

*Vocational Higher Secondary
Education (VHSE)*

Second Year

MANAGEMENT

Reference Book



Government of Kerala
Department of Education

State Council of Educational Research and Training (SCERT),
KERALA
2016

LIST OF CONTRIBUTORS

Participants

Azeez M

Govt VHSS, Cherppulassery, Palakkad

Nixon C. K.

Govt VHSS, Pakalkuri, Thiruvananthapuram.

Sivaprasad G.

VMBS Govt. VHSS, Thalayolapparambu, Kottayam

Sunny T. J.

NIVHSS, Marampalli, Aluva, Ernakulam

Ravisankar V.S.

VHSS for Girls, Thiruvallam, Thiruvananthapuram

Experts

Dr. Simon Thattil

Prof. of Commerce

School of Business Management and Legal Studies

University of Kerala

Sri. Sujan Kumar K.G.

Asst. Professor of Commerce, Govt. College, Kottayam

Academic Co-ordinator

Dr. Jayalekshmi. S

Asst. Professor, SCERT

State Council of Educational Research and Training (SCERT)

Poojappura, Thiruvananthapuram 695012, Kerala

Website : www.scertkerala.gov.in, e-mail : scertkerala@gmail.com

Phone : 0471 - 2341883, Fax : 0471 - 2341869

Typesetting and Layout : SCERT

©Department of Education, Government of Kerala

FOREWORD

Dear learners,

The world of business is rapidly changing. New values and management approaches are appearing, organisations are changing their forms and practices, jobs are being redefined and relocated; information technology and intricacies of globalisation are presenting major organisational and economic challenges before the world of business. Trained managers and manpower are needed to tide over this pressure. The efforts in this direction should be initiated from higher secondary level.

In continuation with changes made in the first year, Management in the second year opens with an introduction to economic environment for managerial decision making and moves to short term and long term financial decision making, functional areas of management like production and operations management. Quality management, a recent development in this field is also included. As the thrust is given to managerial decision making, some areas from Statistics like averages, dispersion, correlation and index numbers which are inevitable tools for decision making are included.

This reference book is the result of new approach in designing the course so as to provide an integrated learning model to the learners. Sincere efforts have been taken to make the content simple, comprehensive and self-exploratory. Self-evaluation and term evaluation questions have been included to help the learner to know the progress of learning. Extended activities are also included to enhance management skills. There is ample opportunity for the learners for self-reflection, critical thinking and active learning by exposing themselves to practical business situations.

Hope that the material will make your learning a delightful, interesting and rewarding. Suggestions for improvement are always welcome.

With regards,

Dr. P A. Fathima
Director
SCERT, Kerala

CONTENTS

Part A

About the Course	5
Syllabus	6

Part B - Units

1. Economic Environment for Management	9
2. Working Capital Management	19
3. Long run Investment Decision – Capital Budgeting	27
4. Production and Operations Management	38
5. Quality Management	54
6. Measures of Central Tendency	64
7. Measures of Dispersion	83
8. Correlation	96
9. Index Numbers	106
10. References	114

ABOUT THE SUBJECT

Management is a developing discipline. It ensures the accomplishment of the objectives of an organization within a set of constraints in scientific manner. Being the budding entrepreneurs, vocational higher secondary learners get ample knowledge, skills and attitudes on various aspects of management. The subject Management is introduced in VHSE as part of the commerce education in all commerce based vocational courses. It helps learners to acquaint with different management concepts and their application in business. Learners are also being introduced to certain tools for managerial decisions making from Economics and Statistics.

Learners have acquired the basic concepts of management, its process, functions, objectives and its functional areas, recent trends and certain tools from economics and statistics, used in managerial decision making, during first year. In the second year, as a continuation of what they have studied, the economic environment for managerial decision making and the areas of short term and long term financial decision making, functional areas of management like production and operations management and quality management are included. More areas from Statistics like averages, dispersion, correlation and index numbers which are inevitable tools for managerial decision making are also included in the syllabus.

SYLLABUS

Unit I ECONOMIC ENVIRONMENT FOR MANAGEMENT (26 Periods)

- 1.1. Economic environment – Meaning and Significance
- 1.2. Basic concepts in Economic Environment
 - 1.2.1. National Income: Gross Domestic Product, Net Domestic Product, Gross National Product, Net National Product
 - 1.2.1.1. Methods of Measuring National Income
 - Value Added Method
 - Income Method
 - Expenditure Method
 - 1.2.1.2. Problems in the calculation of National Income
 - 1.2.2. Business Cycle - Phases of Business Cycle

Unit II WORKING CAPITAL MANAGEMENT (22Periods)

- 2.1 Meaning and Concept of Working Capital
- 2.2 Components of Working Capital
- 2.3 Types of Working Capital
- 2.4 Meaning and significance of working capital management
- 2.5 Approaches to working capital Management

Unit III LONG RUN INVESTMENT DECISION - CAPITAL BUDGETING

(24 Periods)

- 3.1. Meaning and Importance of Capital Budgeting
- 3.2. Capital Budgeting Process
- 3.3. Methods of Capital Budgeting – Traditional (Non- Discounted Cash Flow Methods)
 - 3.3.1. Pay Back Method
 - 3.3.2. Average Rate of Return Method
- 3.4. Methods of Capital Budgeting – Discounted Cash Flow Methods
 - 3.4.1. Net Present Value Method
 - 3.4.2. Profitability Index Method
 - 3.4.3. Internal Rate of Return Method

Unit IV PRODUCTION AND OPERATIONS MANAGEMENT (22 Periods)

- 4.1. Meaning and Importance of Production and Operations Management.
- 4.2. Difference between Production and Operation
- 4.3. Major Decisions of Production Management
- 4.4. Plant Location and factors affecting plant location

- 4.5. Plant Layout and different types of Plant Layouts
- 4.6. Aggregate Planning – Meaning, Importance and Strategies
- 4.7. Master Production Scheduling - Meaning, Significance and Development of Master Production Schedule (MPS)

Unit V QUALITY MANAGEMENT (16 Periods)

- 5.1. Meaning and Definition of Quality
- 5.2. Dimensions of Quality – Product and Service
- 5.3. Meaning and Concept of Quality Management
- 5.4. Principles of Quality Management
- 5.3. Quality Systems
 - 5.3.1. Elements
 - 5.3.2. ISO 9000:2000

Unit VI MEASURES OF CENTRAL TENDENCY (32 Periods)

- 6.1. Meaning and Significance of Central Tendency
- 6.2. Qualities of a good average
- 6.3. Types of Average
- 6.4. Simple Arithmetic Mean – Individual Observation, Discrete Series, Continuous Series.
- 6.5. Weighted Arithmetic Mean
- 6.6. Combined Arithmetic Mean
- 6.7. Correction in Mean
- 6.8. Median - Individual Observation, Discrete Series, Continuous Series.
- 6.9. Determination of Median Graphically.
- 6.10. Partition Values – Quartiles, Deciles and Percentiles
- 6.11. Quartiles - Individual Observation, Discrete Series, Continuous Series.
- 6.12. Percentiles - Individual Observation, Discrete Series, Continuous Series.
- 6.13. Mode - Individual Observation, Discrete Series, Continuous Series.
- 6.14. Locating Mode Graphically
- 6.15. Comparison of mean, median and mode

Unit VII MEASURES OF DISPERSION (28 Periods)

- 7.1. Meaning and Significance of Measures of Dispersion.
- 7.2. Methods of studying Dispersion.
- 7.3. Absolute and Relative Measures of Dispersion.
- 7.4. Range - Individual Observation, Discrete Series, Continuous Series.

- 7.5. Coefficient of Range.
- 7.6. Quartile Deviation -Individual Observation, Discrete Series, Continuous Series.
- 7.7. Co efficient of Quartile Deviation
- 7.8. Mean Deviation - Individual Observation, Discrete Series, Continuous Series.
- 7.9. Co efficient of Mean Deviation
- 7.10. Standard Deviation - Individual Observation, Discrete Series, Continuous Series.
- 7.11. Co efficient of Standard Deviation/Variance
- 7.12. Qualities of a good measure of Dispersion.

Unit VIII CORRELATION

(18 Periods)

- 8.1. Meaning of Correlation
- 8.2. Types of Correlation
 - 8.2.1. Simple, Partial and Multiple
 - 8.2.2. Positive and Negative
 - 8.2.3. Perfect and Imperfect
 - 8.2.4. Linear and Non linear
- 8.3. Methods of studying correlation
 - 8.3.1. Scatter Diagram method
 - 8.3.2. Pearson's Co-efficient of Correlation
 - 8.3.3. Spearman's Rank Correlation

Unit IX INDEX NUMBERS

(22 Periods)

- 9.1. Meaning
- 9.2. Types of Index Numbers
 - 9.2.1. Price Index
 - 9.2.2. Quantity Index
 - 9.2.3. Cost of Living Index
 - 9.2.4. Whole Sale Price Index
- 9.3. Uses and Purpose
- 9.4. Methods of constructing Index Numbers
 - 9.4.1. Simple Index Number
 - 9.4.2. Weighted Index Number
 - Laspeyres' Method
 - Paasche's Method

Unit 1

Economic Environment for Management

- 1.1. Economic environment – Meaning and Significance
- 1.2. Basic concepts in Economic Environment
 - National Income: Gross Domestic Product, Net Domestic Product, Gross National Product, Net National Product
 - Methods of Measuring National Income
 - Value Added Method - Income Method - Expenditure Method
 - Problems in the calculation of National Income
 - Business Cycle - Phases of Business Cycle

Introduction

The success of a business not solely depends on its internal management, but also on many external forces. These external forces include consumers, other business firms, general economic conditions, Government laws and regulations. Business has to monitor the changes happening in these external forces and adapt to these changes for its survival. Economic environment is one of the main elements in business environment. The economic environment is composed of various sets of economic policies, economic system, national income, per capita income, infrastructure, capital formation, development strategy for economic growth and development, resources mobilisation, business cycle etc. This chapter deals with national income and its basic concepts, methods for its measurement and problems in its calculation.

Learning Outcomes

The learner;

- *Identifies the meaning of economic environment*
- *Explains basic concepts in economic environment*
- *States the importance of economic environment*
- *Explains various concepts of national income*
- *Analyzes the various methods of measuring national income*
- *Identifies the problem in the calculations of national income*
- *Identifies the meaning of business cycle*
- *Recognises the phases of business cycle*

Meaning of Economic Environment

Economic environment refers to the economic factors like economic conditions, economic policies and economic systems that influence the business in a country. The basic concepts in economic environment are:

1. Economic system

Economic system is a system, which functions in a country for the purpose of production and distribution of goods and services to satisfy the needs of the people. Economic system can be;

- a. **Capitalism**-Capitalism believes in private ownership of production and distribution facilities. The United States, Japan and United Kingdom are examples of capitalist countries.
- b. **Socialism**-Socialist economy is one where all means of production are collectively owned and it also ascribe a large role to the state. The erstwhile USSR is an example for socialist country.
- c. **Mixed economy**-Existence of both private and public sectors. France, Holland and India are examples of mixed economies.

2. Economic policies

Economic policies lay the framework within which every organisations has to function. Economic policies include;

- A. **Monetary policy**- Monetary policy is primarily concerned with the management of supply of money in a country. The main objective of monetary policy is to maintain price stability and ensure an adequate flow of credit to the productive sectors of the economy. In India, monetary policy is announced twice a year by Reserve bank of India. Monetary policy is also termed as credit control policy. Credit control can be of two types.

- (i) Quantitative credit control (ii) Qualitative credit control

- (i) **Quantitative credit control** - It regulates the volume of total credit and includes;

Bank rate policy- The bank rate, is the rate at which central bank would re-discount the eligible bills already discounted by commercial banks. The central bank can control the money supply in the country by revising the bank rate upwards and downwards.

Open market operations -The central bank may purchase or sell the securities in the open market and thereby control money supply in the economy. For example: suppose there is inflation, to bring down the money supply, the central bank would sell the securities. When there is deflation the central bank would buy the securities.

Variable reserve ratio- Variable reserve ratio refers to the increase or decrease in the statutory liquidity ratio and cash reserve ratio. By increasing the ratio the commercial banks would be left with lesser volume of funds to grant loans and prevent the inflation.

(ii) **Qualitative credit control** - Qualitative credit control means regulating the flow of credit through margin requirements, moral suasion, credit-rationing etc.

B. Fiscal policy - It is the means by which a Government adjust its spending levels and revenue collection to monitor and influence a nation's economy. In other words, fiscal policy is concerned with the determination of State income and expenditure policy. This is the policy, through which Government can encourage and restrict consumption, investment and saving habits in a country. One of the important goals of fiscal policy formulated by the Government of India is to attain rapid economic development of the country. The following are four important techniques of fiscal policy of india;

1. Taxation policy
2. Public expenditure policy
3. Public debt policy
4. Deficit financing policy

C. Foreign trade policy- Foreign trade policy determines the scope for trade between countries. A liberal policy would extend the scope for exports and imports while restrictive trade policy would narrow the scope for trade.

D. Licensing policy- Till 1991, India adopted licensing policy to regulate the growth of industries in India. After 1991 India adopted the policy of liberalisation, liberating the economy from strict rules.

E. Technology policy- The policy of using modern techniques in business.

F. Price policy- Price policy refers to the controls that Government has on the price in a country. Through price policy the Government protects the interest of the people.

Importance of Economic Environment

There is a close and continuous interaction between the business and its economic environment. Economic factors such as per capita income, national income, exploitation of natural resources, employment generation, propensity to consume, industrial development and so on, influence the business environment. Likewise, the economic performance of a country also determines the business environment. The interaction helps in strengthening the business firm and using its resources more efficiently. Economic environment helps the business in the following ways:

- Identifying opportunities and threats.
- Giving direction of growth.
- Continuous learning.
- Image building.
- Meeting competition.
- Identifying strength and weakness.

Assessment Activity

Suppose, as a result of budget announcement there will be a hike of ₹10,000 in the price of two wheelers from April 2016. Analyse its impact on two wheeler market on the basis of a) Sales b) profitability.

National Income

National income is the money value of all the final goods and services produced by a country during a period of one year.

For example, national income consists of millions of metres of cloth, tonnes of sugar, and millions of litres of milk. How can we measure the total income in this case? Since these goods are measured in different physical units, it is not possible to add them together. So the value of all goods and services produced is measured in terms of money, which is the common measure of value.

Basic concepts of National Income

1. Gross Domestic Product (GDP)

Gross domestic product is the money value of all final goods and services produced in the domestic territory of a country during a year.

- (a) Final goods – Final goods are those goods, which are being purchased for final use and not for resale or further processing.
- (b) Domestic territory-
 - Territory lying within the political frontiers, including territorial waters of the country
 - Ships and aircrafts operated by the residence of the country
 - Fishing vessels, oil and natural gas rigs and floating platforms operated by the residence of the country in the international waters.
 - Embassies, consulates and military establishments of the country located abroad.

2. GDP at constant prices and current prices

The domestic product estimated on the basis of the prevailing prices is called gross domestic products at current prices.

The domestic product measured on the basis of fixed prices, in some base year, is known as gross domestic product at constant prices.

3. GDP at factor cost and GDP at market price

GDP at market price is the money value of all goods and services produced in the domestic territory of a country during one year estimated at the prices prevailing in the market.

GDP at factor cost is the estimation of gross domestic product in terms of the earning of factors of production.

Conceptually, the value of GDP at market price and factor cost must be identical. This is because the final value of goods and services at market price must be equal to the cost involved in their production (factor cost).

4. Net Domestic Product (NDP)

Gross domestic product does not represent the true national income because it includes the full value of all goods, even capital goods. When depreciation allowance is subtracted from GDP we get Net Domestic Product.

Capital goods - Capital goods are those final goods which are durable and used in production process but do not get transformed in the production process. They form a part of capital and they gradually undergo wear and tear. For example machines, equipment, buildings etc.

$$\text{NDP} = \text{GDP} - \text{Depreciation}$$

5. Gross National Product (GNP)

Gross National Product is the total value of all goods and services produced by the nationals of a country within the country or outside the country. The value of goods and services produced by non-nationals in India will not be included in the Gross National Product of India.

$$\text{GNP} = \text{GDP} + \text{Income from abroad}$$

6. Net National Product (NNP)

Net National Product is the total value of final goods and services produced in an economy during a year after allowing for depreciation. Thus;

$$\text{NNP} = \text{GNP} - \text{Depreciation} \quad \text{OR}$$

$$\text{NNP} = \text{GDP} + \text{Income from abroad} - \text{Depreciation}$$

NNP is the 'National Income' of an economy. When NNP is divided by the Population of a country, we will get 'Per capita Income'

7. NNP at factor cost

NNP at factor cost is the volume of commodities and services turned out during an accounting year, counted without duplication. It can also be defined as the net value added at factor cost (by the resident) in an economy during an accounting year.

Assessment Activity

Form equations for different concepts of national income.

GNP at market price - depreciation = NNP at market price.

GNP at market price – net income from abroad = GDP at market price.

GDP at market price – net indirect taxes = GNP at factor cost.

NNP at market price – net income from abroad = NDP at market price.

NNP at market price – net indirect taxes = NNP at factor cost.

GDP at market price – net indirect taxes = GDP at factor cost.

GNP at factor cost – depreciation = NNP at factor cost

NDP at market price – net indirect taxes = NDP at factor cost.

GDP at factor cost – depreciation = NDP at factor cost.

Methods of measuring national income

There are three methods of measuring national income:

- (1) Value added method or product method
- (2) Income method
- (3) Expenditure method

1. Value added method or product method

According to value added method or product method or net output method, national income is measured by adding up the money value of all final goods and services produced in a country during one year. There are three steps in computing national income, under product method. They are:

a. Classify the economy into;

- i. Primary sector i.e. producing commodities by exploiting natural resources like land and water e.g. agriculture, forestry, fishing, mining etc.
- ii. Secondary sector i.e. manufacturing sector—transfers one type of commodity into another eg. manufacturing, construction, electricity, gas, water supply etc.
- iii. Tertiary sector i.e. service sector e.g. trade and commerce, transport and communication, banking, insurance Government and professional services.

b. Estimation of net value added

The second step is to find out the net value added at factor cost within the domestic territory of a country.

c. Estimation of National Income

The third step in estimating national income is estimating the net factor income earned from abroad. Net factor income from abroad consists of net compensation of employees, net income from property and entrepreneurship and net retained earnings of resident companies abroad. When we add the net factor income from abroad to the net domestic product we get the national income.

2. The income method

The income method measures national income from the side of the payments made to the primary factors of production for their productive services in an accounting year.

There are four steps involved in estimating national income by the income method. They are: (a) Identifying the production units employing factor services (b) Classifying factor payments (c) Estimating factor payments and (d) Estimating net factor income from abroad.

(a) Identifying the production units into primary sector, secondary sector and tertiary sector.

(b) Classifying factor payments

The factor payments are generally classified into;

compensation of employees - salaries and wages, employers contribution to social security and welfare funds, ration, uniform, housing, medical and education benefits
capital income- rent, interest, profits, royalties, dividends undistributed profits of companies etc.

mixed income - earning from agriculture, trade, transport, income from professions.

(c) Estimating factor payments

The third step is to estimate factor payments i.e. the number of units of each factor employed is multiplied with the income paid to each unit.

(d) Estimating net factor income from abroad

This is the last step in estimating national income. Compensation of employee's, capital income and mixed income earned by all the production units in the domestic territory of a country during an accounting year gives the domestic factor income. By adding the net factor income from abroad with the domestic factor income we get the national income.

3. Expenditure method

The expenditure method estimates national income by measuring final expenditure on gross domestic product. Final expenditure in an economy is the sum total of the expenditure incurred on final goods and services produced. It is the sum total of consumption expenditure and investment expenditure. The final expenditure on gross domestic products consists of:

- a. Private final consumption expenditure
- b. Government final consumption expenditure
- c. Gross fixed capital formation
- d. Changing stocks
- e. Net acquisition of valuables
- f. Net export of goods and services

Problems in the estimation of national income

Generally two types of difficulties are met within the estimation of national income. They are: - (a) conceptual difficulties (b) statistical difficulties

- (a). Conceptual difficulties – conceptual difficulties relate to definition of various concepts and terminology used in this process like definition of nation, method employed in the national income estimation, stage of economic activity at which national income is to be calculated and the type of commodities and services which are to be taken into account in national income.
- (b). Statistical difficulties – Lack of adequate data, lack of differentiation in economic function, double counting etc., are some of the statistical difficulties. In a developing country like India, a large portion of agriculture output does not come to the market at all and is retained either for barter purpose or for self-consumption. In unorganized sectors like small scale industries and trade, hotels and restaurants etc, data on production, capital formation etc are not satisfactory. In India, conditions not only differ between different states but also within each state. Information based on samples taken from a few districts may or may not be valid for the whole states. Occupational distribution of working population of India is not very clearly defined.

Assessment Activity

Calculate the value of goods produced by garment manufacturers assuming that cotton passes through four stages of production.

Value added at different stages

<i>Stages of Production</i>	<i>Value of output (Rs)</i>	<i>Value added (Rs)</i>
1 Cotton cultivation	100	100
2. Cloth Manufacturing	150	50
3. Garment Manufacturing	210	60
4. Retailer	250	40
Total	710	250

Explanation : If we add the value of different stages of production, total comes to ₹710. The customers pay only ₹250. This amount should be added while estimating the national income. This is because the value of the final product, i.e., the cotton garments is only ₹ 250.

Business Cycles

Economic activities never move on a straight line, it faces fluctuations. The wave like fluctuation in the level of economic activity is called business cycles. It may be defined as an alternate expansion and contraction in overall business activity, characterised by the periods-boom, recession, depression and recovery. Business cycle also known as trade cycle, affects the total income, investment, employment and output.

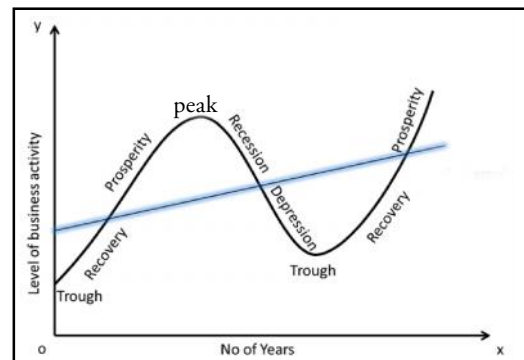
Phases of a Business Cycle

1.Boom (Prosperity or expansion): The boom phase means a state in which the real income consumed, the real income produced and the level of employment are higher or rising. All these bring up the economy to the **peak**.

2.Recession (contraction): Once the economy reached the **peak**, the course will change. A downward tendency in demand occurs. But the producers who are not aware of this go on producing. The supply now exceeds demand. When the producers come to know the situation they are compelled to give up the future investments. Business failures increase and unemployment expands. There is general distress.

3.Depression: During the phase of depression economic activity is at its low ebb. Wages, costs and prices are very low. There is massive unemployment and a fall in the aggregate income of the people. The lowest point at this phase is called '**trough**'

4.Recovery: Depression phase does not continue indefinitely. The idle workers now come forward to work at low wages, consumers start consuming, and banks come forward to give loans. Thus economic activity starts picking up.



Business cycles and Managers

Business cycles are reality. Every firm is a part of economy and hence cannot remain isolated. A thorough knowledge about business cycle, its impact on the economy are inevitable for business managers for forward planning and decision making. Periods of depression bring in pessimism and slacken business activity. Periods of boom create optimism and brighten business prospects. Signs of recession warn about probable losses and recovery signals potential opportunities. Thus the impact of every phase has to be analysed properly.

TE Questions

1. The economic environment of business includes
 - a) Economic system
 - b) Economic policies
 - c) Economic conditions
 - d) All of these
2. Net national product at factor cost is –
 - a) Equal to national income
 - b) more than national income
 - c) less than national income
 - d) always more than the gross national product
3. Which of the following is incorrect?
 - a) $\text{GDP at market price} = \text{GDP at factor cost} + \text{net indirect taxes}$
 - b) $\text{NNP at factor cost} = \text{NNP at market prices} - \text{net indirect taxes}$
 - c) $\text{GNP at market prices} = \text{GDP at market prices} + \text{net factor income from abroad}$
 - d) None of the above.
4. Expansion in general business activities : Inflation
 Contraction in general business activities : _____
5. Name the various methods of quantitative credit control policies of central bank.
6. Differentiate GNP at market prices and NNP at market prices.
7. Mention the three sectors in which an economy can be classified.
8. Examine the various concepts related to national income.
9. What are the various methods of estimating national income?
10. What are the various difficulties involved in estimating national income in India?

Extended Activities

1. Prepare a note on the new initiatives and policies adopted in India for the development of start-ups, small, medium and micro business units.
2. Collect national income and per capita income data from new Economic Survey report available in the web site www.finmin.nic.in
3. Collect monthly sales data of a particular year from 5 shops doing similar business in your town and analyze it on monthly-wise. Link your findings with the different phases of business cycle.

Unit 2

Working Capital Management

- 2.1. Meaning and Concepts of Working Capital
- 2.2. Components of Working Capital
- 2.3. Types of Working Capital
- 2.4. Meaning and Significance of Working Capital Management
- 2.5. Approaches to Working Capital Finance

Introduction

Every organisation requires broadly two kinds of capital. One for investing in fixed assets and another for financing routine activities. Investment in fixed assets is called fixed capital and investment in current assets is called working capital. This chapter deals with how working capital is managed by maintaining an optimum level of current assets and current liabilities.

Learning Outcomes

The learner;

- *Identifies the meaning of working capital*
- *States the importance of working capital*
- *Explains the concepts of working capital*
- *Compares gross working capital with net working capital*
- *Explains different components of working capital*
- *Identifies different kinds of working capital*
- *Analysis the factors affecting working capital*
- *States the meaning and importance of working capital management*
- *Explains different approaches to working capital finance.*

Meaning and Importance of Working Capital

If you propose to start a small business after completing the vocational higher secondary course, say a coffee shop. What all things do you need?

You require building, furniture, utensils, sugar, coffee powder, cash to pay wages and other day-to-day expenses. For all these we need money or capital.

Every business needs funds for two purposes - for its establishment and to carry out its day-to-day operations. The investment made in the fixed assets like building, furniture, utensils etc. is called fixed capital. Funds needed for the purchase of sugar, tea powder etc. and payment of wages and other day to day expenses are known as working capital. Thus, working capital is the sum of money needed to finance current assets.

No business can run successfully without an adequate amount of working capital. The importance of maintaining adequate amount of working capital is as follows:

1. Solvency of the business-Adequate working capital ensures solvency of the business by providing uninterrupted flow of production.
2. Goodwill-Sufficient working capital enables a business to make prompt payments and it will enhance the goodwill of the firm. It also helps to arrange loans on easy and favourable terms.
3. Cash discount- With adequate amount of working capital the business can make cash purchases and thereby avail cash discount.
4. Regular payments of salaries, wages and other day to day commitments-Regular and prompt payment of employees' claims is possible only if sufficient working capital is available. This will raise their morale and eventually leads to increase in efficiency.
5. Exploitation of favourable market conditions- Adequate amount of working capital helps the firm to exploit favourable changes in the market such as reduction in the price of raw materials, unexpected demand for product, etc.
6. Ability to face crisis - Sufficient working capital provides a buffer to face uncertainties.
7. High morale- Adequacy of working capital creates an environment of security, confidence, high morale and enhance overall efficiency in business.

Concepts of Working Capital

The different concepts of Working Capital are :

- (i) **Gross Working Capital-** The sum total of all current assets of a business concern is called as gross working capital. Current assets are those assets which can be converted into cash within a short period of time ie, one year.
- (ii) **Net working capital-** Net working capital is the difference between current assets and current liabilities. Current liabilities are those liabilities which are intended to be paid within one accounting year.

$$\text{Net working capital} = \text{current assets} - \text{current liabilities}$$

Net working capital may be:

- (a) Positive working capital:- excess of current assets over current liabilities.
- (b) Negative working capital;- excess of current liabilities over current assets.
- iii). **Permanent or fixed working capital:** There is always a minimum level of current assets which is continuously required by the enterprise to carry out its normal business operations. For example, a minimum level of raw materials, work in progress, finished goods and cash balance. This minimum level of current assets is called fixed working capital
- iv). **Temporary or variable working capital-** This is the amount of working capital which is required to meet the seasonal demands and some special exigencies.

Components of working capital

Working capital is composed of various current assets and current liabilities, which are as follows;

(A) Current Assets : Current assets include:

- a) Inventory
 - i. Raw materials
 - ii. Work-in-progress
 - iii. Consumable stores
 - iv. Finished goods
- b) Sundry debtors
- c) Bills receivables
- d) Pre-payments
- e) Short term investments
- f) Accrued income
- g) Cash and bank balances

(B) Current liabilities: Current liabilities include:

- a) Sundry creditors
- b) Bills payables
- c) Accrued expenses
- d) Bank overdrafts
- e) Proposed dividends
- f) Short term loans
- g) Tax payments due

Assessment Activity

Compute gross working capital and net working capital from the given balancesheet

Balancesheet of ABC ltd. as on 31.3.2015

Liabilities	Rs.	Assets	Rs.
Equity shares	400000	Goodwill	40000
8% debentures	200000	Land and building	300000
Reserves & Surplus	100000	Plant and machinery	200000
Sundry creditors	300000	Finished goods	120000
Bill payable	60000	Work-in-progress	80000
Outstanding expenses	40000	Prepaid expenses	40000
Bank overdraft	100000	Marketable securities	120000
Provision for tax	40000	Sundry debtors	180000
Proposed dividend	60000	Bill receivables	40000
		Cash & bank	180000
Total	1300000	Total	1300000

As per the balancesheet

1) **Gross working capital**= total of current assets

ie., $120000 + 80000 + 40000 + 120000 + 180000 + 40000 + 180000 = ₹7,60,000$

2) **Net working capital** = current assets – current liabilities

Current assets = ₹7,60,000

Current liabilities = $300000 + 60000 + 40000 + 100000 + 40000 + 60000 = ₹600000$.

Net working capital = $760000 - 600000 = ₹160000$.

Factors determining the working capital requirements

The working capital requirements of a concern depend upon a number of factors such as:

1. **Nature of business**-The working capital requirements of a firm basically depends upon the nature of its business. Public utility undertakings like electricity, water supply and railways need very limited working capital because they offer cash sales only and supply services, not products, and as such no funds are tied up in inventories and receivables. On the other hand, trading and financial firms require investment of large amounts in current assets like inventories, receivables and cash.

2. **Size of business-** Greater the size of a business unit, generally larger will be the requirements of working capital. However, in some cases even smaller concern may need more working capital due to high overhead charges and other economic disadvantages of small size.
3. **Production policy-**In certain industries the demand is subjected to wide fluctuations due to seasonal variations. If the policy is to keep production steady by accumulating inventories it will require higher working capital.
4. **Length of production cycle-**In manufacturing business, the requirements of working capital increase in direct proportion to length of manufacturing process.
5. **Working capital cycle-** In a manufacturing concern the working capital cycle starts with the purchase of raw materials and ends with the realisation of cash from the sale of finished products. Larger the period of the cycle, larger is the requirement of working capital.
6. **Rate of stock turnover** – A firm having a high rate of stock turnover will need lower amount of working capital as compared to a firm having a low rate of turnover.
7. **Credit policy-** A concern that purchases its requirements on credit and sells its products on cash requires lesser amount of working capital. On the other hand, a concern buying its requirements for cash and allowing credit to its customers shall need larger amount of working capital.
8. **Business cycles-** In a period of boom, there is a need for large amount of working capital. In times of depression there will be large amount of idle working capital.
9. **Rate of growth of business** - The working capital requirements of a concern increases with increase in the growth of business activities. For a firm with normal rate of growth and expansion of business, the retained profit may be used for additional working capital. But fast growing concerns require large amount of working capital.
10. **Dividend policy-** A firm that maintains a steady high rate of cash dividend needs more working capital than the firms that retains larger part of its profits.
11. **Price level changes-** Generally, the rising prices will require the firm to maintain larger amount of working capital to maintain the same level of current assets.
12. **Other factors-** Operating efficiency, management ability, irregularities of supply, import policy, importance of labour, banking facilities etc., also influence the requirements of working capital.

Working Capital Management: Meaning and Significance

Working capital management means planning, organising directing and controlling of

working capital. It is concerned with the management of current assets and current liabilities of a firm in such a way that a satisfactory level of working capital is maintained. The aim of working capital management is to deploy such amount of current assets and current liabilities so as to maximise short term liquidity. The two steps involved in the working capital management are;

1. Forecasting the amount of working capital
2. Determining the sources of working capital

Both excess as well as deficit working capital position are bad for any business. Working capital management policies of a firm have great effect on its profitability, liquidity and structural health of the organisation.

Disadvantages of excessive working capital

1. Idle funds earn no profits for the business.
2. Accumulation of inventories causing more chances of theft, waste and losses.
3. Defective credit policy cause higher incidence of bad debts.
4. Due to low rate of return on investments, the value of shares may fall.
5. The redundant working capital gives rise to speculative transactions.

Dangers of inadequate working capital

1. A concern with inadequate working capital cannot pay its short term liabilities in time. This will lose its reputation and shall not be able to get good credit facilities.
2. The concern cannot avail the benefit of bulk purchase and discounts.
3. It becomes difficult for the firms to exploit favourable market condition.
4. The firm cannot pay the day-to-day expenses of its operations.
5. The firm is not possible to utilise the fixed assets due to non – availability of liquid cash.
6. The rate of return on investment also falls with the shortage of working capital.

Out of the two situations, i.e. excess or inadequacy of working capital, the inadequacy of working capital is more dangerous from the point of view of the firm.

Approaches to working capital finance

Broadly speaking, there are two sources for financing working capital requirements:

- a. **Long term sources-** share capital, debentures, public deposits, plough back of profits, loans from financial institutions etc.
- b. **Short term sources-** Short term fund from commercial banks, indigenous bankers, trade creditors, instalment credit, advances, accounts receivables etc.

The management has to decide the proportion of short term and long term sources of finance to be included in the total working capital requirements. There are three basic approaches for determining the mix to finance working capital. They are:

1. Conservative approach

According to this approach, the entire estimated investment in current assets should be financed from long term sources, and short term sources should be used only for emergency requirements. The main features of this approach are:

- a) Liquidity is severally greater
- b) Risk is minimized
- c) The cost of financing is relatively high

2. The aggressive approach

The aggressive approach suggests that the entire estimated requirements of current assets should be financed from short term sources and even a part of fixed assets investments be financed from short term sources. The main features of this approach are:

- a) More risk
- b) Less costly
- c) More profitable

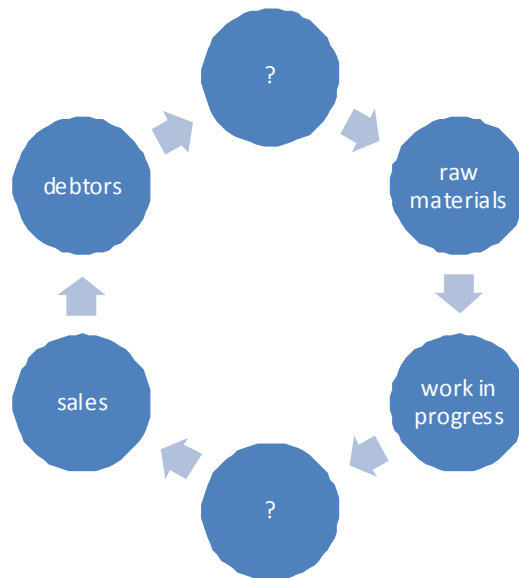
3. The hedging or matching approach

The term hedging usually refers to off setting transaction of a simultaneous but opposite nature which counters balance the effect of each other. The hedging approach suggests that the permanent working capital requirements should be financed with funds from long term sources while the temporary or seasonal working capital requirements should be financed with short term funds.

TE Questions

1. Gross working capital is equal to:
 - a) Total of current assets
 - b) Total of current liabilities
 - c) Current assets-current liabilities
 - d) None of the above
2. According to conservative approach of working capital management, current assets should be financed from
 - a) Long term sources
 - b) Short term sources
 - c) Both Long term sources and Short term sources
 - d) None of the above

3. Complete the diagram



4. Find odd one out and state reason.
Land and building, cash in hand, cash at bank, sundry debtors.
5. Give a short note on Hedging?
6. List out the factors determining working capital requirements?
7. What are the different components of working capital?

Extended Activities

1. Visit a small enterprise working in and around your location. Ask the entrepreneur how he arranged his working capital? Identify the major problems he faces in arranging working capital.
2. Prepare a list of formal agencies in Kerala that provide working capital finance to small entrepreneurs.

Unit 3

Long Run Investment Decision – Capital Budgeting

- 3.1. Meaning and Importance of Capital Budgeting
- 3.2. Methods of Capital Budgeting – Traditional
 - Pay Back Method
 - Average Rate of Return Method
- 3.3. Methods of Capital Budgeting – Discounted Cash Flow Methods
 - Net Present Value Method
 - Profitability Index Method
 - Internal Rate of Return Method

Introduction

The allocation of funds of a concern mainly depends on its investment decision. It is a choice of assets such as short term or current assets and long term or fixed assets where funds will be invested. The investment decision which relates to the short term or current assets is known as working capital management or current assets investment decision whereas the investment decision relating to the long term or fixed assets is known as capital budgeting or capital expenditure decision or long term investment decision.

Learning Outcomes

The learner;

- *Identifies the meaning of capital budgeting*
- *States the importance of capital budgeting*
- *Recognizes the process of capital budgeting*
- *Classifies different types of capital budgeting methods*
- *Explains the concept of Pay Back Period method*
- *Explains the concept of Average Rate of Return method*
- *Compares between Pay Back Period method and Accounting Rate of Return method*
- *Explains the concept of Net Present Value Method*
- *Explains the concept of IRR Method*
- *Explains the concept of Profitability Index Method*
- *Classifies different types of Discounted Cash flow techniques*
- *Differentiate between Traditional Methods and Discounted Cash flow techniques*
- *Solves problems by using different formulae*

Meaning of Capital Budgeting

A progressive business firm continually needs to expand its fixed assets and other resources to be competitive in the race. Investment in fixed assets is an important indicator of business growth. The success of an organisation in the long run depends upon the effectiveness with which the management makes capital expenditure decisions.

The term Capital Budgeting refers to the process of decision making with regard to the investment in fixed assets (ie, long term assets and capital projects). It involves long-term planning for proposed capital expenditure for maximizing return on investments. The capital expenditure may be;

- Cost of acquisition of fixed assets. e.g., land, building and machinery etc.
- Cost of mechanization, automation and replacement.
- Investment on research and development.
- Cost of development and expansion of existing and new projects.

Importance of Capital Budgeting

Capital budgeting is important because of the following reasons:

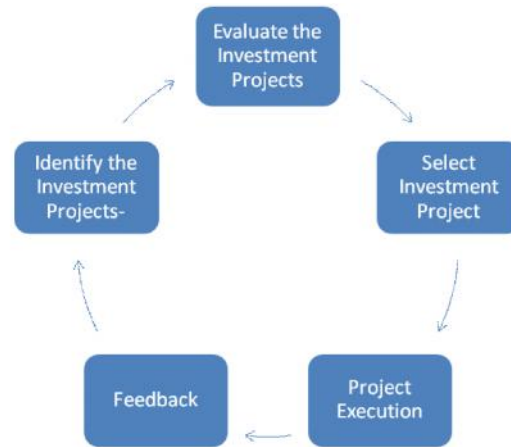
- **Cost:** Initial investment is huge. Hence, these decisions are planned after careful evaluation of various projects.
- **Time:** The effect of the decision is known only in the near future and not immediately.
- **Irreversibility:** These decisions once taken are not easily reversible without incurring huge loss.
- **Risk:** The longer the time period of returns, the greater is the risk. Hence decisions should be taken after a careful review of all available information.
- **Complexity:** Decisions are based on forecasting of future events and inflows. Quantification of future events involves application of statistical and probabilistic techniques.

Process of Capital Budgeting

The process of capital budgeting decision involves five steps;

1. **Identify the Investment Projects** -The first and crucial process of any investment decision is the recognition of opportunities. Several opportunities are available for investment but only promising opportunities that are compatible with firms objectives should be identified

2. **Evaluate the Investment Projects** - It is necessary to estimate inflows and outflows of each of the investment projects. Evaluations are done by using different capital budgeting techniques.
3. **Select Investment Project** - After evaluation, the top management by considering returns, risk as well as the cost of capital, chooses that project which maximises the shareholders' wealth.
4. **Project Execution**- Once the selection is made, the project will be implemented by acquiring necessary funds for financing the project.
5. **Feedback**- After the execution of the project, its progress must be monitored with the help of feedback reports. Actual performance should be compared with the expected one and deviations, if any, should be properly addressed.



Methods of Capital Budgeting

Capital budgeting techniques (Investment appraisal criteria) can be divided into following two groups:

Non-Discounted Cash Flow Methods (Traditional Methods)

- Payback Period (PBP)
- Accounting Rate Of Return (ARR)

Discounted Cash Flow Methods (Modern or Time adjusted Methods)

- Net Present Value (NPV)
- Profitability Index (PI)
- Internal Rate of Return (IRR)

Non-Discounted Cash Flow Methods (Traditional Methods)

(a) Payback Period (PBP) :

The payback period (PBP) is a traditional method of capital budgeting. It is the simplest and perhaps, the most widely used quantitative method for appraising capital expenditure decisions.

PBP is the number of years required to recover the original cash outlay invested in a project.

Computation of PBP

There are two methods of calculating the PBP.

(a) The first method can be applied when the annual cash inflow is uniform. In such a situation the initial cost of the investment is divided by the constant annual cash flow: For example, if an investment of ₹100000 in a machine is expected to generate cash inflow of ₹20,000 per annum for 10 years. Its PBP will be calculated using following formula:

$$\begin{aligned} \text{PBP} &= \text{Initial Investment} / \text{Constant Annual Cash Inflow} \\ &= 100000/20000 = 5 \text{ years} \end{aligned}$$

(b) The second method is used when a project's annual cash inflows are not equal. In such a situation PBP is calculated by the process of cumulating annual cash inflows till the time when cumulative cash flow becomes equal to the original investment outlays.

For example, A firm requires an initial cash outflow of ₹20,000 and the annual cash inflows for 5 years are ₹6000, ₹8000, ₹5000, ₹4000 and ₹4000 respectively. Calculate PBP. Here, When we cumulate the cash flows for the first three years, ₹19,000 is recovered. In the fourth year ₹4000 cash flow is generated by the project but we need to recover only ₹1000. So the time required for recovering ₹1000 will be $(\text{₹}1000/\text{₹}4000) \times 12 \text{ months} = 3 \text{ months}$. Thus, the PBP is 3 years and 3 months (3.25 years).

Decision Rule:

The PBP can be used as a decision criterion to select investment proposal.

- If the PBP is less than the maximum acceptable payback period, accept the project.
- If the PBP is greater than the maximum acceptable payback period, reject the project.

This technique can be used to compare actual payback period with a standard payback period set up by the management in terms of the maximum period during which the initial investment must be recovered.

Uses:

The PBP can be gainfully employed under the following circumstances.

1. The PB method may be useful for the firms suffering from a liquidity crisis.
2. It is very useful for those firms which emphasizes on short run earning performance rather than its long term growth.
3. The reciprocal of PBP is a good approximation of IRR (Internal Rate of Return) which otherwise requires trial & error approach.

Advantages

1. This method is **simple** to calculate and easy to operate.
2. It is suitable in the case of industries where the risk of **technological obsolescence is very high**.
3. It clarifies the concept of **profit or surplus**.
4. When **funds are limited** projects having shorter payback should be selected.
5. This method **promotes liquidity** by stressing on projects with earlier cash inflows.

Limitations

1. It stress on **capital recovery** rather than profitability.
2. It does not consider **post payback cash flows**.
3. This method ignores **time value of money**.

Assessment Activity

From the following two projects find out the most feasible project according to Payback Period Method.

	Project A	Project B
Initial Investment	10000	10000
Cash inflow – Year 1	4000	3000
Cash inflow – Year 2	4000	3000
Cash inflow – Year 3	2000	3000
Cash inflow – Year 4	-----	3000
Cash inflow – Year 5	-----	3000

(b) Accounting/Average Rate of Return (ARR):

The ARR is the ratio of the average profit after tax divided by the average investment.

This method is also known as the Return On Investment (ROI), Return On Capital Employed (ROCE) and is using **accounting profit** rather than cash flow to evaluate investment proposals.

Accounting profit is the difference between total monetary revenue and total monetary costs, and is computed by using Generally Accepted Accounting Principles (**GAAP**).

Accounting profit = total monetary revenue - total costs.

Computation of ARR

The most common method of computing ARR is

$$\text{ARR} = \frac{\text{Average Annual Profit after Tax}}{\text{Average Annual Investment}} \times 100$$

For example, a project requires an investment of ₹10,00,000. The plant & machinery required under the project will have a scrap value of ₹80,000 at the end of its useful life of 5 years. The profits after tax and depreciation are estimated to be as follows:

Year	1	2	3	4	5
Profit after tax (Rs)	5000	75000	125000	130000	80000

We shall calculate ARR using above formula.

$$\text{ARR} = \frac{(5000+75000+125000+130000+80000)/5}{(1000000+80000)/2} \times 100 = 17.04\%$$

Decision Rule:

The ARR can be used as a decision criterion to select investment proposal.

- If the ARR is higher than the minimum rate established by the management, accept the project.
- If the ARR is less than the minimum rate established by the management, reject the project.

The ranking method can also be used to select or reject the proposal using ARR. Highest rank would be given to a project with highest ARR and lowest rank would be given to the project with lowest ARR.

This is the only method considering accounting profit for decision making and irrelevant for today's business decisions.

Discounted Cash Flow Methods

Discounted Cash Flow Methods take into consideration **time value of money**. In an economy, money grows at a particular rate. Therefore, one rupee received today is more worthy than one rupee received tomorrow. This concept is called time value of money. The present value of future cash inflows is computed by **discounting** at an appropriate discount rate and projects are evaluated on that basis. These methods are also known as **modern or time adjusted techniques**.

(a) Net Present Value (NPV)

Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows. NPV is used in capital budgeting to analyse the profitability of a proposed investment or project.

NPV recognises that cash flow streams at different time period differs in value and can be computed only when they are expressed in terms of common denominator i.e. present value.

The procedure for determining the present values consists of two stages. The first stage involves determination of an appropriate discount rate. With the discount rate so selected, the cash flow streams are converted into present values in the second stage.

Computation of NPV

The important steps for calculating NPV are given below.

1. Annual cash flows of the investment project should be forecasted based on realistic assumptions. These cash flows are the incremental cash inflow after taxes but before depreciation.
2. Appropriate discount rate should be identified to discount the forecasted cash flows.
3. Present value (PV) of cash flows should be calculated by multiplying with appropriate discount rate.
4. NPV should be found out by subtracting present value of cash outflows from present value of cash inflows.

Decision Rule:

The present value method can be used as an accept-reject criterion. The present value of the future cash streams or inflows would be compared with present value of outlays. The present value of outlays are the same as the initial investment.

- If the NPV is greater than 0, accept the project.
- If the NPV is less than 0, reject the project.

Advantages

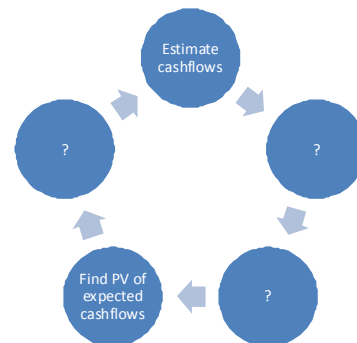
1. It considers the concept of **time value of money**.
2. Unlike payback period, all **cash flows** are considered.

Limitations

1. It involves **complex calculations in discounting** and present value calculations.
2. It **ignores the difference in initial cash outlays**, size of different proposals etc.

Assessment Activities

1. From the diagram given, complete the empty circles.
2. Calculate NPV for a Project X initially costing Rs.250000. It has 10% cost of capital.



It generates following cash flows:

Year	Cashflows	PV@10%
1	90000	.909
2	80000	.826
3	70000	.751
4	60000	.683
5	50000	.621

b) Profitability Index (PI)

Profitability Index (PI) or Benefit-cost ratio (B/C) is similar to the NPV approach. PI approach measures the present value of returns per rupee invested. It is observed as a shortcoming of NPV that, being an absolute measure, it is not a reliable method to evaluate projects requiring different initial investments. The PI method provides solution to this kind of problem. It is a relative measure and can be defined as the ratio which is obtained by dividing the present value of future cash inflows by the present value of cash outlays.

$$PI = \text{Total discounted Cash inflows} / \text{Initial cash outlay}$$

This method is also known as B/C ratio because numerator measures Benefits and denominator Cost.

Decision Rule:

Using the PI ratio,

- Accept the project when $PI > 1$
- Reject the project when $PI < 1$
- May or may not accept when $PI = 1$, the firm is indifferent to the project.

Advantages

1. This method considers time value of money.
2. It is a better project evaluation technique than NPV, and helps in ranking projects where NPV is positive.

Limitation

1. It fails as a guide in resolving capital rationing problems, when projects are indivisible.

c) Internal Rate of Return (IRR):

Internal rate of return (IRR) is the **discount rate at which the net present value of an investment becomes zero**. In other words, IRR is the **discount rate which equates the present value of the future cash flows of an investment with the initial investment**.

IRR refers to that discount rate (Kt) such that

$$\sum \{ \text{Period Cash Flow} / (1+R)^T \} - \text{Initial Investment} = 0$$

where R is the interest rate and T is the number of time periods. IRR is calculated using the NPV formula by solving for R if the NPV equals zero.

Decision Rule

Advantages

1. Time value of money is taken into account.
2. All cash inflows of the project, arising at different points of time are considered.
3. Decisions are immediately taken by comparing IRR with the Firm's cost of capital.
4. It helps in achieving the basic objective of achieving shareholders wealth.

If	Decision
IRR > Ko	Accept the project. Returns over and above the cut-off rate is obtained.
IRR = Ko	Project generates cash flows at a rate just equal to the cost of capital. Hence, it may either be accepted or rejected. This constitutes the indifference point.
IRR < Ko	Reject the project. The project does not provide returns even equivalent to the cut-off rate.

Limitations

1. IRR is only an approximation and cannot be computed exactly without the use of computers.
2. It is tedious to compute in case of multiple cash outflows.

Example:

The management of VGA Textile Company is considering to replace an old machine with a new one. The new machine will be capable of performing some tasks much faster than the old one. The installation of machine will cost ₹8,475 and will reduce the annual labour cost by ₹1,500. The useful life of the machine will be 10 years with no salvage value. The minimum required rate of return is 15%.

Required: Should VGA Textile Company purchase the machine? Use internal rate of return (IRR) method for your conclusion

Solution:

To conclude whether the proposal should be accepted or not, the internal rate of return promised by machine would be found out first and then compare to the company's minimum required rate of return.

The first step in finding out the internal rate of return is to compute a discount factor called internal rate of return factor. It is computed by dividing the investment required for the project by net annual cash inflow to be generated by the project. The formula is given below:

$$\text{IRR Factor} = \frac{\text{Investment required}}{\text{Net annual cash inflow}}$$

In our example, the required investment is ₹8,475 and the net annual cost saving is ₹1,500. The cost saving is equivalent to revenue and would, therefore, be treated as net cash inflow. Using this information, the internal rate of return factor can be computed as follows:

$$\text{Internal rate of return factor} = ₹8,475 / ₹1,500 = 5.650$$

After computing the internal rate of return factor, the next step is to locate the discount factor in “present value of an annuity of ₹1 in arrears table”. Since the useful life of the machine is 10 years, the factor would be found in 10-period line or row. After finding this factor, see the rate of return written at the top of the column in which factor 5.650 is written. That is 12%. It means the internal rate of return promised by the project is 12%. The final step is to compare it with the minimum required rate of return of the VGA Textile Company. That is 15%.

According to internal rate of return method, the proposal is not acceptable because the internal rate of return promised by the proposal (12%) is less than the minimum required rate of return (15%).

Notice that the internal rate of return promised by the proposal is a discount rate that equates the present value of cash inflows with the present value of cash outflows as proved by the following computation:

Present value of cash outflow		₹8,475 × 1.000 = ₹8,475
Present value of cash inflow	1-10 year-period @ 12%	₹1,500 × 5.650 = ₹8,475

Assessment Activity

A company proposes to install a machine involving a capital cost of ₹360000/-. The life of the machine is 5 years and its salvage value at the end of the life is nil. The machine will produce the net operating income after depreciation of ₹68000/- per annum. The company's Tax Rate is 45%. Calculate IRR of the proposal. The PV factors for 5 years is as under-

Discounting factor	14	15	16	17	18
Cumulative factor	3.43	3.35	3.27	3.20	3.13

TE Questions

- The value of a Rupee to be received in future is less than the value of a Rupee on hand today is the concept of;
 - Compounding
 - Discounting
 - Budgeting
 - Time Value of money
- Find the odd one out and state the reason.
 - NPV
 - IRR
 - ARR
 - Profitability Index
- Complete the series

$$\text{NPV} = \text{PV inflows} - \text{PV outflows}$$

$$\dots\dots\dots = \text{PV inflows} - \text{PV outflows} = 0$$
- What is meant by the concept of Accounting Profit?
- Briefly explain the importance of capital budgeting.
- What are the various steps involved in the capital budgeting process? Show the steps with the help of a diagram.
- Explain the advantages and disadvantages of Payback period method.
- You are required to find out the NPV of the following projects, assuming that the cost of capital is 10% and the initial investment is ₹1600 each.

Year	Project A net cashflows (Rs)	Project B net cashflows (Rs)
1	800	200
2	800	400
3	400	400
4	200	400
5	600
6	800

Extended activity

Visit a small scale industrial unit and examine their project reports and prepare an account of capital budgeting techniques used for the evaluation of projects.

Unit 4

Production and Operations Management

- 4.1. Meaning and Importance of Production and Operations Management
- 4.2. Difference between Production and Operation
- 4.3. Major Decisions of Production Management
- 4.4. Plant Location and factors affecting plant location
- 4.5. Plant Layout and different types of Plant Layouts
- 4.6. Aggregate Planning – Meaning, Importance and Strategies
- 4.7. Master Production Scheduling - Meaning, Significance and Development of Master Production Schedule (MPS)

About the Unit

The reason for the existence of any organization is to fulfill the wants of the customer. These wants may be fulfilled through tangible products or intangible services. The management of manufacturing of products is referred to as Production Management and the functions dealing with the operation of services are covered under Operations Management. This unit throws light on the meaning and importance of Production and Operation Management and some important management concepts coming under the function of production and operation.

Learning Outcomes

The learner;

- *States the meaning and importance of production and operation management.*
- *Distinguishes between production and operation*
- *Identifies various types of decisions in production and operations management*
- *Distinguishes between various types of decisions in production and operations management*
- *Identifies the importance of plant location*
- *Lists out various factors affecting plant location*
- *Identifies concept of plant layout*
- *States the importance of plant layout*
- *Suggests suitable types of plant layout*
- *Explains the concept aggregate planning, its meaning and importance*
- *Identifies the strategies used in aggregate planning*

- Explains the Concept of master production scheduling
- Develops a master production schedule (MPS)

Meaning and Importance of Production/Operation Management

• Meaning of Production Management

Having once set up the enterprise, the future survival of enterprise whether micro, small, medium or large depends upon its profit earning capacity. The profit earning capacity of any enterprise depends upon the right decision taken by the entrepreneur regarding investment, location of the plant, product design, quality control, technology etc. All these decisions come under the purview of production management.

The term production is used to indicate a process through which raw materials are converted into finished product. *Production Management* refers to the application of *management* principles to the *production* function in a factory. In other words, *production management* involves application of planning, organising, directing and controlling the *production* process.

Assessment Activity

Discuss the following and define the term production;

- the process is carried out in a factory
- management functions
- application of management functions in production

• Importance of Production Management

The main aim of Production function is to produce the goods and services economically to the full satisfaction of the customer for which they are meant. In order to achieve this aim, it is essential to plan, organise, direct and control the production system.

Assessment Activity

Which one of the following is a correct statement ;

1. Production and operation management helps to produce goods and services economically
2. Production and operation management helps to produce goods which satisfy the customers
3. Production and operation management plans, organises, directs and controls the production system
4. All the above

Difference between Production and Operation

The term production is strictly used in the sense of manufacturing tangible products. The term operation involves services. The differences between production and operations are as follows:

<i>Production</i>	<i>Operation</i>
Manufacturing of tangible product	Rendering of Services
Used in narrow sense	Used in broad sense
Applied to manufacturing organisations	Applied to non-manufacturing organisations
Have closing stock	No closing stock
Demand is regular	Demand fluctuate

Assessment Activity

Observe the following points and arrange them under the heads production and operation in a logical order.

no closing stock
narrow sense
non-manufacturing organisations
closing stock
regular demand
tangible product
services
broad sense
fluctuating demand
manufacturing organisations

Fill the missing points.

Production	Operation
Manufacturing of	Rendering of
Used in sense	Used in sense
Applied to Organisations	Applied to organisations
Have closing stock
..... is regular	Demand

Major Decisions of Production Management

Decisions can be classified into a. Strategic b. Tactical and c. Operational.

1. Strategic Production Planning

Strategic planning involves deciding and developing strategic plans to achieve strategic objectives (or goals). Top management typically develops strategic plans. These decisions or plans are normally long term decisions, which are having implications for the next five years and above. Lot of risk and uncertainty is involved in long term or strategic level planning. Strategic planning needs a through scanning and analysis of external environment to seek information.

Strategic Planning include;

- Technology decisions: Choice of appropriate technology, equipments, process choice and degree of automation.
- Capacity decisions: Amount, timing and type.
- Facilities decisions: Size, location and specializations
- Vertical integration: Direction, extent and balance

2. Tactical Production Plan

Tactical planning is done at middle management level medium term planning (ranging between 2 to 3 years) concerned with deciding specifically how the resources of the organization will be utilized to achieve the organizational strategic goals. Tactical planning involves less uncertainty and hence lower risk compared to strategic planning. Mainly the planning requires internally generated data.

Tactical planning includes:

- Establishing the parameters for measuring operational efficiency and productivity. Making plans to improve utilization of existing resources.
- Prepare an equipment and manpower planning.
- Planning for modernization of the facilities and automation.
- Developing specific technology and tools to enhance production efficiency or productivity.
- Prepares work plans for process redesign, methods improvement and job design.
- Make or buy decision.
- Projections regarding skill requirements for future work assignment and prepare the skill development plans.
- Planning for medium term maintenance (preventive and condition monitoring) to enhance the availability of production facilities.

3. Operational Level Production Planning:

The operational planning decisions are taken at the lower level of management and these are routine decisions. These plans are prepared to establish actions necessary for achieving operational goals. These cover shorter time frame i.e. within a year. No or very less uncertainty in these plans and information needed is internal. They are stated in definite quantitative terms and can be spelt out in terms of time and targets.

Operational level planning includes;

- What is the job
- On which machine/machines it is to be processed (sequence of operations)
- Who should do this job – operator details
- Starting and finishing times of each job in each of the workstation or machines or facilities
- Quality specifications and inspection, and test details

Thus, the operational production plan gives all the details regarding the processing of the product from raw material stage to finished goods ready for dispatch after quality check and performance testing.

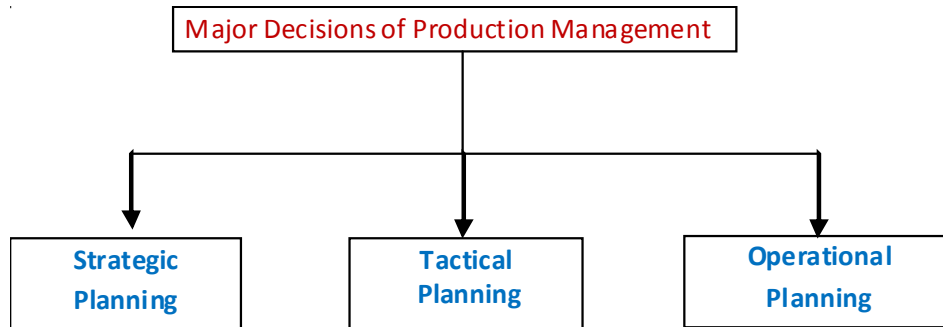
Assessment Activity

a) Classify the following Decisions into Strategic, Tactical and Operational.

- The type of technology to be adopted
- Parameters for measuring operational efficiency
- What type of job
- Prepares work plans for process redesign and job design
- Selects the machine for production
- Who should be the operator
- When should the job start
- What should be the quality
- Improve utilisation of existing resources
- Plant capacity
- Plan for modernisation
- Specific technology and tools to enhance production efficiency or productivity
- Make or buy decision
- Location of the plant
- Prepare equipment and manpower planning
- Projection regarding skill requirements

- Plan for medium term maintenance (preventive and condition monitoring) to enhance the availability of production facilities

b) Observe the following chart and prepare a short note on it;



Plant Location and factors affecting plant location

The location of a plant should be fixed in such a manner that the firm can sell their products most profitably and manufacture them with the least expense.

Factors affecting plant location

Buying

- Nearness to raw materials
- Accessibility of raw materials

Manufacturing

- Proximity to large adaptive labour
- Nearness to sources of power
- Ready accessibility to repair shops
- Nearness to good banking and credit facilities
- Adequate transport and communication facilities
- Ability to build and expand plant cheaply
- Government regulation and subsidy
- Adequate fire fighting facilities
- State of organisations and development of learning
- Suitable soil, climate and topography

Association with other Industries

- Complementary industries
- Competing industries
- Momentum of an early start

Assessment Activity

CASE STUDY

Study the following case and answer the questions below:

Mr. Avinash wants to start a Prawn Processing industry in Kerala. He is a native of Idukki and wanted to start such factory in Thodupuzha, since it is in his own district and very accessible to Kochi. But when consulted with an owner of such a factory from Kollam district, his opinion was to start at Neendakara, Kollam. He tells Avinash that if he starts in Kollam he can easily avail the raw materials at competitive prices. There are also plenty of skilled labourers around and many such industries of the same nature nearby. So it will be easier to get license. Plant can be established without much difficulty and already there are supporting industries nearby.

What are the advantages if a Prawn Processing industry is started in Kollam district

What difficulties Avinash may face if he starts such a business in Thodupuzha?

Plant Layout

Plant layout refers to the arrangement of physical facilities such as machines, equipment, tools, furniture etc. in such a manner so as to have quick flow of material at the lowest cost and with the least amount of handling in processing the product from the receipt of raw material to the delivery of the final product. It is the physical arrangement of planned industrial operations.

Assessment Activity

Field Visit

Visit a nearby Manufacturing Industry and list out the machines, equipments, furniture, buildings etc. used in the factory and sketch the location of each item on a chart paper.

Need for Plant Layout

- Establishment of new plants
- Expansion of the capacity of existing plants
- Incorporation of latest changes in technology, plant design, equipments etc
- Increasing the efficiency of operations

Assessment Activity

Read the following points and give tick mark on the boxes against to the points which need a decision of plant location.

Increasing the quality of the product	<input type="checkbox"/>
Establishment of a new plant	<input type="checkbox"/>
Decrease the volume of production	<input type="checkbox"/>
Forecast the future demand	<input type="checkbox"/>
Increase the efficiency of operation	<input type="checkbox"/>
Increasing the salary of the employees	<input type="checkbox"/>
Expansion of the capacity of the existing plant	<input type="checkbox"/>
Incorporate latest technology in the production process	<input type="checkbox"/>

Types of Layout

- Product or Line Layout
- Process or Functional Layout
- Combination Layout
- Fixed Position or Location Layout

Product or Line Layout

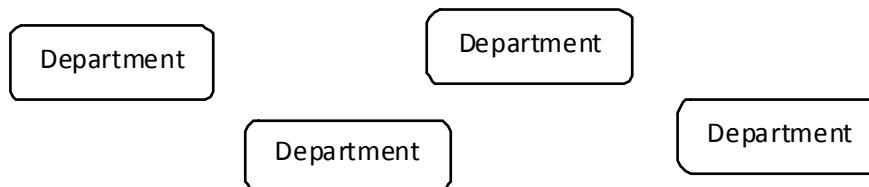
In this layout, the machines and equipments are arranged in one line depending upon the sequence of operations required for the product. The output of one machine becomes input of the next machine. It requires a very little material handling.

It is used for mass production of standardised products.



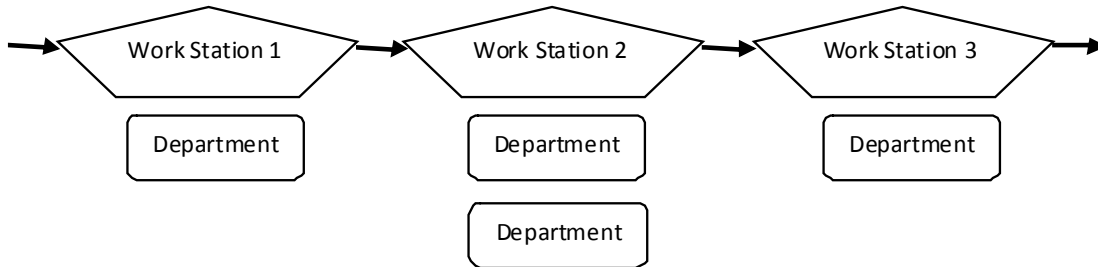
Process Layout

In this layout the machines of a similar type are arranged together at one place. This layout is used for batch production. It is preferred when the product is not standardized and the quantity produced is very small.



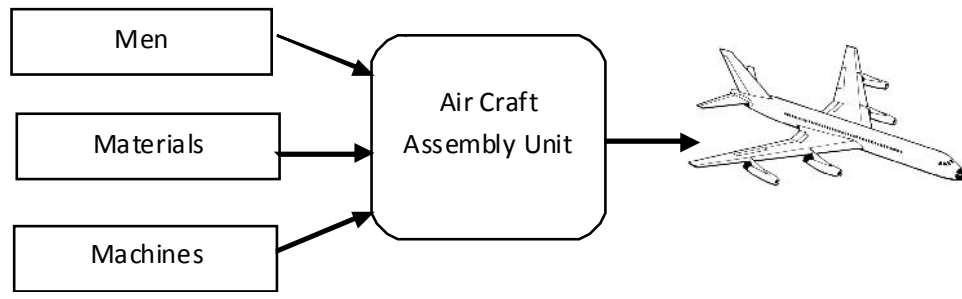
Combined Layout

A combination of process & product layout is known as combined layout. Manufacturing concerns where several products are produced in repeated numbers with no likelihood of continuous production, combined layout is followed.



Fixed Position or Location Layout

Fixed position layout involves the movement of manpower and machines to the product which remains stationary. The movement of men and machines is advisable as the cost of moving them would be lesser. This layout is preferred where the size of the job is bulky and heavy. Example of such type of layout is locomotives, ships, boilers, generators, wagon building, aircraft manufacturing, etc.



Assessment Activity

Suggest a suitable type of layout for the following industries and justify your answers;

- Cashew Industry
- Ship Building
- Car Manufacturing
- Tyre Manufacturing
- Printing Press
- Bus Body Fabrication
- Building Construction
- Readymade Shirts

Aggregate Planning

An organisation can finalise its business plans on the recommendation of demand forecast. Once business plans are ready, an organisation can do backward working from the final sales unit to raw materials required. Thus annual and quarterly plans are broken down into labour, raw material, and working capital requirements over a medium-range period (6 months to 18 months). This process of working out production requirements for a medium range is called aggregate planning. The term aggregate implies that the planning is done for a single overall measure of output or, at the most, a few aggregated product categories. The aim of aggregate planning is to set overall output levels for short term and medium term in considering the fluctuating or uncertainties in demand.

Importance of Aggregate Planning

- Achieving financial goals by reducing overall variable cost and improving the bottom line
- Maximum utilisation of the available production facility
- Provide customer delight by matching demand and reducing wait time for customers
- Reduce investment in inventory stocking
- Able to meet scheduling goals thereby creating a happy and satisfied work force

Aggregate Planning Strategies

There are three types of aggregate planning strategies;

1. **Level Strategy** : Level strategy looks to maintain a steady production rate and work force level. In this strategy, organisation requires a robust forecast demand as to increase or decrease production in anticipation of lower or higher customer demand. Advantage of level strategy is steady work force. Disadvantage of level strategy is high inventory and increased back logs.
2. **Chase Strategy** : Chase strategy looks to dynamically match demand with production. Advantage of chase strategy is lower inventory levels and decreased back logs. Disadvantage is lower productivity, quality and depressed work force.
3. **Hybrid Strategy** : Hybrid strategy looks to balance between level strategy and chase strategy.

Assessment Activity

Identify the type of strategies followed by the following companies.

1. Polo Furniture Pvt. Ltd. forecast a demand of 1500 units per week and they plan to produce 250 units per day uniformly.

2. Tip Top Furniture calculates demand for the next 4 weeks as follows; 1400, 1300, 800 and 900. So they plan to produce 1410 units for the first week, 1305 units for the second week, 802 units for the third week and 905 units for the fourth week.
3. Interior Furnishing Pvt. Ltd. forecast a demand for the next 4 weeks as follows; 1000, 1200, 800, 700. They plan to produce 1200 each for the first two weeks and 750 each for the next two weeks.

Master Production Schedule (MPS)

Aggregate production and capacity plan combine products into product groups, demand into monthly totals and personnel requirements across departments which altogether reflect the top management decisions. Eventually the time comes when individual 'end item' products and services must be scheduled at specific work centres. This is accomplished by master scheduling.

Master scheduling means producing a supply plan, a time table including quantities, to produce specific items or provide specific services within a given time period. Master Scheduling calculates the quantity required to meet demand requirements from all sources.

Assessment Activity

Case Study

Study the following case and suggest suitable solution to the problem faced by the firm.

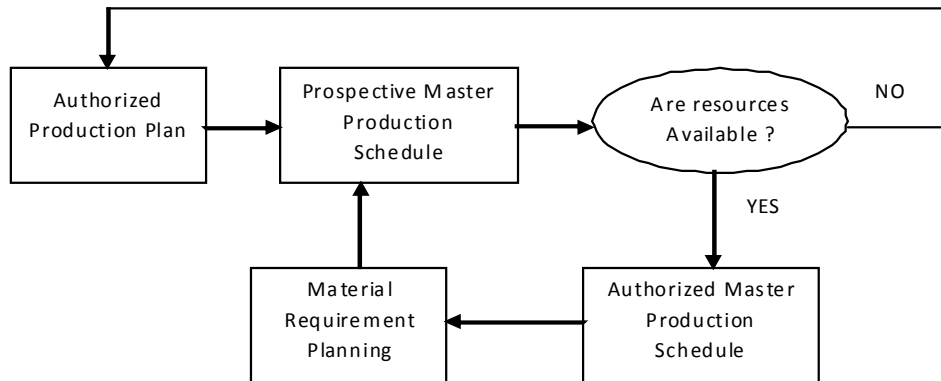
ABC (Pvt) Ltd. is an offset machine manufacturing company at Thiruvananthapuram. In the first week of April, 2016, they had an opening stock of 8 machines and had forecasted a demand of 5 machines per week. They needed a lead time of 1 week for the manufacturing of offset machines. On the first week they had an order of 4 machines and on the second week they had an order of 7 machines. On the third week of April they had an order of 6 machines and on the fourth week they had an order of 4 machines. There was shortage of stock to satisfy the customers and hence some customers cancelled their order and moved to some other suppliers.

Significance of Master Production Scheduling

- It enables marketing to make legitimate delivery commitments to field warehouses and final customers.
- It enables production to evaluate capacity requirements in a more detailed manner.
- It provides the management, opportunity to ascertain whether the business plan and its strategic objectives will be achieved.
- The Master Production Schedule (MPS) is the primary output of the master scheduling process. It is the 'plan' for providing the supply to meet the demand.

Master Production Scheduling Process

- A prospective MPS is created to test whether it meets the schedule with the resources. (eg. Machine capacities, labour, overtime and subcontractors) provided for in the aggregate production plan.
- Operations revise the MPS until it obtains a schedule that satisfies all resource limitations or determines that no feasible schedule can be developed.
- If no feasible schedule can be developed, the production plan must be revised to adjust production requirements or increase authorised resources.
- Once a feasible prospective MPS is accepted, operations use the authorised MPS as input to material requirements planning.
- Operations then determine specific schedules for component production and assembly.
- Actual performance data such as inventory levels and shortages are inputs to the next prospective MPS and the Master Production Scheduling process is repeated.



Developing a Master Production Schedule

The process of developing a master production schedule includes;

1. Calculating the projected on hand inventory.
2. Determining the timing and size of production quantities of specific products.

Calculating Projected on hand inventory

Projected on hand inventory is an estimate of the amount of inventory available each week after demand has been satisfied.

$$\begin{array}{ccccccc}
 \boxed{\text{Projected inventory at the end of this week}} & = & \boxed{\text{Projected on hand inventory at the end of last week}} & + & \boxed{\text{MPS quantity of the current week}} & - & \boxed{\text{Forecasted demand or actual order which ever is higher}}
 \end{array}$$

Assessment Activities

- Geekan Seating Collections (Pvt.) Ltd. produces Executive Chairs and needs to develop an MPS for it. Marketing department has forecasted a demand of 30 chairs for the first week of April. But actual customer orders booked are for 38 chairs. The current on hand inventory is 55 chairs. No MPS quantity is due on week 1. Calculate the projected on hand inventory.

$$(\text{Projected inventory} = 55 + 0 - 38 = 17)$$

- Study the following table, interpret and make a report

Quantity on Hand 55	APRIL	
	Week 1	Week 2
Forecast	30	30
Customer Orders Booked	38	27
Projected on hand Inventory	17	-13
MPS quantity	0	0
MPS start		
Explanation: Forecast is less than the booked orders in week 1. $\text{Projected on hand inventory} = 55 + 0 - 38 = 17$ Forecast is more than the booked orders in week 1. $\text{Projected on hand inventory} = 17 + 0 - 30 = -13.$		

Determining the timing and size of production quantities of specific products.

The purpose of determining the timing and size of MPS quantities is to maintain a non-negative projected on hand inventory. MPS quantities should be scheduled to cover the shortages. The scheduler adds the MPS quantity to the projected on hand inventory and searches for the next period when a shortage occurs. This shortage signals a need for a second MPS quantity and so on.

Illustrative example of a Master Production Schedule



Assessment Activity

Complete the missing columns of the following Master Production Schedule.

KELACHANDRA RUBBER ROLLERS (PVT.) LTD. KOTTAYAM MASTER PRODUCTION SCHEDULE								
Item: Ruber Sheet Rolling Machine units	Order Policy - 50							
weeks	Lead Time - 2							
	MONTHS							
Quantity on hand 25	JULY				AUGUST			
Weeks	1	2	3	4	5	6	7	8
Forecast	10	10	10	10	10	10	10	10
Customer Orders (booked)	12	8	9	11	15	5	7	13
Projected on hand inventory	13	?	43	?	?	7	?	9
MPS quantity	0	0	50	0	?	0	50	0
MPS start	50	?	0	0	?	0	0	0
Explanation: * the time needed to assemble 150 chairs is 1 week. So MPS start on week 1 to be completed on week 2. ** MPS quantity of 150 is needed to avoid shortage of projected on hand inventory. This is repeated in week 7								

TE Questions

1. Which of the following is a wrong statement;
 - a. Production is concerned with tangible goods.
 - b. Operation is concerned with services.
 - c. Operation is used in a broader sense.
 - d. In management, both production and operation are used in the same meaning.
2. Decisions as to the use of technology is a type of;
 - a. Operational Planning.
 - b. Strategic Planning.
 - c. Operational Planning.
 - d. Middle level planning.
3. The suitable lay out for ship building is;
 - a. Product Lay out
 - b. Process Lay out
 - c. Combination Lay out
 - d. Fixed Position Lay out.
4. Steady Production Rate and Workforce Level - Level Strategy
Dynamic matching of demand with production -
5. What do you mean by production management?
6. What is the importance of production management?
7. Differentiate between production and operation management.
8. Which are the different types of decisions in production management?
9. What do you mean by Strategic decision? Give an example.
10. What do you mean by Tactical decision? Give an example.
11. What do you mean by Operational decision? Give an example.
12. Which are the factors affecting plant location?
13. What do you mean by plant layout?
14. Which are the different types of plant layout?
15. What do you mean by fixed position layout? Give an example.
16. What do you mean by aggregate planning?
17. Which are the strategies used in aggregate planning?

18. What is Master Production Scheduling?
19. Explain the master production scheduling process.
20. Why is master production scheduling significant?
21. What do you mean by Master Production Schedule?
22. How is a Master Production Schedule prepared?
23. Develop a Master Production Schedule from the following;

The forecast is 84 units for the first period and 80 for the second week and 60 units for each of the next three weeks. The starting inventory is 20 units. The company uses a lot size of 50 units and the lead period is 1 week. Committed Orders are as follows:

Week	1	2	3	4	5
Customer Orders	82	82	58	40	20

Extended Activity

Meet some entrepreneurs working in and around your locality. Find out the various factors he/she considered while selecting location for his/ her enterprise. Analyse the same and suggest if he/she could have other better options available for selecting the location of the enterprise.

Unit V

Quality Management

- 5.1. Meaning and Definition of Quality
- 5.2. Dimensions of Quality – Product and Service
- 5.3. Meaning and Concept of Quality Management
- 5.4. Principles of Quality Management
- 5.3. Quality Systems
 - Elements
 - ISO 9000:2000

Introduction

In business, engineering and manufacturing, quality has a pragmatic interpretation as the *non-inferiority* or *superiority* of something; it is also defined as *fitness for purpose*. Quality is a perceptual, conditional, and somewhat subjective attribute and may be understood differently by different people. Quality management ensures quality in all areas of marketing, design, purchasing, production or operations and distribution. The entire organisation should excel on all dimensions of products and services that are important to the customer and to achieve Total Quality Management (TQM).

Learning Outcomes

The learner;

- *Identifies the meaning of quality*
- *Recognizes the definitions of quality*
- *Explains the various approaches to quality*
- *Identifies various approaches to quality*
- *Explains the various approaches to quality*
- *Identifies various approaches to quality*
- *States the meaning of Quality Management*
- *Outlines the concept of Quality Management.*
- *Describes the various principles of quality management.*
- *Explains the meaning of Quality Management System*
- *Identifies the elements of Quality management System*

- *Identifies the concept of ISO standards*
- *Explains the concept of ISO 9000:2000.*

Meaning & Definition of Quality

Quality refers to a parameter which decides the superiority or inferiority of a product or service. It can provide a competitive edge to an organisation. The term “quality” has a relative meaning. It may be seen as the totality of features and attributes that satisfy a customer’s stated and implied needs. In simple words, one can say that a product has good quality when it “complies with the requirements specified by the client”.

Quality is an attribute which differentiates a product or service from its competitors. It plays an essential role in every business. ISO defines quality as “the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs”.

Now a days, quality standards and strict compliance to it is considered as the key to success in every field of business either in the form of product or service.

Approaches to Quality

Harvard professor David Garvin, in his book ‘Managing Quality’ summarised five principal approaches to defining quality: transcendent, product-based, user-based, manufacturing-based and value-based. Let’s discuss each one of them:

1. **Transcendental view of Quality:** Those who hold transcendental view would say, “I can’t define it, but I know when I see it.” Advertisers are fond of promoting products in these terms. “Where shopping is a pleasure” (super market), “We love to fly and it shows” (airline), and “It means beautiful eyes” (cosmetics) are examples.
2. **Product-based view of Quality:** Product based definitions are different. Quality is viewed as quantifiable and measurable characteristics or attributes. For example, durability or reliability can be measured (e.g. mean time between failure, fit and finish), and the engineer can design to that benchmark. Quality is determined objectively. Although this approach has many benefits, it has limitations as well. Where quality is based on individual taste or preference, the benchmark for measurement may be misleading.
3. **User-based view of Quality:** User based definitions are based on the idea that quality is an individual matter, and products that best satisfy their preferences (i.e. perceived quality) are those with the highest quality. This is a rational approach but leads to two problems. First, consumer preferences vary widely, and it is difficult to aggregate these preferences into products with wide appeal. This leads to the choice

between a niche strategy or a market aggregation approach which tries to identify those product attributes that meet the needs of the largest number of consumers.

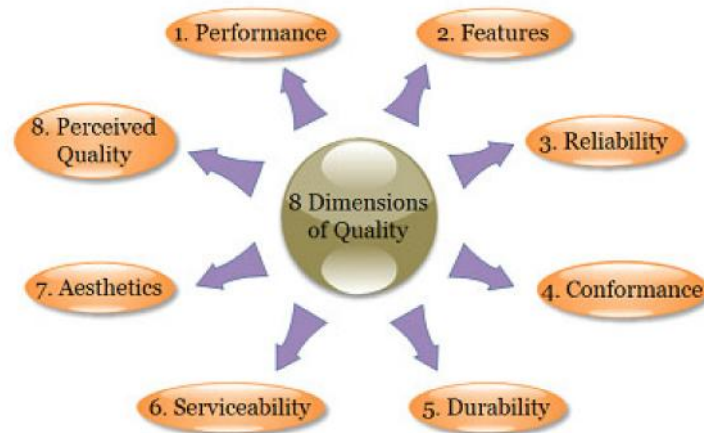
4. **Manufacturing-based view of Quality:** Manufacturing-based definitions are concerned primarily with engineering and manufacturing practices and use the universal definition of “conformance to requirements.” Requirements, or specifications, are established design, and any deviation implies a reduction in quality. The concept applies to services as well as products.
5. **Value-based view of Quality:** Value-based quality is defined in terms of costs and prices as well as a number of other attributes. Thus, the consumer’s purchase decision is based on quality (however it is defined) at the acceptable price.

Dimensions of Quality

Eight dimensions of product quality management can be used at a strategic level to analyse quality characteristics. The concept was defined by David Garvin. Some of the dimensions are mutually reinforcing, where as others are not. Improvement in one may be at the expense of others. Understanding the trade-offs desired by customers among these dimensions can help to build a competitive advantage. Garvin’s eight dimensions can be summarised as follows:

1. **Performance:** Performance refers to a product’s primary operating characteristics. This dimension of quality involves measurable attributes; brands can usually be ranked objectively on individual aspects of performance.
2. **Features:** Features are additional characteristics that enhance the appeal of the product or service to the user.
3. **Reliability:** Reliability is the likelihood that a product will not fail within a specific time period. This is a key element for users who need the product to work without fail.
4. **Conformance:** Conformance is the precision with which the product or service meets the specified standards.
5. **Durability:** Durability measures the length of a product’s life. When the product can be repaired, estimating durability is more complicated. The item will be used until it is no longer economical to operate it. This happens when the repair rate and the associated costs increase significantly.
6. **Serviceability:** Serviceability is the speed with which the product can be put into service when it breaks down, as well as the competence and the behaviour of the service person.

7. **Aesthetics:** Aesthetics is the subjective dimension indicating the kind of response a user has, to a product. It represents the individual's personal preferences.
8. **Perceived Quality:** Perceived Quality is the quality attributed to a good or service based on indirect measures.



Eight dimensions of quality

Service Quality

Service providers want to know what customers (internal or external) care about. Service quality is a good guess. After extensive research, Valerie Zeithaml, A. Parasuraman and Leonard Berry found five dimensions, customers use when evaluating service quality. They named their survey instrument SERVQUAL. The five SERVQUAL dimensions are:

- **TANGIBLES**-Appearance of physical facilities, equipment, personnel, and communication materials.
- **RELIABILITY**-Ability to perform the promised service dependably and accurately.
- **RESPONSIVENESS**-Willingness to help customers and provide prompt service.
- **ASSURANCE**-Knowledge and courtesy of employees and their ability to convey trust and confidence.
- **EMPATHY**-Caring, individualised attention the firm provides its customers.

Meaning and Concept of Quality Management

Quality management is the act of overseeing all activities and tasks needed to maintain a desired level of excellence. This includes creating and implementing quality planning and assurance, as well as quality control and quality improvement. It is also referred to as total quality management (TQM).

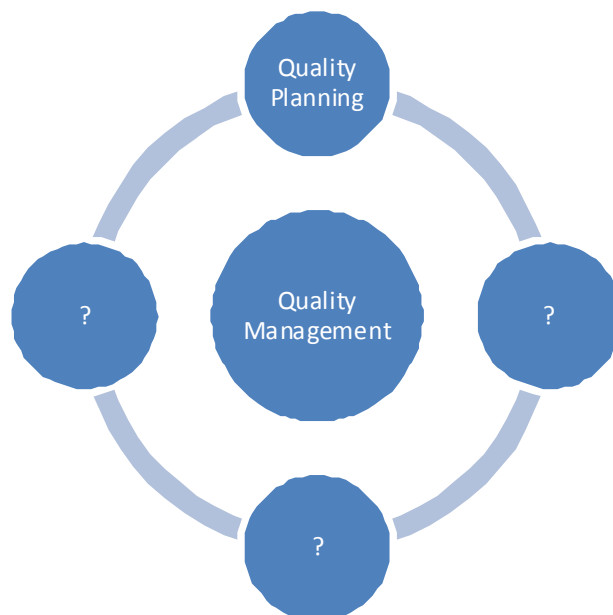
Quality management ensures that an organisation, product or service is consistent. It has four main components: quality planning, quality control, quality assurance and quality improvement. Quality management is focused not only on product and service quality, but also on the means to achieve it.

Quality assurance (QA) is a broad concept that focuses on the entire quality system including suppliers and ultimate consumers of the product or service. It includes all activities designed to produce products and services of appropriate quality.

Quality control(QC) has a narrower focus than quality assurance. Quality control focuses on the process of producing the product or service with the intent of eliminating problems that might result in defects.

Assessment Activity

Complete the components of Quality Management.



Principles of Quality Management

1. **Customer focus** : Organisations depend on their customers and therefore, should understand current and future customer needs. They should meet customer requirements and strive to exceed customer expectations.

Key Benefits:

- Increased revenue and market share obtained through flexible and fast responses to market opportunities
- Increased effectiveness in the use of the organisation's resources to enhance customer satisfaction
- Improved customer loyalty leading to repeat business.

2. **Leadership** : Leaders establish unity of purpose and direction of the organisation. They should create and maintain the internal environment in which people can become fully involved in achieving the organisation's objectives.

Key Benefits:

- People will be motivated towards the organisation's goals and objectives
- Activities are evaluated, aligned and implemented in a unified way
- Mal-communication between levels of an organisation will be minimised.

- 3 . **Involvement of people**: People at all levels are the essence of an organisation and their full involvement should be focused for the benefit of the organisation.

Key Benefits:

- Motivated and committed people within the organisation
- Innovation and creativity in furthering the objectives of the organisation.
- People became accountable for their own performance
- People participate and contribute to continual improvement.

- 4 . **Process approach** : A desired result is achieved more efficiently when activities and related resources are managed as a process.

Key Benefits

- Lower costs through effective use of resources
- Improved, consistent and predictable results
- Focused and prioritised improvement opportunities.

- 5 . System approach to management** : Identifying, understanding and managing interrelated processes as a system contributes to the effectiveness and efficiency of the organisation in achieving its objectives.

Key Benefits:

- The desired result will be best achieved by Integration and alignment of the processes.
- Ability to focus effort on the key processes
- Providing confidence to interested parties as to the consistency, effectiveness and efficiency of the organisation.

- 6 . Continual improvement** : Continual improvement of the organisation's overall performance should be a permanent objective of the organisation.

Key Benefits:

- Performance advantage through improved organisational capabilities
- Alignment of improvement activities at all levels to an organisation's strategic intent
- Flexibility to react quickly to opportunities.

- 7 . Factual approach to decision making** : Effective decisions are based on the analysis of data and information

Key Benefits:

- Informed decisions
- An increased ability to demonstrate the effectiveness of past decisions based on factual records
- Increased ability to review, challenge and, change opinions and decisions if necessary.

- 8. Mutually beneficial supplier relationships:** An organisation and its suppliers are interdependent, and mutually beneficial relationship enhances the ability of both to create value.

Key Benefits:

- Increased ability to create value for both parties
- Flexibility and speed of joint responses to changing market or customer needs and expectations
- Optimisation of costs and resources.

Quality System

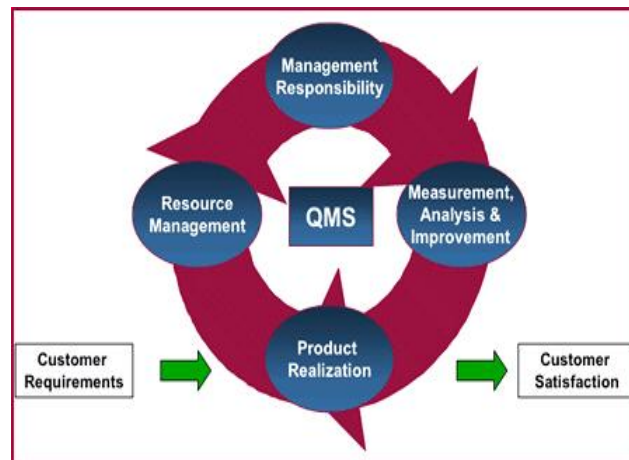
It is the system that an organisation uses to manage the quality of their services or products. Quality management system is only one type of management systems; other examples include financial management systems, safety management systems and environmental management systems.

The definition of a quality system from ISO (the International Organisation for Standardisation) is ‘the management system used to direct and control an organisation with regard to quality’.

Elements of a Quality Management System

The ISO 9001 standard is a model of a quality system, describing the processes and resources required for registration of a company’s quality system. A brief summary of the key elements are detailed below.

- **QMS** - Document processes necessary to ensure product or service is of high quality and conforms to customer requirements.
- **Management Responsibility** - Provide a vision. Show commitment. Focus on the customer. Define policy. Keep everyone informed.
- **Resource Management** - Assign the right person to the job. Create and maintain positive work space.
- **Product Realisation** - Clearly understand customer, product, legal and design requirements. Ensure that the specifications are followed. Check your suppliers.
- **Measurement, Analysis & Improvement** - Identify current and potential problems. Monitor and measure customer satisfaction. Perform internal audits. Fix problems.



International Organisation for Standardisation (ISO) :

International Organisation for Standardisation (ISO) is an international standard-setting body composed of representatives from various national standards organisations. It is an independent, non-Governmental international organisation with a membership of 162 national standards bodies. Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges.

ISO standards are documented rules and guidelines for implementing a quality system into a company. Specific technical specifications and/or other specific criteria may also be included depending on the standard, a company select.

ISO 9000 : 2000

ISO first published its quality standards in 1987 and later revised them in 1994. They were later revised in 2000. The quality standards of 1994 formed the ISO 9000 series. The series comprised ISO 9000, ISO 9001, ISO 9002, ISO 9003 and ISO 9004. Whereas ISO 9000 and ISO 9004 are only established guidelines for operations, ISO 9001, ISO 9002 and ISO 9003 were well defined standards.

The new ISO 9000:2000 has done away with the previous ISO 9002 and ISO 9003 standards. The new series consists of:

- ISO 9000:2000 - describes the fundamentals of a quality management system and specifies terminology. It presents guidelines.
- ISO 9001:2000 - specifies requirements for a quality management system.
- ISO 9004:2000 - guidelines for performance improvement.

Most companies in the world today want to do business with companies and organisations that have ISO 9000 certification. The certification ensures that the company irrespective of language barriers, cultural and social differences, and technological variations has a quality system that meets uniform standards. The ISO 9000:2000 is the only standard that carries third party certification. A third party called Registrar, accredited by national body, is the only authorised entity that can award an ISO 9000 certification. ISO 9000 certification is only awarded after he is satisfied that the organisation meets the ISO 9001 requirements. This certification is recognised worldwide.

Assessment Activity

List out the various types of quality standards suitable for different types of products or services.

Quality standards	Products/Services
AGMARK	?
?	For eco-friendly products
?	For precious metals like gold, platinum etc
?	Quality Management System

TE Questions

- A parameter which decides the superiority or inferiority of a product or service is;
(a) Quantity (b) Value (c) Price (d) Quality
- The five SERVQUAL dimensions does not include;
(a) Tangibles (b) Consistency (c) Empathy (d) Assurance
- Complete the series
Fitness for purpose/Superiority of something - Quality
System that an organisation uses to manage the quality of their services/products
.....
- What you mean by user-based view of quality?
- Briefly explain the elements of Quality Management System.
- Write a short note on ISO 9000:2000 quality standards?
- Explain the various dimensions of Quality with the help of a diagram.
- Discuss the various principles of Quality Management.

Extended activities

- Visit the web sites of different companies and prepare a list of companies and the quality certification they have attained.
- Conduct a survey among people of your locality about the awareness of different quality standards.