LECTURE NOTE

ON

ENTREPRENEURSHIP MANAGEMENT
&
SMART TECHNOLOGY

For
5th sem, Electrical Engg. (Diploma)

DEPARTMENT OF ELECTRICAL ENGINEERING
GOVERNMENT POLYTECHNIC, BARGARH

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SYLLABUS

1. Entrepreneurship

- Concept /Meaning of Entrepreneurship
- Need of Entrepreneurship
- Characteristics, Qualities and Types of entrepreneur, Functions
- Barriers in entrepreneurship
- Entrepreneurs vrs. Manager
- Forms of Business Ownership: Sole proprietorship, partnership forms and others
- Types of Industries, Concept of Start-ups
- Entrepreneurial support agencies at National, State, District Level (Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
- Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks

2. Market Survey and Opportunity Identification (Business Planning)

- Business Planning
- SSI, Ancillary Units, Tiny Units, Service sector Units
- Time schedule Plan, Agencies to be contacted for Project Implementation
- Assessment of Demand and supply and Potential areas of Growth
- Identifying Business Opportunity
- Final Product selection

3. Project report Preparation

- Preliminary project report
- Detailed project report, Techno economic Feasibility
- Project Viability

4. Management Principles

- Definitions of management
- Principles of management
- Functions of management (planning, organising, staffing, directing and controlling etc.)
- Level of Management in an Organisation

5. Functional Areas of Management

a) Production management

- Functions, Activities
- Productivity
- Quality control
- Production Planning and control

b) Inventory Management

- Need for Inventory management
- Models/Techniques of Inventory management

c) Financial Management

- Functions of Financial management
- Management of Working capital
- Costing (only concept)
- Break even Analysis
- Brief idea about Accounting Terminologies: Book Keeping, Journal entry,
- Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)

d) Marketing Management

- Concept of Marketing and Marketing Management
- Marketing Techniques (only concepts)
- Concept of 4P s (Price, Place, Product, Promotion)

e) Human Resource Management

- Functions of Personnel Management
- Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages

6. Leadership and Motivation

a) Leadership

- Definition and Need/Importance
- Qualities and functions of a leader
- Manager Vs Leader
- Style of Leadership (Autocratic, Democratic, Participative)

b) Motivation

- Definition and characteristics
- Importance of motivation
- Factors affecting motivation
- Theories of motivation (Maslow)
- Methods of Improving Motivation
- Importance of Communication in Business
- Types and Barriers of Communication

7. Work Culture, TQM & Safety

- Human relationship and Performance in Organization
- Relations with Peers, Superiors and Subordinates
- TQM concepts: Quality Policy, Quality Management, Quality system
- Accidents and Safety, Cause, preventive measures, General Safety Rules, Personal Protection Equipment(PPE)

8. Legislation

a) Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights

b) Features of Factories Act 1948 with Amendment (only salient points)

c) Features of Payment of Wages Act 1936 (only salient points)

9. Smart Technology

- Concept of IOT, How IOT works
- Components of IOT, Characteristics of IOT, Categories of IOT
- Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart

- Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.

RECOMMENDED BOOKS

1. Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi
2. Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh
3. Entrepreneurship Development and Management by Vasant Desai, Himalaya Pub.House
4. Industrial Engineering and Management by O.P Khanna, Dhanpat Rai and Sons
5. Industrial Engineering and Management by Banga and Sharma, Khanna Publications
6. Internet of Things by Jeeva Jose, Khanna Publications, New Delhi
7. Online Resource on Startups and other concepts

Chapter.1: Entrepreneurship

- **Entrepreneurship** is considered to be the combination of "Entrepreneur" and "Enterprise". Organising an Enterprise is also described as Entrepreneurship.
- **Enterprise** is defined as unit of economic activities or a business organisation.
- **Entrepreneur** is the owner of an Enterprise, who undertakes a business venture by combining the resources for production is called an entrepreneur.

Need of Entrepreneurship/ Role of an Entrepreneur in Industrial Development:

Entrepreneur is considered as very important for the economic and industrial growth of a country. The following point may be considered as role of an entrepreneur or need of entrepreneurship.

i. Entrepreneurs not only creates self-employment for themselves but also provides a lot of employment opportunities for others.
ii. An entrepreneur creates an entrepreneurial culture in the society. Many persons may be tempted to become entrepreneurs when they see a successful entrepreneur nearby.
iii. Entrepreneurs prefer to establish their units at their own places and in their own locality. So there is no congestion of industries at one place. Industries are established evenly throughout the country.
iv. Entrepreneurs provides goods and services to the people at most competitive rates and in time.
v. Entrepreneurs usually starts small enterprises and provides goods and services at most competitive rates and hence restrict the monopolistic activities of big business organisations.
vi. Establishment of industries by entrepreneurs at different places provides a balanced economic growth of various regions of the country.
vii. Establishment of industries or enterprise by the entrepreneur attracts other related industries or enterprises.
viii. Various types of raw materials found scattered throughout the country in small quantities. Such unused small quantities of materials can be effectively used by small entrepreneurs to make small useful products and ensure better utilisation of national resources.

Characteristics and Qualities of Entrepreneur:

The characteristic and qualities of an entrepreneur are mentioned below:

1. Self-Confidence
2. Risk-Taking ability

3. Leadership quality
4. Determination
5. Decision Making ability
6. Desire for unique production
7. Managerial skill
8. Emotional tolerance
9. Intelligence
10. Competitive spirit

Types of Entrepreneur:

Based on their working relationship with the business environment they are functioning in, various types of entrepreneurs can be found. The chief categories are these four types of entrepreneurs, i.e.

1. Innovative entrepreneurs,
2. Imitating Entrepreneurs,
3. Fabian Entrepreneurs, and
4. Drone Entrepreneurs.

1. Innovative entrepreneurs:
   - This type of an entrepreneur is more interested in introducing some new ideas into the market, organization or in the nation.
   - They are drawn towards innovations and invest a lot of time and wealth in doing research and development.
2. Imitating Entrepreneurs:
   - These entrepreneurs copy or imitates an existing business in efficient manner.
   - They observe an existing successful system and replicate it in a manner where all the deficiencies of the original business model are removed and all its efficiencies are retained.
   - These entrepreneurs help to improve an existing product or production process and can offer suggestions to enhance the use of better technology.
3. Fabian Entrepreneurs:
   - These are entrepreneurs that are very careful in their approaches and cautious in adopting any changes.
   - They are not prone to sudden decisions and try to stay away from any innovations or change that doesn't fit their narrative.
4. Drone Entrepreneurs:
   - These are entrepreneurs who do not like a change.
   - They want to do business in their own traditional or orthodox methods of production and systems.

Functions of an Entrepreneur:

1. To Prepare Plan:

The first and foremost function of an entrepreneur is to prepare the plan or scheme of production i.e. types of goods to be produced, quantity of production etc.

2. Selection of the Site:

The entrepreneur has to select the site for the factory to be installed. The place should be near to the market, railway station. The place may be close to the source of raw materials also. The selection of the place has an important impact on the cost of production.

3. Provision of Capital:

Capital is the basic requirement to start an enterprise. It is not necessary that the entrepreneur should arrange the capital for investment.

4. Provision of Labour:

- Different types of labour are required to produce one type of commodity. The entrepreneur has to make provision of labours for different tasks.
- Entrepreneur decides the level and type of labour required for the enterprise. Then different workers are assigned to the work accordingly.

5. Purchase of Machines and Tools:

Entrepreneur has to purchase machines and tools in order to start and continue the production at reasonable cost.

6. Provision of Raw Materials:

Entrepreneur has to make provision of raw materials. He should purchase the best quality of raw materials at minimum cost.

7. Advertisement:

The responsibility of the entrepreneur is not only to produce goods but also to sell his products. Entrepreneur has to advertise his/her products explaining the superiority and quality of his goods through newspapers, magazines, radio, TV, etc. Advertisement is done to increase the sale.

8. Follow Government regulations:

The entrepreneur has to contact government because the modern production system is controlled by the government in several ways. A licence is taken before the start of production. The entrepreneur has to abide by certain rules and regulations of production and has to pay taxes regularly.

9. Risk-Taking:

Entrepreneurship takes the risk for the new venture. For innovative actions in the field of production technology, for launching new products in a volatile market and to use new raw materials in production etc. an entrepreneur has to take the risk.

10. Innovation:

Under the context of changing market, the entrepreneur has to add new utilities to existing products to sustain in the market through innovation.

Barriers in Entrepreneurship:

Entrepreneur faces many hurdles while running an enterprise which are acts as barriers

1. Finance:
   We are all bustling with ideas that are unique and can make for an amazing business start-up. But no matter how good your idea is, you will always need stable finances and funding from the investors to begin the process and take the first step towards your journey of entrepreneurship.
2. Fear of failure:
   There is always a fear of failure while starting an enterprise. There is a fear whether we are on the right track, is the idea worthwhile, will there be profit, will I find investors, and various such fears and tensions act as the Barriers to Entrepreneurship.
3. No strategic plan:
   Lack of proper planning and strategy in place before starting a business is one of the most common Barriers to Entrepreneurship.
4. Human resource issues:
   Entrepreneurs require the support of human resource to make a business profitable and successful. So employees with proper knowledge, expertise, and experience are needed to increase the efficiency of the business.
5. Stringent rules and regulations of the market:
   It is not very easy for entrepreneurs to enter the new market as there are quite many rules and regulations imposed by the government authorities. There are various laws and compliances to be adhered to such as taxation, environmental regulations, licenses, property rights, and much more which act as the barriers to Entrepreneurship.
6. Fewer opportunities:
   Even though there is a lot of talent pool in the market with the aspiring entrepreneurs buzzing with the ideas, but the opportunities presented to them are quite less and fewer. Nepotism and corruption are the reason behind less opportunity and act as the Barriers to Entrepreneurship.
7. Lack of capacity:
   Some entrepreneurs lack the capacity to embrace the opportunities and make the enterprise successful. The reasons may be lack of knowledge, lack of education, lack of willingness, lack of strategic knowledge, and cultural hindrances etc. Tis may act as barrier to start an enterprise.
8. Less market experience:
   Market experience is highly required before launching a product in to it. It is quite necessary to gain a relative amount of work experience by working in the industry domain or sector as per the education levels and interest. Once the person has relative amount of market exposure he/she can take the risk.
9. Lack of risk-taking capacity:
   Lack of risk-taking capacity acts as one of the major barriers to entrepreneurship. The entrepreneur has to take the risk to introduce new ideas in to the business.
10. Lack of practical knowledge:
    Having a strong educational background is just not enough to pursue business as it requires practical knowledge to withstand in the changing market.

ENTREPRENEURSHIP VS. MANAGER:

Entrepreneur vs Manager	
Entrepreneur	**Manager**
Entrepreneur is visonary and bears all financial risks.	Manager works for salary, and does not have to bear any risks.
Focuses on starrting and expanding the business ideas	Focus on daily smooth functioning of business
Key motivation for Entrepreneur is achievments	Mangers motivation comes from the power that comes with their position
Reward for all the efforts is profit he earns from the enterprise	Remuneration is the salary he draws from the company
Entrepreneur can be informal and casual	Manager's approach to every problem is very formal

FORMS OF BUSINESS OWNERSHIP

There are different forms of business ownership. Some of the important business ownership types are listed below:

1. **SOLE-PROPRIETORSHIP**
   - When a business is started by a single person it is known as Sole-Proprietorship or single ownership.
   - In this business an entrepreneur uses his own resources, own skill, and own knowledge and manages the business alone.

   Advantages of a Sole Proprietorship:
   - Starting a sole-Proprietorship business is quite easy.
   - All profits/benefits earned by the business belongs to the sole proprietor.
   - As the sole-proprietor is the only person in the business it is quite easy to maintain the business confidentiality or secrecy.
   - As the sole-proprietor is the only person in the business, he can take prompt decisions whenever required and there is no need to consult others.
   - The business is easy to dissolve at any time without any formalities.

   Disadvantages of a Sole-Proprietorship:

   - As the sole-proprietor is the only person in the business, he/she can contribute only limited amount of money for the business. So the financial resource is limited.
   - One single person is not likely to be an expert in all the activities of the business. So it is very difficult in case of a single person to manage the whole business.
   - In case of any risk the sole-proprietor is legally responsible for all debts against the business. So the business as well as his personal assets are at risk.
   - Since the whole business is dependent upon a single person so the future of the business is uncertain.
2. **PARTNERSHIP:**

- When two or more people share ownership of a single business it is called partnership.
- The Partners manages the business together and share the profit or losses as per the agreement. The written legal agreement is called 'Partnership Deed'.
- The minimum number of members in partnership business is two and the maximum limit depends upon the type of business.

Advantages of a Partnership:

- Since more than one members in this business so this business has more financial strength than sole-proprietorship.
- Since there are many partners with varieties of talents, the partnership business become more efficient than individual ownership.
- Lesser risk than individual ownership business.

Disadvantages of a Partnership:

- Partners are jointly and individually liable for the actions of the other partners.
- Profits must be shared between all partners as per agreement.
- The shares of a partner in Partnership business is not transferable.
- Disagreements can occur between the partners.
- In a partnership, no decision can be taken without the consent of other partners.
- The partnership business have a limited life; it may end upon the withdrawal or death of a partner.

3. CORPORATIONS

- This business is owned by a group of individuals known as share holders.
- Shareholders elect board of directors to oversee the business activities.
- A corporation, is a form of business operation that declares the business as a separate, legal entity guided by a group of officers known as board of directors.
- A corporation can be taxed; it can be sued; it can enter into contractual agreements.
- The corporation has a life of its own and does not dissolve when ownership changes.

Advantages of a Corporation

- Shareholders have limited liability for the corporation's debts or judgments against the corporations.
- Generally, shareholders can only be held accountable for their investment in stock of the company.
- Corporations can raise additional funds through the sale of stock.

Disadvantages of a Corporation

- The process of incorporation requires more time and money than other forms of organisation.
- Corporations are monitored by federal, state and some local agencies, and as a result may have more paperwork to comply with regulations.
- Incorporating may result in higher overall taxes.

4. COOPERATIVE SOCIETY:

- In cooperative society a group of people belonging to a particular class or category starts a business for their mutual benefits.
- Cooperative society generally started by middle class or lower middle class section of the society belonging to a particular area.
- The main aim of the cooperative society is not to earn profit but to provide the best possible services to its members.
- It can continue its operation for an unlimited period of time.

- Membership of the cooperative society is purely voluntary for all individual with common economic interest. Anyone can become a member by purchasing the share of the cooperative society and withdraw his/her membership by simple application.

5. JOINT STOCK COMPANY:

- A Joint stock company is a company which is limited by shares. It has a permanent paid up capital which is divided in to shares known as stock.
- Stock can be held or transferred among its members and by no other person.

TYPES OF INDUSTRIES

Industry is a place where goods and services are produced. Depending on nature of the industrial activities, industry can be classified in to five categories, such as:

1. Manufacturing Industry
2. Extractive Industry
3. Genetic Industry
4. Construction Industry
5. Service Industry

1. Manufacturing Industry:

- These type of industries purchase raw materials and make product either for final consumption or for use by another industry.
- Basing upon the manufacturing process, manufacturing industries are classified in to four category, such as:
  a) Assembling Industry
  b) Processing Industry
  c) Analytical Industry
  d) Mixed type or synthetic type Industry
    a) Assembling Industry: This type of industry procure or purchase different type of components, parts, accessories etc. and assemble them in to useful products. Example: automobile industries, bicycle industry, TV industry etc.
    b) Processing Industry: In this type of industry raw materials are purchased and are introduced to various processes one after another to get the final products. The processes may be grinding, polishing, drilling, shaping, heating etc. Example: Furniture industries, textile industry, paper making industry, jute mills etc.
    c) Analytical Industry: In this type of industries raw materials are introduced and several products are obtained from that raw material due to different analytical processes. Example: In milk industry, several products like cheese, butter, curd, milk powder, ghee, condensed milk etc. are made from different processing of milk. Other examples are petroleum industries, flour mills etc.
    d) Mixed type or synthetic type Industry: In this type of industry different raw materials are combined at different proportions to make different type of products. Example: Food processing industries, medicine industries, cosmetic industries, fertilizer industries etc.

2. Extractive Industries:

- This type of industry is engaged in the process of extraction of different raw materials or commodities from nature, like mines, forests, seas etc.
- Mining ores, collection of forest product, collection of marine products, fishing etc. comes under extractive industries.

3. **Genetic Industries:**
   These industries are engaged in reproduction or multiplication of plant and species with the objective of sale or economic activities.
   Example: Poultry, fisheries, cattle breeding etc.
4. **Construction Industries:**
   These industries are engaged in the construction of various infrastructure like roads, dams, bridges, canal buildings etc.
5. **Service Industries:**
   - These industries provides various types of services to the people or organisations.
   - These industries do not produce any goods or commodities.
   - Example: Cinema industries, Hotels, TV channels, cable operator companies, Internet services, Hospitals etc.

CONCEPT OF START-UP:

A start-up is a young company founded by one or more entrepreneurs to develop a unique product or service and bring it to market.

- It is a company or project begun by an entrepreneur, who have an innovative idea to seek, develop, and validate a scalable economic model.
- Start-ups refer to new businesses that intend to grow large.
- In the early stages, start-up companies have little or no revenue coming in. They have an idea that they have to develop, test, and market.
- To raise the fund the entrepreneur has to prove the validity of the concept/ idea to potential lenders and investors or funding agencies.
- There is some time limit for registering the young company as start-up like in India it is 10yrs from the day of establishment.

ENTREPRENEURIAL SUPPORT AGENCIES AT NATIONAL, STATE AND DISTRICT LEVEL:

Some of the agencies who provides support to Entrepreneurs are listed below:

1. **DIC:**

The **District Industries Center (DIC)** is the institution at the district level, which provides all the services and support facilities to the entrepreneurs for setting up Small and Village Industries with the aim of promoting, facilitating and developing industrial growth.

2. **OSIC:**
   - **ODISHA SMALL INDUSTRIES CORPORATION LTD. (OSIC)** was established on 3rd April, 1972 as a wholly owned Corporation of Government of Odisha.

- The basic objective of the Corporation is to aid, assist and promote the MSMEs in the State for their sustained growth and development to gear up the industrialization process in the State.
- Although there are a number of other State Corporations looking after various aspects of industrial development, yet this is the only Corporation in the State exclusively engaged in the development of the MSMEs which form the back bone of industrial sector in the state.

3. **NSIC:**

   National Small Industries Corporation (NSIC), is an ISO 9001-2015 certified Government of India Enterprise under Ministry of Micro, Small and Medium Enterprises (MSME). NSIC has been working to promote, aid and foster the growth of micro, small and medium enterprises in the country.

4. **SIDBI:**

   Small Industries Development Bank of India (SIDBI) set up on 2nd April 1990 under an Act of Indian Parliament, acts as the Principal Financial Institution for Promotion, Financing and Development of the Micro, Small and Medium Enterprise (MSME) sector as well as for co-ordination of functions of institutions engaged in similar activities.

5. **NABARD:**

   National Bank for Agriculture and Rural Development (NABARD) is an apex Development Financial Institution in India. The Bank has been entrusted with matters concerning Policy Planning and Operations in the field of credit for Agriculture and other Economic activities in rural areas in India

6. **KVIC:**
   - **The Khadi and Village Industries Commission (KVIC)** is a statutory body formed in April 1957 (as per an RTI) by the Government of India, under the Act of Parliament, 'Khadi and Village Industries Commission Act of 1956'.
   - It is an apex organisation under the Ministry of Micro, Small and Medium Enterprises, with regard to khadi and village industries within India, which seeks to - "plan, promote, facilitate, organise and assist in the establishment and development of khadi and village industries in the rural areas in coordination with other agencies engaged in rural development wherever necessary

7. **COMMERCIAL BANKS:**
   - A commercial bank is a type of financial institution that accepts deposits, offers checking account services, makes various loans, and offers basic financial products like certificates of deposit (CDs) and savings accounts to individuals and small businesses. Some of the commercial banks are: SBI, HDFC, Federal Bank etc.
   - Commercial banks make money by providing loans and earning interest income from those loans. The types of loans a commercial bank can issue vary and may include mortgages, vehicle loans, business loans, and personal loans. A commercial bank may specialize in just one or a few types of loans.

TECHNOLOGY BUSINESS INCUBATOR (TBI)

- TBI is an entity, which helps technology-based start-up businesses with all the necessary resources/support that the start-up needs to evolve and grow into a mature business.
- Typically, TBIs provide budding entrepreneurs all necessary infrastructure support, technology/prototype development support, research assistance, help in getting funding, business consulting assistance, marketing assistance and do whatever is necessary to make the start-up a successful business.
- The primary goal of a business incubator is to facilitate economic development by improving survival and growth of new entrepreneurial units.

SCIENCE & TECHNOLOGY ENTREPRENEURSHIP PARK (STEP)

- The Science & Technology Park helps in creating an atmosphere for innovation and entrepreneurship.
- It provides active interaction between academic institutions and industries for sharing ideas, knowledge, experience and facilities for the development of new technologies and their rapid transfer to the end user.
- A STEP creates the necessary climate for innovation, information exchange, sharing of experience and facilities and opening new avenues for students, teachers, researchers and industrial managers to grow in a trans-disciplinary culture.
- It offers facilities such as training, testing and calibration facilities, precision tool room/central workshop, prototype development, business facilitation, computing, data bank, library and documentation, communication, seminar hall/conference room, common facilities such as phone, fax, photocopying.

Chapter-2: Market Survey and Opportunity Identification

Business Planning:

- Business Plan is a written document describing the nature of the business, the sales and marketing strategy, and the financial background, and containing a projected profit and loss statement.
- Business plans can help perform a number of tasks for those who write and read them. They're used by investment-seeking entrepreneurs to convey their vision to potential investors. They may also be used by firms that are trying to attract key employees, prospect for new business, deal with suppliers or simply to understand how to manage their companies better.

Generally, a business plan has the following components:

- **Title Page and Contents**
  A business plan should be presented in a binder with a cover listing the name of the business, the name(s) of the entrepreneur(s), address, phone number, e-mail and website addresses, and the date.
- **Executive Summary**
  The executive summary, or statement of purpose, states your reason for writing the business plan.
- **Description of the Business**
  The business description usually begins with a short explanation of the industry. It also describes the outlook for the future.
- **Description of the Product or Service**
  It describe the product or service going to be provided by the business organisation.
- **Market Analysis**
  A thorough market analysis will help you define your prospects as well as help you establish pricing, distribution, and promotional strategies that will allow your company to be successful.
- **Competitive Analysis**
  The purpose of the competitive analysis is to determine:
  - The strengths and weaknesses of the competitors within your market.
  - Strategies that will provide you with a distinct advantage.
  - Barriers that can be developed to prevent competition from entering your market.
  - Any weaknesses that can be exploited in the product development cycle.
- **Operations and Management**
  The operations and management component of your plan is designed to describe how the business functions on a continuing basis.
- **Financial Components of Your Business Plan**
  After defining the product, market and operations, the next area to turn your attention to are the three financial statements that form the backbone of your business plan: the income statement, cash flow statement, and balance sheet.
- **Supporting Documents**

In this section, include any other documents that are of interest to your reader, such as your resume; contracts with suppliers, customers, or clients, letters of reference, letters of intent, copy of your lease and any other legal documents, tax returns for the previous three years, and anything else relevant to your business plan.

SSI,Ancillary Unit, Tiny Unit, Service sector units

Small Scale Industries (SSI)

- An Industry whose investment is more than 25 lakh rupees but does not exceed 5 crore rupees for manufacturing unit (or more than10 lakh rupees but does not exceed 2 crore rupees for service sector unit) can be considered as Small scale Industry (SSI).

Ancillary Unit

- A small scale industry (SSI) can enjoy the status of an ancillary small industry, if it supplies not less than 50 percent of its production to another industrial unit, referred to as the parent unit.
- The ancillary small industrial unit can manufacture parts, components, sub-assemblies, tools or intermediate products for the parent unit. Apart from catering to the needs of the parent unit, it can do business on its own.

Tiny Unit (micro scale unit)

- A tiny unit is defined as an industrial enterprise whose investment in plant and machinery does not exceed Rs. 25 lakhs for manufacturing unit (or Rs. 10 lakh for service sector unit).

Service sector units

- Service sector units provide services to the society. These units do not manufacture any goods.
- Some examples of service sector units are retail, banks, hotels, real estate, education, health, social work, computer services, recreation, media, communications, electricity, gas and water supply.

Time Schedule plan

The Importance of Scheduling

Scheduling is the art of planning your activities so that you can achieve your goals and priorities in the available time. It helps to:

- Understand what you can realistically achieve within your time.
- Make sure you have enough time for essential tasks.
- Add contingency time for "the unexpected" situations.
- Take tasks as per your capacity.
- Work steadily toward your personal and career goals.
- Have enough time for family and friends, exercise and hobbies.
- Achieve a good work-life balance.

How to Schedule Your Time

- Step 1: Identify Available Time
- Step 2: Schedule Essential Actions
- Step 3: Schedule High-Priority Activities
- Step 4: Schedule Contingency Time
- Step 5: Analyse Your Activities

Assessment of demand and supply in potential areas of growth:

To have the assessment of demand and to supply under mentioned steps are required to be taken which may help the entrepreneur to set up his own industry or to start his own business. In any industry the entrepreneur must have the knowledge of demand and supply. The steps are as follow:

1. To assess the demand the questionnaires are required to be prepared and brought to the notice of consumer by asking the questions like why, where, how, when, terms and by showing the comparative statement of the other manufacturers.
2. This demand can also be assessed by the entrepreneur by visiting various industries manufacturing the goods in the field of interest of the entrepreneur.
3. To go through the economic report available in the list of industries at Udyog Bhawan, New Delhi.
4. To assess the requirement of demand the entrepreneur must have the survey report of the various organizations dealing in the line of providing literatures and manuals which help the entrepreneur to set up his own industry. As the supply is concerned once the demand is known in the market as per the product life cycle. The items can be manufactured at the site of the industrialist. The demand and supply affects as per the 4 P's.

   (*a*) Product (*b*) Price

   (*c*) Promotion (*d*) Place.

The graph of the product life cycle is shown in figure.

As per the marketing management, first of all to start any product its demand should be known in the market, then the price should be decided

by going through various factors, then the promotion of the product should be launched in the market. Lastly the place where the product is to be sold should be decided.

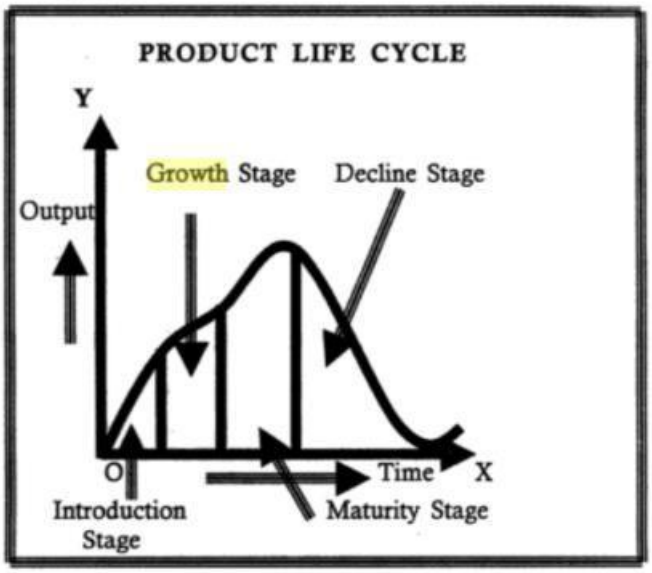


Fig. 3.2

There are various stages like introduction, growth, maturity and the decline. These stages occur in any kind of business to be started.

Identifying business opportunity:

Business opportunity can be described as an economic idea which can be converted to business and earn profit.

An entrepreneur need to identify right opportunity so that it can be converted in to a successful business. A business opportunity should have:

- **A good market scope for the product he is going to produce:** Entrepreneur has to analyse the market scope for selling the product. The demand of the product should be sufficiently higher than the supply.
- **An adequate rate of return on the investment:** The rate of return should be attractive so that it will cover the remuneration of the entrepreneur, interest on loans and some extra money which will be utilised for the growth and expansion of the business in future.
- **Feasibility or practicability of the idea:** The idea stated by the entrepreneur must be feasible and practicable.
- **Competence of the entrepreneur to encash the idea:** The entrepreneur should have the skills or competency to convert the idea in to a business.
- **Assurance for future growth:** There must be an assurance for a prosperous future and steady growth of the business.

Before identifying the final business opportunity a lot of informations are collected about various types of product and services available in the market and their merits and demerits and the expectation of consumer. Then the business opportunity is selected for further processing.

Final product selection:

The entrepreneur has to select the final product which is going to be manufactured by his/her enterprise. Entrepreneur has to select the product basing upon these following factors:

- **Demand of the product in the market**: There must be existing demand of the product in the market. Supply-demand gap for the product need to be analysed.
- **Financing:** The available finance is considered for selecting the product, as finance is required for production, marketing, promotion etc.
- **Rate of return on investment**: The product should generate good profit and rate of return on investment should be good.
- **Availability of Raw materials:** Sources, quality and available quantity of raw materials or starter materials are considered before finalizing a product.
- **Technical considerations**: Use of technologies, power requirements, use of new equipment / machineries are considered.
- **Availability of skilled manpower:** Qualified and skilled personnel will be required for the production and marketing of the product.

Basing upon the above factor the final product is selected.

Chapter-3: PROJECT REPORT PREPARATION

Preliminary Project Report

Preliminary Project Report is a formal document that describes specific activities, events, occurrences, or subjects of a project to explain progress of the project up to a certain point in time. This document is presented and communicated at project status meetings to explain what goals, deliverables and results are produced and what activities are still in progress. The document serves as the basisfor developing the final project report.

PPR is much shorter than the project report and its reporting requirementslight.PPR serves several purposes

- Providing an additional motivation for an early start on the project.
- Helping set some useful targets for delivery of intermediate results andtheir documentation.

A typical preliminary report for projects highlights the following data:

- ***Problem/need*:** A clear description of the problem or need the projectaims to handle.
- ***Proposed solution*:** a brief description of how to address theproblem/need.
- ***Work effort*:** An analysis summary of work relevant to the project.
- ***Status*:** current state of project work, including activities completed and unfinished.
- ***Evaluation*:** an analysis and assessment of project work by specific criteria such as cost-effectiveness, feasibility, manageability,performance, others.
- ***Schedule*:** a timeline with specific milestones and events related to project work.

The project preliminary report describes your progress so far. It should form the basisof your final report.

The preliminary report should include:

- **Problem:** A clear description of the problem you are addressing. This shouldbe more refined and persuasive than the version in your original proposal.
- **Related work:** A good summary and analysis of the work relevant to yourproject. Everything you describe should be related directly to your project:
    - Why is it relevant? (Don't assume the reader can read your mind.)
    - If it attempts to solve a similar problem, why is it not a satisfactory solution?
    - What ideas in the other project can be applied to your project?

  If there is related work you have not yet studied, list that in the related worksection along with your plans for learning about it.

- **Proposed Solution:** Describe your idea for solving the problem. This need notyet be complete, but should include some specific ideas.
- **Research Plan:** Describe clearly exactly what you will do.
- **Evaluation Plan:** Describe how you will evaluate your work. This should include (possibly speculative) descriptions of specific sample programs youwill use in your evaluation.
- **Schedule and Division of Labor:** Calendar showing specific milestones, whenthey will be accomplished, and how the team will split up the work.

There are no length constraints on the preliminary report, but you should aim to be asconcise, clear and organized as possible. Since you are working in groups, the writingand presentation should be at a high quality. You should be able to reuse most of the preliminary report (after changing the verb tenses!) in your final report

Detailed Project Report

A Detailed Project Report is a document which provides details on the overall picture of the proposed business. The project report gives an account of the project proposal to ascertain the prospects of the proposed plan/activity. Project Report is a written document relating to any investment.

Project Details:

a. Promoters
b. Registered office
c. Location of the factory

d. Line of activity
e. Background of other directors
f. Scheme of project
g. Land and site development
h. Building and civil works
i. Plant and machinery
j. Contingencies to plant and machinery
k. Utilities
l. Miscellaneous fixed assets
m. Vehicles
n. Quality control and testing equipment
o. Deposits
p. Preliminary and preoperative expenses
q. Working capital margin
r. Schedule of implementation
s. Management

Raw Materials Details:

a. Requirement of raw materials
b. Situation of raw material availability indigenously
c. Feasibility of import of raw materials
d. Areas from which raw material can be procured
e. Suppliers of raw materials
f. Annual requirement
g. Transportation of raw materials
h. Varieties and grades of raw material
i. Cost of raw materials and transportation cost to the factory
j. Linkages with suppliers of raw material.

Utilities Details:

a. Power
b. Steam
c. Compressed air
d. Fuel

e. Water
f. Chilled water
g. Effluent and waste disposal

Technical Details:

a. Plant capacity
b. Capacity utilization
c. Manufacturing process with flow chart
d. Plant layout
e. Product description and properties
f. Packaging and its cost
g. Plant and machinery details
h. Plant and machinery suppliers

Manpower Details:

a. Manpower requirement
b. Organization chart
c. Availability of manpower.

Financial Details:

a. Cost of project, with details to individual cost items
b. Means of finance
c. Workings for financial projections
d. Estimates of production and sales
e. Estimated cost of production and profitability
f. Estimated funds flow statement
g. Projected balance sheet
h. Statement of debt service coverage ratio

i. Statement of computation of working capital
j. Statement of break-even analysis
k. IRR calculations
l. Payback period calculations
m. Return on investment calculations
n. Debt-equity ratio calculations
o. Promoters' contribution to Cost of project
p. Promoter's contribution to Total equity

Marketing Details:

a. Present state of the industry
b. Consumer preferences
c. Market requirements
d. Market segments
e. Distribution channels
f. Market characteristics of the product
g. Export prospects and international market
h. Marketing and selling arrangements.

Project Evaluation-Social Angle:

a. Analysis of critical factors
b. Socio Economic benefit
c. Labour availability
d. Impact on ecology
e. Foreign exchange earnings
f. Import substitution
g. Technology absorption

Project viability

A **project** is economically **viable** if the economic benefits of the **project** exceed its economic costs, when analyzed for society as a whole. The economic costs of the **project** are not the same as its financial costs—externalities and environmentalimpacts should be considered.

Feasibility study

A feasibility study is an assessment of how practical or doable a proposed method or plan is. It is an analysis that tries to find out whether it is possible to complete a project,successfully.

Viability study

A viability study is an investigation into a business idea. Specifically, whether the ideawill make money, i.e., whether it will be profitable

Chapter-4: MANAGEMENT PRINCIPLES

Definition of management

Management is the coordination and administration of tasks to achieve a goal. Such administration activities include setting the organization's strategy and coordinating the efforts of staff to accomplish these objectives through the application of available resources. Management can also refer to the seniority structure of staff members withinan organization.

To be an effective manager, you'll need to develop a set of skills, including planning, communication, organization and leadership. You will also need extensive knowledge of the company's goals and how to direct employees, sales and other operations to accomplish them.

Principles of management

1. Division of Work-

Segregating work in the workforce amongst the worker will enhance the quality of the product. Similarly, he also concluded that the division of work improves the productivity, efficiency, accuracy and speed of the workers. This principle is appropriate for both the managerial as well as a technicalwork level.

2. Authority and Responsibility-

These are the two key aspects of management. Authority facilitates the management to work efficiently, and responsibility makes them responsible for the work done under their guidance orleadership.

3. Discipline-

Without discipline, nothing can be accomplished. It is the core value for any project or any management. Good performance and sensible interrelation make the management job easy and comprehensive. Employees good behaviour also helps them smoothly build and progress in theirprofessional careers.

4. Unity of Command-

This means an employee should have only one boss and follow his command. If an employee has tofollow more than one boss, there begins a conflict of interest and can create confusion.

5. Unity of Direction-

Whoever is engaged in the same activity should have a unified goal. This means all the person working in a company should have one goal and motive which will make the work easier and achieve the set goal easily.

6. Remuneration:

This plays an important role in motivating the workers of a company. Remuneration can be monetary or non-monetary. However, it should be according to an individual's efforts they have made.

7. Order-

A company should maintain a well-defined work order to have a favourable work culture. Thepositive atmosphere in the workplace will boost more positive productivity.

8. Equity-

All employees should be treated equally and respectfully. It's the responsibility of a manager that no employees face discrimination.

9. Stability-

An employee delivers the best if they feel secure in their job. It is the duty of the management tooffer job security to their employees.

10. Initiative-

The management should support and encourage the employees to take initiatives in an organization.It will help them to increase their interest and make then worth.

Functions of management

- **Planning-** is the purpose of ascertaining in advance what is supposed to be done and who has to do it. This signifies establishing goals in advance and promoting a way of delivering them effectively and efficiently. In an establishment, the aim is the obtainment and sale of conventional Indian handloom and workmanship articles. They trade furnishings, ready- mades, household items and fabrics made out of classical Indian textiles.
- **Organizing-** is the administrative operation of specifying grouping tasks, duties, authorizing power and designating resources needed to carry out a particular system. Once a definite plan has been set for the completion of an organizational intent, the organizing party reviews the actions and resources expected to execute the program. It ascertains what actions and resources are needed. It determines who will do a distinct job, where and when it will be done.
- **Staffing-** is obtaining the best resources for the right job. A significant perspective of management is to make certain that the appropriate people with the apt skills are obtainable in the proper places and times to achieve the goals of the company. This is also called the human resource operations and it includes activities such as selection, placement, recruitment and coaching of employees.

- **Directing-** involves directing, leading and encouraging the employees to complete the tasks allocated to them. This entails building an environment that inspires employees to do their best. Motivation and leadership are 2 chief elements of direction. Directing also includes communicating efficiently as well as managing employees at the workplace. Motivating workers means simply building an atmosphere that urges them to want to work. Leadership is inspiring others to do what the manager wants them to do.
- **Controlling-** is the management operation of controlling organizational achievement towards the accomplishment of organizational intentions. The job of controlling comprises ascertaining criteria of performance, computing the current performance, comparing this with

organized rules and taking remedial action where any divergence is observed. Here management should ascertain what activities and outputs are important to progress, how and where they can be regulated and who should have the power to take remedial response

Levels of Management

There are three levels of management found within an organization, where managers at these levels have different roles to perform for theorganization to have a smooth performance, and the levels are:

1. **Top-Level Management/ Administrative level**
2. **Middle-Level Management/ Executor**
3. **Low-level Management/ Supervisor**

1. Top Level Management

The Top-level management controls the management of goals and policies and the ultimate source of authority of the organization. They apply control and coordination of all the activities of the firm as they organize the several departments of the enterprise which would include their budget, techniques, and agendas.

Top-level management is accountable to the shareholders for the performance of the organization. There are several functions performed by the top-level management, but three of them are themost important, and they are:

- To lay down the policies and objective of the organization
- Strategizing the plans of the enterprise and aligning competent managers to the departments or middle level to carry them out.
- Keeping the communication between the enterprise and the outsideworld.

2. Middle Level of Management

Middle-level Management is also referred to as the executor level, they are subordinates of the top-level management and are responsible for the organization and direction of the low-level

management. They account for the top-level management for the activities of their departments.

The middle-level managers are semi- executives and are made up of the departmental managers and branch manager. They could be divided into senior and junior middle-level management if the organization is big. They coordinate the responsibilities of the sub-unit of the firm and access the efficiency of lower-level managers.

The middle-level managers are in charge of the employment and training of the lower levels. They are also the communicators between the top level and the lower level as they transfer information, reports, and other data of the enterprise to the top-level. Apart from these, there are three primary functions of the middle-level management in the organization briefed below:

- To carry out the plans of the organization according to policies and directives laid down by the top-level management.
- To organize the division or departmental activities.
- To be an inspiration or create motivation for junior managers to improve their efficiency.

3. Lower Level of Management

The lower level Management is also referred to as the supervisory or the operative level of managers. They oversee and direct the operative employees. They spend most of their time addressing the functions of the firm, as instructed by the managers above them.

The lower-level managers are the first line of managers as they feature at the base of operations, so they are essential personnel that communicates the fundamental problems of the firm to the higher levels. This management level is made up of the foreman, the line boss, the shift boss, the section chief, the head nurse, superintendents, and sergeants.

They are the intermediary; they solve issues amidst the workers and are responsible for the maintenance of appropriate relationships within the organization. They are also responsible for training, supervising, and directing the operative employees.

The lower level manager represents the management to the operative workers as they ensure discipline and efficiency in the organization.
The duty of inspiration and encouragement falls to them, as they strengthened the workforce. They also organize the essential machines, tools, and other materials required by the employees to gettheir job done.

- To allocate tasks and responsibilities to the operative employees.
- To ensure quality and be responsible for the production quantity.
- To communicate the goals and objective of the firm laid down by thehigher level
- managers to the employees and also the suggestions, recommendations, appeals, and information concerning employeeproblems to the higher-level managers.
- To give instruction and guided direction to workers on their day to dayjobs.
- To give periodic reports of the workers to the higher-level managers

Chapter-5: FUNCTIONAL AREAS OF MANAGEMENT

a) Production Management

The role of production management is very extensive. But the sole purpose isto ensure that the business produces quality products that meet the needs of customers on a regular basis. Below are the functions of production management.

Production Control – Here the manager oversees the production process. Heor she must find and ensure the correct production plan, that is, followed during the production process. If there are deviations, the Product Manager should take corrective measures.

Planning – This function is important in every organization. It should plan forwhen the actual production will begin and end.

Cost and Quality Control – Every company knows how essential quality controland cost is. Customers are not just looking for the best products. But they want to keep them very cheap. Quality control is an important task that a production manager must perform. It involves a number of checks made on the product to ensure the quality remains intact.

Maintenance of Machinery – Production management ensures that the equipment used is in good working condition. That is, the engine replaces thenon-functioning or damaged parts to make it work optimally.

Selection of Product and Design- First selects the right product for production. Then selects the right design for the product. You have to be careful when selecting the product and design because the life and success of the companydepend on it. The product should be selected only after a thorough review of all other alternative products. After selecting the right product, you need to choose the right design. The design should be tailored to the needs of the customers. It should provide maximum value for customers at lower prices.

Therefore, product management should use techniques such as valueengineering and value analysis.

Productivity - Productivity describes various measures of the efficiency ofproduction. Often, a productivity measure is expressed as the ratio of anaggregate output to a single input or an aggregate input used in a production process, i.e. output per unit of input, typically over a specific period of time.

b) Inventory Management

In simple terms, inventory management is a set of all those processes which youutilize to oversee and organize your goods or materials in your facility.

Need for Inventory Management-

1. **Tracking Inventory-**

A good system will help you keep track of your inventory and offer a centralized view of stock across sales channels – how much is in stock, and where. It will also allow allocating inventory to specific sales channels,which is important if you have warehouses and distribution centers at multiple locations, thus, enabling warehouse management.

2. **Control your costs-**

Keeping reports about your inventory helps you understand what stocksare doing well, versus which are just taking up shelf space. Lack of the right inventory at the right time can mean back orders, excess inventory,
etc. These drive up costs.

3. **Improve your delivery-**

Late delivery due to stock-outs is bound to give you a bad reputation. Fortracking, it is important for you to know when the vendor is shipping inventory and when it will arrive. This helps you manage customer
expectations by delivery as, when and where they want.

4. **Manage planning and forecasting-**

The software can help you improve demand forecasting by analyzing datatrends from well-performing stocks. This minimizes your holding and handling costs, improves revenues and frees up cash flows. Also, by planning and forecasting – you deliver on customer expectations better.

5. Reduce the time for managing inventory-

With a good inventory management solution, you can reduce the time taken to keep track of all the products you have on hand and on order.Additionally, you save the time taken up in inventory recounts if your records are in place.

Models/Techniques of Inventory Management

Inventory management is a highly customizable part of doing business. The optimalsystem is different for each company.
However, every business should strive to remove human error from inventory management as much as possible, which means taking of advantage inventory management software.Regardless of the system you use.

The following eight techniques to will help you improve your inventory management.

1. Set par levels

Make inventory management easier by setting “par levels” for each of your products. Par levels are the minimum amount of product that must be on handat all times. When your inventory stock dips below the predetermined levels, you know it’s time to order more.
Ideally, you’ll typically order the minimum quantity that will get you back abovepar. Par levels vary by product and are based on how quickly the item sells and how long it takes to get back in stock. Although setting par levels requiressome research and decision-making up front, having them set will systemize the process of ordering. Not only will it make it easier for you to make decisions quickly, it will allow your staff to make decisions on your behalf.

2. First-In First-Out (FIFO)

“First-in, first-out” is an important principle of inventory management. It meansyour oldest stock (first-in) gets sold first (first-out), not your newest stock. Thisis especially important for perishable products so you don’t end up with unsellable spoilage.
In order to manage a FIFO system, you’ll need an organized warehouse. Thistypically means adding new products from the back, or otherwise making sureold product stays at the front. If you’re working with a warehousing and fulfillment company they probably do this already, but it's a good idea to call them to confirm.

3. Manage relationships

Part of successful inventory management is being able to adapt quickly. Whether you need to return a slow selling item to make room for a new product, restock a fast seller very quickly, troubleshoot manufacturing issues,or temporarily expand your storage space, it’s important to have a strong

relationship with your suppliers. That way they'll be more willing to work withyou to solve problems.

In particular, having a good relationship with your product suppliers goes a long way. Minimum order quantities are often negotiable. Don't be afraid to ask for a lower minimum so you don't have to carry as much inventory.

4. Contingency planning

A lot of issues can pop up related to inventory management. These types of problems can cripple unprepared businesses. For example:

- Your sales spike unexpectedly and you oversell your stock
- You run into a cash flow shortfall and can't pay for product you desperatelyneed
- Your warehouse doesn't have enough room to accommodate your seasonalspike in sales
- A miscalculation in inventory means you have less product than you thought
- A slow moving product takes up all your storage space
- Your manufacturer runs out of your product and you have orders to fill
- Your manufacturer discontinues your product without warning

It's not a matter of if problems arise, but when. Figure out where your risks areand prepare a contingency plan. How will you react? What steps will you take to solve the problem? How will this impact other parts of your business?
Remember that solid relationships go a long way here.

5. Regular auditing

Regular reconciliation is vital. In most cases, you'll be relying on software andreports from your warehouse to know how much product you have stock.
However, it's important to make sure the facts match up. There are severalmethods for doing this.

Physical inventory

A physical inventory is the practice is counting your entire inventory at once.Many businesses do this at their year-end because it ties in with accountingand filing income tax. Although physical inventories are typically only done once a year.

Spot checking

If you do a full physical inventory at the end of the year and you often run intoproblems, or you have a lot of products, you may want to start spot checking throughout the year. This simply means choosing a product, counting it, and comparing the number to what it's supposed to be. This isn't done on a schedule and is supplemental to physical inventory.

Cycle counting

Instead of doing a full physical inventory, some businesses use cycle countingto audit their inventory. Rather than a full count at year-end, cycle counting spreads reconciliation throughout the year. Each day, week, or month a different product is checked on a rotating schedule.

6. Prioritize with ABC

Certain products need more attention than others. Using an ABC analysis letsyou prioritize your inventory management by separating out products that require a lot of attention from those that don't. Do this by going through your product list and adding each product to one of three categories:

1. **High-value products** with a *low frequency of sales*
2. **Moderate value products** with a *moderate frequency of sales*
3. **Low-value products** with a *high frequency of sales*

Items in category A require regular attention because their financial impact is significant but sales are unpredictable. Items in category C require less oversight because they have a smaller financial impact and they're constantlyturning over. Items in category B fall somewhere in-between.

7. Accurate forecasting

A huge part of good inventory management comes down to accurately predicting demand. Make no mistake, this is incredibly hard to do. There arecountless variables involved and you'll never know for sure exactly what's coming—but you can try to get close. Here are a few things to look at when projecting your future sales:

- Trends in the market
- Last year's sales during the same week
- This year's growth rate
- Guaranteed sales from contracts and subscriptions
- Seasonality and the overall economy
- Upcoming promotions
- Planned ad spend

8. Consider dropshipping

Dropshipping is almost an ideal scenario from an inventory management perspective. Instead of having to carry inventory and ship products yourself— whether internally or through third-party logistics—the manufacturer or wholesaler takes care of it for you. Basically, you completely remove inventorymanagement from your business.

Many wholesalers and manufacturers advertise dropshipping as a service, buteven if your supplier doesn't, it may still be an option. Don't be afraid to ask.
Although products often cost more this way than they do in bulk orders, you don't have to worry about expenses related to holding inventory, storage, andfulfillment.

C) FINANCIAL MANAGEMENT

FUNCTION OF FINANCIAL MANAGEMENT-

Financial Management means planning, organizing, directing and controlling the financial activities such as procurement and utilization of funds of the enterprise.

1. **Estimation of capital requirements:** A finance manager has to make estimationwith regards to capital requirements of the company. This will depend upon expected costs and profits and future programmes and policies of a concern.

Estimations have to be made in an adequate manner which increases earningcapacity of enterprise.

2. **Determination of capital composition:** Once the estimation has been made, the capital structure have to be decided. This involves short- term and long- termdebt equity analysis. This will depend upon the proportion of equity capital a company is possessing and additional funds which have to be raised from outside parties.
3. **Choice of sources of funds:** For additional funds to be procured, a companyhas many choices like-
    a. Issue of shares and debentures
    b. Loans to be taken from banks and financial institutions
    c. Public deposits to be drawn like in form of bonds.

    Choice of factor will depend on relative merits and demerits of each source andperiod of financing.

4. **Investment of funds:** The finance manager has to decide to allocate funds into profitable ventures so that there is safety on investment and regular returns is possible.
5. **Disposal of surplus:** The net profits decision have to be made by the finance manager. This can be done in two ways:
    a. Dividend declaration - It includes identifying the rate of dividends andother benefits like bonus.
    b. Retained profits - The volume has to be decided which will depend upon expansional, innovational, diversification plans of the company.
6. **Management of cash:** Finance manager has to make decisions with regards to cash management. Cash is required for many purposes like payment of wages and salaries, payment of electricity and water bills, payment to creditors, meetingcurrent liabilities, maintainance of enough stock, purchase of raw materials, etc.
7. **Financial controls:** The finance manager has not only to plan, procure and utilize the funds but he also has to exercise control over finances. This can be done through many techniques like ratio analysis, financial forecasting, cost andprofit control, etc.

Working Capital Cycle (WCC)

The working capital cycle (WCC) is the amount of time it takes to turn the net current assets and current liabilities into cash. The longer the cycle is, the longer a business istying up capital in its working capital without earning a return on it. Therefore, companies strive to reduce its working capital cycle by collecting receivables quicker orsometimes stretching accounts payable.

What Is Working Capital Management?

Working capital management is a business strategy designed to ensure that a company operates efficiently by monitoring and using its current assets and liabilities to the best effect. The primary purpose of working capital managementis to enable the company to maintain sufficient cash flow to meet its short-term operating costs and short-term debt obligations

KEY TAKEAWAYS

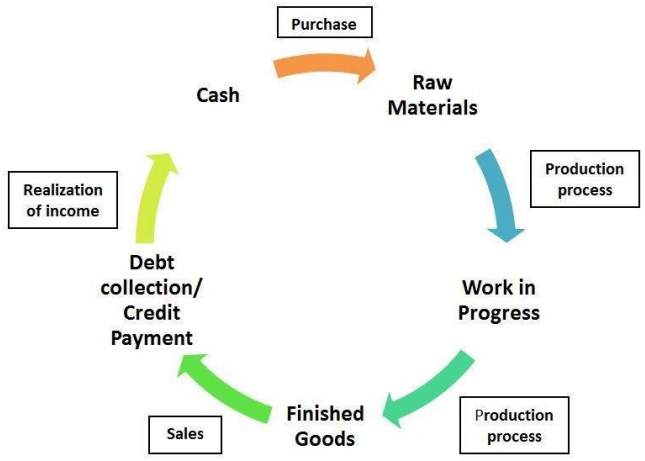
- Working Capital Management requires monitoring a company's assets andliabilities to maintain sufficient cash flow.
- The strategy involves tracking three ratios: the working capital ratio, thecollection ratio, and the inventory ratio.
- Keeping those three ratios at optimal levels ensures efficient workingcapital management

Understanding Working Capital

Working capital is the difference between a company's current assets and its current liabilities.

Current assets include cash, accounts receivable, and inventories.

Current liabilities include accounts payable, short-term borrowings, and accrued liabilities.



Operating Cycle of a Business

Meaning of Costing:

Costing is the classifying, recording and appropriate allocation of expenditure for the determination of the costs of products or services,and for presentation of suitably arranged data for the purposes of control, and guidance of management.

Main aims of costing are:

1. To determine the exact cost of each article.
2. To determine the cost incurred during each operation to keepcontrol over workers' wages.
3. To provide information to ascertain the selling price of the product.
4. To supply information for detection of wastage.
5. It helps in reducing the total cost of manufacture.
6. It suggests changes in design when the cost is higher.
7. To help in formulating the policies for charging the prices of theproduct.
8. To facilitate preparation of estimate for submitting the rates intenders or quotations.
9. To compare the actual cost with the estimated cost of thecomponent.

What is a Break-Even Analysis?

A break-even analysis is a financial tool which helps a company to determine the stage at which the company, or a new service or a product, will be profitable. In other words, it is a financial calculation for determining the number of products or services a company should sell or provide to cover its costs (particularly fixed costs). Break-even is a situation where an organisation is neither making money nor losing money, but all the costs have been covered.
Break-even analysis is useful in studying the relation between the variable cost, fixed cost and revenue. Generally, a company with low fixed costs will have a low break-even point of sale. For example, say Happy Ltd has fixed costs of Rs. 10,000 vs Sad Ltd has fixed costs of Rs. 1,00,000 selling similar products, Happy Ltd will be able to break even with the sale of lesser products as compared to Sad Ltd.

Components of Break Even Analysis

Fixed costs

Fixed costs are also called overhead costs. These overhead costs occur after the decision to start an economic activity is taken and these costs are directly related to the level of production,but not the quantity of production. Fixed costs include (but are not limited to) interest, taxes, salaries, rent, depreciation costs, labour costs, energy costs etc. These costs are fixed rrespective of the production. In case of no production also the costs must be incurred.

Variable costs

Variable costs are costs that will increase or decrease in direct relation to the production volume. These costs include cost of raw material, packaging cost, fuel and other costs that are directly related to the production.

Calculation of Break-Even Analysis

The basic formula for break-even analysis is derived by dividing the total fixed costs of production by the contribution per unit (price per unit less the variable costs).

CONTRIBUTION PER UNIT= (SELLING PRICE PER UNIT-VARIABLE COST PER UNIT)BREAK EVEN POINT(BEP)= $\frac{\text{FIXED COST}}{\text{CONTRIBUTION PER UNIT}}$ OR

$$\frac{\text{FIXED COST}}{\text{(AVERAGE PRICE PER UNIT- VARIABLE COST PER UNIT)}}$$

For an example:

Variable costs per unit: Rs. 400

Sale price per unit: Rs. 600

Desired profits: Rs. 4,00,000

Total fixed costs: Rs. 10,00,000

First we need to calculate the break-even point per unit, so we will divide the Rs.10,00,000 of fixed costs by the Rs. 200 which is the **contribution per unit** =(Rs. 600 – Rs. 400).

Break Even Point = Rs. 10,00,000/ Rs. 200 = 5000 units Next, this number of units can be shown in rupees by multiplying the 5,000 units with the selling price of Rs. 600 per unit.

We get Break Even Sales at 5000 units x Rs. 600 = Rs. 30,00,000. (Break-even point in rupees)

BRIEF IDEA ABOUT ACCOUNTING TERMINOLOGIES

Bookkeeping is the recording, on a day-to-day basis, of the financial transactions and information pertaining to a business. It ensures that records of the individual financial transactions are correct, up-to-date and comprehensive. Accuracy is therefore vital to the process.

A journal entry is a record of the business transactions in the accounting books of a business. A properly documented journal entry consists of the correct date, amounts tobe debited and credited, description of the transaction and a unique reference number.

A journal entry is the first step in the accounting cycle. A journal details all financial transactions of a business and makes a note of the accounts that are affected. Since most businesses use a double-entry accounting system, every financial transaction impact at least two accounts, while one account is debited, another account is credited.This means that a journal entry has equal debit and credit amounts

The basic format of a journal entry is as follows:

	Debit	Credit
Account name and number	Rs.1000	
Account name and number		Rs.1000

The total amount you enter in the debit column equals the total amount entered in thecredit column.

Petty Cash Book is maintained to record small expenses such as postage, stationery, telegram. A separate column is allotted for each type of expenditure. The difference between the total of the debit items and that of the 'total column' on the credit representsthe balance of the petty cash in hand.

Format of Simple Petty Cash Book

Specimen of Simple Petty Cash Book

Cash Received	C.B. Folio	Date	Particulars	V.N.	Total Payment ($)

Example of Simple Petty Cash Book

Record the following transactions in a Simple Petty Cash Book for the Month or January2019.

2019		$
Jan. 01	Cash received from head cashier for petty expenses	1,000
Jan. 05	Paid Telephone Expenses	100
Jan. 07	Paid Postage Expenses	15
Jan. 10	Cartage paid	50
Jan. 11	Traveling Expenses paid	100
Jan. 12	Paid Office Expenses	300
Jan. 15	Postage Expenses paid	20
Jan. 20	Paid Telephone Bill	100
Jan. 28	Miscellaneous Expenses	75
Jan. 31	Cartage paid	20

Solution

Cash Received	C.B. Folio	Date	Particulars	V.N.	Total Payment ($)
		2019			
1,000		Jan. 01	Bank account		
		Jan. 05	Telephone Account		100
		Jan. 07	Postage Account		15
		Jan. 10	Cartage account		50
		Jan. 11	Traveling		100
		Jan. 12	Office Exp. Account		300
		Jan. 15	Postage Account		20
		Jan. 20	Telephone Account		100
		Jan. 28	Miscellaneous Exp. Account		75
		Jan. 31	Cartage Account		20
			Balance c/d		220
1,000					1,000
220		Feb. 01	Balance b/d		
780		Feb. 01	Bank Account		

Profit And Loss Account -

The account that shows annual net profit or net loss of a business is called **Profit and Loss Account**. It is prepared to determine the net profit or net loss of a trader. P&L account is a component of final accounts.

Example

From the Following trial balance of John & Co. prepare the Trading and Profit and LossAccount for the year ended 31st December 2019.

	$		$
Opening Stock	20,000	Sales	56,000
Sales Returns	1,000	Creditors	20,000
Purchases	31,000	Capital	1,00,000
Carriage Inwards	20,000	Purchases Return	1,000
Salaries	4,000	Loan	21,000
Investment	20,000	Interest on Investment	2,000
Commission	500		
Wages	2,000		
Customs Duty	4,000		
Building	80,000		
Insurance	1,200		
Discount	300		
Furniture	4,000		
Sundry Debtors	20,000		
Cash	8,000		
	2,00,000		2,00,000

The closing stock was valued at $32,000.

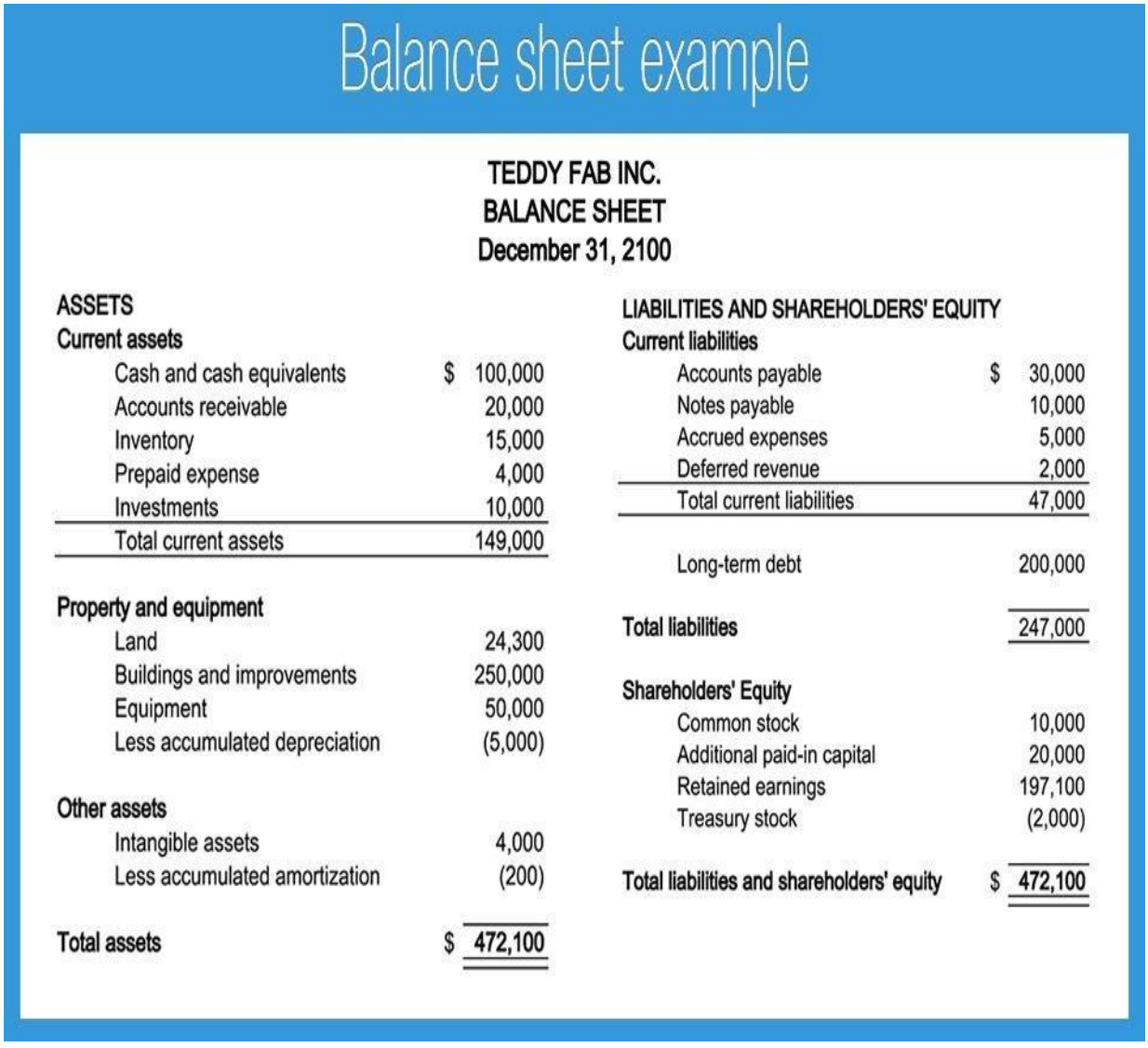
Solution

John and Co.
Trading and Profit and Loss Account
For the year ended 31st Dec. 2019

		$			$
Opening Stock		20,000	Sales	56,000	
Purchases	31,000		Less: Sales Return	1,000	55,000
Less: Purchases Return	1,000	30,000	Closing Stock		32,000
Carriage Inwards		4,000			
Wages		2,000			
Customs Duty		4,000			
Gross Profit (Transfer to P&L A/c)		27,000			
		87,000			87,000
Salaries		4,000	Gross Profit b/d		27,000
Insurance		1,200	Interest on Investment		2,000
Commission		500			
Discount		300			
Net Profit (Transferred to Capital A/c)		23,000			
		29,000			29,000

Balance Sheet

A balance sheet gives a statement of a business's assets, liabilities and shareholders' equity at a specific point in time. They offer a snapshot of what your business owns and what it owes as well as the amount invested by its owners, reported on a single day. A balance sheet tells you a business's worth at a given time, so you can better understandits financial position.



d) MARKETING MANAGEMENT-

Market

The market actually refers to a set up where potential buyers and sellers can meet toexchange goods or services. It is basically a medium that facilitates these transactionsin an economy. It allows for the exchange of goods, services, information under
the protection of the law and generally in exchange for consideration.

In marketing, businesses will design strategies that satisfy customers' needs, increase sales, maximize profit and beat their competition. That is a nice truth and statement, butmany might ask, "what philosophy is the best for a company in setting marketing strategies?"

Well, in this article we will discuss 5 different concepts of marketing that each have aspecific function in a holistic marketing strategy. The concepts are:

1. The Production Concept
2. The Product Concept
3. The Selling Concept
4. The Marketing Concept
5. The Societal Marketing Concept

The Production Concept

The production concept is the most operations-oriented than any of the other marketing concepts on this list. It speaks to the human truth that we prefer products that are easily available and inexpensive.

The basic idea of this concept is that businesses will want to produce widely cheap products in maximum volumes to maximize profitability and scale. Businesses assumethat consumers are primarily interested in product availability and low prices while customer's needs might not be fully addressed.

Such an approach is probably most effective when a business operates in very highgrowth markets or where the potential for economies of scale is significant.

The Product Concept

The product concept is not so much about the production and business output butfocuses more on the customer.
Potential customers favor products that offer quality, performance, or innovativefeatures.

This marketing concept believes in potential customers and how their brand loyalty is closely tied to options of products, the quality of those products and the benefits they get from the product and the business they invest in.

This is seen most commonly with our obsession with Apple products and looking forward to their new gadgets and features upon launch!

The Selling Concept

The selling concept is the bread and butter of marketing efforts as it believes that people will not buy enough of a business's product so businesses need to persuadethem to do so.
This concept puts a lot of power into the hands of a business who has a whole plan to effectively stimulate more buying with its potential customers. A lot of the time we also see this action used when a business has to deal with overcapacity and needing to sellwhat they make rather than what the market needs or wants.

Businesses that choose to use this marketing concept must be good at finding potentialcustomers and emotionally sell them on the benefits of their "not needed product."

The Marketing Concept

The marketing concept is the concept of competition. It is a marketing concept that believes that the success of a business depends on the marketing efforts that deliver abetter value proposition than its competitors.

This concept focuses on the needs and wants of target marketing as well as deliveringvalue better than its competition. Through marketing, it's your goal to be the preferred option compared to your competitors.

The Societal Marketing Concept

The societal marketing concept is the most progressive and modern-day applicable marketing mindset to have. It is a marketing concept that believes in giving back to society by producing better products that help the world be a better place.

MARKETING TECHNIQUES

Social Networks and Viral Marketing

Social media marketing focuses on providing users with content they find valuable andwant to share across their social networks, resulting in increased visibility and traffic.
Social media shares of content, videos, and images also influence Search Engine Optimization (SEO) efforts in that they often increase relevancy in search results withinsocial media networks like Facebook, Twitter, YouTube, and Instagram and search engines like Google and Yahoo.

Paid Media Advertising

Paid media is a tool that companies use to grow their website traffic through paid advertising. One of the most popular methods is pay-per-click (PPC) links. Essentially, acompany buys or "sponsors" a link that appears as an add in search engine results when keywords related to their product or service are searched (this process is commonly known as search engine marketing, or SEM). Every time the add is clicked, the company pays the search engine (or other third party host site) a small fee for the visitor — a literal "pay per click."

Internet Marketing

Internet marketing, or online marketing, combines web and email to advertise and drivee-commerce sales. Social media platforms may also be included to leverage brand presence and promote products and services. In total, these efforts are typically used inconjunction with traditional advertising formats like radio, television, and print.

Email Marketing

Email marketing is a highly effective way to nurture and convert leads. However, it's nota game of chance, as to whether your message winds up in spam filters. Instead, email marketing is an automated process that targets specific prospects and customers with the goal of influencing their purchasing decisions. Email marketing success is measuredby open rates and click-through rates, so strategy comes into play, particularly when it's
used as a component of a larger internet marketing initiative.

Direct Selling

Direct selling accomplishes exactly what the name suggests — marketing and sellingproducts directly to consumers. In this model, sales agents build face-to-face relationships with individuals by demonstrating and selling products away from retail settings, usually in an individual's home.

Point-of-Purchase Marketing

Point-of-Purchase marketing (or POP marketing) sells to a captive audience — those shoppers already in-store and ready to purchase. Product displays, on-package coupons, shelf talkers that tout product benefits, and other attention-getting "sizzle" often sway buying decisions at the shelf by making an offer simply too good — and toovisible — to pass up.

CONCEPT OF 4P s

Marketing is simplistically defined as 'putting the right product in the right place, at the right price, at the right time.' Though this sounds like an easy enough proposition, a lotof hard work and research needs to go into setting this simple definition up.

The **marketing mix** is a crucial tool to help understand what the product or service canoffer and how to plan for a successful product offering. The marketing mix is most commonly executed through the 4 P's of marketing: Price**,** Product**,** Promotion**,** and Place**.**

Product

The product is either a tangible good or an intangible service that is seem to meet a specific customer need or demand. All products follow a logical product life cycle and itis vital for marketers to understand and plan for the various stages and their unique challenges. It is key to understand those problems that the product is attempting to solve. The benefits offered by the product and all its features need to be understood and the unique selling proposition of the product need to be studied. In addition, the potential buyers of the product need to be identified and understood.

Price

Price covers the actual amount the end user is expected to pay for a product. How a product is priced will directly affect how it sells. This is linked to what the perceived value of the product is to the customer rather than an objective costing of the product onoffer. If a product is priced higher or lower than its perceived value, then it will not sell.

This is why it is imperative to understand how a customer sees what you are selling. If there is a positive customer value, than a product may be successfully priced higher than its objective monetary value. Conversely, if a product has little value in the eyes ofthe consumer, then it may need to be underpriced to sell. Price may also be affected bydistribution plans, value chain costs and markups and how competitors price a rival product.

Promotion

The marketing communication strategies and techniques all fall under the promotion heading. These may include advertising, sales promotions, special offers and public relations. Whatever the channel used, it is necessary for it to be suitable for the product,the price and the end user it is being marketed to. It is important to differentiate betweenmarketing and promotion. Promotion is just the communication aspect of the entire marketing function.

Place

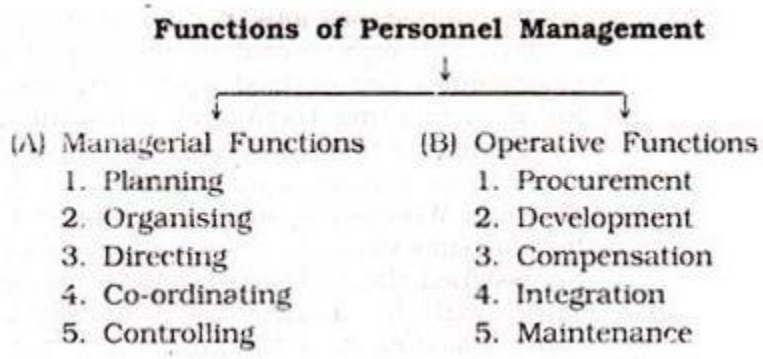
Place or placement has to do with how the product will be provided to the customer. Distribution is a key element of placement. The placement strategy will help assesswhat channel is the most suited to a product. How a product is accessed by the enduser also needs to compliment the rest of the product strategy

HUMAN RESOURCE MANAGEMENT

Functions of personnel management

(A) Managerial Functions.

(B) Operative Functions.



A. Managerial Functions:

Management aims at getting things done by others. Managerial functions deal with planning, organizing, directing, coordinating and controlling theactivities of employees in an enterprise.

1. Planning:

Planning involves thinking in advance. It is the determination of strategies,programmes, policies, procedures to accomplish organizational objectives. Planning is a difficult task which involves ability to think, to predict, to analyze, and to come to decisions.

2. Organizing:

Organization is a process of allocating the task among its members for achieving organizational objectives. This is done by designing the structure

or relationship among jobs, personnel and physical factors. For achieving enterprise goals a number of plans, policies and programmes are decided upon. Organization is a channel for implementing them and achieving goodresults. The assignment of tasks and fixing of responsibilities will be the function of personnel management.

3. Directing:

It is the basic function of managerial personnel. Directing means telling people to do a particular work. It does not mean only issuing orders to employees but also ensures that they perform as per the directions. The employees are also given instructions for carrying out their task. The ordersand instructions should be clear and precise so that these are obeyed properly.

Motivating employees to accomplish their task is also a part of directing function. The circumstances, psychology, economic and social factors influencing employees should be taken into consideration while selectingthe techniques of motivation. Though all these decisions are taken by thetop level management but personnel department is consulted at. every stage. The effectiveness of various plans and policies for motivating employees is also undertaken by personnel department.

4. Coordinating:

Organizational objectives will be achieved only if group activities in the enterprise are coordinated effectively. There may be a problem of each group or department trying to pursue its own goals without bothering about overall objectives. A coordinated approach will help in achievingcommon goals.

Coordination of personnel is required at all levels of management. Personnel department coordinates the task of developing, interpreting andreviewing personnel policies and programmes related to employees. The final decisions may be left to line managers but personnel department makes suggestions for improvements.

5. Controlling:

Controlling is the act of checking, regulating and verifying whether everything occurs as per the standards set and plans adopted. The performance of persons is regularly reviewed to find out whether it is goingaccording to the standards or not. In case, performance is low then steps are taken to improve it in future. Controlling function involves reviewing performance and taking corrective measures.

B. Operative Functions:

These functions are related to the procuring, developing, compensating, integrating and maintaining a work-force for attaining organizational goals.These functions are also known as service functions.

1. Procurement:

This function relates to the procuring of sufficient and appropriate numberof persons for carrying out business work. The needs of the organization should be assessed to find out the requirements of persons. Besides number, the procurement of suitable persons is also essential. For this purpose, the requirements of various jobs should be studied for fixing the educational and technical experience of persons expected to man those jobs. Only the right type of persons will be able to give satisfactory results.

2. Development:

The development function is concerned with the development of employeesby increasing their skill and proficiency in work. The persons are given proper training through various methods so that their performance is betterin undertaking the jobs. Proper job description will enable the employees toknow their weak points in performing various jobs. Training programmes are made suitable to cover up deficiencies in workers' performance.

3. Compensation:

It is concerned with securing adequate and equitable remuneration to persons working in the organization. Job analysis will enable in fixing theremuneration for various jobs. The needs of the jobs and qualifications of persons who will take up those jobs should be taken into consideration while fixing remuneration. If the employees are paid less than they shouldhave got, they may leave the job at an earliest opportunity. So compensation should be fixed in such a way that it is able to attract and retain suitable persons in the organization.

4. Integration:

Integration is concerned with the attempt to effect reconciliation of individual, organization and social interest. It involves infusing among employees a sense of belonging to the enterprise. The employees should identify their personal interest with that of the organization. They should have a feeling that everything good of the enterprise will also be in their interest. This will bring about harmony of interests both of employees and the organization. There should be proper communication channel at all levels. The grievances of employees should be redressed at the earliest. Thiswill help in creating good industrial relations and will integrate them.

5. Maintenance:

This function deals with sustaining and improving conditions that have been established. Better conditions of work should be maintained at all times. The employees will feel happy to work under such conditions. These conditions include establishment of health, sanitation and safety standards.If working conditions deteriorate, then employees will be prompted to leavethe enterprise. Personnel department is put in charge of providing and maintaining healthy and conducive working conditions in the enterprise.

What is Manpower Planning?

Manpower planning is the process of estimating the optimum number of people required for completing a project, task or a goal within time. Manpower planning includes parameters like number of personnel, different types of skills, time periodetc. It is a never ending continuous process to make sure that the business has the optimized resources available when required taking into consideration the upcoming future projects and also the replacement of the outgoing employees. It isalso called as Human Resource Planning.

Recruitment-

Recruitment is a process of finding and attracting the potential resources for filling up the vacant positions in an organization. It sources the candidates with the abilities and attitude, which are required for achieving the objectives of an organization.

Recruitment process is a process of identifying the jobs vacancy, analyzing the job requirements, reviewing applications, screening, shortlisting and selecting the right candidate.

Sources of manpower

Recruitment is of 2 types

Internal Recruitment – is a recruitment which takes place within the concern or organization. Internal sources of recruitment are readily available to an organization. Internal sources are primarily three – Transfers, promotions and Re- employment of ex-employees. Re-employment of ex-employees is one of the

internal sources of recruitment in which employees can be invited and appointed to fill vacancies in the concern.
Internal recruitment may lead to increase in employee's productivity as their motivation level increases. It also saves time, money and efforts. But a drawback of internal recruitment is that it refrains the organization from new blood.

External Recruitment – External sources of recruitment have to be solicited from outside the organization. External sources are external to a concern. But it involves lot of time and money .The external sources of recruitment include – Employment at factory gate, advertisements, employment exchanges, employment agencies, educational institutes, labour contractors, recommendations etc.

Selection Process

Every organization creates a selection process because they have their own requirements. Although, the main steps remain the same. So, let's understand in briefhow the selection process works.

- **Receiving Applications**

  Potential employees apply for a job by sending applications to the organization.The application gives the interviewers information about the candidates like their bio-data, work experience, hobbies and interests.

- **Screening Applications**

  Once the applications are received, they are screened by a special screening committee who choose candidates from the applications to call for an interview.Applicants may be selected on special criteria like qualifications, work experience etc.

- **Employment Tests**

  Before an organization decides a suitable job for any individual, they have to gauge their talents and skills. This is done through various employment tests likeintelligence tests, aptitude tests, proficiency tests, personality tests etc.

- **Employment Interview**

  The next step in the selection process is the employee interview. Employment interviews are done to identify a candidate's skill set and ability to work in an organization in detail. Purpose of an employment interview is to find out the suitability of the candidate and to give him an idea about the work profile and what is expected of the potential employee. An employment interview is criticalfor the selection of the right people for the right jobs.

- **Medical Examination**

  The medical exam is also a very important step in the selection process. Medical exams help the employers know if any of the potential candidates are physically and mentally fit to perform their duties in their jobs.

- **Final Selection and Appointment Letter**

  This is the final step in the selection process. After the candidate has successfully passed all written tests, interviews and medical examination, the employee is sent or emailed an appointment letter, confirming his selection to the job.
  The appointment letter contains all the details of the job like working hours,salary, leave allowance etc. Often, employees are hired on a conditional basiswhere they are hired permanently after the employees are satisfied with theirperformance.

Methods of Training:

1. On-the-job Training (OJT) Methods:

This is the most common method of training in which a trainee is placed ona specific job and taught the skills and knowledge necessary to perform it.

The advantages of OJT are as follows:

1. On the job method is a flexible method.
2. It is a less expensive method.
3. The trainee is highly motivated and encouraged to learn.
4. Much arrangement for the training is not required.

On-the-job training methods are as follows:

1. Job rotation:

This training method involves movement of trainee from one job to anothergain knowledge and experience from different job assignments. This method helps the trainee understand the problems of other employees.

2. Coaching:

Under this method, the trainee is placed under a particular supervisor whofunctions as a coach in training and provides feedback to the trainee.

Sometimes the trainee may not get an opportunity to express his ideas.

3. Job instructions:

Also known as step-by-step training in which the trainer explains the way ofdoing the jobs to the trainee and in case of mistakes, corrects the trainee.

4. Committee assignments:

A group of trainees are asked to solve a given organizational problem bydiscussing the problem. This helps to improve team work.

2. Off-the-job Methods:

On the job training methods have their own limitations, and in order to have the overall development of employee's off-the-job training can also beimparted. The methods of training which are adopted for the development of employees away from the field of the job are known as off-the-job methods.

The following are some of the off-the-job techniques:

1. Case study method:

Usually case study deals with any problem confronted by a business whichcan be solved by an employee. The trainee is given an opportunity to

analyse the case and come out with all possible solutions. This method canenhance analytic and critical thinking of an employee.

2. Incident method:

Incidents are prepared on the basis of actual situations which happened indifferent organizations and each employee in the training group is asked tomake decisions as if it is a real-life situation. Later on, the entire group discusses the incident and takes decisions related to the incident on the basis of individual and group decisions.

3. Role play:

In this case also a problem situation is simulated asking the employee to assume the role of a particular person in the situation. The participant interacts with other participants assuming different roles. The whole playwill be recorded and trainee gets an opportunity to examine their own performance.

4. Business games:

According to this method the trainees are divided into groups and each group has to discuss about various activities and functions of an imaginaryorganization. They will discuss and decide about various subjects like production, promotion, pricing etc. This gives result in co-operative decision making process.

6. Lectures:

This will be a suitable method when the numbers of trainees are quite large. Lectures can be very much helpful in explaining the concepts and principles very clearly, and face to face interaction is very much possible.

Payment of Wages

The Payment of Wages Act, 1936 (Act) is essentially meant to benefit industrial employees who do not have very high salaries. It applies to all employees working ina factory or working through a sub-contractor or directly with the railway administration or those employed in the industrial sector as the Act specifies.

In 2017, the Government of India increased the ceiling limit to Rs. 24,000 per month.This means that employees with wages u to the ceiling limit are covered under the Act.

Chapter-6: Leadership & Motivation

Leadership in business is the capacity of a company's **management** to set and achieve challenging goals, take fast and decisive action when needed, outperform the competition, and inspire others to perform at the highest level they can.

Need/Importance of Leadership

Leadership plays an important role in the development of any organization. No organization can work efficiently without effective leadership. Leadership is an important function of the management which helps to enhance productivity and toachieve organizational goals. In fact leadership is an essential part and a crucial component of effective management which helps to maximize efficiency and achieve organizational goals.

The importance of leadership in organizational development cannot bedenied.

- **Influencing the behaviour of people:** A leader impresses his subordinates with his leadership ability. He brings them under his control in such a way thatthey put in their best efforts to achieve the goals of the organization. Good leaders usually get good results through their followers.
- **Helps employees in fulfilling their needs:** A leader establishes personal relationship with his subordinates and tries to meet their requirements. Peoplefollow a leader because he provides them security and the opportunities to earn wealth, gives them the right to work and tries to understand their feelings.Employees willingly accept him because he takes care of their needs.
- **Introducing required changes:** The business environment is changing at a quick pace, so in order to face the changing environment, many alterations have to be introduced in the organization. Since the people already happen tobe under the influence of the leader, he can easily makes them agree to implement these changes.
- **Solving conflicts effectively:** A leader can effectively solve every type of conflict be it employee vs. employee or employees vs. employer. A leader allows his followers the liberty to express their views. That is the reason that he easily understands the reality of the conflict, in this way, by understandingthe nature of the conflict he tries to provide timely solution and minimizes thepossibility of adverse results.
- **Training and Development of Subordinates:** A leader helps in the trainingand development of the employees. He makes them aware of the modern techniques of work. In addition, he makes it possible for them to be good leaders in future.
- **Setting a clear vision:** This means Influencing employees to understand andaccept the future state of the organization. A good leader will influence his

followers to perform their duties by explaining the vision and the importance oftheir role in the outcome.

- **Motivating and guiding employees:** This involves finding out the needs of the employees and fulfilling them. It is important to define the employees role in the work process and provide them with the tools needed. A good leader willexplain the task and be available to assist them if they run into a problem.
- **Building morale:** This involves pulling everyone together towards a commentgoal. A good leader will let the employees know how much their work is appreciated. A simple gesture like providing praise for a task well done, or throwing a party to recognize small achievements, will regenerate their spirits.

Qualities of a Leader

Integrity

The importance of integrity should be obvious. Integrity is essential for the individual and the organization. It's especially important for top-level executives who are charting the organization's course and making countlessother significant decisions.

Ability to Delegate

Delegating is one of the core responsibilities of a leader, but it can be tricky todelegate effectively. The goal isn't just to free yourself up — it's also to enableyour direct reports, facilitate teamwork, provide autonomy, lead to better decision-making, and help your direct reports grow. In order to delegate well, you also need to build trust with your team.

Communication

Effective leadership and effective communication are intertwined. You need tobe able to communicate in a variety of ways, from transmitting information to coaching your people. And you must be able to listen and communicate with awide range of people across roles, social identities, and more. The quality andeffectiveness of communication across your organization directly affects the success of your business strategy too.

Gratitude

Gratitude can lead to higher self-esteem, reduced depression and anxiety,and even better sleep. Few people regularly say "thank you" at work, even

though most people say they'd be willing to work harder for an appreciative boss. Learn how to give thanks and practice more gratitude in the workplace.

Learning Agility

Learning agility is the ability to know what to do when you don't know what todo. If you're a "quick study" or are able to excel in unfamiliar circumstances, you might already be learning agile. But anybody can foster learning agility through practice, experience, and effort.

Influence

For some people, "influence" feels like a dirty word. But being able to convincepeople through logical, emotional, or cooperative appeals is a component of being an inspiring, effective leader. Influence is quite different from manipulation, and it needs to be done authentically and transparently. It requires emotional intelligence and trust-building.

Courage

It can be hard to speak up at work, whether you want to voice a new idea, provide feedback to a direct report. That's part of the reason courage is a keyskill for good leaders. Rather than avoiding problems or allowing conflicts to fester, courage enables leaders to step up and move things in the right direction.

Respect

Treating people with respect on a daily basis is one of the most important things a leader can do. It will ease tensions and conflict, create trust, and improve effectiveness. Respect is more than the absence of disrespect, and itcan be shown in many different ways.

Functions of a Leader:

1. Setting Goals:

A leader is expected to perform creative function of laying out goals andpolicies to

persuade the subordinates to work with zeal and confidence.

2. Organizing:

The second function of a leader is to create and shape the organization on scientific lines by assigning roles appropriate to individual abilities with the

view to make its various components to operate sensitively towards theachievement of enterprise goals.

3. *Initiating Action:*

The next function of a leader is to take the initiative in all matters of interest to the group. He should not depend upon others for decision andjudgment. He should float new ideas and his decisions should reflect original thinking.

4. *Co-Ordination:*

A leader has to reconcile the interests of the individual members of thegroup with that of the organization. He has to ensure voluntary co- operation from the group in realizing the common objectives.

5. *Direction and Motivation:*

It is the primary function of a leader to guide and direct his group and motivate people to do their best in the achievement of desired goals, heshould build up confidence and zeal in the work group.

6. *Link between Management and Workers:*

A leader works as a necessary link between the management and the workers. He interprets the policies and programmes of the management tohis subordinates and represents the subordinates' interests before the management. He can prove effective only when he can act as the true guardian of the interests of his subordinates.

Manager Vs Leader

Basis	Manager	Leader
Origin	A person becomes a manager by virtueof his position.	A person becomes a leader on basis of hispersonal qualities.
Formal Rights	Manager has got formal rights in anorganization because of his status.	Rights are not available to a leader.
Followers	The subordinates are the followers ofmanagers.	The group of employees whom the leadersleads are his followers.
Functions	A manager performs all five functions ofmanagement.	Leader influences people to work willinglyfor group objectives.
Necessity	A manager is very essential to aconcern.	A leader is required to create cordial relation between person working in and fororganization.
Stability	It is more stable.	Leadership is temporary.
Mutual Relationship	All managers are leaders.	All leaders are not managers.
Accountability	Manager is accountable for self andsubordinates behaviour and performance.	Leaders have no well definedaccountability.
Concern	A manager's concern is organizationalgoals.	A leader's concern is group goals and member's satisfaction.
Followers	People follow manager by virtue of jobdescription.	People follow them on voluntary basis.
Role continuation	A manager can continue in office till heperforms his duties satisfactorily in congruence with organizational goals.	A leader can maintain his position onlythrough day to day wishes of followers.
Sanctions	Manager has command over allocationand distribution of sanctions.	A leader has command over different sanctions and related task records. Thesesanctions are essentially of informal nature.

Leadership Styles

Autocratic Leadership

Authoritarian leaders, also known as autocratic leaders, provide clear expectations for what needs to be done, when it should be done, and how it should be done. This style of leadership is strongly focused on both command by the leader and control of the followers. There is also a clear division between the leader and the members. Authoritarian leaders make decisions independently, with little or no input from the rest of the group.

Authoritarian leadership is best applied to situations where there is little time for group decision-making or where the leader is the most knowledgeable member of the group. The autocratic approach can be a good one when the situation calls for rapid decisions and decisive actions.

Democratic Leadership

Democratic leadership is typically the most effective leadership style. Democratic leaders offer guidance to group members, but they also participate in the group and allow input from other group members. Democratic leaders tend to make followers feel like they are an important part of the team, which helps foster commitment to the goals of the group.

Participative Leadership

Participative leaders encourage group members to participate, but retain the final say in the decision-making process. Group members feel engaged in the process and are more motivated and creative.

Need/Importance of motivation

1. **Greater efficiency:**

Motivation enhances the efficiency of the employees and of organization. When employees are motivated, they can perform withcommitment and dedication.

2. **Reduction in absenteeism and labour turnover:** Motivated employees may not remain absent or leave the organization. They develop a sense of belonging towards theorganization and thus improve their overall performance.

3. Team spirit:

Motivation improves team spirit of employees, and this improves thework environment and the overall performance of the employee and the organization.

4. Reduction in wastages and breakages:

Motivated employees take great care in handling machines and other resources. This will reduce wastages and breakages, thus resulting inhigher benefits to the organization.

5. Cordial relations:

Motivation enables cordial and healthy relationship in the organization. Motivation helps reduce labour grievances and disputes.It ensures sound relations between the management and the labour. Itimproves the overall efficiency of the organization.

6. Promotion of innovation:

Motivated employees use their initiative to find out innovative ways in the performance of their operations. Such employees are more creative and help the organization to gain the competitive advantage.

7. Optimum use of resources:

Motivation leads to greater employee involvement and lesser wast-ages. This leads to optimum utilization of resources.

8. Corporate image:

Motivated employees are more loyal to the organization. They work with a sense of commitment and dedication. This improves the overallperformance of the employee, which enables better results for the company. This results in better relations with all the stakeholders.

Characteristics/Features of Motivation:

1. Interaction between the individual and the situation: Motivation is not a personal trait but an interaction between theindividual and the situation.

2. Goal-directed behaviour:

Motivation leads to an action that is goal oriented. Motivation leads toaccomplishment of organizational goals and satisfaction of personal needs.

3. Systems oriented:

Motivation is influenced by two forces:

a. **Internal forces:**

These forces are internal to the individual, i.e., their needs, wants andnature.

b. **External forces:**

These forces are external to the individual, which may be organizational related such as management philosophy, organizationalstructure, and superior-subordinate relationship, culture, customs, religion and values.

4. Positive or negative:

Positive motivation or the carrot approach offers positive incentivessuch as appreciation, promotion, status and incentives. Negative motivation or stick approach emphasizes penalties, fines and punishments.

5. Dynamic and complex in nature:

Human behaviour is highly complex, and it becomes extremely difficult to understand people at work. Motivation is a dynamic andcomplex process.

Factors Affecting Motivation

1. Reward and recognition

There are many ways to reward employees. Rewards can vary in both cost and impact and it is best to offer a portfolio of rewards, examples include once in a lifetime trips and experiences, vouchers or somethingas simple as an extra day off. The aim of rewarding and recognisingemployees is to encourage and motivate them to exceed within their roles and promote positive behaviours.

2. Development

Development is very important for motivating employees; studies have shown that 20% of employees prefer career development opportunities and training to monetary reward. Development makes an employee self-dependent and allows them to contribute more effectively in the workplace. It also helps employees to enhance their input to your business.

3. Leadership

Only 2 in 10 employees strongly agree that their performance is managed in a way that motivates them to do outstanding work – this clearly displays how much a good leader motivates employees. A good leader has the knowledge of what truly inspires loyal and motivated humans to perform at a high level. It is important that a good leader has reasonable expectations, gives credit where credit is due and appreciates their staff.

4. Work life balance

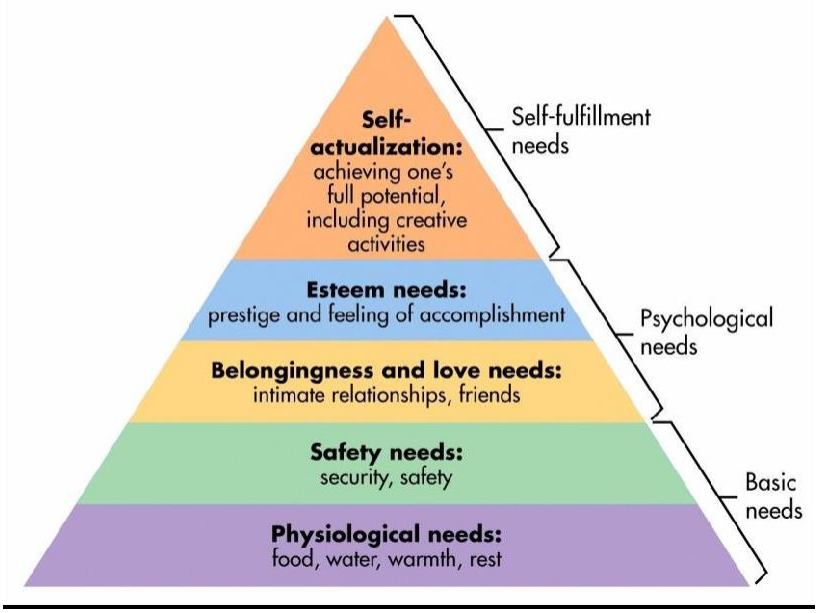
Providing a good work life balance nurtures employees. Motivated employees are less likely to take sick days, leave the organization and will be more prepared to work longer hours. Equally these same employees are more likely to 'burn out' and will feel less motivated if there is not a healthy work life balance. As an organization, it is importantto ensure that employees are working reasonable hours and are combining work with activities that promote health and wellbeing.

5. Work environment

Motivated employees thrive in a positive work environment. This refers tothe physical and non-physical environment – the physical environment is the office space and surrounding areas. Employees work better in openspaces that stimulate the senses.

Regarding the intangible environment, motivated employees value engagement and communication. Engagement is achieved through manydifferent factors such as, giving regular feedback, development and daily challenges.

Theories of Motivation(Maslow)



1. **Physiological needs** - these are biological requirements for human survival, e.g. air, food, drink, shelter, clothing, warmth, sex, sleep.

If these needs are not satisfied the human body cannot function optimally. Maslow considered physiological needs the most important as all the other needs become secondary until these needs are met.

2. **Safety needs** - Once an individual's physiological needs are satisfied, the needs for security and safety become salient. People want to experience order, predictability and control in their lives. These needs can be fulfilled by the family and society (e.g. police, schools, business and medical care).

For example, emotional security, financial security (e.g. employment, social welfare), law and order, freedom from fear, social stability, property, health and wellbeing (e.g. safety against accidents and injury).

3. **Love and belongingness needs** - after physiological and safety needs have been fulfilled, the third level of human needs is social and involves feelings of belongingness.The need for interpersonal relationships motivates behavior

Examples include friendship, intimacy, trust, and acceptance, receiving and givingaffection and love. Affiliating, being part of a group (family, friends, work).

4. **Esteem needs** are the fourth level in Maslow's hierarchy - which Maslow classifiedinto two categories: (i) esteem for oneself (dignity, achievement, mastery, independence) and (ii) the desire for reputation or respect from others (e.g., status, prestige).

Maslow indicated that the need for respect or reputation is most important for children and adolescents and precedes real self-esteem or dignity.

5. **Self-actualization needs** are the highest level in Maslow's hierarchy, and refer to the realization of a person's potential, self-fulfillment, seeking personal growth and peak experiences. Maslow (1943) describes this level as the desire to accomplish everything that one can, to become the most that one can be

Methods of Improving Motivation

1. Recognize great work

One of the **most important factors** that contribute to employee motivation ishow often their hard work is recognized. **70%** of employees say that motivation and morale would improve massively with increased recognition from managers. After all, if an employee puts a lot of effort into a project to produce exceptional results but their hard work isn't recognized, why would they continue to be a high-performing employee?

2. Celebrate results

Part of what makes setting small and measurable goals so important is that itprovides plenty of opportunities to celebrate your team's hard work.

This doesn't mean you need to give a standing ovation to every employee who made it to work on time, but it is crucial to let everyone know exactlyhow much each of their contributions move the organization forward.

3. Stay positive

Negative emotions have their place, and some really good process or cultural changes can stem from having tough conversations. However, it'simportant to find ways to inject positive experiences into your team's interactions to create a **net positive workplace**.

4. Stay fueled

It's hard to stay focused and driven when you're hungry. That's why it's soimportant for everyone to stay fed, hydrated.
Unfortunately, it's common for employees to become so busy engrossed in their work that they can barely squeeze in time for lunch. That's not great fortheir health and even worse for their productivity.

5. Take regular breaks

Banging your head against a problem for three hours is rarely productive. Stepping back and taking a moment to recalibrate isn't just helpful in stayingmotivated, it's also important to your health.
Sitting all day isn't good for you, and neither is working nonstop. Taking a short break every hour or two can have a positive effect on both your mind and body, especially for **remote workers**. Don't forget to get up from yourdesk and grab some fresh air.

6. Stay healthy

When you're ill, stay at home! It's unlikely that you'll be getting any of yourbest work done when you can hardly hold your head up, and not taking the time to rest will only prolong your sickness and prevent your body from recovering.

7. Be transparent

Every relationship, including work relationships, is built on trust. Defaultingto transparency is one of the best ways to encourage an atmosphere of trust amongst you and your team, and a team that trusts you will be more motivated and engaged with their work.

8. Provide clarity

In order to be motivated about your work, it's crucial that you actually understand what your goals and objectives are. For many employees, that

understanding starts with transparency, and ends with clarity. Without clarity, transparency begins to lose its effectiveness and motivational power.

9. Provide a sense of security

We're not talking about hiring a bouncer for your office (although you should make sure your employees feel safe at your workplace!). We're talking about employees feeling secure enough to show their full selves at work.

Once employees feel secure, they're more likely to be motivated to reach, and further stretch their potential.

10. Offer small, consistent rewards

Rewarding employees for their hard work is a motivational rule that nearly goes without saying. However, there are several ways to go about doing that,and some are more effective than others. Annual bonuses are a common way many employers reward employees fortheir hard work.

Importance of Communication in Business Communication is one of the most important functions of management. It promotes managerial efficiency and induces the human elements in an organisation to develop a spirit of cooperation.

1. Efficient and Smooth Running of an Enterprise:

The smooth and efficient functioning of an enterprise entirely depends upon the effectiveness of the system of communication. It provides the necessary basis of direction and leadership. It actuates people to action inaccordance with the desires of the management. Without proper communication, performance and achievements of the goals may not be possible.

2. Basis of Decision Making:

Communication is the basis of decision making. It helps the management totake essential decision and conduct vital operations. The quality of decisions made in an organisation entirely depends on the amount and quality of information available to the management. The quality of information depends upon effective communication, and the quality of

communication exercises considerable influence on the quality of decisionmaking.In the absence of effective communication it may not be possible for the top management to come in closer contacts with each other.

3. Proper Planning and Coordination:

Communication is very helpful in planning and coordinating the activities of business. If the system of communication is good, useful suggestions willcome from the subordinates to the superiors. This would be helpful in the formation of plans.

4. For Higher Productivity at Minimum Cost:

Effective communication between employers and employees plays a vitalrole in obtaining maximum production with the minimum of cost.

Communication will make the employee feel more secure and moreinterested in his work.

5. Morale Building:

Communication in industry is the basis for morale building. Under aneffective system of communication, it is quite convenient for the employees to bring their grievances to the notice of the management and get a proper adjustment. It creates mutual trust and faith.

6. Binds People Together:

Effective communication induces the human elements in an organization to develop a spirit of cooperation and produces the will todo work before actually doing it. In this way, effective communication binds the people of an organization together.

7. Creates Mutual Trust and Confidence:

Effective communication creates mutual trust and confidence betweenthe management and the labour. It gives job satisfaction to the workers. It is essential for healthy industrial relations. Sharing ideas and experiences with workers eliminates their fears and misunderstanding and helps in winning over their trust and confidence.

TYPES OF COMMUNICATION

1. VERBAL COMMUNICATION

Verbal communication is the use of language to transfer information through speakingor sign language. It is one of the most common types, often used during presentations,video conferences and phone calls, meetings and one-on-one conversations. Verbal communication is important because it is efficient. It can be helpful to support verbal communication with both nonverbal and written communication.

2. NON-VERBAL COMMUNICATION

Nonverbal communication is the use of body language, gestures and facial expressions to convey information to others. It can be used both intentionally and unintentionally. For example, you might smile unintentionally when you hear a pleasing or enjoyable idea or piece of information. Nonverbal communication is helpfulwhen trying to understand others' thoughts and feelings

3. WRITTEN COMMUNICATION

Written communication is the act of writing, typing or printing symbols like letters and numbersto convey information. It is helpful because it provides a record of information for reference.
Writing is commonly used to share information through books, pamphlets, blogs, letters,memos and more. Emails and chats are a common form of written communication in theworkplace.

4. VISUAL COMMUNICATION

Visual communication is the act of using photographs, art, drawings, sketches, charts and graphs to convey information. Visuals are often used as an aid during presentations to providehelpful context alongside written and/or verbal communication. Because people have differentlearning styles, visual communication might be more helpful for some to consume ideas and information.

Barriers in Communication

1. ***Semantic Barriers:***

Semantics is the study of right choice of words. The semantic network of sender may be different from that of the receiver and therefore, the message may not be understood as intended.

The word 'profits' has different meaning — pre-tax profits or post-tax profits, fixed amount of profit or rate of return.

(a) Symbols with different meanings – A word can have differentmeaning in different contexts. Wrong perception leads to communication problems.

(b) Badly expressed message – It may happen on account of omissionof needed words, inadequate vocabulary, usage of wrong words, etc.

(c) Unclarified assumptions – Certain assumptions of thecommunication are subject to different interpretations.

(d) Technical Jargon – Sometimes people may not understand theactual meaning of technical jargon or language used by specialists.

(e) Faulty translations – Sometimes mistakes may creep in if translator who is not proficient in both English and Hindi is involvedin translating the communication.

(f) Body language and gesture decoding – Communication may be wrongly perceived if there is no match between what is said and whatis expressed in body movements.

2. ***Psychological/Emotional barriers:***

Communication will be disrupted if state of mind of both sender and receiver of communication is not in an ideal position.

(a) Premature evaluation – If a person has pre-conceived notions against the communication, then he will evaluate the meaning of message before the sender completes his message.

(b) Loss by transmission and poor retention – Successive transmissionof the message results in inaccurate information. Usually people cannot retain the information for long time if they are inattentive or not interested.

(c) Lack of attention – Non-listening of message due to pre-occupiedmind of the receiver acts as a major psychological barrier.

3. *Organisational Barriers:*

(a) Organisational policy – Effectiveness of communication may behampered if organisational policy is not supportive to free flow of communications.
(b) Status – A status conscious manager may not allow hissubordinates to express their feelings freely.
(c) Rules and regulations – Rigid rules and cumbersome proceduresmay be a hurdle to communication.
(d) Complexity in organisation structure – Communication gets delayed and distorted if there are number of managerial levels in anorganisation.
(e) Organisational facilities – Communications may be hampered iffacilities for smooth, clear and timely communications are not provided.

4. *Personal Barriers:*

(a) Fear of challenge to authority – A superior may withhold or suppress communication if he thinks that a particular communicationmay adversely affect his authority.
(b) Lack of confidence of superior on his subordinates – Superiors may not seek advice or opinions of their subordinates if they do nothave confidence on the competency of their subordinates.
(c) Unwillingness to communicate – If subordinates perceive that it may adversely affect their interests, then they may not be prepared tocommunicate with their superiors.
(d) Lack of proper incentives – Subordinates may not take initiative tocommunicate if there is no motivation or incentive for communication.

Chapter-7: HUMAN RELATIONSHIP AND PERFORMANCE IN AN ORGANISATION

A human relation is the relationship between human resources of the organization. Human resource is one of the important assets of an organization. Hence, healthy human relations lead to increased productivity and efficiency. It also plays crucial role ingrowth and success of the organization.

Relation with Peers, Superiors and Subordinates

It is always an experience to interact with the peer, superior and subordinate groups. Allthe three groups of people give a different feel and learning, when we interact with them. All the three groups are important and very much existent in all areas of life.
Whether it is family, office, friends, mentors, teachers, bosses, acquaintances, etc, all ofthem are typically divided into three categories.

Peers:
The first category will always be peers because we respond to them very easily and very firstly. We normally tend to be comfortable with them in terms of talking and interacting. One more reason of a person being comfortable with peers is they have similar problems and they empathize very well with each other. For example colleaguesin office, friends, cousins, acquaintances, social circles, etc.

Superiors:
The second category is superiors. The teachers, mentors, bosses, family, etc generallyfall in this category. They are the ones who are higher than us as far as the knowledge or experience. They expect a certain kind of respectful treatment from us, while we dealwith them. We normally tend to take time to interact with them directly; more so, particularly because they also have an expectation barrier to break first with us. They are the ones from whom you learn effortlessly because we know that they know more than us. For example uncles, aunts, bosses, bosses of bosses, mentors, aged consultants, senior positions in any way, etc.

Subordinates:
The third category opens up the scope of being a mentor to others, as well as taking work from them or helping them to cope up. They are lesser either by age, experience, knowledge or relationship and that's why we feel good dealing with them and sometimes even show them off our seniority. They are the ones who need our reciprocation for their growth but still our responses to them are important; if we have totake work from them or they are in our social circles or fall in as a team to achieve targets in professional fronts.

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Three golden rules to these three categories are:

- Be a good peer, only then you will be in a position to build up long term relationships for coming days. A good peer is one who values opinion of another peer helps him out when the other one needs and be a good pal who is genuinelyinterested in other person's growth.
- Be a good superior, only then you will be respected for what you do, by your juniorsand appreciated as a team leader. A good superior takes a team to a new height and thereby take the organization and family to highs and achieve targets which arevery difficult.
- Be a good subordinate, only then you can enhance the credit of your bosses, mentors which in turn will add to lot of credit to your standing. A good subordinate isone on whom the boss or family can rely on for whatever is given to finish and who gives unbiased opinions and is helpful in decision making with his genuine interest of his superior's progress.

TQM is a continuous process of improvement for individual, groups as well as the entire organization, whereby managers attempt to change the organization's way of working by developing people's knowledge about what to do, how to do, doing it with the right methods and measuring the improvement of the process and the current level of achievement.
TQM is widely used in manufacturing, education, hospitals, call centers, government,and service industries, as well as space and science programs

Basic concepts of TQM

1. **Quality:** The totality of features and characteristics of product or service that bearson its ability to satisfy stated or implied needs of a customer.
2. **Quality Policy:** The overall quality intentions and directions of an organization asregards quality formally expressed by top management. The quality policy forms an element of the corporate policy and is authorized by top management.
3. **Quality Management:** The aspect of the overall management function that determines and implements quality policy. Quality management includes strategicplanning, allocation of resources and other systematic activities for quality such asoperations and evaluations.
4. **Quality Assurance:** Quality assurance is all those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy

requirements of a customer. Unless the requirements of customer are fully reflected in the product or service, quality assurance will not be complete. Quality assurance servesas a management tool to provide confidence in supplier/manufacture in contractual situation.While taking a broad view of quality control, we come across different words such as limits, tolerance, allowance, fit etc. These words are described in terms of below limits. Limits for a dimension or other unit of measurement are the two extreme permissible measurements for that dimension or unit.

5. **Quality Control:** Quality controls are operational techniques and activities that are used to fulfill requirements for quality. Quality control techniques and activities aim both,at monitoring a process and at eliminating causes of unsatisfactory performance at relevant stages of the production in order to achieve economic effectiveness of an organization.
6. **Conformity:** An affirmative indication or judgment that the supplier/manufacturer of a product or service has met the requirements of the relevant specifications, contact or regulations and also the state of meeting requirements, is the real test of quality.
7. **"Quality Circle":** QC is a process that stimulates everyone to achieve greater satisfaction in the work environment. It is based on mutual trust and cooperation. It also includes group participation, information sharing and decision making. Its primary aim isto provide a better quality of working life to workmen at all levels in an organization. "QCis a small group of employees in the same work.Work area or doing a similar type of work who voluntarily meet regularly for about an hour every week to identify, analyze and resolve wok-related problems, leading to improvement in their total performance and enrichment of their work life".

Workplace (Health, Safety and Welfare) Regulations 1992

The Workplace (Health, Safety and Welfare) Regulations 1992, as amended, apply to all workplaces except ships, building and construction sites.

The creation and maintenance of a safe place of work must be achieved by ensuring:

- workplace structures and buildings are safe at all times
- buildings are stable and suitable for the tasks to be carried out
- environmental conditions, eg heating, lighting and ventilation, provide for the comfort and well-being of employees and are suitable for the nature of work being done
- the workplace is free of hazards arising from the use, storage, transport and disposal of materials, substances and waste
- Floors, walkways and access arrangements (including roads) do not pose a hazard and space should be adequate to allow risk-free movements of people, materials and moving equipment.
- areas where it may be possible to fall from a height are guarded; such areas include:
  - roofs where access is required to ventilation equipment and for other maintenance purposes
  - process operations carried out at different heights (eg filling of high level hoppers, split or mezzanine floors in factories) protection is provided to guard against falling objects

The processes of keeping the workplace clean, ordered and tidy are adequate. provision for sanitary and washing facilities, storage and changing of clothing rest rooms and arrangements for meals and provision of drinking water are adequate

Causes of Accidents

Accidents are events that result from a complex interaction of a variety of factors. There is no single theory that can account for the way all accidents arise. It is possible, however, to recognize some of these factors and interactions to assist in identifying preventive measures. They can be classified into direct and indirect causes.

It is occasionally difficult to draw a line between direct and indirect causes and such classification should not be seen as setting hard and fast approaches to accident prevention and investigation. They do, however, provide a useful way of examining and rationalizing accidents.

Direct causes

These can be seen as directly causing the accident because they are mostly physically observable. They include the immediate and basic causes from Bird's approach and consist of a variety of circumstances and situations.

Unsafe conditions of premises

The conditions at the place of work can be hazardous and will give rise to accidents if the hazards are not controlled. Such conditions can include:

- unsafe design
- environment
- housekeeping
- plant and equipment
- substances
- radiation
- Fire

Maintenance

Failures or inadequacy in the provision of maintenance can give rise to accidents. The absence or inadequacy of maintenance of equipment can also give rise to failures that may cause injury.

Indirect causes

Management systems

Management systems are required to both identify and deliver the required risk control measures. Identification of control measures should be made on the basis of the hazards and associated risk in the workplace leading to the development of effective control measures. These include recruitment and training systems, as well as supervision, monitoring and compliance systems.

Where management systems are less than adequate or absent then the conditions in the organization will tend to be unsafe and the potential for accidents will be increased. The creation and maintenance of management systems is essential in order to comply with the Management of Health and Safety at Work Regulations 1999, Regulation 5(1), which requires every employer to "give effects to such arrangements…for the effective planning, organization, control, monitoring and review of preventive and protective measures".

PREVENTIVE MEASURES

Accidents are unplanned occurrences that result in injuries, illness, death, and lossof property and/or production. While there is no way to completely eliminate accidents, there are certain plans, preparations, and actions that can be taken to reduce them.

Know the Hazards

- Be aware of surroundings. Look around and identify workplace hazards that couldcause harm.
- Look for ways to reduce or eliminate hazards, and implement them.
- Report unsafe areas or practices.
- Dress for the weather.
- Use the EHS Job Hazard Analysis tools to identify hazards associated with jobtypes.

Create a Safe Work Area

- Keep an orderly workplace. Poor housekeeping can cause serious health and safety hazards. The layout of the workplace should have adequate egress routesand be free of debris.
- Inspect vehicles before and after use. DRIVE SAFELY.
- Continually cultivate a safety standard.
- Take breaks and move around regularly throughout the day. Small breaks (standingup and moving around) can make a big difference in combating the dangers of staying in a static position all day long.
- Pay attention to workstation ergonomics.

Use Safe Lifting Techniques

Follow the following safe lifting practices:

  - Lift from a position of power
  - Keep the load close
  - Use a staggered stance
  - Don't twist while lifting
- Training in body mechanics can reduce strain injuries and keep employees safeduring lifting and moving.

Personal Protective Equipment

- The proper use of Personal Protective Equipment (PPE) can dramatically reduce therisk of injury. Examples of PPE include gear such as earplugs, hard hats, safety goggles, gloves, air-purifying respirators and safety shoes.

Regular Communication

- Notify supervisors about safety hazards.
- Speak up and be involved in safety planning.
- Continually cultivate a safety standard.

Education and Training

- Ensure everyone has the proper safety training relating to the hazards of the job.
- Take advantage of Environmental Health and Safety online training programs.It is each employee's responsibility to take an active role in maintaining safety.

GENERAL SAFETY RULES

1. Report all work injuries and illnesses immediately.
2. Report all Unsafe Acts or Unsafe Conditions to your Supervisor.
3. Use seat belts when on Company business in any vehicles.
4. Firearms, weapons, or explosives are not permitted on Company Property.
5. Use, possession, sale or being under the influence of illegal drugs, misuse of prescription drugs and/or alcohol is not permitted on Company Property or while "onduty".
6. Only authorized and trained Employees may repair or adjust machinery and equipment. Lock and Tag out Procedures must be followed before removing any machineguards or working on powered machinery and equipment. Replace all guards when the job is completed.
7. Only qualified and trained Employees may work on or near Exposed Energized Electrical Parts or Electrical Equipment. Follow Electrical Safety Rules when workingwith electrically powered machinery and equipment.
8. Only authorized and trained Employees may enter a posted Confined Space. All confined spaces will be posted Confined Space - Permit Required. Entry is allowed onlyafter permits are properly issued.
9. Only authorized and trained Employees may dispense or use chemicals. It is your responsibility to know where SDS's (Safety Data Sheets) are located and that they are available for your use and review.
10. Keep work areas clean and aisles clear. Do not block emergency equipment or exits.
11. Wear and use the prescribed Personal Protective Safety Equipment. This includes foot protection, head protection, gloves, etc.
12. Smoking is permitted only in the designated "Smoking Areas".

Personal protective equipment (PPE)

PPE is equipment that will protect the user against health or safety risks at work. It can include items such as safety helmets, gloves, eye protection, high-visibility clothing, safety footwear and safety harnesses. It also includes respiratory protective equipment (RPE).

Chapter-8: LEGISLATION

The term "Intellectual Property Rights" refers to the legal rights granted with the aim to protect the creations of the intellect. These rights include Industrial Property Rights (e.g. patents, industrial designs and trademarks) and Copyright (right of the author or creator)and Related Rights (rights of the performers, producers and broadcasting organizations)

In most countries, there are four primary types of intellectual property (IP) that can belegally protected: patents, trademarks, copyrights, and trade secrets each have their own attributes, requirements and costs.

1. Patent-

A patent is the granting of a property right by a sovereign authority to an inventor.
A patent provides the inventor exclusive rights to the patented process, design, or invention for a certain period in exchange for a complete disclosure of the invention.

2. Trademark-

A trademark is a brand name. A trademark or service mark includes any word, name,symbol, device, or any combination, used or intended to be used to identify and distinguish the goods/services of one seller or provider from those of others, and to indicate the source of the goods/services.

3. Copyright-

Copyright refers to the legal right of the owner of intellectual property.
In simpler terms, copyright is the right to copy. This means that the original creators ofproducts and anyone they give authorization to are the only ones with the exclusive right to reproduce the work.

SALIENT FEATURES OF FACTORY ACT 1948

The main objectives of the Indian Factories Act, 1948are to regulate the working conditions in factories, to regulate health, safety welfare, and annual leave and enact special provision in respect of young persons, women and children who workin the factories.

1. Working Hours:

According to the provision of working hours of adults, no adult worker shall be required or allowed to work in a factory for more than 48 hours in a week. Thereshould be a weekly holiday.

2. Health:

For protecting the health of workers, the Act lays down that every factory shall be kept clean and all necessary precautions shall be taken in this regard. The factories should have proper drainage system, adequate lighting, ventilation, temperature etc.Adequate arrangements for drinking water should be made. Sufficient latrine and urinals should be provided at convenient places. These should be easily accessible to workers and must be kept cleaned.

Cleanliness {Section 11}
Every factory should be kept clean and free from effluvia (Harmful discharge) arisingfrom any drain.

Disposal of wastes and effluents {Section12}
Effective arrangements should be made in every factory for the treatment and effluentsdue to the manufacturing process and for their disposal.

Ventilation and temperature {Section 13}
Effective and suitable provisions should be made in every factory for securing andmaintaining in every workroom; adequate ventilation by the circulation of fresh air.

Dust and fume {Section 14}
Effective measures should be taken to prevent inhalation of dust and fume that mayproduce in the course of manufacturing process.

Artificial humidification {Section 15}
In any factory where the humidity of air is artificially increased, the State Government may make rules prescribing standards of humidification; regulating the methods used for artificially increasing humidity of the air; and directing prescribed test for determiningthe humidity of the air to be correctly carried out and recorded; and prescribing methodsto be adopted for securing adequate ventilation and cooling of the air in the workrooms.

Overcrowding {Section 16}
No room in any factory should lie overcrowded to an extent injurious to the health of theworkers employed therein.

Lighting {Section 17}
In every part of a factory where workers are working or passing, there should be provided and maintained sufficient and suitable lighting, natural or artificial, or both.

Drinking water {Section 18}
In every factory effective arrangements should be made to provide sufficient supply of drinking water.

Latrines and urinals {Section 19}
In every factory sufficient latrine and urinal point and alsoseparate for male and female workers, at all times while they are at the factory.

Spittoons {Section 20}
In every factory there should be provided a sufficient number of spittoons in convenientplaces and they shall be maintained in a clean and hygienic condition.

3. Safety:

In order to provide safety to the workers, the Act provides that the machinery shouldbe fenced, no young person shall work at any dangerous machine, in confined spaces, there should be provision for manholes of adequate size so that in case of emergency the workers can escape.

- The machinery in every factory should be properly fenced. **{Section 21}**
- Only the trained adult male worker, wearing tight fitting clothing which should be supplied by the Occupier, should be allowed to work near the machinery in motion. **{Section 22}**
- No young person shall be employed on dangerous machinery, unless he is fully instructed as to the danger arising in connection with the machine and the precautions to be observed and he has received sufficient training in work at themachine. **{Section 23}**
- Suitable arrangements should be made to provide striking gear and devices forcutting off power in case of emergencies. **{Section 24}**
- Sufficient precautions should be taken with regard to self-acting machines toavoid accidents. **{Section 25}**
- To prevent danger, all machinery driven by power should be encased and effectively guarded. **{Section 26}**
- Woman worker and children should not be employed in any part of the factory for pressing cotton in which a cotton-opener is at work. **{Section 27}**
- Hoists and Lifts in a factory should be periodically inspected by the CompetentPerson. **{Section 28}**
- Lifting Machines, Chains, Ropes and Lifting Tackles in a factory should be periodically inspected by the Competent Person. **{Section 29}**

- Where process of grinding is carried on, a notice indicating the maximum safe working peripheral speed of every grind-stone or abrasive wheel etc., should befixed to the revolving machinery.**{Section 30}**
- Where any plant or machinery or any part thereof is operated at a pressure above atmospheric pressure, effective measures should be taken to ensure thatthe safe working pressure of such plant of machinery or part is not exceeded.**{Section 31}**
- Floors, stairs and means of access should be soundly constructed and properly maintained. **{Section 32}**
- Pits, sumps opening in floor etc., should be either securely covered orfenced. **{Section 33}**
- No workman shall be employed in any factory to lift, carry or move any load soheavy as to be likely to cause him injury. **{Section 34}**
- Necessary protective equipment should be provided to protect the eyes of the workman, where the working involves risk of injury to the eyes. **{Section 35}**

4. Welfare:

For the welfare of the workers, the Act provides that in every factory adequateand suitable facilities for washing should be provided and maintained for the use of workers.

Facilities for storing and drying clothing, facilities for sitting, first-aid appliances, shelters, rest rooms' and lunch rooms, crèches, should be there.

- Adequate and suitable 'washing facilities' should be provided in every factory. **{Section 42}**
- Provision should be made to provide suitable places for keeping clothing notworn during working hours and for the drying of wet clothing.**{Section 43}**
- In every factory, suitable arrangements for sitting should be provided and maintained for all workers obliged to work in a standing position, in order thatthey may take advantage of any opportunities for rest which may occur in thecourse of their work.**{Section 44}**
- First-Aid Boxes with the prescribed contents should be provided and maintained so as to be readily accessible during all working hours at the rate of at least one Box for every 150 workmen. **{Section 45}**
- In every factory wherein more than 500 workers are employed there should be provided and maintained an Ambulance containing the prescribed equipment andin the charge of such medical and nursing staff. **{Section 45(4)}**
- The Occupier should provide a canteen for the use of workers in every factory,where the number of workmen employed is more than 250.**{Section 46}**
- In every factory wherein more than 150 workers are employed adequate andsuitable shelters or rest rooms and a suitable lunch room, with provision for

drinking water, where workers can eat meals brought by them, should beprovided and maintained for the use of the workers. **{Section 47}**

- In every factory wherein more than 30 women workers are ordinarily employedthere should be provided and maintained a suitable room for the use of children under the age of six years of such women. **{Section 48}**

5. Penalties:-

The provisions of The Factories Act, 1948, or any rules made under the Act, or anyorder given in writing under the Act is violated, it is treated as an offence. The following penalties can be imposed:-

(a) Imprisonment for a term which may extend to one year;

(b) Fine which may extend to one lakh rupees; or

(c) Both fine and imprisonment.

If a worker misuses an appliance related to welfare, safety and health of workers, orin relation to discharge of his duties, he can be imposed a penalty of Rs. 500/-.

Salient features of the payment of wages act 1936

a) The Act was formed with the intention to regulate timely payment of wagesto specific class of workers employed in industry without any wrongful deductions apart from what is mentioned in the Act.

b) The Act ensures that the salary be paid by **7th of each month** in factories/establishments having a workforce of less than 1000 workers andby **10th of each month** in other cases.

c) The Act ensures fixing of wage period, time and mode of payment ofwages.

d) The Act does not cover those whose wage is **Rs. 24,000/-** or more permonth.

e) The Act provides a worker with its duly right as covered under the Act.

f) The Act empowers a worker to file a claim directly or through a Trade Unionor through an Inspector, before with the Authority appointed under the Payment of Wages Act in case there is a delay in wages or in case of an unauthorized deduction

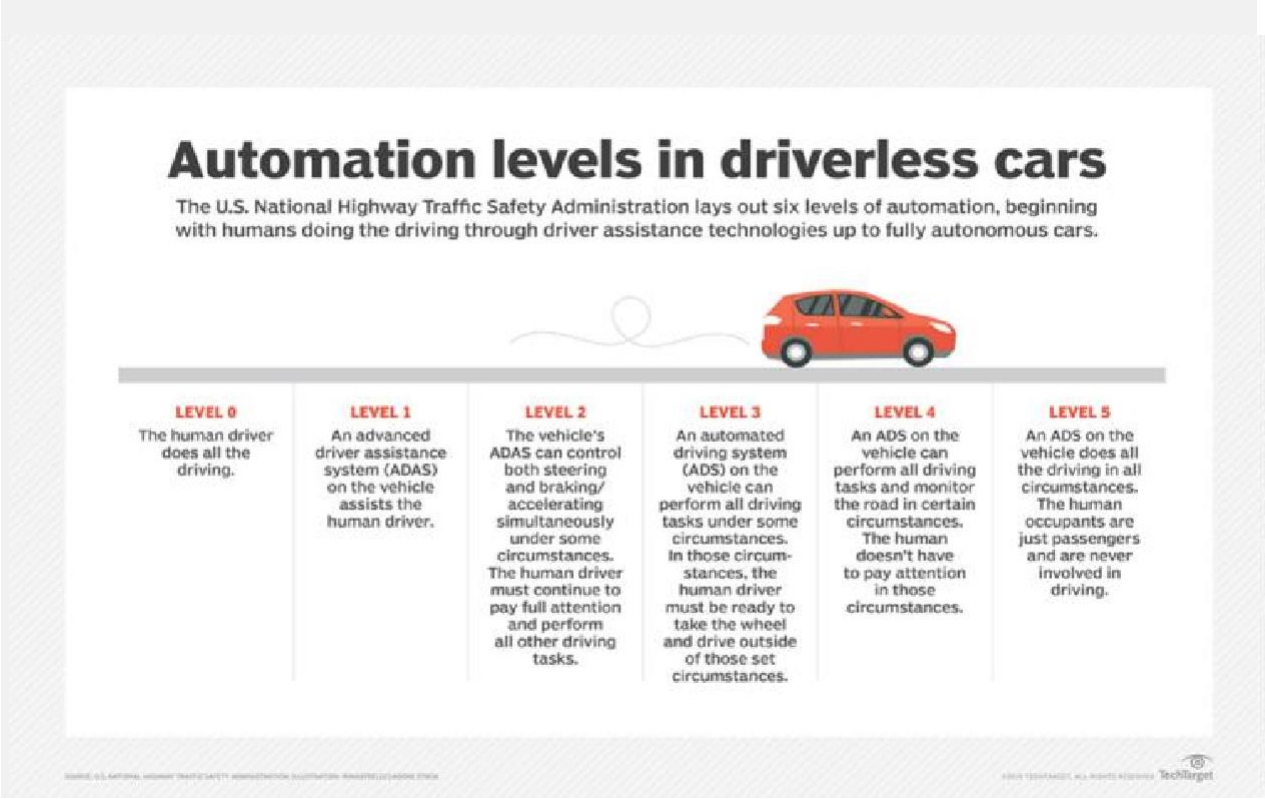
Chapter-9: Smart Technology

What is IoT?

The IoT is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators and connectivity which enablesthese things to connect and exchange data. The term “Thing” in “Internet of Things” is used quite broadly. For example, a thing within the IoT could be a person with a heart monitor implant, a pet with a biochip transponder, a vehicle that has built-in sensors to alert the driver when tire pressure is low — or any other natural or man-made object thatan IP address can be assigned to, thus gaining the ability to transfer data over a network. As a result, it is becoming increasingly easy to create opportunities to directly integrate the physical world into computer-based systems which results in improvements, efficiency, economic benefits and reduced human exertion(Physical or Mental effort).

IoT Example: Autonomous Vehicles

An autonomous vehicle, sometimes referred to as self-driving cars or driverless cars, is avehicle that uses a combination of sensors, camera, radar and artificial intelligence (AI)to travel between destinations without a human operator. In order to qualify as being completely autonomous, a vehicle must be able to navigate without needing human intervention to a predetermined destination via roads that have not been adapted for its use.



IoT Example: Smart Homes

Smart Home technology, also known as home automation is a classic example of the IoTin practice. Home automation provides home owners with comfort, security, convenienceand improves energy efficiency by affording them the ability to control other smart devices, usually via a smart home app on their smartphone or a different networked device. Smart home systems and devices operate together and share consumer usage data among themselves in order to automate actions based on the owner's preferences.

Today, almost every appliance associated with domestic life has a smart home option. Afew examples:

- Smart TVs connect to the internet to access content through applications, such as on-demand video and music. Some smart TVs also include voice orgesture recognition.
- Using smart locks and garage-door openers, users can grant or deny access to visitors. Smart locks can also detect when residents are near and unlock the doors for them.
- Pet care can be automated with connected feeders. Houseplants and lawns can be watered by way of connected timers.

IoT Explained

A complete IoT system integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface. Below I will briefly explain eachcomponent and what it does.

1) Sensors/Devices

First, sensors or devices collect data from their environment. This could be as simple asa temperature reading or as complex as a full video feed.

I use “sensors/devices,” because multiple sensors can be bundled together or sensors can be part of a device that does more than just sense things. For example, your phoneis a device that has multiple sensors (camera, accelerometer, GPS, etc), but your phone is not *just* a sensor. However, whether it’s a standalone sensor or a full device, in this first step data is beingcollected from the environment by *something*.

2) Connectivity

Next, that data is sent to the cloud.The sensors/devices can be connected to the cloudthrough a variety of methods including: cellular, satellite, WiFi, Bluetooth, low-power wide-area networks (LPWAN), or connecting directly to the internet via ethernet.

Each option has tradeoffs between power consumption, range and bandwidth . Choosing which connectivity option is best comes down to the specific IoT application,but they all accomplish the same task: getting data to the cloud.

3) Data Processing

Once the data gets to the cloud, software performs some kind of processing on it. This could be very simple, such as checking that the temperature reading is within anacceptable range.

Or it could also be very complex, such as using computer vision onvideo to identify objects such as intruders(in order to commit crime) in your house.

But what happens when the temperature is too high or if there *is* an intruder in yourhouse? That’s where the user comes in.

4) User Interface

Next, the information is made useful to the end-user in some way. This could be via analert to the user (email, text, notification, etc). For example, a text alert when the temperature is too high in the company’s cold storage.

Also, a user might have an interface that allows them to proactively check in on the system. For example, a user might want to check the video feeds in their house via aphone app or a web browser.

However, it’s not always a one-way street. Depending on the IoT application, the user may also be able to perform an action and affect the system. For example, the user might remotely adjust the temperature in the cold storage via an app on their phone. And some actions are performed automatically. Rather than waiting for you to adjust thetemperature, the system could do it automatically via predefined rules. And rather than just call you to alert you of an intruder, the IOT system could also automatically notify relevant authorities.

Components of IOT

1. *Sensors or End Devices*

For any IOT use case, the components of the endpoint are sensors. Sensors capture electric pulse or analog signals which are passed through the IOT ecosystems. Based onthe use case and domains RFID (Radio Frequency Identification), temperature sensors, light sensors, electromagnetic sensors, etc. are used. For example, smart phones and smart wearables are equipped with sensors like accelerometer, Gyroscope sensors, etc. Data obtained from these IOT endpoints can be used in various domains like Human activity recognition, medical stability, etc. Based on the use case and precision requirements sensors can be chosen keeping the following parameters in mind

- Accuracy of the input readings
- Reliability percentage of the inputs
- The purpose of the use case, for example, sensors required for a temperature-dependent use case, will differ from use cases based on motions.
- Industry grade IOT systems can be integrated with multi-technology, cross- functional and cross-vendor products. Based on the complexity and compatibilitysensors are chosen for a particular use case.

2. *Network or Connectivity Layer*

In a typical IOT ecosystem, sensors are connected with computation layers and intelligent layers via network or connectivity layers. IOT endpoints need to be always connected with various other components seamlessly over the connectivity layer. Based on the scale of the implementations IOT components can be connected overs LANs, MANs or WANs. It can also be connected through telephony networks like LTE (Long Term Evolution or popularly known as 4G Network) or light-based technologies like Li-Fi(where light is used as a mode of communication to maintain interconnections). For local use cases, Bluetooth and Wi-Fi can also be used.

An IOT network consists of various network components like routers, gateways, switches, various network protocols, etc. Based on the use case and domain propernetwork infrastructure is needed to be chosen.

3. *Security Layers*

The heart of any industry-grade IOT user story is ‘data’. In a standard use case, analog ordigital signal is acquired by sensors and the signal is then converted to a format on top of which AI/ML components can work. In the total flow of data, proper security systems and methodologies need to be enforced. The data can be compromised in any layers starting from the data acquisition to business insights derivations. We can enforce

proper security by using strong encryption in various layers of communication, usingproper firmware and anti-malware systems, etc.

4. *Compute Engines*

Industry grade IOT systems typically use multiple technology stacks inside an umbrella.For example in insurance premiums can be calculated as a variable component as per the driving pattern of the insurer. The data collected from smart devices are convertedand preprocessed to a format on which machine learning models are developed.
Customers can use any cloud partners of their choice or develop their own infrastructureto execute a use case.
For example, the compute engines from PaaS (Product as a service) or IaaS (IoT asservice) will differ from on-premise systems.

5. *Technology and Governance Standards*

Sensitive information flow over the various components of the IoT ecosystem. To cope up with this the systems need to adhere to proper technique and governance standardand KPIs

- Typical Technical standards: Wi-Fi, WAN, etc.
- Network Protocols: HTTP, TCP/IP, UDP, etc.
- Data management standards: ETL, CAP (for distributed systems), etc.
- IoT systems need to follow the regulations and quality standards of respective regulatory authorities and business standards.

6. *Intelligent Insights and Actions*

Most of the practical and industry-grade IoT use cases are intended to derive businessinsights or actionable recommendations. The preprocessed data need to be integratedwith ML components and the trained models are deployed to the production environment. The choice of the technology stack to develop the intelligent business component is dependent on the compatibility with the in house existing systems, the scale of the business, the complexity of the use case, and precision and latency requirements of the domain, company partnerships, etc.

Characteristics of IoT:

1. **Connectivity.** This doesn't need too much further explanation. Witheverything going on in IoT devices and hardware, with sensors and other electronics and connected hardware and control systems thereneeds to be a connection between various levels.

2. **Things**. Anything that can be tagged or connected as such as it's designed to be connected. From sensors and household appliancesto tagged livestock. Devices can contain sensors or sensing materials can be attached to devices and items.
3. **Data**. Data is the glue of the Internet of Things, the first steptowards action and intelligence.
4. **Communication**. Devices get connected so they can communicate data and this data can be analyzed. Communication can occur over short distances or over a long range to very long range. Examples: Wi-Fi, LPWA network technologies such as LoRa or NB-IoT.
5. **Intelligence**. The aspect of intelligence as in the sensing capabilities in IoT devices and the intelligence gathered from bigdata analytics (also artificial intelligence).
6. **Action**. The consequence of intelligence. This can be manual action, action based upon debates regarding phenomena (for instance in smart factory decisions) and automation, often the mostimportant piece.
7. **Ecosystem**. The place of the Internet of Things from a perspectiveof other technologies, communities, goals and the picture in which the Internet of Things fits. The Internet of Everything dimension, the platform dimension and the need for solid partnerships.

Categories of IOT

1. LPWANs

Low Power Wide Area Networks (LPWANs) are the new phenomenon in IoT. By providing long-range communication on small, inexpensive batteries that last for years,this family of technologies is purpose-built to support large-scale IoT networks sprawling over vast industrial and commercial campuses.
LPWANs can literally connect all types of IoT sensors – facilitating numerous applications from asset tracking, environmental monitoring and facility management to occupancy detection and consumables monitoring. Nevertheless,
LPWANs can only send small blocks of data at a low rate, and therefore are better suitedfor use cases that don't require high bandwidth and are not time-sensitive.

2. Cellular (3G/4G/5G)

Well-established in the consumer mobile market, cellular networks offer reliable broadband communication supporting various voice calls and video streaming applications. On the downside, they impose very high operational costs and powerrequirements. While cellular networks are not viable for the majority of IoT applications powered by battery-operated sensor networks, they fit well in specific use cases such as connected

cars or fleet management in transportation and logistics. For example, in-car infotainment, traffic routing, advanced driver assistance systems (ADAS) alongside fleet telematics and tracking services can all rely on the ubiquitous and high bandwidth cellular connectivity. Cellular next-gen 5G with high-speed mobility support and ultra-low latency is positioned to be the future of autonomous vehicles and augmented reality. 5G is alsoexpected to enable real-time video surveillance for public safety, real-time mobile delivery of medical data sets for connected health, and several time-sensitive industrial automation applications in the future.

3. Zigbee and Other Mesh Protocols

Zigbee is a short-range, low-power, wireless standard (IEEE 802.15.4), commonly deployed in mesh topology to extend coverage by relaying sensor data over multiple sensor nodes. Compared to LPWAN, Zigbee provides higher data rates, but at the sametime, much less power-efficiency due to mesh configuration.

Because of their physical short-range (< 100m), Zigbee and similar mesh protocols (e.g.Z-Wave, Thread etc.) are best-suited for medium-range IoT applications with an even distribution of nodes in close proximity. Typically, Zigbee is a perfect complement to Wi-Fi for various home automation use cases like smart lighting, HVAC controls, security and energy management, etc. – leveraging home sensor networks.

4. Bluetooth and BLE

Defined in the category of Wireless Personal Area Networks, Bluetooth is a short-range communication technology well-positioned in the consumer marketplace. Bluetooth Classic was originally intended for point-to-point or point-to-multipoint (up to seven slave nodes) data exchange among consumer devices. Optimized for power consumption, Bluetooth Low-Energy was later introduced to address small-scale **Consumer IoT** applications.

BLE-enabled devices are mostly used in conjunction with electronic devices, typically smartphones that serve as a hub for transferring data to the cloud. Nowadays, BLE iswidely integrated into **fitness and medical wearables** (e.g. smartwatches, glucose meters, pulse oximeters, etc.) as well as **Smart Home devices** (e.g. door locks) – whereby data is conveniently communicated to and visualized on smartphones.

5. Wi-Fi

There is virtually no need to explain Wi-Fi, given its critical role in providinghigh-throughput data transfer for both enterprise and home environments.

However, in the IoT space, its major limitations in coverage, scalability and powerconsumption make the technology much less prevalent.

Imposing high energy requirements, Wi-Fi is often not a feasible solution for large networks of battery-operated IoT sensors, especially in industrial IoT and smart buildingscenarios. Instead, it more pertains to connecting devices that can be conveniently connected to a power outlet like **smart home gadgets and appliances, digital signages or security cameras.**

Wi-Fi 6 – the newest Wi-Fi generation – brings in greatly enhanced network bandwidth(i.e. <9.6 Gbps) to improve data throughput per user in congested environments. With

this, the standard is poised to level up public Wi-Fi infrastructure and transform customer experience with **new digital mobile services** in retail and mass entertainment sectors. Also, **in-car networks for infotainment and on-board diagnostics** are expected to be the most game-changing use case for Wi-Fi 6. Yet, the development willlikely take some more time.

6. RFID

Radio Frequency Identification (RFID) uses radio waves to transmit small amounts of data from an RFID tag to a reader within a very short distance. Till now, the technologyhas facilitated a major revolution in **retail** and **logistics**.

By attaching an RFID tag to all sorts of products and equipment, businesses can track their inventory and assets in real-time – allowing for better stock and production planning as well as optimized **supply chain management**. Alongside increasing IoT adoption, RFID continues to be entrenched in the retail sector, enabling new IoT applications like smart shelves, self-checkout, and smart mirrors.

Applications of IOT

Smart home

Smart Home clearly stands out, ranking as highest Internet of Things application on all measured channels. More than 60,000 people currently search for the term “Smart Home” each month. This is not a surprise. The IoT Analytics company database for Smart Home includes 256 companies and startups. More companies are active in smart home than any other application in the field of IoT. The total amount of funding for Smart Home startups currently exceeds $2.5bn. This list includes prominent startup names such as Nest or AlertMe as well as a number of multinational corporations like Philips, Haier, or Belkin.

Smart City

Smart city spans a wide variety of use cases, from traffic management to water distribution, to waste management, urban security and environmental monitoring. Its popularity is fueled by the fact that many Smart City solutions promise to alleviate real pains of people living in cities these days. IoT solutions in the area of Smart City solve traffic congestion problems, reduce noise and pollution and help make cities safer

Smart Agriculture

Statistics estimate the ever-growing world population to reach nearly 10 billion by the year 2050. To feed such a massive population one needs to marry agriculture to technology and obtain best results. There are numerous possibilities in this field. One ofthem is the **Smart Greenhouse**.

A greenhouse farming technique enhances the yield of crops by *controlling environmental parameters*. However, manual handling results in production loss, energy loss, and labor cost, making the process less effective.

A greenhouse with embedded devices not only makes it easier to be monitored but also, enables us to control the climate inside it. Sensors measure different parameters according to the plant requirement and send it to the cloud. It, then, processes the data and applies a control action.

SmartEnergy

As worldwide energy consumption is expected to grow by 40% over the next 25 years, the need for smarter energy solutions has reached an all-time high. IoT is revolutionizing nearly every part of the energy industry from generation to transmission to distribution and changing how

energy companies and customers interact. Both solution providers and energy companies themselves understand the need for and value of connected IoT solutions in the sector

Smart Transportation

Smart transportation, a key internet of things vertical application, refers to the integrated application of modern technologies and management strategies in transportation systems.These technologies aim to provide innovative services relating to different modes of transport and traffic management and enable users to be better informed and make safer and 'smarter' use of transport networks.

In 2010, the European Union had defined Intelligent Transportation Systems (ITS) as a systems "in which information and communication technologies are applied in the field of roadtransport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport."

Smart transportation includes the use of several technologies, from basic management systems such as car navigation; traffic signal control systems; container management systems; automatic number plate recognition or speed cameras to monitor applications, suchas security CCTV systems; and to more advanced applications that integrate live data and feedback from a number of other sources.

Smart Healthcare

IoT for **healthcare** can also be used for research purposes. It's because **IoT** enables usto collect a massive amount of data about the patient's illness which would have taken many years if we collected it manually. ..... Even the existing devices are now being updated by **IoT** by simply **using** embedding chips of a **smart** devices.

Smart Industry

The Industrial world is changing in a trend which goes under a variety of names including **Industry 4.0**, **Industrial Internet of Thing (IIoT)** and **smart manufacturing**.This *Smart Industry* trend is bringing about a fundamental change in the way factories and workplaces function, making them safer, more efficient, more flexible and more environmentally friendly. With factories accounting for 40% of the world's energy consumption, reducing their energy use will play a major role in putting the planet on amore sustainable course. Machines are evolving to be aware of the humans around them and provide new interfaces such as smart tools, augmented reality and touchlessinterfaces for easier and safer interactions. Machines are also becoming connected inside the factory and to the cloud, enabling optimal planning and flexibility in manufacturing and maintenance.