It helps in budgeting.

Conclusions are drawn on the basis of the analysis obtained by using ratio analysis. The decisions affected may be whether to supply goods on credit to a concern, whether bank loans will be made available, etc.

(f) **Financial Ratios for Budgeting:** In this field ratios are able to provide a great deal of assistance. Budget is only an estimate of future activity based on past experience, in the making of which the relationship between different spheres of activities are invaluable.

It is usually possible to estimate budgeted figures using financial ratios.

Ratios also can be made use of for measuring actual performance with budgeted estimates. They indicate directions in which adjustments should be made either in the budget or in performance to bring them closer to each other.

3.6 LIMITATIONS OF FINANCIAL RATIOS

The limitations of financial ratios are listed below:

(i) ***Diversified product lines:*** Many businesses operate a large number of divisions in quite different industries. In such cases ratios calculated on the basis of aggregate data cannot be used for inter-firm comparisons.

(ii) ***Financial data are badly distorted by inflation****:* Historical cost values may be substantially different from true values. Such distortions of financial data are also carried in the financial ratios.

(iii) **Seasonal factors** :It may also influence financial data.

Example: A company deals in cotton garments. It keeps a high inventory during October - January every year. For the rest of the year its inventory level becomes just 1/4th of the seasonal inventory level.

So liquidity ratios and inventory ratios will produce biased picture. Year end picture may not be the average picture of the business. Sometimes it is suggested to take monthly average inventory data instead of year end data to eliminate seasonal factors. But for external users it is difficult to get monthly inventory figures. (Even in some cases monthly inventory figures may not be available).

(iv) ***To give a good shape to the popularly used financial ratios (like current ratio, debt- equity ratios, etc.)***: The business may make some year-end adjustments. Such window dressing can change the character of financial ratios which would be different had there been no such change.

(v) ***Differences in accounting policies and accounting period*****:** It can make the accounting data of two firms non-comparable as also the accounting ratios.

(vi) ***No standard set of ratios against which a firm's ratios can be compared*****:** Sometimes a firm's ratios are compared with the industry average. But if a firm desires to be above the average, then industry average becomes a low standard. On the other hand, for a below average firm, industry averages become too high a standard to achieve.

(vii) ***Difficulty to generalise whether a particular ratio is good or bad*****:** For example, a low current ratio may be said 'bad' from the point of view of low liquidity, but a high current ratio may not be 'good' as this may result from inefficient working capital management.

(viii) ***Financial ratios are inter-related, not independent*****:** Viewed in isolation one ratio may highlight efficiency. But when considered as a set of ratios they may speak differently. Such interdependence among the ratios can be taken care of through multivariate analysis.

Financial ratios provide clues but not conclusions. These are tools only in the hands of experts because there is no standard ready-made interpretation of financial ratios.

3.7 FINANCIAL ANALYSIS

It may be of two types: - Horizontal and vertical**:**

Horizontal Analysis: When financial statement of one year are analysed and interpreted after comparing with another year or years, it is known as horizontal analysis. It can be based on the ratios derived from the financial information over the same time span.

Vertical Analysis: When financial statement of single year is analyzed then it is called vertical analysis. This analysis is useful in inter firm comparison. Every item of Profit and loss account is expressed as a percentage of gross sales, while every item on a balance sheet is expressed as a percentage of total assets held by the firm.

3.8 SUMMARY OF RATIOS

Another way of categorizing the ratios is being shown to you in a tabular form. A summary of the ratios has been tabulated as under:

Ratio	Formulae	Interpretation
Liquidity Ratio		
Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	A simple measure that estimates whether the business can pay short term debts.
Quick Ratio	$\frac{\text{Quick Assets}}{\text{Current Liabilities}}$	It measures the ability to meet current debt immediately. Ideal ratio is 1
Cash Ratio	$\frac{\left(\text{Cash and Bank balances} + \text{Marketable Securities}\right)}{\text{Current Liabilities}}$	It measures absolute liquidity of the business.
Basic Defense Interval Ratio	$\frac{\left(\text{Cash and Bank balances} + \text{Marketable Securities}\right)}{\text{Opearing Expenses} \div \text{No. of days}}$	It measures the ability of the business to meet regular cash expenditures.
Net Working Capital Ratio	Current Assets – Current Liabilities	It is a measure of cash flow to determine the ability of business to survive financial crisis.
Capital Structure Ratio		
Equity Ratio	$\frac{\text{Shareholders' Equity}}{\text{Capital Employed}}$	It indicates owner's fund in companies to total fund invested.

Debt Ratio	$\frac{\text{Total outside liabilities}}{\text{Total Debt} + \text{Net worth}}$	It is an indicator of use of outside funds.
Debt to equity Ratio	$\frac{\text{Total Outside Liabilities}}{\text{Shareholders' Equity}}$	It indicates the composition of capital structure in terms of debt and equity.
Debt to Total Assets Ratio	$\frac{\text{Total Outside Liabilities}}{\text{Total Assets}}$	It measures how much of total assets is financed by the debt.
Capital Gearing Ratio	$\frac{\left(\begin{array}{c}\text{Preference Share Capital} + \text{Debentures}\\ + \text{Other Borrowed funds}\end{array}\right)}{\left(\begin{array}{c}\text{Equity Share Capital} +\\ \text{Reserves \& Surplus} - \text{Losses}\end{array}\right)}$	It shows the proportion of fixed interest bearing capital to equity shareholders' fund. It also signifies the advantage of financial leverage to the equity shareholder.
Proprietary Ratio	$\frac{\text{Proprietary Fund}}{\text{Total Assets}}$	It measures the proportion of total assets financed by shareholders.
Coverage Ratios		
Debt Service Coverage Ratio (DSCR)	$\frac{\text{Earnings available for debt services}}{\text{Interest} + \text{Instalments}}$	It measures the ability to meet the commitment of various debt services like interest, instalment etc. Ideal ratio is 2.
Interest Coverage Ratio	$\frac{\text{EBIT}}{\text{Interest}}$	It measures the ability of the business to meet interest obligations. Ideal ratio is > 1.
Preference Dividend Coverage Ratio	$\frac{\text{Net Profit / Earning after taxes (EAT)}}{\text{Preference dividend liability}}$	It measures the ability to pay the preference shareholders' dividend. Ideal ratio is > 1.

Fixed Charges Coverage Ratio	$\dfrac{\text{EBIT} + \text{Depreciation}}{\text{Interest} + \dfrac{\text{Re-payment of loan}}{1 - \text{tax rate}}}$	This ratio shows how many times the cash flow before interest and taxes covers all fixed financing charges. The ideal ratio is > 1.
Activity Ratio/ Efficiency Ratio/ Performance Ratio/ Turnover Ratio		
Total Asset Turnover Ratio	$\dfrac{\text{Sales / Cost of Goods Sold}}{\text{Average Total Assets}}$	A measure of total asset utilisation. It helps to answer the question - What sales are being generated by each rupee's worth of assets invested in the business?
Fixed Assets Turnover Ratio	$\dfrac{\text{Sales / Cost of Goods Sold}}{\text{Fixed Assets}}$	This ratio is about fixed asset capacity. A reducing sales or profit being generated from each rupee invested in fixed assets may indicate overcapacity or poorer-performing equipment.
Capital Turnover Ratio	$\dfrac{\text{Sales / Cost of Goods Sold}}{\text{Net Assets}}$	This indicates the firm's ability to generate sales per rupee of long term investment.
Working Capital Turnover Ratio	$\dfrac{\text{Sales / COGS}}{\text{Working Capital}}$	It measures the efficiency of the firm to use working capital.
Inventory Turnover Ratio	$\dfrac{\text{COGS / Sales}}{\text{Average Inventory}}$	It measures the efficiency of the firm to manage its inventory.
Debtors Turnover Ratio	$\dfrac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$	It measures the efficiency at which firm is managing its receivables.
Receivables (Debtors') Velocity	$\dfrac{\text{Average Accounts Receivables}}{\text{Average Daily Credit Sales}}$	It measures the velocity of collection of receivables.

Payables Turnover Ratio	$\frac{\text{Annual Net Credit Purchases}}{\text{Average Accounts Payables}}$	It measures the velocity of payables payment.
Profitability Ratios based on Sales		
Gross Profit Ratio	$\frac{\text{Gross Profit}}{\text{Sales}} \times 100$	This ratio tells us something about the business's ability consistently to control its production costs or to manage the margins it makes on products it buys and sells.
Net Profit Ratio	$\frac{\text{Net Profit}}{\text{Sales}} \times 100$	It measures the relationship between net profit and sales of the business.
Operating Profit Ratio	$\frac{\text{Operating Profit}}{\text{Sales}} \times 100$	It measures operating performance of business.
Expenses Ratio		
Cost of Goods Sold (COGS) Ratio	$\frac{\text{COGS}}{\text{Sales}} \times 100$	It measures portion of a particular expenses in comparison to sales.
Operating Expenses Ratio	$\left(\frac{\text{Administrative exp.} + \text{Selling \& Distribution Overhead}}{\text{Sales}}\right) \times 100$	
Operating Ratio	$\frac{\text{COGS} + \text{Operating expenses}}{\text{Sales}} \times 100$	
Financial Expenses Ratio	$\frac{\text{Financial expenses}}{\text{Sales}} \times 100$	
Profitability Ratios related to Overall Return on Assets/ Investments		
Return on Investment (ROI)	$\frac{\text{Return / Profit / Earnings}}{\text{Investments}} \times 100$	It measures overall return of the business on investment/ equity funds/capital employed/ assets.

Return on Assets (ROA)	$\frac{\text{Net Profit after taxes}}{\text{Average total assets}}$	It measures net profit per rupee of average total assets/ average tangible assets/ average fixed assets.
Return on Capital Employed ROCE (Pre-tax)	$\frac{\text{EBIT}}{\text{Capital Employed}}\times 100$	It measures overall earnings (either pre-tax or post tax) on total capital employed.
Return on Capital Employed ROCE (Post-tax)	$\frac{\text{EBIT (1-t)}}{\text{Capital Employed}}\times 100$	It indicates earnings available to equity shareholders in comparison to equity shareholders' net worth.
Return on Equity (ROE)	$\frac{\left(\begin{array}{c}\text{Net Profit after taxes -}\\ \text{Preference dividend (if any)}\end{array}\right)}{\text{Net worth / equity shareholders' fund}}\times 100$	
Profitability Ratios Required for Analysis from Owner's Point of View		
Earnings per Share (EPS)	$\frac{\text{Net profit available to equity shareholders}}{\text{Number of equity shares outstanding}}$	EPS measures the overall profit generated for each share in existence over a particular period.
Dividend per Share (DPS)	$\frac{\text{Dividend paid to equity shareholders}}{\text{Number of equity shares outstanding}}$	Proportion of profit distributed per equity share.
Dividend payout Ratio (DP)	$\frac{\text{Dividend per equity share}}{\text{Earning per Share (EPS)}}$	It shows % of EPS paid as dividend and retained earnings.
Profitability Ratios related to market/ valuation/ Investors		
Price-Earnings per Share (P/E Ratio)	$\frac{\text{Market Price per Share (MPS)}}{\text{Earning per Share (EPS)}}$	At any time, the P/E ratio is an indication of how highly the market "rates" or "values" a business. A P/E ratio is best viewed in the context of a sector or market average to get a feel for relative value and stock market pricing.

Dividend Yield	$\frac{\text{Dividend} \pm \text{Change in share peice}}{\text{Initial share price}} \times 100$ OR $\frac{\text{Dividend per Share (DPS)}}{\text{Market Price per Share (MPS)}} \times 100$	It measures dividend paid based on market price of shares.
Earnings Yield	$\frac{\text{Earnings per Share (EPS)}}{\text{Market Price per Share (MPS)}} \times 100$	It is the relationship of earning per share and market value of shares.
Market Value /Book Value per Share	$\frac{\text{Market value per share}}{\text{Book value per share}}$	It indicates market response of the shareholders' investment.
Q Ratio	$\frac{\text{Market Value of equity and liabilities}}{\text{Estimated replacement cost of assets}}$	It measures market value of equity as well as debt in comparison to all assets at their replacement cost.

ILLUSTRATION 1

In a meeting held at Solan towards the end of 2018, the Directors of M/s HPCL Ltd. have taken a decision to diversify. At present HPCL Ltd. sells all finished goods from its own warehouse. The company issued debentures on 01.01.2019 and purchased fixed assets on the same day. The purchase prices have remained stable during the concerned period. Following information is provided to you:

INCOME STATEMENTS

Particulars	2018 (₹)		2019 (₹)	
Cash Sales	*30,000*		*32,000*	
Credit Sales	*2,70,000*	*3,00,000*	*3,42,000*	*3,74,000*
Less: Cost of goods sold		*2,36,000*		*2,98,000*
Gross profit		*64,000*		*76,000*
Less: Operating Expenses				
Warehousing	*13,000*		*14,000*	
Transport	*6,000*		*10,000*	
Administrative	*19,000*		*19,000*	

Selling	*11,000*		*14,000*	
		49,000		*57,000*
Net Profit		*15,000*		*19,000*

BALANCE SHEET

Assets & Liabilities	***2018 (₹)***		***2019 (₹)***	
Fixed Assets (Net Block)	*-*	*30,000*	*-*	*40,000*
Receivables	*50,000*		*82,000*	
Cash at Bank	*10,000*		*7,000*	
Stock	*60,000*		*94,000*	
Total Current Assets (CA)	*1,20,000*		*1,83,000*	
Payables	*50,000*		*76,000*	
Total Current Liabilities (CL)	*50,000*		*76,000*	
Working Capital (CA - CL)		*70,000*		*1,07,000*
Total Assets		*1,00,000*		*1,47,000*
Represented by:				
Share Capital		*75,000*		*75,000*
Reserve and Surplus		*25,000*		*42,000*
Debentures		*–*		*30,000*
		1,00,000		*1,47,000*

You are required to CALCULATE the following ratios for the years 2018 and 2019.

(i) *Gross Profit Ratio*

(ii) *Operating Expenses to Sales Ratio.*

(iii) *Operating Profit Ratio*

(iv) *Capital Turnover Ratio*

(v) *Stock Turnover Ratio*

(vi) *Net Profit to Net Worth Ratio, and*

(vii) *Receivables Collection Period.*

Ratio relating to capital employed should be based on the capital at the end of the year. Give the reasons for change in the ratios for 2 years. Assume opening stock of ₹40,000 for the year 2019. Ignore Taxation.

SOLUTION

Computation of Ratios

Ratio	*2018 (₹)*	*2019 (₹)*
1. Gross profit ratio *(Gross profit/sales)*	$\frac{64,000 \times 100}{3,00,000} = 21.3\%$	$\frac{76,000 \times 100}{3,74,000} = 20.3\%$
2. Operating expense to sales ratio (*Operating exp/ Total sales)*	$\frac{49,000 \times 100}{3,00,000} = 16.3\%$	$\frac{57,000 \times 100}{3,74,000} = 15.2\%$
3. Operating profit ratio *(Operating profit / Total sales)*	$\frac{15,000 \times 100}{3,00,000} = 5\%$	$\frac{19,000 \times 100}{3,74,000} = 5.08\%$
4. Capital turnover ratio (Sales / capital employed)	$\frac{3,00,000}{1,00,000} = 3$	$\frac{3,74,000}{1,47,000} = 2.54$
5.Stock turnover ratio (COGS / Average stock)	$\frac{2,36,000}{50,000} = 4.72$	$\frac{2,98,000}{77,000} = 3.87$
6. Net Profit to Networth (Net profit / Networth)	$\frac{15,000 \times 100}{1,00,000} = 15\%$	$\frac{17,000 \times 100}{1,17,000} = 14.5\%$
7.Receivables collection period(Average receivables / Average daily credit sales) (Refer to working note)	$\frac{50,000}{739.73} = 67.6$ days	$\frac{82,000}{936.99} = 87.5$ days
Working note: Average daily sales = Credit sales / 365	$\frac{2,70,000}{365} = 739.73$	$\frac{3,42,000}{365} = 936.99$

Analysis: The decline in the Gross profit ratio could be either due to a reduction in the selling price or increase in the direct expenses (since the purchase price has remained the same). Similarly there is a decline in the ratio of operating expenses to sales. However since operating expenses have little bearing with sales, a decline in this ratio cannot be necessarily interpreted as an increase in operational efficiency. An in-depth analysis reveals that the decline in the warehousing and the administrative expenses has been partly set off by an increase in the transport and the selling expenses. The operating profit ratio has remained the same in spite of a decline in the Gross profit margin ratio. In fact the company has not benefited at all in terms of operational performance because of the increased sales.

The company has not been able to deploy its capital efficiently. This is indicated by a decline in the Capital turnover from 3 to 2.5 times. In case the capital turnover would have remained at 3 the company would have increased sales and profits by ₹ 67,000 and ₹ 3,350 respectively.

The decline in stock turnover ratio implies that the company has increased its investment in stock. Return on Net worth has declined indicating that the additional capital employed has failed to increase the volume of sales proportionately. The increase in the Average collection period indicates that the company has become liberal in extending credit on sales. However, there is a corresponding increase in the current assets due to such a policy.

It appears as if the decision to expand the business has not shown the desired results.

ILLUSTRATION 2

Following is the abridged Balance Sheet of Alpha Ltd. :-

Liabilities	***₹***	***Assets***	***₹***	***₹***
Share Capital	*1,00,000*	*Land and Buildings*		*80,000*
Profit and Loss Account	*17,000*	*Plant and Machineries*	*50,000*	
Current Liabilities	*40,000*	*Less: Depreciation*	*15,000*	*35,000*
				1,15,000
		Stock	*21,000*	
		Receivables	*20,000*	
		Bank	*1,000*	*42,000*
Total	*1,57,000*	*Total*		*1,57,000*

With the help of the additional information furnished below, you are required to PREPARE Trading and Profit & Loss Account and a Balance Sheet as at 31st March, 2019:

(i) The company went in for reorganisation of capital structure, with share capital remaining the same as follows:

Share capital	*50%*
Other Shareholders' funds	*15%*
5% Debentures	*10%*
Payables	*25%*

Debentures were issued on 1st April, interest being paid annually on 31st March.

(ii) *Land and Buildings remained unchanged. Additional plant and machinery has been bought and a further ₹ 5,000 depreciation written off.*

(The total fixed assets then constituted 60% of total fixed and current assets.)

(iii) *Working capital ratio was 8 : 5.*

(iv) *Quick assets ratio was 1 : 1.*

(v) *The receivables (four-fifth of the quick assets) to sales ratio revealed a credit period of 2 months. There were no cash sales.*

(vi) *Return on net worth was 10%.*

(vii) *Gross profit was at the rate of 15% of selling price.*

(viii) *Stock turnover was eight times for the year.*

Ignore Taxation.

SOLUTION

Particulars	%	(₹)
Share capital	50%	1,00,000
Other shareholders funds	15%	30,000
5% Debentures	10%	20,000
Payables	25%	50,000
Total	100%	2,00,000

Land and Buildings

Total liabilities = Total Assets

₹ 2,00,000 = Total Assets

Fixed Assets = 60% of total fixed assets and current assets

= ₹ 2,00,000 × 60/100 = ₹ 1,20,000

Calculation of additions to Plant & Machinery

	₹
Total fixed assets	1,20,000
Less: Land & Buildings	80,000
Plant and Machinery (after providing depreciation)	40,000
Depreciation on Machinery up to 31-3-20X8	15,000
Add: Further depreciation	5,000
Total	20,000

Current assets = Total assets – Fixed assets

= ₹ 2,00,000 – ₹ 1,20,000 = ₹ 80,000

Calculation of stock

Quick ratio: $= \frac{\text{Current assets - stock}}{\text{Current liabilities}} = 1$

$= \frac{₹\ 80,000 - \text{stock}}{₹\ 50,000} = 1$

₹ 50,000 = ₹ 80,000 – Stock

Stock = ₹ 80,000 - ₹ 50,000

= ₹ 30,000

Receivables = 4/5th of quick assets

= (₹ 80,000 – 30,000)$\times$ 4/5

= ₹ 40,000

Receivables turnover ratio

$= \frac{\text{Receivables}}{\text{Credit Sales}} \times 12 \text{ Months}$ = 2 months

$= \frac{40,000 \times 12}{\text{Credit Sales}}$ = 2 months

$2 \times$ credit sales = 4,80,000

Credit sales = 4,80,000/2

= ₹ 2,40,000

Gross profit (15% of sales)

₹ 2,40,000 × 15/100 = ₹ 36,000

Return on net worth (net profit)

Net worth	=	₹ 1,00,000 + ₹ 30,000		
	=	₹ 1,30,000		
Net profit	=	₹ 1,30,000 × 10/100	=	₹ 13,000
Debenture interest	=	₹ 20,000 × 5/100	=	₹ 1,000

Projected profit and loss account for the year ended 31-3-2019

To cost of goods sold	2,04,000	By sales	2,40,000
To gross profit	36,000		
	2,40,000		2,40,000
To debenture interest	1,000	By gross profit	36,000
To administration and other expenses	22,000		
To net profit	13,000		
	36,000		36,000

Projected Balance Sheet as at 31st March, 2019

Liabilities	₹	Assets		₹
Share capital	1,00,000	Fixed assets		
Profit and loss A/c	30,000	Land & buildings		80,000
(17,000+13,000)		Plant & machinery	60,000	
5% Debentures	20,000	*Less*: Depreciation	20,000	40,000
Current liabilities		Current assets		
		Stock	30,000	
Trade creditors	50,000	Recivables	40,000	
	_	Bank	10,000	80,000
	2,00,000			2,00,000

ILLUSTRATION 3

X Co. has made plans for the next year. It is estimated that the company will employ total assets of ₹ 8,00,000; 50 per cent of the assets being financed by borrowed capital at an interest cost of 8 per cent per year. The direct costs for the year are estimated at ₹4,80,000 and all other operating expenses are estimated at ₹ 80,000. the goods will be sold to customers at 150 per cent of the direct costs. Tax rate is assumed to be 50 per cent.

You are required to CALCULATE: (i) net profit margin; (ii) return on assets; (iii) asset turnover and (iv) return on owners' equity.

SOLUTION

The net profit is calculated as follows:

Particulars	₹	₹
Sales (150% of ₹ 4,80,000)		7,20,000
Direct costs		4,80,000
Gross profit		2,40,000
Operating expenses	80,000	
Interest changes (8% of ₹ 4,00,000)	32,000	1,12,000
Profit before taxes		1,28,000
Taxes (@ 50%)		64,000
Net profit after taxes		64,000

(i) Net profit margin $= \frac{\text{Profit after taxes}}{\text{Sales}} = \frac{₹\ 64,000}{₹\ 7,20,000} = 0.89 \text{ or } 8.9\%$

Net profit margin $= \frac{\text{EBIT (1 - T)}}{\text{Sales}} = \frac{₹\ 1,60,000(1-0.5)}{7,20,000} = 0.111 \text{ or } 11.1\%$

(ii) Return on assets $= \frac{\text{EBIT (1 - T)}}{\text{Assets}} = \frac{₹\ 1,60,000(1-0.5)}{8,00,000} = 0.10 \text{ or } 10\%$

(iii) Asset turnover $= \frac{\text{Sales}}{\text{Assets}} = \frac{₹\ 7,20,000}{₹\ 8,00,000} = 0.9 \text{ times}$

(iv) Return on equity $= \frac{\text{Net Profit after taxes}}{\text{Owners' equity}} = \frac{₹\ 64,000}{50\% \text{ of } ₹\ 8,00,000}$

$= \frac{₹\ 64,000}{₹\ 4,00,000} = 0.16 \text{ or } 16\%$

ILLUSTRATION 4

ABC Company sells plumbing fixtures on terms of 2/10, net 30. Its financial statements over the last 3 years are as follows:

Particular	*2017*	*2018*	*2019*
	₹	₹	₹
Cash	*30,000*	*20,000*	*5,000*
Accounts receivable	*2,00,000*	*2,60,000*	*2,90,000*
Inventory	*4,00,000*	*4,80,000*	*6,00,000*
Net fixed assets	*8,00,000*	*8,00,000*	*8,00,000*
	14,30,000	*15,60,000*	*16,95,000*
	₹	₹	₹
Accounts payable	*2,30,000*	*3,00,000*	*3,80,000*
Accruals	*2,00,000*	*2,10,000*	*2,25,000*
Bank loan, short-term	*1,00,000*	*1,00,000*	*1,40,000*
Long-term debt	*3,00,000*	*3,00,000*	*3,00,000*
Common stock	*1,00,000*	*1,00,000*	*1,00,000*
Retained earnings	*5,00,000*	*5,50,000*	*5,50,000*
	14,30,000	*15,60,000*	*16,95,000*
	₹	₹	₹
Sales	*40,00,000*	*43,00,000*	*38,00,000*
Cost of goods sold	*32,00,000*	*36,00,000*	*33,00,000*
Net profit	*3,00,000*	*2,00,000*	*1,00,000*

ANALYSE the company's financial condition and performance over the last 3 years. Are there any problems?

SOLUTION

Ratios	2017	2018	20179
Current ratio	1.19	1.25	1.20
Acid-test ratio	0.43	0.46	0.40
Average collection period	18	22	27
Inventory turnover	NA*	8.2	6.1
Total debt to net worth	1.38	1.40	1.61
Long-term debt to total capitalization	0.33	0.32	0.32
Gross profit margin	0.200	0.163	0.132
Net profit margin	0.075	0.047	0.026
Asset turnover	2.80	2.76	2.24
Return on assets	0.21	0.13	0.06

Analysis: The company's profitability has declined steadily over the period. As only ₹ 50,000 is added to retained earnings, the company must be paying substantial dividends. Receivables are growing slower, although the average collection period is still very reasonable relative to the terms given. Inventory turnover is slowing as well, indicating a relative buildup in inventories. The increase in receivables and inventories, coupled with the fact that net worth has increased very little, has resulted in the total debt-to-worth ratio increasing to what would have to be regarded on an absolute basis as a high level.

The current and acid-test ratios have fluctuated, but the current ratio is not particularly inspiring. The lack of deterioration in these ratios is clouded by the relative build up in both receivables and inventories, evidencing deterioration in the liquidity of these two assets. Both the gross profit and net profit margins have declined substantially. The relationship between the two suggests that the company has reduced relative expenses in 2016 in particular. The build-up in inventories and receivables has resulted in a decline in the asset turnover ratio, and this, coupled with the decline in profitability, has resulted in a sharp decrease in the return on assets ratio.

ILLUSTRATION 5

Following information are available for Navya Ltd. along with various ratio relevant to the particulars industry it belongs to. APPRAISE your comments on strength and weakness of Navya Ltd. comparing its ratios with the given industry norms.

Navya Ltd.

BALANCE SHEET AS AT 31.3.2019

Liabilities	Amount (₹)	Assets	Amount (₹)
Equity Share Capital	48,00,000	Fixed Assets	24,20,000
10% Debentures	9,20,0000	Cash	8,80,000
Sundry Creditors	6,60,000	Sundry debtors	11,00,000
Bills Payable	8,80,000	Stock	33,00,000
Other current Liabilities	4,40,000		-
Total	77,00,000	Total	77,00,000

STATEMENT OF PROFITABILITY

FOR THE YEAR ENDING 31.3.2019

Particulars	Amount (₹)	Amount (₹)
Sales		1,10,00,000
Less: Cost of goods sold:	-	-
Material	41,80,000	-
Wages	26,40,000	-
Factory Overhead	12,98,000	81,18,000
Gross Profit	-	28,82,000
Less: Selling and Distribution Cost	11,00,000	-
Administrative Cost	12,28,000	23,28,000
Earnings before Interest and Taxes	-	5,54,000
Less: Interest Charges	-	92,000
Earning before Tax	-	4,62,000
Less: Taxes & 50%	-	2,31,000
Net Profit (PAT)		2,31,000

INDUSTRY NORMS

Ratios	Norm
Current Assets/Current Liabilities	2.5
Sales/ debtors	8.0
Sales/ Stock	9.0
Sales/ Total Assets	2.0

Net Profit/ Sales	*3.5%*
Net profit /Total Assets	*7.0%*
Net Profit/ Net Worth	*10.5%*
Total Debt/Total Assets	*60.0%*

SOLUTION

Ratios		Navya Ltd.	Industry Norms
1.	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	$\frac{52,80,000}{19,80,000} = 2.67$	2.50
2	$\frac{\text{Sales}}{\text{Debtors}}$	$\frac{1,10,00,000}{11,00,000} = 10.0$	8.00
3.	$\frac{\text{Sales}}{\text{Stock}}$	$\frac{1,10,00,000}{33,00,000} = 3.33$	9.00
4.	$\frac{\text{Sales}}{\text{Total Assets}}$	$\frac{1,10,00,000}{77,00,000} = 1.43$	2.00
5	$\frac{\text{Net Profit}}{\text{Sales}}$	$\frac{2,31,000}{1,10,00,000} = 2.10\%$	3.50%
6.	$\frac{\text{Net Profit}}{\text{Total Assets}}$	$\frac{2,31,000}{77,00,000} = 3.00\%$	7%
7.	$\frac{\text{Net Profit}}{\text{Net Worth}}$	$\frac{2,31,000}{48,00,000} = 4.81\%$	10.5%
8.	$\frac{\text{Total Debt}}{\text{Total Assets}}$	$\frac{29,00,000}{77,00,000} = 37.66\%$	60%

Comments:

1. The position of Navya Ltd. is better than the industry norm with respect to Current Ratios and the Sales to Debtors Ratio.
2. However, the position of sales to stock and sales to total assets is poor comparing to industry norm.
3. The firm also has its net profit ratios, net profit to total assets and net profit to total worth ratio much lower than the industry norm.
4. Total debt to total assets ratio suggest that, the firm is geared at lower level and debt are used to Asset.

SUMMARY

- **Financial Analysis and its Tools:** For the purpose of obtaining the material and relevant information necessary for ascertaining the financial strengths and weaknesses of an enterprise, it is necessary to analyze the data depicted in the financial statement. The financial manager has certain analytical tools which help in financial analysis and planning. The main tools are Ratio Analysis and Cash Flow Analysis.
- **Ratio Analysis**:- The ratio analysis is based on the fact that a single accounting figure by itself may not communicate any meaningful information but when expressed as a relative to some other figure, it may definitely provide some significant information. Ratio analysis is not just comparing different numbers from the balance sheet, income statement, and cash flow statement. It is comparing the number against previous years, other companies, the industry, or even the economy in general for the purpose of financial analysis.
- **Type of Ratios and Importance of Ratios Analysis**:- The ratios can be classified into following four broad categories:

  (i) Liquidity Ratios

  (ii) Capital Structure/Leverage Ratios

  (iii) Activity Ratios

  (iv) Profitability Ratios
- A popular technique of analyzing the performance of a business concern is that of financial ratio analysis. As a tool of financial management, they are of crucial significance. The importance of ratio analysis lies in the fact that it presents facts on a comparative basis and enables drawing of inferences regarding the performance of a firm.
- Ratio analysis is relevant in assessing the performance of a firm in respect of following aspects:

  I Liquidity Position

  II Long-term Solvency

  III Operating Efficiency

  IV Overall Profitability

  V Inter-firm Comparison

  VI Financial Ratios for Supporting Budgeting

TEST YOUR KNOWLEDGE

MCQs based Questions

1. Ratio of Net sales to Net working capital is a:
   - (a) Profitability ratio
   - (b) Liquidity ratio
   - (c) Current ratio
   - (d) Working capital turnover ratio
2. Long-term solvency is indicated by:
   - (a) Debt/ equity ratio
   - (b) Current Ratio
   - (c) Operating ratio
   - (d) Net profit ratio
3. Ratio of net profit before interest and tax to sales is:
   - (a) Gross profit ratio
   - (b) Net profit ratio
   - (c) Operating profit ratio
   - (d) Interest coverage ratio.
4. Observing changes in the financial variables across the years is:
   - (a) Vertical analysis
   - (b) Horizontal Analysis
   - (c) Peer-firm Analysis
   - (d) Industry Analysis.
5. The Receivable-Turnover ratio helps management to:
   - (a) Managing resources
   - (b) Managing inventory
   - (c) Managing customer relationship
   - (d) Managing working capital

Theoretical Questions

1. DISCUSS any three ratios computed for investment analysis.
2. DISCUSS the financial ratios for evaluating company performance on operating efficiency and liquidity position aspects.
3. DISCUSS Stock Turnover ratio and Gearing ratio?
4. DISCUSS the composition of Return on Equity (ROE) using the DuPont model.
5. EXPLAIN briefly the limitations of Financial ratios.
6. DISCUSS DuPont Model.

Practical Problems

1. The total sales (all credit) of a firm are ₹ 6,40,000. It has a gross profit margin of 15 per cent and a current ratio of 2.5. The firm's current liabilities are ₹ 96,000; inventories ₹ 48,000 and cash ₹ 16,000.

   (a) DETERMINE the average inventory to be carried by the firm, if an inventory turnover of 5 times is expected? (Assume a 360 day year).

   (b) DETERMINE the average collection period if the opening balance of debtors is intended to be of ₹ 80,000? (Assume a 360 day year).

2. The capital structure of Beta Limited is as follows:

Equity share capital of ₹ 10 each	8,00,000
9% preference share capital of ₹ 10 each	3,00,000
	11,00,000

   Additional information: Profit (after tax at 35 per cent), ₹ 2,70,000; Depreciation, ₹ 60,000; Equity dividend paid, 20 per cent; Market price of equity shares, ₹ 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 shares

   (d) Price-earnings ratio.

3. The following accounting information and financial ratios of PQR Ltd. relate to the year ended 31st December, 2018

2016

I	*Accounting Information:*	
	Gross Profit	15% of Sales
	Net profit	8% of sales
	Raw materials consumed	20% of works cost
	Direct wages	10% of works cost
	Stock of raw materials	3 months' usage
	Stock of finished goods	6% of works cost
	Debt collection period	60 days
	All sales are on credit	
II	*Financial Ratios:*	
	Fixed assets to sales	1 : 3
	Fixed assets to Current assets	13 : 11
	Current ratio	2 : 1
	Long-term loans to Current liabilities	2 : 1
	Capital to Reserves and Surplus	1 : 4

If value of fixed assets as on 31st December, 2017 amounted to ₹ 26 lakhs, PREPARE a summarised Profit and Loss Account of the company for the year ended 31st December, 2018 and also the Balance Sheet as on 31st December, 2018.

4. Ganpati Limited has furnished the following ratios and information relating to the year ended 31st March, 2019.

Sales	₹ 60,00,000
Return on net worth	25%
Rate of income tax	50%
Share capital to reserves	7:3
Current ratio	2
Net profit to sales	6.25%
Inventory turnover (based on cost of goods sold)	12
Cost of goods sold	₹ 18,00,000

Interest on debentures	₹ 60,000
Receivables	₹ 2,00,000
Payables	₹ 2,00,000

You are required to:

(a) CALCULATE the operating expenses for the year ended 31st March, 2019.

(b) PREPARE a balance sheet as on 31st March in the following format:

Balance Sheet as on 31st March, 2019

Liabilities	₹	Assets	₹
Share Capital		Fixed Assets	
Reserve and Surplus		Current Assets	
15% Debentures		Stock	
Payables		Receivables	
		Cash	

5. Using the following information, PREPARE this balance sheet:

Long-term debt to net worth	0.5 to 1
Total asset turnover	2.5 ×
Average collection period*	18 days
Inventory turnover	9 ×
Gross profit margin	10%
Acid-test ratio	1 to 1

∗Assume a 360-day year and all sales on credit.

	₹		₹
Cash	__________	Notes and payables	1,00,000
Accounts receivable	__________	Long-term debt	__________
Inventory	__________	Common stock	1,00,000
Plant and equipment	__________	Retained earnings	1,00,000
Total assets	__________	Total liabilities and equity	__________

ANSWERS/SOLUTIONS

Answers to the MCQs based Questions

1. (d) **2.** (a) **3.** (c) **4.** (b) **5.** (d)

Answers to the Theoretical Questions

1. Please refer paragraph 3.3.4.2

2. Please refer paragraph 3.3.4

3. Please refer paragraph 3.3.3. & 3.3.2

4. Please refer paragraph 3.3.4.2

5. Please refer paragraph 3.5

6. Please refer paragraph 3.3.4.2

Answers to the Practical Problems

1. **(a)** Inventory turnover $= \frac{\text{Cost of goods sold}}{\text{Average inventory}}$

Since gross profit margin is 15 per cent, the cost of goods sold should be 85 per cent of the sales.

Cost of goods sold = 0.85 × ₹ 6,40,000 = ₹ 5,44,000.

Thus, $= \frac{₹\ 5,44,000}{\text{Average inventory}} = 5$

Average inventory = $= \frac{₹\ 5,44,000}{5}$ = ₹1,08,800

(b) Average collection period = $\frac{\text{Average Receivables}}{\text{Credit Sales}} \times 360 \text{ days}$

Average Receivables = $\frac{(\text{Opening Receivables} + \text{Closing Receivables})}{2}$

Closing balance of receivables is found as follows:

	₹	₹
Current assets (2.5 of current liabilities)		2,40,000
Less: Inventories	48,000	
Cash	16,000	64,000
∴ Receivables		1,76,000

$\because$ Average Receivables = $\frac{(₹\,1,76,000 + ₹\,80,000)}{2}$

₹ 2,56,000 ÷2 = ₹ 1,28,000

Average collection period = $\frac{₹\,1,28,000}{₹\,6,40,000} \times 360 = 72$ days

2. (a) **Dividend yield on the equity shares**

$$= \frac{\text{Dividend per share}}{\text{Market price per share}} \times 100 = \frac{₹\,2\,(= 0.20 \times ₹\,10)}{₹\,40} \times 100 = 5 \text{ per cent}$$

(b) Dividend coverage ratio

(i) Preference = $\frac{\text{Profit after taxes}}{\text{Dividend payable to preference shareholders}}$

$$= \frac{₹\,2,70,000}{₹\,27,000\,(= 0.09 \times ₹\,3,00,000)} = 10 \text{ times}$$

(ii) Equity =

$$\frac{\text{Profit after taxes - Preference share dividend}}{\text{Dividend payable to equity shareholders at current rate of ₹ 2 per share}}$$

$$= \frac{₹\,2,70,000 - ₹27,000}{₹\,1,60,000\,(80,000 \text{ shares} \times ₹\,2)} = 1.52 \text{ times}$$

(c) Earnings per equity share = $\frac{\text{Earnings available to equity shareholders}}{\text{Number of equity shares outstanding}}$

$$= \frac{₹\,2,43,000}{80,000} = ₹\,3.04 \text{ per share}$$

(d) Price-earning(P/E)ratio = $\frac{\text{Market price per share}}{\text{Earnings per share}} = \frac{₹\,40}{₹\,3.04} = 13.2$ times

3. (a) **Working Notes:**

(i) Calculation of Sales = $\frac{\text{Fixed Assets}}{\text{Sales}} = \frac{1}{3}$

$$\therefore \frac{26,00,000}{\text{Sales}} = \frac{1}{3} \Rightarrow \text{Sales} = ₹\,78,00,000$$

(ii) Calculation of Current Assets

$$\frac{\text{Fixed Assets}}{\text{Current Assets}} = \frac{13}{11}$$

$$\therefore \frac{26,00,000}{\text{Current Assets}} = \frac{13}{11} \Rightarrow \text{Current Assets} = ₹\ 22,00,000$$

(iii) Calculation of Raw Material Consumption and Direct Wages

	₹
Sales	78,00,000
Less: Gross Profit	11,70,000
Works Cost	66,30,000

Raw Material Consumption (20% of Works Cost) ₹ 13,26,000

Direct Wages (10% of Works Cost) ₹ 6,63,000

(iv) Calculation of Stock of Raw Materials (= 3 months usage)

$$= 13,26,000 \times \frac{3}{12} = ₹\ 3,31,500$$

(v) Calculation of Stock of Finished Goods (= 6% of Works Cost)

$$= 66,30,000 \times \frac{6}{100} = ₹\ 3,97,800$$

(vi) Calculation of Current Liabilities

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = 2$$

$$\therefore \frac{22,00,000}{\text{Current Liabilities}} = 2 \Rightarrow \text{Current Liabilities} = ₹\ 11,00,000$$

(vii) Calculation of Receivables

$$\text{Average collection period} = \frac{\text{Receivables}}{\text{Credit Sales}} \times 365$$

$$\frac{\text{Receivables}}{78,00,000} \times 365 = 60 \Rightarrow \text{Receivables} = ₹\ 12,82,191.78 \text{ or } ₹12,82,192$$

(viii) Calculation of Long term Loan

$$\frac{\text{Long term Loan}}{\text{Current Liabilities}} = \frac{2}{1}$$

$$\frac{\text{Long term loan}}{11{,}00{,}000} = \frac{2}{1} \Rightarrow \text{Long term loan} = ₹\ 22{,}00{,}000.$$

(ix) Calculation of Cash Balance

		₹
Current assets		22,00,000
Less: Receivables 12,82,192		
Raw materials stock	3,31,500	
Finished goods stock	3,97,800	20,11,492
Cash balance		1,88,508

(x) Calculation of Net worth

Fixed Assets		26,00,000
Current Assets		22,00,000
Total Assets		48,00,000
Less: Long term Loan	22,00,000	
Current Liabilities	11,00,000	33,00,000
Net worth		15,00,000

Net worth = Share capital + Reserves = 15,00,000

$$= \frac{\text{Capital}}{\text{Reserves and Surplus}} = \frac{1}{4} \Rightarrow \text{Share Capital}$$

$$= 15{,}00{,}000 \times \frac{1}{5} = ₹\ 3{,}00{,}000$$

$$\text{Reserves and Surplus} = 15{,}00{,}000 \times \frac{4}{5} = ₹\ 12{,}00{,}000$$

...

Profit and Loss Account of PQR Ltd.
for the year ended 31st December, 2018

	Particulars	₹	Particulars	₹
To	Direct Materials	13,26,000	By Sales	78,00,000
To	Direct Wages	6,63,000		
To	Works (Overhead) Balancing figure	46,41,000		
To	Gross Profit c/d (15% of Sales)	11,70,000		–
		78,00,000		78,00,000
To	Selling and Distribution Expenses (Balancing figure)	5,46,000	By Gross Profit b/d	11,70,000
To	Net Profit (8% of Sales)	6,24,000		–
		11,70,000		11,70,000

Balance Sheet of PQR Ltd.
as at 31st December, 2018

Liabilities	₹	Assets	₹
Share Capital	3,00,000	Fixed Assets	26,00,000
Reserves and Surplus	12,00,000	Current Assets:	
Long term loans	22,00,000	Stock of Raw Material	3,31,500
Current liabilities	11,00,000	Stock of Finished Goods	3,97,800
		Receivables	12,82,192
	–	Cash	1,88,508
	48,00,000		48,00,000

4. (a) Calculation of Operating Expenses for the year ended 31st March, 2019.

		(₹)
Net Profit [@ 6.25% of Sales]		3,75,000
Add: Income Tax (@ 50%)		3,75,000

...

Profit Before Tax (PBT)		7,50,000
Add: Debenture Interest		60,000
Profit before interest and tax (PBIT)		8,10,000
Sales		60,00,000
Less: Cost of goods sold	18,00,000	
PBIT	8,10,000	26,10,000
Operating Expenses		33,90,000

(b) Balance Sheet as on 31st March, 2019

Liabilities	₹	Assets	₹
Share Capital	10,50,000	Fixed Assets	17,00,000
Reserve and Surplus	4,50,000	Current Assets:	
15% Debentures	4,00,000	Stock	1,50,000
Payables	2,00,000	Receivables	2,00,000
-	-	Cash	50,000
	21,00,000		21,00,000

Working Notes:

(i) **Share Capital and Reserves**

The return on net worth is 25%. Therefore, the profit after tax of ₹ 3,75,000 should be equivalent to 25% of the net worth.

$$\text{Net worth} \times \frac{25}{100} = ₹\ 3,75,000$$

$$\therefore \quad \text{Net worth} = \frac{₹\ 3,75,000 \times 100}{25} = ₹\ 15,00,000$$

The ratio of share capital to reserves is 7:3

$$\text{Share Capital} = 15,00,000 \times \frac{7}{10} = ₹\ 10,50,000$$

$$\text{Reserves} = 15,00,000 \times \frac{3}{10} = ₹\ 4,50,000$$

(ii) **Debentures**

Interest on Debentures @ 15% = ₹ 60,000

$\therefore$ Debentures = $\frac{60,000 \times 100}{15}$ = ₹ 4,00,000

(iii) **Current Assets**

Current Ratio = 2

Payables = ₹ 2,00,000

$\therefore$ Current Assets = 2 Current Liabilities = 2 × 2,00,000 = ₹ 4,00,000

(iv) Fixed Assets

Liabilities	₹
Share capital	10,50,000
Reserves	4,50,000
Debentures	4,00,000
Payables	2,00,000
	21,00,000
Less: Current Assets	4,00,000
Fixed Assets	17,00,000

(v) **Composition of Current Assets**

Inventory Turnover = 12

$$\frac{\text{Cost of goods sold}}{\text{Closing stock}} = 12$$

Closing stock = $\frac{₹\,18,00,000}{12}$ = Closing stock = ₹ 1,50,000

Composition	₹
Stock	1,50,000
Receivables	2,00,000
Cash (balancing figure)	50,000
Total Current Assets	4,00,000

5. $\frac{\text{Long-term debt}}{\text{Net worth}} = 0.5 = \frac{\text{Long-term debt}}{2,00,000}$

$\text{Long-term debt} = ₹\,1,00,000$

Total liabilities and net worth = ₹ 4,00,000

Total assets = ₹ 4,00,000

$\frac{\text{Sales}}{\text{Total assets}} = 2.5 = \frac{\text{Sales}}{4,00,000} = \text{Sales} = ₹\ 10,00,000$

Cost of goods sold = (0.9) (₹ 10,00,000) = ₹ 9,00,000.

$\frac{\text{Cost of goods sold}}{\text{Inventory}} = \frac{9,00,000}{\text{Inventory}} = 9 = \text{Inventory} = ₹1,00,000$

$\frac{\text{Receivables} \times 360}{10,00,000} = 18 \text{ days}$

$\text{Receivables} = ₹\ 50,000$

$\frac{\text{Cash} + 50,000}{1,00,000} = 1$

$\text{Cash} = ₹\ 50,000$

Plant and equipment = ₹ 2,00,000.

Balance Sheet

	₹		₹
Cash	50,000	Notes and payables	1,00,000
Accounts receivable	50,000	Long-term debt	1,00,000
Inventory	1,00,000	Common stock	1,00,000
Plant and equipment	2,00,000	Retained earnings	1,00,000
Total assets	4,00,000	Total liabilities and equity	4,00,000

Management Accounting

Responsibility Accounting

Responsibility Accounting- Concept

- It is used to measure performance of divisions of an organisation rather than organisation as a whole.
- 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.
- Proper authority is given to the persons so that they are able to keep up their performance. In case the performance is not according to the predetermined standards then the persons who are assigned this duty will be personally responsible for it. In responsibility accounting the emphasis is on men rather than on systems.
- Responsibility Accounting collects and reports planned and actual accounting information about the inputs and outputs of responsibility centres"
- Responsibility Accounting must be designed to suit the existing structure of the organization.
- Responsibility should be coupled with authority. An organization structure with clear assignment of authorities and responsibilities should exist for the successful functioning of the responsibility accounting system. The performance of each manager is evaluated in terms of such factors.

Responsibility Accounting- Meaning & Definition

- Responsibility accounting is a system of management accounting under which accountability is established according to the responsibility delegated to various levels of management and a management information and reporting system instituted to give adequate feedback in terms of the delegated responsibility.
- Under this system, divisions or units of an organisation under a specific authority in a person are developed as responsibility centres & evaluated individually for their performance.
- **Horngreen:** defines "Responsibility accounting is a system of accounting that recognizes various responsibility centres throughout the organisation 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". According to this definition, the organisation is divided into various responsibility centres and each centre is responsible for its costs. The performance of each responsibility centre is regularly measured.
- **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 a management information and reporting system instituted to give adequate feedback in terms of the delegated responsibility. Under this system divisions or units of an organisation under a specified authority in a person are developed as responsibility centres and evaluated individually for their performance."

Essential Features of Responsibility Accounting

1. Inputs and Outputs or Costs and Revenues:
   - The implementation and maintenance of responsibility accounting system is based upon information relating to inputs and outputs.
   - The physical resources utilized in an organisation such as quantity of raw material used and labour hours consumed, are termed as inputs. These inputs expressed in the monetary terms are known as costs.
   - Similarly, outputs expressed in monetary terms are called revenues.
   - Thus, responsibility accounting is based on cost and revenue information.

2. Planned and Actual Information or Use of Budgeting:
   - Effective responsibility accounting requires both planned and actual financial information.
   - It is not only the historical cost and revenue data but also the planned future data which is essential for the implementation of responsibility accounting system.
   - It is through budgets that responsibility for implementing the plans is communicated to each level of management.
   - The use of fixed budgets, flexible budgets and profit planning are all incorporated into one overall system of responsibility accounting.

3. Identification of Responsibility Centres:
   - The whole concept of responsibility accounting is focused around identification of responsibility centres.
   - The responsibility centres represent the sphere of authority or decision points in an organisation.
     In a small firm, one individual or a small group of individuals, who are usually the owners may possibly manage or control the entire organisation.
   - However, for effective control, a large firm is, usually, divided into meaningful segments, departments or divisions. These sub- units or divisions of organisation are called responsibility centres.
   - A responsibility centre is under the control of an individual who is responsible for the control of activities of that sub-unit of the organisation.
   - This responsibility centre may be a very small sub-unit of the organisation, as an individual could be made responsible for one machine used in manufacturing operations, or it may be very big division of the organisation, such as a divisional manager could be responsible for achieving a certain level of profit from the division and investment under his control.
   - However, the general guideline is that “the unit of the organisation should be separable and identifiable for operating purposes and its performance measurement possible”.

4. Relationship between Organisation Structure and Responsibility Accounting System:
    - A sound organisation structures with clear-cut lines of authority—responsibility relationships are a prerequisite for establishing a successful responsibility accounting system.
    - Responsibility accounting system must be so designed as to suit the organisation structure of the organisation.
    - It must be founded upon the existing authority- responsibility relationships in the organisation.
    - In fact, responsibility accounting system should parallel the organisation structure and provide financial information to evaluate actual results of each individual responsible for a function.

5. Assigning Costs to Individuals and Limiting their Efforts to Controllable Costs:
    - After identifying responsibility centres and establishing authority-responsibility relationships, responsibility accounting system involves assigning of costs and revenues to individuals.
    - Only those costs and revenues over which an individual has a definite control can be assigned to him for evaluating his performance
    - The following guidelines should be followed while assigning of costs
        - If the person has authority over both the acquisition and use of the services, he should be charged with the cost of these services.
        - If the person can significantly influence the amount of cost through his own action, he may be charged with such costs.
        - Even if the person cannot significantly influence the amount of cost through his own direct action, he may be charged with those elements with which the management desires him to be concerned, so that he will help to influence those who are responsible.

6. Performance Reporting:
    - A control system to be effective should be such that deviations from the plans must be reported at the earliest so as to take corrective action for the future. The deviations can be known only when performance is reported.
    - Responsibility accounting system is focused on performance reports also known as ‘responsibility reports’, prepared for each responsibility unit.
    - Unlike authority which flows from top to bottom, reporting flows from bottom to top. These reports should be addressed to appropriate persons in respective responsibility centres.
    - The reports should contain information in comparative form as to show plans (budgets) and the actual performance and should give details of variances which are related to that centre.
    - The variances which are not controllable at a particular responsibility centre should also be mentioned separately in the report.

- To be effective, the reports should be clear and simple. Use of diagrams, charts, illustrations, graphs and tables may be made to make them attractive and easily understandable.

Pre-requisites of Responsibility Accounting

- It should be a big company with divisionalised organisation structure
- The organisation should have clearly set goals and targets
- Managers should actively participate in establishing budgets against which their performance is measured
- Managers are held responsible only for those activities over which they exercise significant degree of control
- Performance reporting should be timely and contain significant information relating to the responsibility centres

Responsibility centre

- The main focus of responsibility accounting lies on the responsibility centres.
- A responsibility centre is a sub unit of an organization under the control of a manager who is held responsible for the activities of that centre.
- It is like a small business to achieve the objectives of a large organisation

1. **Cost Centre**
    - A cost or expense centre is a segment of an organisation in which the managers are held responsible for the cost incurred in that segment but not for revenues.
    - According to CIMA, London a cost centre is "a location person or equipment , for which costs maybe ascertained and used for purposes of cost control"
    - Responsibility in a cost centre is restricted to cost.
    - For planning purposes, the budget estimates are cost estimates; for control purposes, performance evaluation is guided by a cost variance equal to the difference between the actual and budgeted costs for a given period.
    - Cost centre managers have control over some or all of the costs in their segment of business, but not over revenues.
    - In manufacturing organisations, the production and service departments are classified as cost centre. Also, a marketing department, a sales region or a single sales representative can be defined as a cost centre.
    - Cost centre may vary in size from a small department with a few employees to an entire manufacturing plant. In addition, cost centres may exist within other cost centres.
    - E.g. accounting department, repairs & maintenance department

2. **Revenue Centre**
   - It is a segment of the organisation 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 expense of the marketing department.
   - The revenue centre manager will control the selling price, promotion mix and product mix
   - The performance of a revenue centre is evaluated by comparing the actual revenue with budgeted revenue, and actual marketing expenses with budgeted marketing expenses.
   - E.g. sales department

3. **Profit Centre**
   - Also called business centre
   - It is a segment of an organisation whose manager is responsible for both revenues and costs.
   - In a profit centre, the manager has the responsibility and the authority to make decisions that affect both costs and revenues (and thus profits) for the department or division.
   - The managers are encouraged to act as if they were running their own separate business
   - The main purpose of a profit centre is to maximise profit by making decisions relating to production volume, product mix, selling price, marketing strategy.
   - Profit centre managers aim at both the production and marketing of a product.

4. **Investment Centre**
   - It is responsible for both profits and investments.
   - The investment centre manager has control over revenues, expenses and the amounts invested in the centre's assets.
   - 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 manager of an investment centre has more authority and responsibility than the manager of either a cost centre or a profit centre.

- Besides controlling costs and revenues, he has investment responsibility too. ‘Investment on asset’ responsibility means the authority to buy, sell and use divisional assets.
- E.g. a new hotel being developed

Steps for Achieving Goals of Responsibility Accounting:

1. The organisation is divided into various responsibility centres each responsibility centre is put under the charge of a responsibility manager. The managers are responsible for the performance of their departments.

2. The targets of each responsibility centre are set in. The targets or goals are set in consultation with the manager of the responsibility centre so that he may be able to give full information about his department. The goals of the responsibility centres are properly communicated to them.

3. The actual performance of each responsibility centre is recorded and communicated to the executive concerned and the actual performance is compared with goals set and it helps in assessing the work of these centres.

4. If the actual performance of a department is less than the standard set, then the variances are conveyed to the top management. The names of those persons who were responsible for that performance are also conveyed so that responsibility may be fixed.

5. Timely action is taken to take necessary corrective measures so that the work does not suffer in future. The directions of the top level management are communicated to the concerned responsibility centre so that corrective measures are initiated at the earliest.

The purpose of all these steps is to assign responsibility to different individuals so that the performance is improved. In case the performance is not up to their targets set, then responsibility may be fixed for it. Responsibility accounting will certainly act as control device and it will help in improving the overall performance of the business.

Advantages of Responsibility Accounting

- Some responsibility is given to each individual and he is held accountable for his performance. No person can assign his responsibility to others. In this system, responsibility is fixed individually

- Facilitates stricter control on costs & revenue along with helping in planning and decision making

- When responsibility is fixed for each department, managers consider themselves important part of the organisation. It helps in developing spirit of initiative among employees and increases their motivation

- A mechanism for presenting information is provided. A framework for managerial performance appraisal systems can be established on that basis, besides motivating managers to act in the best interest of the enterprise

- Relevant and up to the minute information is made available which can be used to estimate future costs &/or revenue and fix up standards for departmental budgets.

Problems in Responsibility Accounting

- For responsibility accounting to be effective, a proper classification between controllable and non-controllable costs is a prime requisite. But practical difficulties arise while doing so on account of the complex nature & variety of costs.

- Separate departmental pursuits may lead to inter-departmental rivalry and it may be prejudicial to the interest of the enterprise as a whole. Managers may act in the best interest of their own, but not in the best interest of the enterprise

- Can't be relied upon completely as a tool for management control. It is a system just to direct the attention of management to those areas of performance which require further investigation

- Preparation of an organisation chart which clearly delineates lines of responsibility and authority is a difficult task

- Responsibility accounting reports may be overloaded with all available information

Divisional Performance- Concept

- The whole organisation is divided into separate divisions and each divisional manager has great deal of independence.
- The manager of each division is accountable for performance of its operations as also the nature of operations undertaken.

- It leads to creation of a decentralised organisation structure and each division is treated as a separate responsibility centre. The performance of each responsibility centre will be separately measured and compared with other responsibility centres for managerial decisions.
- However, authority can't be exclusive one, implying that full autonomy can't be fully granted to the divisional head as no unit can be independent of other units within one organisation.
- The performance of each division has to be separately and independently evaluated only to place responsibility for effective management so that those who are doing the jobs don't shrink from their duties and the operations which they are bound to perform.

Merits of Divisional Performance

- Promotes quick decision making and avoids red tape and delays
- Motivates divisional managers to perform better. It also helps to improve their job satisfaction and self-fulfilment
- Makes top management free from detailed involvement in the day to day operations and enables them to devote themselves to important policy matters.

Demerits of Divisional Performance

- Various divisions may compete with each other and in that divisional mangers may try to increase their own profits at the expenses of other divisions
- There may be lack of coordination and cooperation between divisions. This results in lack of harmony in achieving overall goals of the business

Measurement of Divisional Performance

1. **Variance Analysis**
    - Actual performance is compared with standard or budgeted performance and any variance between the two is analysed to know the causes so that responsibility can be established and corrective actions taken.
    - Should be undertaken at each cost centre & revenue centre.

2. **Profit**
    - The absolute amount of profit earned by a profit centre

3. **Return on Investment**
    - ROI addressed divisional profit as a percentage of the assets employed in the division. Assets employed can be defined as total divisional assets, assets controllable by the divisional manager, or net assets.

ROI= (Divisional Profit/ Divisional investment) * 100

= (EBIT/ capital employed) * 100

= (Profit/ sales) * (Sales/ capital invested) * 100

- An organisation can improve the ROI either by improving the net profit margin or by increasing the turnover with the same amount of investment. It implies that the performance of a firm/ segment can be improved either by increasing the profit margin per rupee of sales or by generating more sales volume per rupee of investment

- Advantages
    - Is easy to understand & interpret
    - It Is a measure of relative performance and therefore can be used to compare the firms od different sizes.
    - Helps in ensuring good congruence between the different divisions and the firm
    - Is widely accepted measure of performance because it relates net income to investments made in the division
    - Motivate divisional managers to improve their performance by optimum utilisation of the capital invested in the divisions.

- Limitations
    - Satisfactory definition of profit & investment on which ROI is based are difficult to find
    - There are different methods of valuation of assets such as book value, original cost, current replacement cost etc which of these valuations is to be taken for calculating ROI remains a difficult question to answer
    - There may be some practical difficulties in calculating the divisional profit which in turn will make calculations of ROI difficult.

4. Residual Income

- Also known as Economic value added (EVA) method
- Was developed by consulting firm Stern Stewart & co.
- Residual income is excess income generated more than the minimum rate of return

Residual Income = Divisional Profit- Cost of capital

=Divisional Profit- (Divisional Investment* rate of interest)

- Advantages
    - It leads to better decisions than ROI
    - It has the advantage of showing division's ability to earn more than the cost of capital
    - Divisional managers are made to realise that there is an opportunity cost of funds used by the divisions in the form of cost of capital

- Disadvantages
    - Cannot be used to compare the performance of divisions of different size
    - This method is difficult to understand and apply
    - It may be difficult to determine the rate of calculating cost of capital