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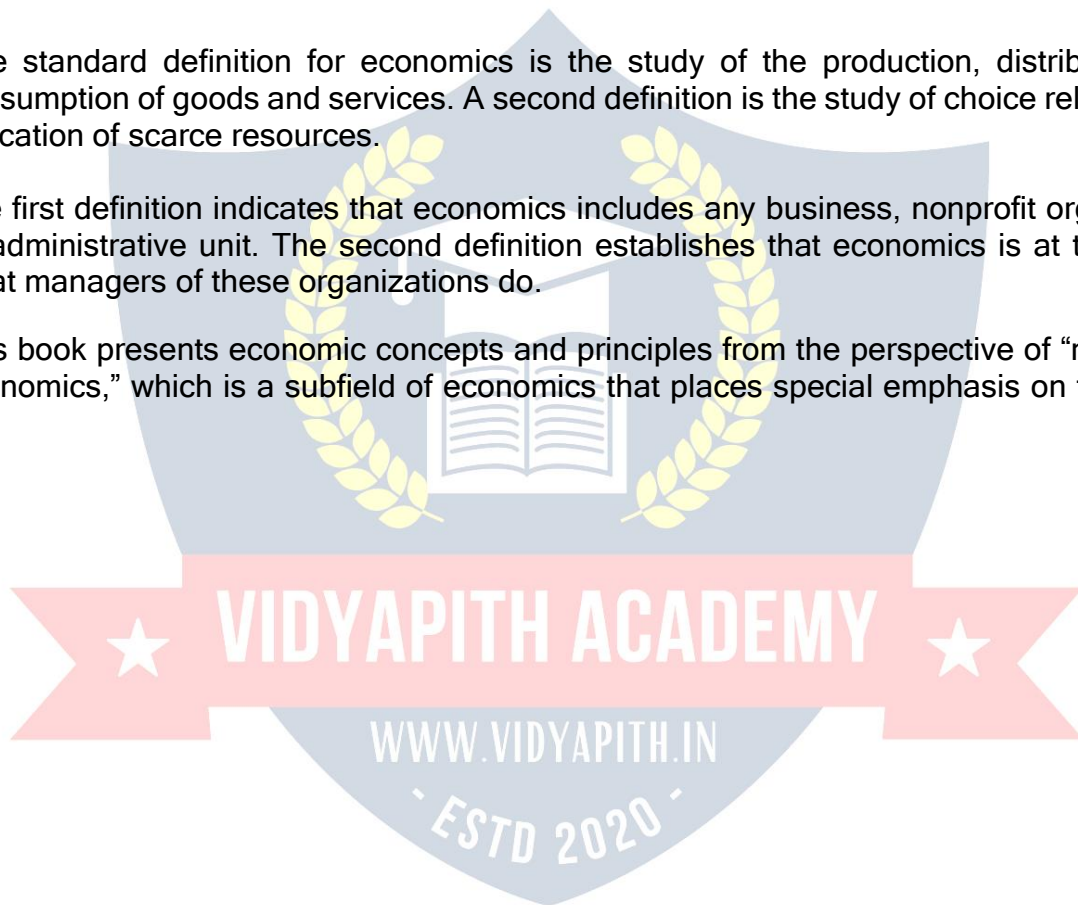
Managerial Economics

MANAGERIAL ECONOMICS

One standard definition for economics is the study of the production, distribution, and consumption of goods and services. A second definition is the study of choice related to the allocation of scarce resources.

The first definition indicates that economics includes any business, nonprofit organization, or administrative unit. The second definition establishes that economics is at the core of what managers of these organizations do.

This book presents economic concepts and principles from the perspective of “managerial economics,” which is a subfield of economics that places special emphasis on the choice



aspect in the second definition. The purpose of managerial economics is to provide economic terminology and reasoning for the improvement of managerial decisions.

Most readers will be familiar with two different conceptual approaches to the study of economics: microeconomics and macroeconomics.

Microeconomics studies phenomena related to goods and services from the perspective of individual decision-making entities—that is, households and businesses. Macroeconomics approaches the same phenomena at an aggregate level,

for example, the total consumption and production of a region. Microeconomics and macroeconomics each have their merits. The microeconomic approach is essential for understanding the behavior of atomic entities in an economy.

However, understanding the systematic interaction of the many households and businesses would be too complex to derive from descriptions of the individual units. The macroeconomic approach provides measures and theories to understand the overall systematic behavior of an economy.

Since the purpose of managerial economics is to apply economics for the improvement of managerial decisions in an organization, most of the subject material in managerial economics has a microeconomic focus.

However, since managers must consider the state of their environment in making decisions and the environment includes the overall economy, an understanding of how to interpret and forecast macroeconomic measures is useful in making managerial decisions.

Why Managerial Economics Is Relevant for Managers

In a civilized society, we rely on others in the society to produce and distribute nearly all the goods and services we need.

However, the sources of those goods and services are usually not other individuals but organizations created for the explicit purpose of producing and distributing goods and services.

Nearly every organization in our society—whether it is a business, nonprofit entity, or governmental unit—can be viewed as providing a set of goods, services, or both. The responsibility for overseeing and making decisions for these organizations is the role of executives and managers.

Most readers will readily acknowledge that the subject matter of economics applies to their organizations and to their roles as managers.

However, some readers may question whether their own understanding of economics is essential, just as they may recognize that physical sciences like chemistry and physics are at work in their lives but have determined they can function successfully without a deep understanding of those subjects.

Whether or not the readers are skeptical about the need to study and understand economics per se, most will recognize the value of studying applied business disciplines like marketing, production/operations management, finance, and business strategy.

These subjects form the core of the curriculum for most academic business and management programs, and most managers can readily describe their role in their organization in terms of one or more of these applied subjects.

A careful examination of the literature for any of these subjects will reveal that economics provides key terminology and a theoretical foundation.

Although we can apply techniques from marketing, production/operations management, and finance without understanding the underlying economics, anyone who wants to understand the why and how behind the technique needs to appreciate the economic rationale for the technique.

We live in a world with scarce resources, which is why economics is a practical science. We cannot have everything we want. Further, others want the same scarce resources we want.

Organizations that provide goods and services will survive and thrive only if they meet the needs for which they were created and do so effectively. Since the organization's customers also have limited resources, they will not allocate their scarce resources to acquire something of little or no value.

And even if the goods or services are of value, when another organization can meet the same need with a more favorable exchange for the customer, the customer will shift to the other supplier.

Put another way, the organization must create value for their customers, which is the difference between what they acquire and what they produce. The thesis of this book is that those managers who understand economics have a competitive advantage in creating value.

Managerial Economics Is Applicable to Different Types of Organizations

In this book, the organization providing goods and services will often be called a "business" or a "firm," terms that connote a for-profit organization. And in some portions of the book, we discuss principles that presume the underlying goal of the organization is to create profit.

However, managerial economics is relevant to nonprofit organizations and government agencies as well as conventional, for-profit businesses. Although the underlying objective may change based on the type of organization, all these organizational types exist for the purpose of creating goods or services for persons or other organizations.

Managerial economics also addresses another class of manager: the regulator. As we will discuss in the economic exchanges that result from organizations and persons trying to achieve their individual objectives may not result in the best overall pattern of exchange unless there is some regulatory guidance.

Economics provides a framework for analyzing regulation, both the effect on decision making by the regulated entities and the policy decisions of the regulator.

Managerial Economics : Definition

Managerial economics is a discipline which deals with the application of economic theory to business management. It deals with the use of economic concepts and principles of business decision making. Formerly it was known as "Business Economics" but the term has now been discarded in favor of Managerial Economics.

Managerial Economics may be defined as the study of economic theories, logic and methodology which are generally applied to seek solution to the practical problems of business.

Managerial Economics is thus constituted of that part of economic knowledge or economic theories which is used as a tool of analysing business problems for rational business decisions. Managerial Economics is often called as Business Economics or Economic for Firms.

Definition of Managerial Economics:

"Managerial Economics is economics applied in decision making. It is a special branch of economics bridging the gap between abstract theory and managerial practice." - Haynes, Mote and Paul.

"Business Economics consists of the use of economic modes of thought to analyse business situations." - McNair and Meriam

"Business Economics (Managerial Economics) is the integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management." - Spencer and Seegelman.

"Managerial economics is concerned with application of economic concepts and economic analysis to the problems of formulating rational managerial decision." - Mansfield

as defined by Edwin Mansfield is "concerned with application of the economic concepts and economic analysis to the problems of formulating rational managerial decision."^[1] It is sometimes referred to as business economics and is a branch of economics that applies microeconomic analysis to decision methods of businesses or other management units.

As such, it bridges economic theory and economics in practice. It draws heavily from quantitative techniques such as regression analysis, correlation and calculus.

If there is a unifying theme that runs through most of managerial economics, it is the attempt to optimize business decisions given the firm's objectives and given constraints imposed by scarcity, for example through the use of operations research, mathematical programming, game theory for strategic decisions,^[4] and other computational methods.

Managerial decision areas include:

- assessment of investible funds
- selecting business area
- choice of product
- determining optimum output
- determining price of product
- determining input-combination and technology
- Sales promotion.

Almost any business decision can be analyzed with managerial economics techniques, but it is most commonly applied to:

- Risk analysis - various models are used to quantify risk and asymmetric information and to employ them in decision rules to manage risk.
- Production analysis - microeconomic techniques are used to analyze production efficiency, optimum factor allocation, costs, economies of scale and to estimate the firm's cost function.
- Pricing analysis - microeconomic techniques are used to analyze various pricing decisions including transfer pricing, joint product pricing, price discrimination, price elasticity estimations, and choosing the optimum pricing method.
- Capital budgeting - Investment theory is used to examine a firm's capital purchasing decisions.^[7]

At universities, the subject is taught primarily to advanced undergraduates and graduate business schools. It is approached as an integration subject. That is, it integrates many concepts from a wide variety of prerequisite courses. In many countries it is possible to read for a degree in Business Economics which often covers managerial economics, financial economics, game theory, business forecasting and industrial economics.

Nature of Managerial Economics:

- The primary function of management executive in a business organisation is decision making and forward planning.
- Decision making and forward planning go hand in hand with each other. Decision making means the process of selecting one action from two or more alternative courses of action. Forward planning means establishing plans for the future to carry out the decision so taken.

- The problem of choice arises because resources at the disposal of a business unit (land, labor, capital, and managerial capacity) are limited and the firm has to make the most profitable use of these resources.
- The decision making function is that of the business executive, he takes the decision which will ensure the most efficient means of attaining a desired objective, say profit maximisation.

After taking the decision about the particular output, pricing, capital, raw-materials and power etc., are prepared. Forward planning and decision-making thus go on at the same time.

- A business manager's task is made difficult by the uncertainty which surrounds business decision-making. Nobody can predict the future course of business conditions.

He prepares the best possible plans for the future depending on past experience and future outlook and yet he has to go on revising his plans in the light of new experience to minimise the failure.

Managers are thus engaged in a continuous process of decision-making through an uncertain future and the overall problem confronting them is one of adjusting to uncertainty.

- In fulfilling the function of decision-making in an uncertainty framework, economic theory can be, pressed into service with considerable advantage as it deals with a number of concepts and principles which can be used to solve or at least throw some light upon the problems of business management.

E.g. are profit, demand, cost, pricing, production, competition, business cycles, national income etc. The way economic analysis can be used towards solving business problems, constitutes the subject-matter of Managerial Economics.

- Thus in brief we can say that Managerial Economics is both a science and an art.

Scope of Managerial Economics:

The scope of managerial economics is not yet clearly laid out because it is a developing science. Even then the following fields may be said to generally fall under Managerial Economics:

1. Demand Analysis and Forecasting
2. Cost and Production Analysis
3. Pricing Decisions, Policies and Practices
4. Profit Management
5. Capital Management

These divisions of business economics constitute its subject matter.

Recently, managerial economists have started making increased use of Operation Research methods like Linear programming, inventory models, Games theory, queuing up theory etc., have also come to be regarded as part of Managerial Economics.

1. **Demand Analysis and Forecasting:** A business firm is an economic organisation which is engaged in transforming productive resources into goods that are to be sold in the market. A major part of managerial decision making depends on accurate estimates of demand.

A forecast of future sales serves as a guide to management for preparing production schedules and employing resources. It will help management to maintain or strengthen its market position and profit base.

Demand analysis also identifies a number of other factors influencing the demand for a product. Demand analysis and forecasting occupies a strategic place in Managerial Economics.

2. **Cost and production analysis:** A firm's profitability depends much on its cost of production. A wise manager would prepare cost estimates of a range of output, identify the factors causing variations in cost estimates and choose the cost-minimising output level, taking also into consideration the degree of uncertainty in production and cost calculations.

Production processes are under the charge of engineers but the business manager is supposed to carry out the production function analysis in order to avoid wastages of materials and time.

Sound pricing practices depend much on cost control. The main topics discussed under cost and production analysis are: Cost concepts, cost-output relationships, Economics and Diseconomies of scale and cost control.

3. **.Pricing decisions, policies and practices:** Pricing is a very important area of Managerial Economics. In fact, price is the genesis of the revenue of a firm and as such the success of a business firm largely depends on the correctness of the price decisions taken by it.

The important aspects dealt with this area are: Price determination in various market forms, pricing methods, differential pricing, product-line pricing and price forecasting.

4. **Profit management:** Business firms are generally organized for earning profit and in the long period, it is profit which provides the chief measure of success of a firm. Economics tells us that profits are the reward for uncertainty bearing and risk taking.

A successful business manager is one who can form more or less correct estimates of costs and revenues likely to accrue to the firm at different levels of output. The more successful a manager is in reducing uncertainty, the higher are the profits earned by him.

In fact, profit-planning and profit measurement constitute the most challenging area of Managerial Economics.

5. **Capital management:** The problems relating to firm's capital investments are perhaps the most complex and troublesome.

Capital management implies planning and control of capital expenditure because it involves a large sum and moreover the problems in disposing the capital assets off are so complex that they require considerable time and labour.

The main topics dealt with under capital management are cost of capital, rate of return and selection of projects.

ECONOMIC THEORY & MANAGERIAL THEORY

Economic theory:- it is a system of interrelationships. Among the social sciences, economics is the most advanced in terms of theoretical orientations. There are well defined theoretical structures in economics.

One of the most widely discussed Structures is the postulation or axiomatic method of theory formulation. The theory of competitive equilibrium is entirely based on axiomatic method. Both in deductive inferences and inductive generalizations, the underlying principle is the interrelationships.

Managerial Theory:- Managerial theory refers to those aspects of economic theory and application which are directly relevant to the practice of management and the decision making process. Managerial theory is pragmatic it is concerned with those analytical tools which are useful in improving decision making.

Economic Theory Vs Managerial Theory

Economic theory deals with the body of principles. But managerial theory deals with the application of certain principles to solve the problem of the firm. Economic theory has the characteristics of both micro and macroeconomics.

But managerial theory has only micro characteristics. Economic theory deals with the study of individual firm as well as individual consumer. But managerial theory studies only individual firm.

Economic theory deals with a study of distribution theories of rent, wages interest and profits. But managerial theory deals with a study of only profit theories. Economic theory is based on certain assumptions. But in managerial theory these assumptions disappear due to practical situations.

Economic theory is both positive and normative in character but managerial theory is essentially normative in nature. Economic theory studies only economic aspects of the problem whereas managerial theory studies both economic and non economic aspects.

Nature of Managerial Economics

Decision Making:- Managerial Economics is a science applied to decision making.

It bridges the gap between abstract theory and managerial practice. Managerial Economics is supposed to enrich the conceptual and technical skill of a manager.

The primary function of a manager in business organization is decision making and forward planning under certain business conditions.

Some of the important managerial decisions: Production decision, inventory Decision, cost decision, marketing decision, financial decision, personnel decision, and miscellaneous decisions. One of the hallmarks of a good executive is the ability to take quick decision, he must have the clarity of goals, use all the information he can get, weigh pros and cons and make fast decisions.

Why Decisions are taken?

The decisions are taken to achieve certain objectives. Quantitative techniques are also used in decision making, but it is important to remember other variables such as human and behavioral considerations, technological forces and environmental factors influence the choices and decisions made by managers. Steps in Decision Making

- Set objectives
- Define the problem
- Find possible alternative solutions
- Select the best solution
- And proceed with that choice

Scope of Managerial Economics

Managerial Economics is a developing subject. The scope of managerial economics refers to its area of study. Its scope does not extend to macro-economic theory and the economics of public policy. Positive versus Normative Managerial Economic is fundamentally normative and perspective in nature Subject Matter of Managerial Economics

- Demand Analysis and Forecasting,
- Cost and production analysis

- Inventory management
- Advertising
- Pricing decision, policies and practices
- Profit management
- Capital management

1. **Demand Analysis & Forecasting:-** A major part of managerial decision making depends on accurate estimates of demand. When demand is estimated, the manager does not stop at the stage of assessing the current demand but estimates future demand as well.

This is what is called by demand forecasting. Demand analysis helps in identifying the various factors influencing the demand for a firm's product and provides guide lines to manipulate demand.

Cost and Production analysis• In decision making, cost estimates are very essential. The determinants of estimating costs, the relationship between cost and output, the forecast of cost and profit are vital to a firm.

2. **Inventory Management:-** An inventory refers to a stock of raw materials which a firm keeps. Managerial will use such methods as Economic order Quantity (EOQ) approach.

3. **Advertising:-** To produce a commodity is one thing and to market it is another. Expenditure on advertising and related types of promotional activities is called selling costs by economists. Methods of Advertising:

- Percentage of Sales Approach
- All You can Afford Approach
- Competitive Parity Approach
- Objective and task Approach
- Return on Investment Approach

4. **Pricing decision, Policies & Practices:-** When pricing a commodity, the cost of production has to be taken into account. Business decisions are greatly influenced by pervading market structure and the structure of markets that has been evolved by the nature of competition existing in the market.

Pricing is actually guided by consideration of cost plan pricing and the policies of public enterprises

5. **Profit Management:** - In appraising a company, we must first understand how profits arise. The concept of profit maximization is very useful in selecting the alternatives in making a decision at the firm level. Profit forecasting is an essential function of any management.

Managerial economics tries to find out the cause and effect relationship by factual study and logical reasoning. For example, the statement that profits are maximum when marginal revenue is equal to marginal cost, a substantial of economic analysis of this deductive proposition attempts specific conclusions about what should be done.

6. **Capital Management:-** Planning and control of capital expenditure is the basic executive function. The capital budgeting process takes different forms in different industries.

It involves the equimarginal principle. The objective is to assure the most profitable use of funds, which means that funds must not be applied when the marginal returns are less than in other uses.

Relation to other Branches of Knowledge

- Managerial Economics and Economics
- Managerial Economics and theory of decision making
- Managerial Economics and Operations research
- Managerial Economics and Statistics
- Managerial Economics and Accounting
- Managerial Economics and Mathematics

Managerial Economics & Economics

Managerial Economics has been described as economics applied to decision making. It may be studied as a special branch of economics, bridging the gap between pure economic theory and managerial practice.

Managerial Economics & Theory of Decision Making

Decision making is an integral part of today's business management. Economists are interested in the efficient use of scarce resources hence they are naturally interested in business decision problems and they apply economics in management of business problems. Hence managerial economics is economics applied in decision making

Managerial Economics & Operation Research

Mathematicians, statisticians, engineers and others teamed up together and developed models and analytical tools which have since grown into specialized subject, known as operation research. The basic purpose of the approach is to develop a scientific model of the system which may be utilized for policy making.

Managerial Economics and Statistics

Statistics is important to managerial economics. It provides the basis for the empirical testing of theory. Statistics is important in providing the individual firm with measures of the appropriate functional relationship involved in decision making. Statistics supplies many tools to managerial economics, forecasting has to be done. For this purpose, trend projections are used. Similarly regression technique is used.

Managerial Economics & Accounting

Managerial economics is closely related to accounting. It is concerned with recording the financial operation of a business firm. A business is started with the main aim of earning profit.

Managerial economics & Mathematics

Mathematics is another important subject closely related to managerial economics. For the derivation and exposition of economic analysis, we require a set of mathematical tools. The important branches of mathematics generally used by a managerial economist are geometry, algebra, and calculus.

Techniques or Methods of Managerial Economics

Managerial economics uses the following methods to explain and solve business problems of the firm:

- Scientific method
- The statistical method
- Method of intellectual experiment

1) **Scientific Method:** - Scientific method is a branch of study which is concerned with observed facts systematically classified and which includes trustworthy method for discovery of truths. Scientific method alone can bring about confidence in the validity of conclusions. We usually adopt an inductive as well as deductive approach in any analysis of managerial behavior.

2) **The Statistical Method:** - Statistical methods are a mechanical process designed to facilitate the condensation and analysis of the large body of quantitative data.

Statistical methods are used for such comparison among past, present and future estimates. For example, such methods as extrapolation can be applied for the

purpose of making future about the trends of demand and supply of a particular Commodity.

- 3) **Method of Intellectual Experiment:** - The fundamental problem in managerial economics is to find out the nature of any relationship between different variables such as cost, price and output. To analyze behavior we use models. A model is an abstraction from reality. A model may be in the form of diagram, a verbal description or a mathematical description. It can be classified in three categories:
- Iconic
 - Analogue
 - symbolic

Models are approximate representation of reality. Models can guide business executive to predict the future consequences

- 4) **The Method of Simulation:** - This method has gained popularity with the development of electronic computers. A manager has to take numerous decisions in the management of business which may be minor or major, simple or complex. They have to ensure once the decision is taken it is to be implemented within the minimum time and cost.
- 5) **The Historical Method:** - Past knowledge is pre-requisite for present knowledge. The historical method requires experience not only in collecting data but also in finding out their relations and significance in particular context. For applying historical method, the managerial economist should be familiar with the general field of this topic.
- 6) **The Descriptive Method:** - This method is used to describe the organization and functioning of the institutions and the policies which have economic significance. This method provides empirical and logical basis for drawing conclusions and gaining knowledge. Thus it enables the managerial economist to describe or present the picture of a phenomenon under investigation

Role of Managerial Economist in Business Decision

Decision making is integral part of today's business management. Making a decision is one of the most difficult tasks faced by a professional manager. Managerial decisions are based on the flow of information. Decision making is both managerial function and organizational process.

Purpose of the decision

The purpose of the decision making as well as planning is to direct human behavior and effort towards a future goal or objective. A good decision is one that is based on logic, considers all available data and possible alternatives and applies the quantitative approach.

Role of Managerial Economist in Business Decision

- The basic decisions are those which are very important, a serious mistake will endanger the company's existence.
- The selection of location
- The selection of product line
- The decision relating to manage the business are all basic decisions

Decisions

1. Production decision

Production is an economic activity which supplies goods and services for sale in a market to satisfy human wants; thereby profit maximization is made possible. A manager may face problems relating to best combination of the factors to gain maximum profit or how to use different machine hours for maximum production advantage

2. Inventory Decision

The decision to hold inventories to meet demand is quite important for a firm and the level of inventories serves as a guide to plan production and is therefore a strategic management variable.

- 3. Cost Decision:**-In the absence of cost control, profits would come down due to increasing cost.
- 4. Marketing Decision:-** The marketing executive must make decisions on target market, market positioning, product development, pricing channels of distribution communication and promotion. Marketing Decision are of 2 types:-
 - Sales Decision:- Sales decision is concerned with how much to produce and sell for maximizing profit.
 - Purchase decision:- The purchase decision is concerned with the objective of acquiring these resources at the lowest possible prices so as to maximize profit.
- 5. Investment Decision:** - The problem of risks and imperfect foresight are very crucial for the investment decision. Investment decision covers issues like the

decisions regarding the amount of money for capital investment, the source of financing this investment, allocation of this investment among different projects overtime.

- 6. Personnel Decision:-** Personnel decisions cover the areas of manpower planning, recruitment, selection, training and development, performance appraisal

Role and Responsibilities of a Managerial Economist

With the advent of managerial revolution and transition from owner- manager to professional executive, the managerial economist have occupied an important place in modern business.

Organizationally, a managerial economist is placed nearer to the policy maker simple because his main role is to improve the quality of policy making as it affects short term operation and long range planning.

External and internal Factors

The prime duty of managerial economist is to make extensive study of the business environment and external factors affecting the firm's interest.

i. What are the current trends in the local? ii.

What about the size of the population iii. Is

competition increase or decrease iv. Are

fashions, tastes and preferences undergoing

Internal factors:-The managerial economist can help the management in making Decision regarding the internal operations of a firm in respect of such problems as cost structure, forecasting of demand and price.

i. What should be the production schedule?

ii. What should be the profit? iii. What

type of technology should be adopted?

iv. What strategies have to be adopted?

v. What are the factors influencing the input cost

Responsibilities of Managerial Economist

The study and interpretation of economic data in the light of problems of the management. The managerial economist should be in a position to spare more time and thought on problems of an economic nature than the firm's administration.

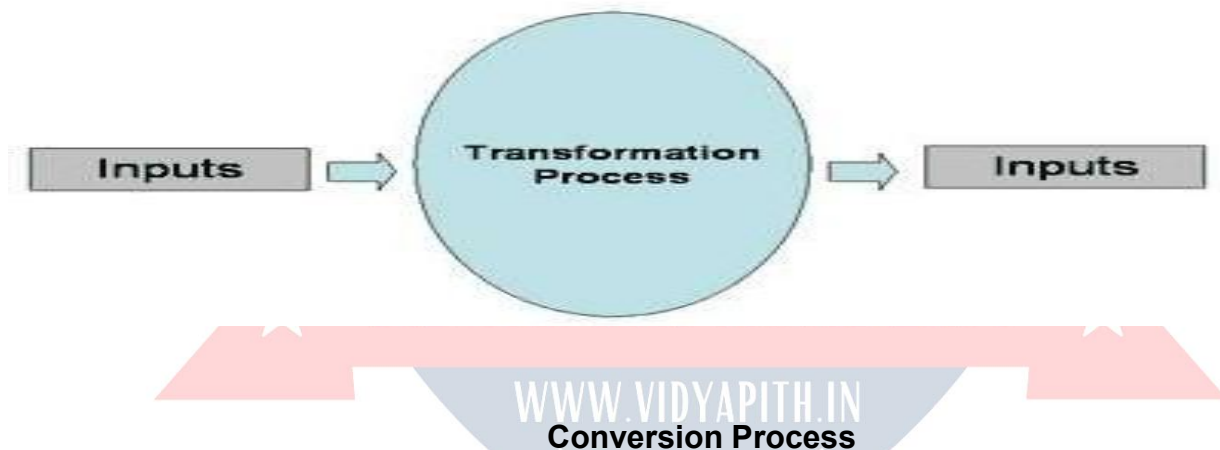
The most important obligation of a managerial economist is that his objective must coincide with that of the business.

The other important is to make accurate forecast A managerial economist should enlarge the area of certainty To discharge his role successfully, he must recognize his responsibilities. A manager should contribute the profitable growth of the firm through his realistic attitude.

INTRODUCTION TO PRODUCTION AND OPERATIONS MANAGEMENT

Definition

Production and Operations Management ("POM") is about the transformation of production and operational inputs into "outputs" that, when distributed, meet the needs of customers.



The process in the above diagram is often referred to as the "**Conversion Process**". There are several different methods of handling the conversion or production process - **Job, Batch, Flow and Group**. POM incorporates many tasks that are interdependent, but which can be grouped under five main headings:

PRODUCT

Marketers in a business must ensure that a business sells products that meet customer needs and wants. The role of Production and Operations is to ensure that the business actually makes the required products in accordance with the plan. The role of PRODUCT in POM therefore concerns areas such as:

- Performance
- Aesthetics
- Quality
- Reliability
- Quantity
- Production costs - Delivery dates

PLANT

To make PRODUCT, PLANT of some kind is needed. This will comprise the bulk of the fixed assets of the business. In determining which PLANT to use, management must consider areas such as:

- Future demand (volume, timing)
- Design and layout of factory, equipment, offices
- Productivity and reliability of equipment
- Need for (and costs of) maintenance
- Health and safety (particularly the operation of equipment) - Environmental issues (e.g. creation of waste products)

PROCESSES

There are many different ways of producing a product. Management must choose the best process, or series of processes. They will consider:

- Available capacity
- Available skills
- Type of production
- Layout of plant and equipment
- Safety
- Production costs
- Maintenance requirements

PROGRAMMES

The production PROGRAMME concerns the dates and times of the products that are to be produced and supplied to customers. The decisions made about programmer will be influenced by factors such as:

- Purchasing patterns (e.g. lead time)
- Cash flow
- Need for / availability of storage
- Transportation

PEOPLE

Production depends on PEOPLE, whose skills, experience and motivation vary. Key people-related decisions will consider the following areas:

- Wages and salaries
- Safety and training
- Work conditions
- Leadership and motivation
- Unionization
- Communication

INTRODUCTION TO PRODUCTION AND OPERATION MANAGEMENT

Production management becomes the acceptable term from 1930s to 1950s. As F.W. Taylor's works become more widely known, managers developed techniques that focused on economic efficiency in manufacturing. Workers were studied in great detail to eliminate wasteful efforts and achieve greater efficiency. At the same time, psychologists, socialists and other social scientists began to study people and human behavior in the working environment. In addition, economists, mathematicians, and computer socialists contributed newer, more sophisticated analytical approaches. With the 1970s emerge two distinct changes in our views. The most obvious of these, Reflected in the new name operations management was a shift in the service and manufacturing sectors of the economy. As service sector became more prominent, the change from 'production' to 'operations' emphasized the broadening of our field to service organizations. The second, more suitable change was the beginning of an emphasis on synthesis, rather than just analysis, in management practices.

CONCEPT OF PRODUCTION

Production function is that part of an organization, which is concerned with the transformation of a range of inputs into the required outputs (products) having the requisite quality level. Production is defined as "the step-by-step conversion of one form of material into another form through chemical or mechanical process to create or enhance the utility of the product to the user." Thus production is a value addition process. At each stage of processing, there will be value addition. Edwood Buffa defines production as 'a process by which goods and services are created'. Some examples of production are: manufacturing custom-made products like, boilers with a Specific capacity, constructing flats, some structural fabrication works for selected customers, etc., and manufacturing standardized products like, car, bus, motor cycle, radio, television, etc.

PRODUCTION SYSTEM

The production system of an organization is that part, which produces products of an organization. It is that activity whereby resources, flowing within a defined system, are combined and transformed in a controlled manner to add value in accordance with the

policies communicated by management. A simplified production system is shown above.

The production system has the following characteristics:

1. Production is an organized activity, so every production system has an objective.
2. The system transforms the various inputs to useful outputs.
3. It does not operate in isolation from the other organization system.
4. There exists a feedback about the activities, which is essential to control and improve System performance.

Classification of Production System

Production systems can be classified as Job Shop, Batch, Mass and Continuous Production systems.

• **JOB SHOP PRODUCTION**

Job shop production are characterized by manufacturing of one or few quantity of products Designed and produced as per the specification of customers within prefixed time and cost. The Distinguishing feature of this is low volume and high variety of products. A job shop comprises of general purpose machines arranged into different departments. Each job demands unique technological requirements, demands processing on machines in a certain sequence.

Characteristics

The Job-shop production system is followed when there is:

1. High variety of products and low volume.
2. Use of general purpose machines and facilities.
3. Highly skilled operators who can take up each job as a challenge because of uniqueness.
4. Large inventory of materials, tools, parts.
5. Detailed planning is essential for sequencing the requirements of each product, capacities for each work centre and order priorities.

Advantages

Following are the advantages of job shop production:

1. Because of general purpose machines and facilities variety of products can be produced.
2. Operators will become more skilled and competent, as each job gives them learning opportunities.
3. Full potential of operators can be utilized.
4. Opportunity exists for creative methods and innovative ideas.

Limitations

Following are the limitations of job shop production:

1. Higher cost due to frequent set up changes.
2. Higher level of inventory at all levels and hence higher inventory cost.
3. Production planning is complicated.
4. Larger space requirements.

• **BATCH PRODUCTION**

Batch production is defined by American Production and Inventory Control Society (APICS) "as a form of manufacturing in which the job passes through the functional departments in lots or batches and each lot may have a different routing." It is characterized by the manufacture of limited number of products produced at regular intervals and stocked awaiting sales.

Characteristics

Batch production system is used under the following circumstances:

1. When there is shorter production runs.
2. When plant and machinery are flexible.
3. When plant and machinery set up is used for the production of item in a batch and change of set up is required for processing the next batch.
4. When manufacturing lead time and cost are lower as compared to job order production.

Advantages

Following are the advantages of batch production:

1. Better utilization of plant and machinery.
2. Promotes functional specialization.
3. Cost per unit is lower as compared to job order production.
4. Lower investment in plant and machinery.
5. Flexibility to accommodate and process number of products.
6. Job satisfaction exists for operators.

Limitations

Following are the limitations of batch production:

1. Material handling is complex because of irregular and longer flows.
2. Production planning and control is complex.
3. Work in process inventory is higher compared to continuous production.
4. Higher set up costs due to frequent changes in set up.

• **MASS PRODUCTION**

Manufacture of discrete parts or assemblies using a continuous process are called mass production. This production system is justified by very large volume of production. The machines are arranged in a line or product layout. Product and process standardization exists and all outputs follow the same path.

Characteristics

Mass production is used under the following circumstances:

1. Standardization of product and process sequence.
2. Dedicated special purpose machines having higher production capacities and output rates.
3. Large volume of products.
4. Shorter cycle time of production.
5. Lower in process inventory.
6. Perfectly balanced production lines.
7. Flow of materials, components and parts is continuous and without any back tracking.
8. Production planning and control is easy.

9. Material handling can be completely automatic.

Advantages

Following are the advantages of mass production:

1. Higher rate of production with reduced cycle time.
2. Higher capacity utilization due to line balancing.
3. Less skilled operators are required.
4. Low process inventory.
5. Manufacturing cost per unit is low.

Limitations

Following are the limitations of mass production:

1. Breakdown of one machine will stop an entire production line.
2. Line layout needs major change with the changes in the product design.
3. High investment in production facilities.

• **CONTINUOUS PRODUCTION**

Production facilities are arranged as per the sequence of production operations from the first operations to the finished product. The items are made to flow through the sequence of operations through material handling devices such as conveyors, transfer devices, etc.

Characteristics

Continuous production is used under the following circumstances:

1. Dedicated plant and equipment with zero flexibility.
2. Material handling is fully automated.
3. Process follows a predetermined sequence of operations.
4. Component materials cannot be readily identified with final product.
5. Planning and scheduling is a routine action.

Advantages

Following are the advantages of continuous production:

1. Standardization of product and process sequence.
2. Higher rate of production with reduced cycle time.
3. Higher capacity utilization due to line balancing.
4. Manpower is not required for material handling as it is completely automatic.
5. Person with limited skills can be used on the production line.
6. Unit cost is lower due to high volume of production.

Limitations

Following are the limitations of continuous production:

1. Flexibility to accommodate and process number of products does not exist.
2. Very high investment for setting flow lines.
3. Product differentiation is limited.

PRODUCTION MANAGEMENT

Production management is a process of planning, organizing, directing and controlling the activities of the production function. It combines and transforms various resources used in the production subsystem of the organization into value added product in a controlled manner as per the policies of the organization.

E.S. Buffa defines production management as, “Production management deals with Decision making related to production processes so that the resulting goods or services are produced according to specifications, in the amount and by the schedule demanded and out of minimum cost.”

Objectives of Production Management

The objective of the production management is ‘to produce goods services of right quality and quantity at the right time and right manufacturing cost’.

1. RIGHT QUALITY

The quality of product is established based upon the customers’ needs. The right quality is not necessarily best quality. It is determined by the cost of the product and the technical characteristics as suited to the specific requirements.

2. RIGHT QUANTITY

The manufacturing organization should produce the products in right number. If they are produced in excess of demand the capital will block up in the form of inventory and if the quantity is produced in short of demand, leads to shortage of products.

3. RIGHT TIME

Timeliness of delivery is one of the important parameter to judge the effectiveness of production department. So, the production department has to make the optimal utilization of input resources to achieve its objective.

4. RIGHT MANUFACTURING COST

Manufacturing costs are established before the product is actually manufactured. Hence, all attempts should be made to produce the products at pre-established cost, so as to reduce the variation between actual and the standard (pre-established) cost.

OPERATING SYSTEM

Operating system converts inputs in order to provide outputs which are required by a customer. It converts physical resources into outputs, the function of which is to satisfy customer wants i.e., to provide some utility for the customer. In some of the organization the product is a physical good (hotels) while in others it is a service (hospitals). Bus and taxi services, tailors, hospital and builders are the examples of an operating system.

Everett E. Adam & Ronald J. Ebert define operating system as, “An operating system (function) of an organization is the part of an organization that produces the organization’s physical goods and services.”

Ray Wild defines operating system as, “An operating system is a configuration of resources combined for the provision of goods or services.”

Concept of Operations

An operation is defined in terms of the mission it serves for the organization, technology it employs and the human and managerial processes it involves. Operations in an organization can be categorized into manufacturing operations and service operations. Manufacturing operations is a conversion process that includes manufacturing yields a tangible output: a product, whereas, a conversion process that includes service yields an intangible output: a deed, a performance, an effort.

Distinction between Manufacturing Operations and Service Operations

Following characteristics can be considered for distinguishing manufacturing operations with service operations:

1. Tangible/Intangible nature of output
2. Consumption of output
3. Nature of work (job)
4. Degree of customer contact
5. Customer participation in conversion
6. Measurement of performance.

Manufacturing is characterized by tangible outputs (products), outputs that customers consume overtime, jobs that use less labor and more equipment, little customer contact, no customer participation in the conversion process (in production), and sophisticated methods for measuring production activities and resource consumption as product are made. Service is characterized by intangible outputs, outputs that customers consumes immediately, jobs that use more labor and less equipment, direct consumer contact, frequent customer participation in the conversion process, and elementary methods for measuring conversion activities and resource consumption. Some services are equipment based namely rail-road services, telephone

Services and some are people based namely tax consultant services, hair styling.

OPERATIONS MANAGEMENT

Framework for Managing Operations

Managing operations can be enclosed in a frame of general management function. Operation managers are concerned with planning, organizing, and controlling the activities which affect human behavior through models.

- **PLANNING**

Activities that establishes a course of action and guide future decision-making is planning. The operations manager defines the objectives for the operations subsystem of the organization, and the policies, and procedures for achieving the objectives. This stage includes clarifying the role and focus of operations in the organization's overall strategy. It also involves product planning, facility designing and using the conversion process.

- **ORGANIZING**

Activities that establishes a structure of tasks and authority. Operation managers establish a structure of roles and the flow of information within the operations subsystem. They determine the activities required to achieve the goals and assign authority and responsibility for carrying them out.

- **CONTROLLING**

Activities that assure the actual performance in accordance with planned performance. To ensure that the plans for the operations subsystems are accomplished, the operations manager must exercise control by measuring actual outputs and comparing them to planned operations management. Controlling costs, quality, and schedules are the important functions here.

- **BEHAVIOUR**

Operation managers are concerned with how their efforts to plan, organize, and control affect human behavior. They also want to know how the behavior of subordinates can affect management's planning, organizing, and controlling actions. Their interest lies in decision-making behavior.

• **MODELS**

As operation managers plan, organize, and control the conversion process, they encounter many problems and must make many decisions. They can simplify their difficulties using models like aggregate planning models for examining how best to use existing capacity in short-term, break even analysis to identify break even volumes, linear programming and computer simulation for capacity utilization, decision tree analysis for long-term capacity problem of facility expansion, simple median model for determining best locations of facilities etc.

Objectives of Operations Management

Objectives of operations management can be categorized into customer service and resource utilization.

CUSTOMER SERVICE

The first objective of operating systems is the customer service to the satisfaction of customer wants. Therefore, customer service is a key objective of operations management. The operating system must provide something to a specification which can satisfy the customer in terms of cost and timing. Thus, primary objective can be satisfied by providing the 'right thing at a right price at the right time'. These aspects of customer service—specification, cost and timing—are described for four functions in They are the principal sources of customer satisfaction and must, therefore, be the principal dimension of the customer service objective for operations managers.

Principal customer wants	Function	Primary considerations	Other considerations
Manufacture Goods of a given, requested or	Cost, i.e., purchase price or cost of obtaining goods.	Acceptable specification	Timing, i.e., delivery delays from order or request to receipt of goods.

Transport Management of a given, requested	Cost, i.e., cost of movements.	Timing, i.e., or acceptable specification	1. Duration or time to move.
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2. Wait or delay from requesting to its commencement.	Supply Goods of a given, requested or	Cost, i.e., purchase price or cost of obtaining acceptable specification goods.	Timing, i.e., delivery delay from order or request to receipt of goods.
Service Treatment of a given, requested or	Cost, i.e., cost of movements.	Acceptable specification	Timing, i.e.

1. Duration or time required for treatment.

2. Wait or delay from requesting treatment to its commencement.

Generally an organization will aim reliably and consistently to achieve certain standards and operations manager will be influential in attempting to achieve these standards.

Hence, this objective will influence the operations manager's decisions to achieve the required customer service.

RESOURCE UTILISATION

Another major objective of operating systems is to utilize resources for the satisfaction of customer wants effectively, i.e., customer service must be provided with the achievement of effective operations through efficient use of resources. Inefficient use of resources or inadequate customer service leads to commercial failure of an operating system. Operations management is concerned essentially with the utilization of resources, i.e., obtaining maximum effect from resources or minimizing their loss, under utilization or waste.

The extent of the utilization of the resources' potential might be expressed in terms of the proportion of available time used or occupied, space utilization, levels of activity, etc. Each measure indicates the extent to which the potential or capacity of such resources is utilized. This is referred as the objective of resource utilization. Operations management is also concerned with the achievement of both satisfactory customer service and resource utilization.

An improvement in one will often give rise to deterioration in the other. Often both cannot be maximized, and hence a satisfactory performance must be achieved on both objectives. All the activities of operations management must be tackled with these two objectives in mind, and many of the problems will be faced by operations managers because of this conflict. Hence, operations managers must attempt to balance these basic objectives.

Summarizes the twin objectives of operations management. The type of balance Established both between and within these basic objectives will be influenced by market Considerations, competitions, the strengths and weaknesses of the organization, etc. Hence, the operations managers should make a contribution when these objectives are set.

MANAGING GLOBAL OPERATIONS

The term 'globalization' describes businesses' deployment of facilities and operations around the world. Globalization can be defined as a process in which geographic distance becomes a factor of diminishing importance in the establishment and maintenance of cross border economic, political and socio-cultural relations. It can also be defined as worldwide drive toward a globalized economic system dominated by supranational corporate trade and banking institutions that are not accountable to democratic processes or national governments. There are four developments, which have spurred the trend toward globalization. These are:

1. Improved transportation and communication technologies;
2. Opened financial systems;
3. Increased demand for imports; and
4. Reduced import quotas and other trade barriers.

When a firm sets up facilities abroad it involve some added complexities in its operation. Global markets impose new standards on quality and time. Managers should not think about domestic markets first and then global markets later, rather it could be think globally and act

The customer service objective.

To provide agreed/adequate levels of customer service (and hence customer satisfaction) by providing goods or services with the right specification, at the right cost and at the right time.

The resource utilization objective. To achieve adequate levels of resource utilization (or productivity) e.g., to achieve agreed levels of utilization of materials, machines and labor. Locally. Also, they must have a good understanding of their competitors. Some other important challenges of managing multinational operations include other languages and customs, different management style, unfamiliar laws and regulations, and different costs. Managing global operations would focus on the following key issues:

- To acquire and properly utilize the following concepts and those related to global operations, supply chain, logistics, etc.
- To associate global historical events to key drivers in global operations from different perspectives.
- To develop criteria for conceptualization and evaluation of different global operations.
- To associate success and failure cases of global operations to political, social, economical and technological environments.
- To envision trends in global operations.
- To develop an understanding of the world vision regardless of their country of origin, residence or studies in a respectful way of perspectives of people from different races, studies, preferences, religion, politic affiliation, place of origin, etc.

SCOPE OF PRODUCTION AND OPERATIONS MANAGEMENT

Production and operations management concern with the conversion of inputs into outputs, using physical resources, so as to provide the desired utilities to the customer while meeting the other organizational objectives of effectiveness, efficiency and adoptability. It distinguishes itself from other functions such as personnel, marketing, finance, etc., by its primary concern for 'conversion by using physical resources.' Following are the activities which are listed under production and operations management functions:

1. Location of facilities
2. Plant layouts and material handling
3. Product design
4. Process design
5. Production and planning control
6. Quality control
7. Materials management

1. LOCATION OF FACILITIES

Location of facilities for operations is a long-term capacity decision which involves a long term commitment about the geographically static factors that affect a business organization. It is an important strategic level decision-making for an organization. It deals with the questions such as 'where our main operations should be based?' The selection of location is a key-decision as large investment is made in building plant and

machinery. An improper location of plant may lead to waste of all the investments made in plant and machinery equipments. Hence, location of plant should be based on the company's expansion and policy, diversification plan for the products, changing sources of raw materials and many other factors. The purpose of the location study is to find the optimal location that will results in the greatest advantage to the organization.

2. PLANT LAYOUT AND MATERIAL HANDLING

Plant layout refers to the physical arrangement of facilities. It is the configuration of departments, work centers and equipment in the conversion process. The overall objective of the plant layout is to design a physical arrangement that meets the required output quality and quantity most economically. According to James Moore, "Plant layout is a plan of an optimum arrangement of facilities including personnel,

operating equipment, storage space, material handling Equipments and all other supporting services along with the design of best structure to contain all these facilities”.

‘Material Handling’ refers to the ‘moving of materials from the store room to the machine and from one machine to the next during the process of manufacture’. It is also defined as the ‘art and science of moving, packing and storing of products in any form’. It is a specialized activity for a modern manufacturing concern, with 50 to 75% of the cost of production. This cost can be reduced by proper section, operation and maintenance of material handling devices. Material handling devices increases the output, improves quality, speeds up the deliveries and decreases the cost of production. Hence, material handling is a prime consideration in the designing new plant and several existing plants.

3. PRODUCT DESIGN

Product design deals with conversion of ideas into reality. Every business organization have to design, develop and introduce new products as a survival and growth strategy. Developing the new products and launching them in the market is the biggest challenge faced by the organizations. The entire process of need identification to physical manufactures of product involves three functions: marketing, product development, and manufacturing. Product development trans lattes the needs of customers given by marketing into technical specifications and designing the various features into the product to these specifications. Manufacturing has the responsibility of selecting the processes by which the product can be manufactured. Product design and development provides link between marketing, customer needs and expectations and the activities required to manufacture the product.

4. PROCESS DESIGN

Process design is a macroscopic decision-making of an overall process route for converting the raw material into finished goods. These decisions encompass the selection of a process, choice of technology, process flow analysis and layout of the facilities. Hence, the important decisions in process design are to analyze the workflow for converting raw material into finished product and to select the workstation for each included in the workflow.

5. PRODUCTION PLANNING AND CONTROL

Production planning and control can be defined as the process of planning the production in advance, setting the exact route of each item, fixing the starting and finishing dates for each item, to give production orders to shops and to follow up the progress of products according to orders. The principle of production planning and control lies in the statement ‘First Plan Your Work and then Work on Your Plan’. Main functions of production planning and control includes planning, routing, scheduling, dispatching and follow-up.

- **Planning** is deciding in advance what to do, how to do it, when to do it and who is to do it. Planning bridges the gap from where we are, to where we want to go. It makes it possible for things to occur which would not otherwise happen.
- **Routing** may be defined as the selection of path which each part of the product will follow, which being transformed from raw material to finished products. Routing determines the most advantageous path to be followed from department to department and machine to machine till raw material gets its final shape.

- **Scheduling** determines the programmer for the operations. Scheduling may be defined as 'the fixation of time and date for each operation' as well as it determines the sequence of operations to be followed.
- **Dispatching** is concerned with the starting the processes. It gives necessary authority so as to start a particular work, which has already been planned under 'Routing' an 'Scheduling'. Therefore, dispatching is 'release of orders and instruction for the starting of production for anytime in acceptance with the route sheet and schedule charts'. The function of **follow-up** is to report daily the progress of work in each shop in a prescribed preformed and to investigate the causes of deviations from the planned performance.

6. QUALITY CONTROL

Quality Control (QC) may be defined as 'a system that is used to maintain a desired level of quality in a product or service'. It is a systematic control of various factors that affect the quality of the product. Quality control aims at prevention of defects at the source, relies on effective feedback system and corrective action procedure.

Quality control can also be defined as 'that industrial management technique by means which product of uniform acceptable quality is manufactured'. It is the entire collection of Activities which ensures that the operation will produce the optimum quality products at minimum cost. The main objectives of quality control are:

- To improve the companies income by making the production more acceptable to the customers i.e., by providing long life, greater usefulness, maintainability, etc.
- To reduce companies cost through reduction of losses due to defects.
- To achieve interchangeability of manufacture in large scale production.
- To produce optimal quality at reduced price.
- To ensure satisfaction of customers with productions or services or high quality level, to build customer goodwill, confidence and reputation of manufacturer.
- To make inspection prompt to ensure quality control.
- To check the variation during manufacturing.

MATERIALS MANAGEMENT

Materials management is that aspect of management function which is primarily concerned with the acquisition, control and use of materials needed and flow of goods and services connected with the production process having some predetermined objectives in view. The main objectives of materials management are:

- To minimize material cost.
- To purchase, receive, transport and store materials efficiently and to reduce the related cost.
- To cut down costs through simplification, standardization, value analysis, import substitution, etc.
- To trace new sources of supply and to develop cordial relations with them in order to ensure continuous supply at reasonable rates.
- To reduce investment tied in the inventories for use in other productive purposes and to develop high inventory turnover ratios.

MAINTENANCE MANAGEMENT

In modern industry, equipment and machinery are a very important part of the total productive effort. Therefore, their idleness or downtime becomes are very expensive.

Hence, it is very important that the plant machinery should be properly maintained.

The main objectives of maintenance management are:

1. To achieve minimum breakdown and to keep the plant in good working condition at the lowest possible cost.
2. To keep the machines and other facilities in such a condition that permits them to be used at their optimal capacity without interruption.
3. To ensure the availability of the machines, buildings and services required by other sections of the factory for the performance of their functions at optimal return on investment.



Quality management ensures that an organization, product or service is consistent. It has four main components: quality planning, quality control, quality assurance and quality also the means to achieve it. Quality management therefore uses quality assurance and improvement. Quality management is focused not only on product and service quality, but control of processes as well as products to achieve more consistent quality.

Principles

The International Standard for Quality management (ISO 9001:2008) adopts a number of management principles that can be used by top management to guide their organizations towards improved performance.

Customer focus

Since the organizations depend on their customers, they should understand current and future customer needs, should meet customer requirements and should try to exceed the expectations of customers. An organization attains customer focus when all people in the organization know both the internal and external customers and also what customer requirements must be met to ensure that both the internal and external customers are satisfied.

Leadership

Leaders of an organization establish unity of purpose and direction of it. They should go for creation and maintenance of such an internal environment, in which people can become fully involved in achieving the organization's quality objective.

Involvement of people

People at all levels of an organization are the essence of it. Their complete involvement enables their abilities to be used for the benefit of the organization.

Process approach

The desired result can be achieved when activities and related resources are managed in an organization as a process.

System approach to management

An organization's effectiveness and efficiency in achieving its quality objectives are contributed by identifying, understanding and managing all interrelated processes as a system. Quality Control involves checking transformed and transforming resources in all stages of production process.

Continual improvement

One of the permanent quality objectives of an organization should be the continual improvement of its overall performance, leveraging clear and concise PPMs (Process Performance Measures).

Factual approach to decision making

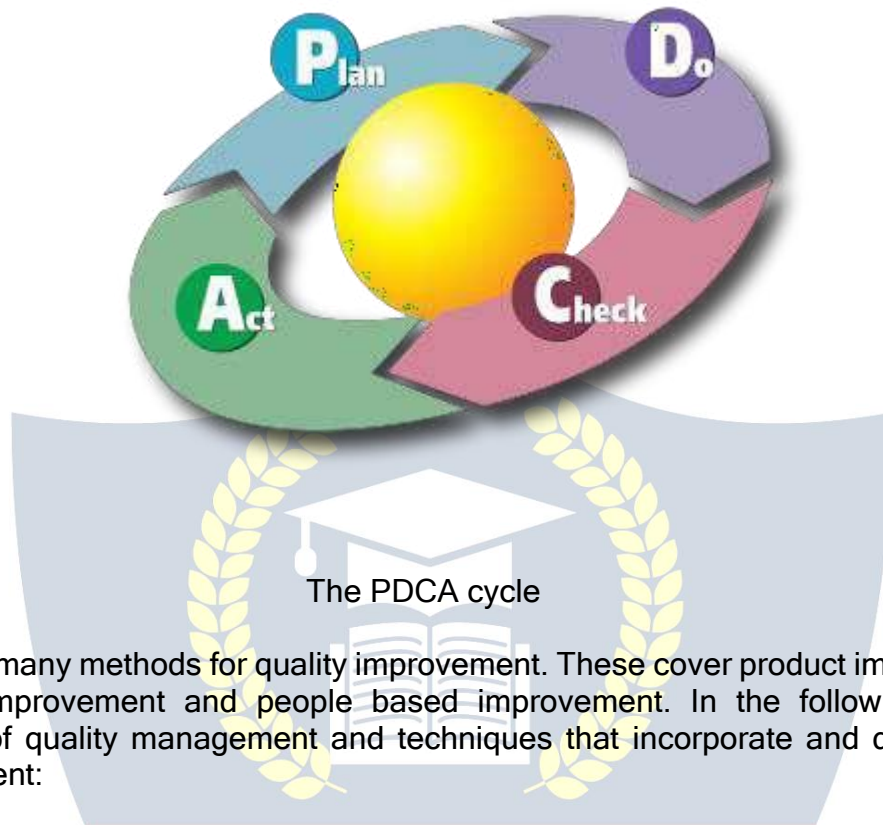
Effective decisions are always based on the data analysis and information.

Mutually beneficial supplier relationships

Since an organization and its suppliers are interdependent, therefore a mutually beneficial relationship between them increases the ability of both to add value.

These eight principles form the basis for the quality management system standard ISO 9001:2008.

Quality improvement



There are many methods for quality improvement. These cover product improvement, process improvement and people based improvement. In the following list are methods of quality management and techniques that incorporate and drive quality improvement:

Quality standards

The International Organization for Standardization (ISO) created the Quality Management System (QMS) standards in 1987. They were the ISO 9000:1987 series of standards comprising ISO 9001:1987, ISO 9002:1987 and ISO 9003:1987; which were applicable in different types of industries, based on the type of activity or process: designing, production or service delivery.

The standards are reviewed every few years by the International Organization for Standardization. The version in 1994 was called the ISO 9000:1994 series; consisting of the ISO 9001:1994, 9002:1994 and 9003:1994 versions.

The last major revision was in the year 2008 and the series was called ISO 9000:2000 series. The ISO 9002 and 9003 standards were integrated into one single certifiable standard: ISO 9001:2000. After December 2003, organizations holding ISO 9002 or 9003 standards had to complete a transition to the new standard.

ISO released a minor revision, ISO 9001:2008 on 14 October 2008. It contains no new requirements. Many of the changes were to improve consistency in grammar,

facilitating translation of the standard into other languages for use by over 950,000 certified organization in the 175 countries (as at Dec 2007) that use the standard.

The ISO 9004:2009 document gives guidelines for performance improvement over and above the basic standard (ISO 9001:2000). This standard provides a measurement framework for improved quality management, similar to and based upon the measurement framework for process assessment.

The Quality Management System standards created by ISO are meant to certify the processes and the system of an organization, not the product or service itself. ISO 9000 standards do not certify the quality of the product or service.

In 2005 the International Organization for Standardization released a standard, ISO 22000, meant for the food industry. This standard covers the values and principles of ISO 9000 and the HACCP standards. It gives one single integrated standard for the food industry and is expected to become more popular in the coming years in such industry. ISO has also released standards for other industries. For example Technical Standard TS 16949 defines requirements in addition to those in ISO 9001:2008 specifically for the automotive industry. ISO has a number of standards that support quality management. One group describes processes (including ISO/IEC 12207 & ISO/IEC 15288) and another describes process assessment and improvement ISO 15504. The Software Engineering Institute has its own process assessment and improvement methods, called CMMi (Capability Maturity Model – integrated) and IDEAL respectively.

ELEMENTS OF A QUALITY SYSTEM

There are several elements to a quality system, and each organization is going to have a unique system. The most important elements of a quality system include participative management, quality system design, customers, purchasing, education and training, statistics, auditing, and technology.

- ✓ **Participative Management** The entire quality process, once started, will be an ongoing dynamic part of the organization, just like any other department such as marketing or accounting. It will also need the continuous focus of management. The implementation and management of a successful quality system involves many different aspects that must be addressed on a continuous basis.
- ✓ **Vision and Values.** The starting point for the management and leadership process is the formation of a well-defined vision and value statement. This statement will be used to establish the importance of the quality system and build motivation for the changes that need to take place, whether the organization plans to exceed customer expectations, commit to a defined level of customer satisfaction, or commit to zero defects. The exact form of the vision and values is not as important as the fact that it is articulated and known by everyone involved. This vision and value statement is going to be a driving

force to help mold the culture that is needed throughout the organization in the drive for quality. It is not the words of the value statement that produce quality products and services; it is the people and processes that determine if there is going to be a change in quality. The vision and value will be very important statements to set agendas for all other processes used to manage the quality system.

- ✓ **Developing the Plan.** The plan for the quality system is going to be different for every organization, but there are similar characteristics:
- ✓ There should be clear and measurable goals. ✓ There are financial resources variable for quality.
- ✓ The quality plan is consistent with the organization's vision and values.

The plan for the quality system might also include pilot projects that would entail setting up small quality projects within the organization. This will allow management to understand how well the quality system is accepted, learn from mistakes, and have greater confidence in launching an organization-wide quality system. The plan should provide some flexibility for employee empowerment, because, as has been demonstrated, the most successful quality systems allow employees at all levels to provide input.

- ✓ **Communication.** Change, especially a movement toward higher quality, is challenging to communicate effectively, yet the communication process is essential for the company's leaders to move the organization forward. Communication is the vital link between management, employees, consumers, and stakeholders. These communication lines also bring about a sense of camaraderie between all individuals involved and help sustain the drive for the successful completion of longterm quality goals. Communication systems also must allow for employees to give feedback and provide possible solutions to issues the company must face. Management needs to allow for this in both formal and informal ways, such as employee feedback slips and feedback roundtable meetings. The responsibility for fostering a culture that values communication lies with senior management. They alone have to ensure that goals and objectives are communicated to all. They are also responsible for setting up the system for feedback from the employees.
- ✓ **Rewards and Acknowledgment.** Rewards, compensation, and acknowledgment for achievements in quality are very effective ways to motivate employees. They tell employees at the end of the day exactly what management is trying to accomplish. Rewards, compensation, and acknowledgment may also be seen as a form of communication— they are tangible methods that senior management uses to let employees know that quality is important. This could come in the form of individual rewards or team rewards. Rewards, compensation, and acknowledgment take many forms, and it is up to management to ensure that this type of program is in line with the goals and objectives of the quality system and the goals and objectives of the organization. Organizations have found that the best and most cost-effective

reward, compensation, and acknowledgment programs are geared to meeting specific criteria.

Principles of Quality Management

Quality management is becoming increasingly important to the leadership and management of all organizations. It is necessary to identify Quality Management as a distinct discipline of management and lay down universally understood and accepted rules for this discipline. The ISO technical committee working on the ISO9000 standards had published a document detailing the quality management principles and application guidelines. (This article is based on the said document). The latest revision (version 2008) of ISO9000 standards are based on these principles.

Definition of Quality Management Principle:

"A quality management principle is a comprehensive and fundamental rule / belief, for leading and operating an organization, aimed at continually improving performance over the long term by focusing on customers while addressing the needs of all other stake holders".

The eight principles are...

1. Customer-Focused Organization
2. Leadership
3. Involvement of People
4. Process Approach
5. System Approach to Management
6. Continual Improvement
7. Factual Approach to Decision Making and
8. Mutually Beneficial Supplier Relationships.

1. **Principle 1 - Customer-Focused Organization:** "Organizations depend on their customers and therefore should understand current and future customer needs, meet customer requirements and strive to exceed customer expectations".

Steps in application of this principle are

- Understand customer needs and expectations for products, delivery, price, dependability, etc.

- Ensure a balanced approach among customers and other stake holders (owners, people, suppliers, local communities and society at large) needs and expectations.
- Communicate these needs and expectations throughout the organization.
- Measure customer satisfaction & act on results, and
- Manage customer relationships.

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

Steps in application of this principle are ...

- Be proactive and lead by example.
- Understand and respond to changes in the external environment.
- Consider the needs of all stake holders including customers, owners, people, suppliers, local communities and society at large.
- Establish a clear vision of the organization's future.
- Establish shared values and ethical role models at all levels of the organization.
- Build trust and eliminate fear.
- Provide people with the required resources and freedom to act with responsibility and accountability.
- Inspire, encourage and recognize people's contributions.
- Promote open and honest communication.
- Educate, train and coach people.
- Set challenging goals and targets, and
- Implement a strategy to achieve these goals and targets.

3. **Principle 3 - Involvement of People:** "People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit".

Steps in application of this principle are...

- Accept ownership and responsibility to solve problems.
- Actively seek opportunities to make improvements, and enhance competencies, knowledge and experience.
- Freely share knowledge & experience in teams.
- Focus on the creation of value for customers.
- Be innovative in furthering the organization's objectives.
- Improve the way of representing the organization to customers, local communities and society at large.
- Help people derive satisfaction from their work, and
- Make people enthusiastic and proud to be part of the organization.

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

Steps in application of this principle are ...

- Define the process to achieve the desired result.
- Identify and measure the inputs and outputs of the process.
- Identify the interfaces of the process with the functions of the organisation.
- Evaluate possible risks, consequences and impacts of processes on customers, suppliers and other stake holders of the process.
- Establish clear responsibility, authority, and accountability for managing the process.
- Identify internal and external customers, suppliers and other stake holders of the process, and
- When designing processes, consider process steps, activities, flows, control measures, training needs, equipment, methods, information, materials and other resources to achieve the desired result.

5. **Principle 5 - System Approach to Management**: "Identifying, understanding and managing a system of interrelated processes for a given objective improves the organization's effectiveness and efficiency."

Steps in application of this principle are...

- Define the system by identifying or developing the processes that affect a given objective.
- Structure the system to achieve the objective in the most efficient way.
- Understand the interdependencies among the processes of the system.
- Continually improve the system through measurement and evaluation, and
 - Estimate the resource requirements and establish resource constraints prior to action.

6. **Principle 6 - Continual Improvement:** "Continual improvement should be a permanent objective of the organization." Steps in application of this principle are...

- Make continual improvement of products, processes and systems an objective for every individual in the organization.
- Apply the basic improvement concepts of incremental improvement and breakthrough improvement.
- Use periodic assessments against established criteria of excellence to identify areas for potential improvement.
- Continually improve the efficiency and effectiveness of all processes.
- Promote prevention based activities.
- Provide every member of the organization with appropriate education and training, on the methods and tools of continual improvement such as the PlanDo-Check-Act cycle, problem solving , process re-engineering, and process innovation.
- Establish measures and goals to guide and track improvements, and □
Recognize improvements.

7. **Principle 7 - Factual Approach to Decision Making:** "Effective decisions are based on the analysis of data and information."

Steps in application of this principle are...

- Take measurements and collect data and information relevant to the objective.
- Ensure that the data and information are sufficiently accurate, reliable and accessible.
- Analyses the data and information using valid methods.
- Understand the value of appropriate statistical techniques, and
- Make decisions and take action based on the results of logical analysis balanced with experience and intuition.

8. **Principle 8 - Mutually Beneficial Supplier Relationships:** "An organization and its suppliers are interdependent, and a mutually beneficial relationship enhances the ability of both to create value."

Steps in application of this principle are...

- Identify and select key suppliers.
- Establish supplier relationships that balance short-term gains with long-term considerations for the organization and society at large.
- Create clear and open communications.
- Initiate joint development and improvement of products and processes.
- Jointly establish a clear understanding of customers' needs.
- Share information and future plans, and
- Recognize supplier improvements and achievements.

Quality System Design

A quality system is composed of the standards and procedures that are developed to ensure that the level of quality desired is repeated in every unit of a product or service. This portion of the quality system is very concrete and can be measured and managed. Before you start,

your organization should establish a core team to carry the performance system design process forward.

The eight steps of the design process are:

1. Understand and map all business structures and processes. This forces employees involved in designing a performance measurement system to think through and understand the entire organization, its competitive position, the environment in which it operates, and its business processes. This will also allow for complete understanding of customer touch points and how the different operations in the organization affect the customer's perception of quality.
2. Develop business performance priorities. The performance measurement system should support the stakeholders' requirements from the organization's strategy through to its business processes. This order of priorities must be in place well before the process enters the actual design phase.
3. Understand the current performance measurement system. Every organization has some kind of measurement system in place. For this reason, there are basically two ways to approach the design and implementation of a new performance measurement system. Either you can scrap the old system and introduce a new one as a replacement, or you can redevelop the existing system. Both approaches can work, but the former approach is more likely to lead to trouble. People will cling to the old measurement system and either use both systems simultaneously or use the old one and simply go through the motions of the new one. You can eliminate this outcome by taking the second approach.
4. Develop performance indicators. The most important element of a performance measurement system is the set of performance indicators you will use to measure your organization's performance and business processes. This is the point in the design process where the top-down approach meets the bottom-up design approach and where the broad masses of the organization become involved. The purpose of this step is to develop the performance measurement system with an appropriate number of relevant and accurate performance indicators.
5. Decide how to collect the required data. Developing perfect performance indicators that will tell you everything you ever wanted to know about what goes on in your organization is one thing, but being able to collect the data required to calculate these performance indicators is a completely different matter. This issue must initially be addressed during the development of the performance indicators so that you avoid selecting those that can never actually be measured. There will be trade-offs of cost and time versus the benefits of collecting data, but a likely middle ground between perfect data/high cost and no data/no cost will be found.
6. Design reporting and performance data representation formats. In this step, you decide how the performance data will be presented to the users; how the users should apply the performance data for management, monitoring, and improvement; and who will have access to performance data. After you finish, you should have a performance measurement system that has a solid place in your organization's overall measurement based management system.

7. Test and adjust the performance measurement system. Your first attempt at the performance measurement system will probably not be perfect—there are bound to be performance indicators that do not work as intended, conflicting indicators, undesirable behavior, and problems with data availability. This is to be expected. In this step you should extensively test the system and adjust the elements that do not work as planned.
8. Implement the performance measurement system. Now it's time to put your system to use. This is when the system is officially in place and everyone can start using it. This step involves issues such as managing user access, training, and demonstrating the system. This is not an absolute process that needs to be followed to the letter in order for it to work. In some cases, one or more steps may be unnecessary; in others, additional steps may be needed. It's up to you to make the necessary adjustments to the process to maximize the probability of the system's success.

PRODUCTION AND OPERATIONS MANAGEMENT

Operations management is an area of management concerned with overseeing, designing, and controlling the process of production and redesigning business operations in the production of goods or services. It involves the responsibility of ensuring that business operations are efficient in terms of using as few resources as needed, and effective in terms of meeting customer requirements. It is concerned with managing the process that converts inputs (in the forms of raw materials, labor, and energy) into outputs (in the form of goods and/or services).

The relationship of operations management to senior management in commercial contexts can be compared to the relationship of line officers to highest-level senior officers in military science. The highest-level officers shape the strategy and revise it over time, while the line officers make tactical decisions in support of carrying out the strategy. In business as in military affairs, the boundaries between levels are not always distinct; tactical information dynamically informs strategy, and individual people often move between roles over time.

According to the United States Department of Education, operations management is the field concerned with managing and directing the physical and/or technical functions of a firm or organization, particularly those relating to development, production, and manufacturing. Operations management programs typically include instruction in principles of general management, manufacturing and production systems, factory management, equipment maintenance management, production control, industrial labor relations and skilled trades supervision, strategic manufacturing policy, systems analysis, productivity analysis and cost control, and materials planning.^{[1][2]} Management, including operations management, is like engineering in that it blends art with applied science. People skills, creativity, rational analysis, and knowledge of technology are all required for success.

Operations management

In 1911 Frederick Taylor published his "The Principles of Scientific Management",^[4] in which he characterized scientific management as:

1. The development of a true science;
2. The scientific selection of the worker;
3. The scientific education and development of the worker;
4. Intimate friendly cooperation between the management and the workers.

Taylor is also credited for developing stopwatch time study, this combined with Frank and Lillian Gilbreth motion study gave way to time and motion study which is centered on the concepts of standard method and standard time. Other contemporaries of Taylor worth remembering are Morris Cooke (rural electrification in 1920s and implementer of Taylor's principles of scientific management in the Philadelphia's Department of Public Works), Carl Barth (speed-and-feed-calculating slide rules) and Henry Gantt (Gantt chart). Also in 1910 Hugo Diemer published the first industrial engineering book: Factory Organization and Administration.

In 1913 Ford W. Harris published his "How Many parts to make at once" in which he presented the idea of the economic order quantity model. He described the problem as follows:

"Interest on capital tied up in wages, material and overhead sets a maximum limit to the quantity of parts which can be profitably manufactured at one time; "set-up" costs on the job fix the minimum. Experience has shown one manager a way to determine the economical size of lots"^[5]

In 1931 Walter Shewhart published his Economic Control of Quality of Manufactured Product, the first systematic treatment ^[6] of the subject of Statistical Process Control.

In the 1940s Methods-time measurement (MTM) was developed by H.B. Maynard, JL Schwab and GJ Stegemerten. MTM was the first of a series of predetermined motion time systems, predetermined in the sense that estimates of time are not determined in loco but are derived from an industry standard. This was explained by its originators in a book they published in 1948 called "Method-Time Measurement".^[7]

In 1943, in Japan, Taiichi Ohno arrived at Toyota Motor company. Toyota evolved a unique manufacturing system centered on two complementary notions: just in time (produce only what is needed) and autorotation (automation with a human touch). Regarding JIT, Ohno was inspired by American supermarkets: workstations functioned like a supermarket shelf where the customer can get products they need, at the time they need and in the amount needed, the workstation (shelf) is then restocked. Autorotation was developed by Toyoda Sakichi in Toyoda Spinning and Weaving: an automatically activated loom that was also foolproof, that is automatically detected problems. In 1983 J.N Edwards published his "MRP and Kanban-American style" in which he described JIT goals in terms of seven zeros:^[8] zero defects, zero

(excess) lot size, zero setups, zero breakdowns, zero handling, zero lead time and zero surging. This period also marks the spread of Total Quality Management in Japan, ideas initially developed by American authors such as Deming, Juran and Armand V. Feigenbaum. Schonberger^[9] identified seven fundamentals principles essential to the Japanese approach:

1. Process control: SPC and worker responsibility over quality
2. Easy able -to-see quality: boards, gauges, meters, etc. and poka-yoke
3. Insistence on compliance: "quality first"
4. Line stop: stop the line to correct quality problems
5. Correcting one's own errors: worker fixed a defective part if he produced it
6. The 100% check: automated inspection techniques and foolproof machines
7. Continual improvement: ideally zero defects

In 1987 the International Organization for Standardization (ISO), recognizing the growing importance of quality, issued the ISO 9000, a family of standards related to quality management systems. There has been some controversy thought regarding the proper procedures to follow and the amount of paperwork involved.

Meanwhile in 1964, a different approach was developed by Joseph Orlicky as a response to the TOYOTA Manufacturing Program: Material Requirements Planning (MRP) at IBM, latter gaining momentum in 1972 when the American Production and Inventory Control Society launched the "MRP Crusade". One of the key insights of this management system was the distinction between dependent demand and independent demand. Independent demand is demand which originates outside of the production system, therefore not directly controllable, and dependent demand is demand for components of final products, therefore subject to being directly controllable by management through the bill of materials, via product design.

Recent trends in the field revolve around concepts such as Business Process Reengineering (launched by Michael Hammer in 1993^[10]), Lean Manufacturing, Six Sigma (an approach to quality developed at Motorola between 1985-1987) and Reconfigurable Manufacturing Systems.

The term lean manufacturing was coined in the book *The Machine that Changed the World*.^[11] Six Sigma refers to control limits placed at six (6) standard deviations from the mean of a normal distribution, this became very famous after Jack Welch of General Electric launched a company-wide initiative in 1995 to adopt this set of methods. More recently, Six Sigma has included DMAIC (for improving processes) and DFSS (for designing new products and new processes)

Topics

Production systems

In a job shop machines are grouped by technological similarities regarding transformation processes, therefore a single shop can work very different products (in this picture four colors). Also notice that in this drawing each shop contains a single machine.

Flexible Manufacturing System: in the middle there are two rails for the shuttle to move pallets between machining centers (there are also FMS which use AGVs), in front of each machining center there is a buffer and in left we have a shelf for storing pallets. Usually in the back there is a similar system for managing the set of tools required for different machining operations.

A production system comprises both the technological elements (machines and tools) and organizational behavior (division of labor and information flow). An individual production system is usually analyzed in the literature referring to a single business, therefore it's usually improper to include in a given production system the operations necessary to process goods that are obtained by purchasing or the operations carried by the customer on the sold products, the reason being simply that since businesses need to design their own production systems this then becomes the focus of analysis, modeling and decision making (also called "configuring" a production system) .

A first possible distinction in production systems (technological classification) is between process production and part production.

- Process production means that the product undergoes physical -chemical transformations and lacks assembly operations, therefore the original raw materials cant easily be obtained from the final product, examples include: paper, cement and nylon.
- Part production (excuse and ovens) comprises both manufacturing systems and assembly systems. In the first category we find job shops, manufacturing cells, flexible manufacturing systems and transfer lines, in the assembly category we have fixed position systems, assembly lines and assembly shops (both manual and/or automated operations).^[12]



Delivery lead time is the blue bar, manufacturing time is the whole bar, the green bar is the difference between the two.

Another possible classification^[13] is one based on Lead Time (manufacturing lead time vs delivery lead time): Engineer to Order (ETO), Purchase to Order (PTO), Make to Order (MTO), Assemble to Order (ATO) and Make to Stock (MTS). According to this classification different kinds of systems will have different customer order decoupling points (CODP), meaning that Work in Progress (WIP) cycle stock levels are practically nonexistent regarding operations located after the CODP (except for WIP due to queues). (See Order fulfillment)

The concept of production systems can be expanded to the service sector world keeping in mind that services have some fundamental differences in respect to material goods: intangibility, client always present during transformation processes, no stocks for "finished goods". Services can be classified according to a service process matrix:^[14] degree of labor intensity (volume) vs. degree of customization (variety). With a high degree of labor intensity there are Mass Services (e.g., commercial banking bill payments and state schools) and Professional Services (e.g., personal physicians and lawyers), while with a low degree of labor intensity there are Service Factories (e.g., airlines and hotels) and Service Shops (e.g., hospitals and auto mechanics).

The systems described above are ideal types: real systems may present themselves as hybrids of those categories. Consider, for example, that the production of jeans involves initially carding, spinning, dyeing and weaving, then cutting the fabric in different shapes and assembling the parts in pants or jackets by combining the fabric with thread, zippers and buttons, finally finishing and distressing the pants/jackets before being shipped to stores.

The beginning can be seen as process production, the middle as part production and the end again as process production: it's unlikely that a single company will keep all the stages of production under a single roof, therefore the problem of vertical integration and outsourcing arises. Most products require, from a supply chain perspective, both process production and part production.

Metrics: efficiency and effectiveness

Operations strategy concerns policies and plans of use of the firm productive resources with the aim of supporting long term competitive strategy. Metrics in operations management can be broadly classified into efficiency metrics and effectiveness metrics. Effectiveness metrics involve:

1. Price (actually fixed by marketing, but lower bounded by production cost): purchase price, use costs, maintenance costs, upgrade costs, disposal costs
2. Quality: specification and compliance
3. Time: productive lead time, information lead time, punctuality
4. Flexibility: mix, volume, gamma
5. Stock availability

A more recent approach, introduced by Terry Hill,^[16] involves distinguishing competitive variables in order winner and order qualifiers when defining operations strategy. Order winners are variables which permit differentiating the company from competitors, while order qualifiers are prerequisites for engaging in a transaction. This view can be seen as a unifying approach between operations management and marketing (see segmentation and positioning).

Productivity is a standard efficiency metric for evaluation of production systems, broadly speaking a ratio between outputs and inputs, and can assume many specific forms, for example: machine productivity, workforce productivity, raw material productivity, warehouse productivity (=inventory turnover).

It is also useful to break up productivity in use U (productive percentage of total time) and yield η (ratio between produced volume and productive time) to better evaluate production systems performances. Cycle times can be modeled through manufacturing engineering if the individual operations are heavily automated, if the manual component is the prevalent one, methods used include: time and motion study, predetermined motion time systems and work sampling.

ABC analysis is a method for analyzing inventory based on Pareto distribution, it posits that since revenue from items on inventory will be power law distributed then it makes sense to manage items differently based on their position on a revenue-inventory level matrix, 3 classes are constructed (A,B and C) from cumulative item revenues, so in a matrix each item will have a letter (A,B or C) assigned for revenue and inventory. This method posits that items away from the diagonal should be managed differently: items in the upper part are subject to risk of obsolescence, items in the lower part are subject to risk of stock out.

Throughput is a variable which quantifies the number of parts produced in the unit of time. Although estimating throughput for a single process maybe fairly simple, doing so for an entire production system involves an additional difficulty due to the presence of queues which can come from: machine breakdowns, processing time variability, scraps, setups, maintenance time, lack of orders, lack of materials, strikes, bad coordination between resources, mix variability, plus all these inefficiencies tend to compound depending on the nature of the production system.

One important example of how system throughput is tied to system design are bottlenecks: in job shops bottlenecks are typically dynamic and dependent on scheduling while on transfer lines it makes sense to speak of "the bottleneck" since it can be univocally associated with a specific station on the line. This leads to the problem of how to define capacity measures, that is an estimation of the maximum output of a given production system, and capacity utilization.

Overall Equipment Effectiveness (OEE) is defined as the product between system availability, cycle time efficiency and quality rate. OEE is typically used as key performance indicator (KPI) in conjunction with the lean manufacturing approach.

Configuration and management

Classic EOQ model: trade-off between ordering cost (blue) and holding cost (red). Total cost (green) admits a global optimum. A typical MRP II construct: general planning (top) concerned with forecasts, capacity planning and inventory levels, programming (middle) concerned with calculation of workloads, rough-cut capacity planning, MPS, capacity requirements planning, traditional MRP planning, control (bottom) concerned with scheduling.

When introducing kanbans in real production systems attaining unitary lot from the start maybe unfeasible, therefore the kanban will represent a given lot size defined by management

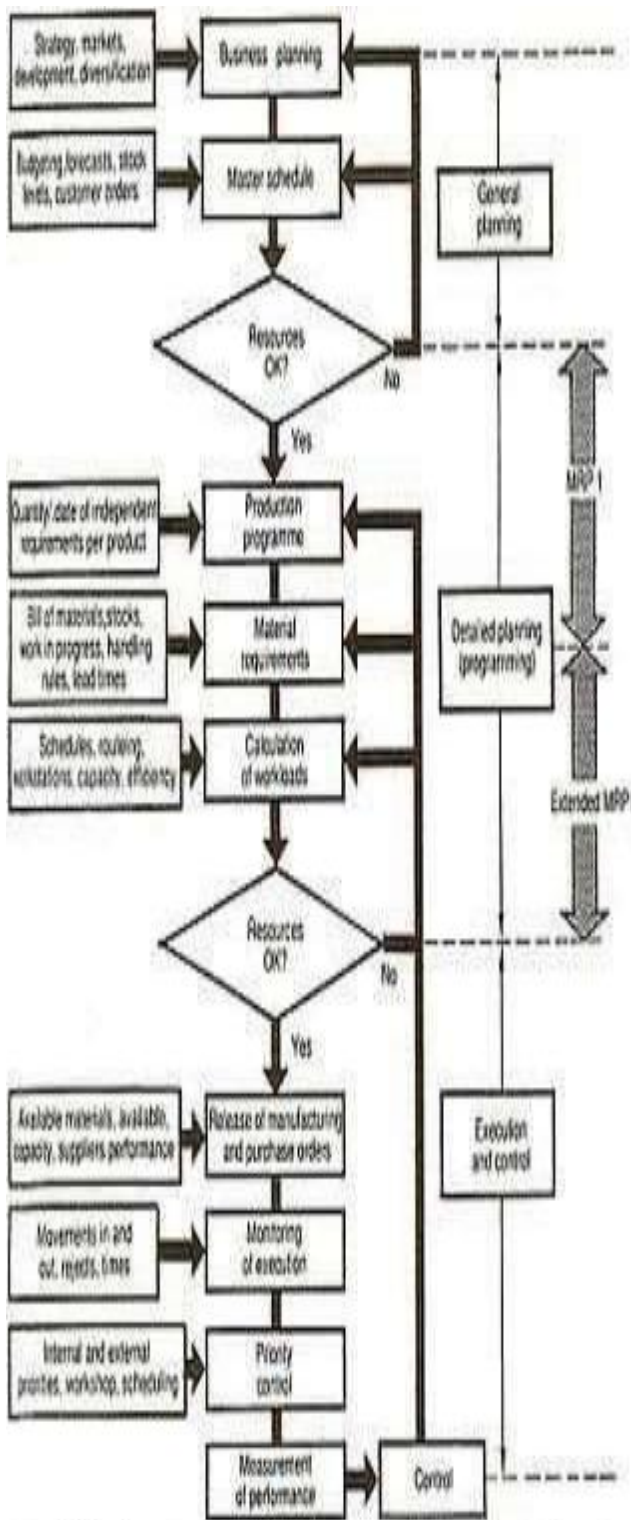
Value Stream Mapping, a representation of materials and information flows inside a company, mainly used in the lean manufacturing approach. The calculation of the time-line (bottom) usually involves using Little's Law to derive lead time from stock levels and cycle times

Designing the configuration of production systems involves both technological and organizational variables. Choices in production technology involve: dimensioning capacity, fractioning capacity, capacity location, outsourcing processes, process technology, automation of operations, trade-off between volume and variety (see Hayes-Wheelwright matrix). Choices in the organizational area involve: defining worker skills and responsibilities, team coordination, worker incentives and information flow.

Regarding the planning of production there is a basic distinction between the push approach and the pull approach, with the later including the singular approach of Just in Time. Pull means that the production system authorizes production based on inventory level, push means that production occurs based on demand (for-casted or present, that is purchase orders). It should be noticed that an individual production system can be both push and pull, for example activities before the CODP may work under a pull system, while activities after the CODP may work under a push system.

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Around 1980, over-frequent changes in sales forecasts, entailing continual adjustments in production, as well as the unsuitability of the parameters fixed by the system, led MRP (Material Requirement Planning) to evolve into a new concept: Manufacturing Resource Planning or MRP2.

Regarding the traditional pull approach a number of techniques have been developed based on the work of Ford W. Harris^[5] (1913) which came to be known as the Economic order quantity (EOQ), which formed the basis of subsequent techniques as the Wagner-Within Procedure, the News Vendor Model, Base Stock Model and the Fixed Time Period Model. These models usually involve the calculation of cycle stocks and buffer stocks, the latter usually modeled as a function of demand variability. The Economic Production Quantity^[17] (EPQ) differs from the EOQ model only in that it assumes a constant fill rate for the part being produced, instead of the instantaneous refilling of the EOQ model.

Joseph Orlicky and others developed Material Requirement Planning (MRP) at IBM, essentially a push approach to inventory control and production planning, which takes as input both the Master Production Schedule (MPS) and the Bill of Materials (BOM) and gives as output a schedule for the materials (components) needed in the production process. MRP therefore is a planning tool to manage purchase orders and production orders (also called jobs).

The MPS can be seen as a kind of aggregate planning for production coming in two fundamentally opposing varieties: plans which try to chase demand and level plans which try to keep uniform capacity utilization. Many models have been proposed to solve MPS problems:

- Analytical models (e.g. Magee Boodman model) □
- Exact optimization algorithmic models (e.g. LP and ILP) □
- Heuristic models (e.g. Aucamp model).

MRP can be briefly described as a 3s procedure: sum (different orders), split (in lots), shift (in time according to item lead time). To avoid an "explosion" of data processing in MRP (number of BOMs required in input) planning bills (such as family bills or super bills) can be useful since they allow a rationalization of input data into common codes. MRP had some notorious problems such as infinite capacity and fixed lead times, which influenced successive modifications of the original software architecture in the form of MRP II and ERP.

In this context problems of scheduling (sequencing of production), loading (tools to use), part type selection (parts to work on) and applications of operations research have a significant role to play.

Lean Manufacturing is an approach to production which arose in Toyota between the end of World War II and the seventies. It comes mainly from the ideas of Taiichi Ohno and Toyoda Sakichi which are centered on the complementary notions of Just in Time and Autorotation (jidoka), all aimed at reducing waste (usually applied in PDCA style). Some additional elements are also fundamental:^[18] production smoothing (Heijunka), capacity buffers, setup reduction, cross-training and plant layout.

- Heijunka: production smoothing presupposes a level strategy for the MPS and a final assembly schedule developed from the MPS by smoothing aggregate production requirements in smaller time buckets and sequencing final assembly to achieve repetitive manufacturing. If these conditions are met, expected throughput can be equaled to the inverse of takt time. Besides volume, heijunka also means attaining mixed model production, which however may only be feasible through setup reduction. A standard tool for achieving this is the Heijunka box
- Capacity buffers: ideally a JIT system would work with zero breakdowns, this however is very hard to achieve in practice, and nonetheless Toyota favors acquiring extra capacity over extra WIP to deal with starvation.
- Set-up reduction: typically necessary to achieve mixed model production, a key distinction can be made between internal and external setup. Internal setups (ex: removing a die) refers to tasks when the machine is not working, while external setups can be completed while the machine is running (ex: transporting dies).
- Cross training: important as an element of Autorotation, Toyota cross trained their employees through rotation, this served as an element of production flexibility, holistic thinking and reducing boredom.
- Layout: U-shaped lines or cells are common in the lean approach since they allow for minimum walking, greater worker efficiency and flexible capacity.

A series of tools have been developed mainly with the objective of replicating Toyota success: a very common implementation involves small cards known as kanbans, these also come in some varieties: reorder kanbans, alarm kanbans, triangle kanbans, etc. In the classic kanban procedure with one card:

- Parts are kept in containers with their respective kanbans
- The downstream station moves the kanban to the upstream station and starts producing the part at the downstream station

- The upstream operator takes the most urgent kanban from his list (compare to queue discipline from queue theory) and produces it and attach its respective kanban

The two-card kanban procedure differs a bit:

- The downstream operator takes the production kanban from his list
- If required parts are available he removes the move kanban and places them in another box, otherwise he chooses another production card
- He produces the part and attach its respective production kanban
- Periodically a mover picks up the move kanbans in upstream stations and search for the respective parts, when found he exchanges production kanbans for move kanbans and move the parts to downstream stations

Since the number of kanbans in the production system is set by managers as a constant number, the kanban procedure works as WIP controlling device, which for a given arrival rate, per Little's Law, works as lead time controlling device.

In Toyota the TPS represented more of a philosophy of production than a set of specific tools, the latter would include: SMED, Value Stream Mapping, 5S, poka-yoke, elimination of time batching, lot-size reduction, Rank Order Clustering, single point scheduling, multiprocess handling and back flush accounting.

Seen more broadly JIT can include methods such as: product standardization and modularity, group technology, total productive maintenance, job enlargement, job enrichment, flat organization and vendor rating (JIT production is very sensitive to replenishment conditions).

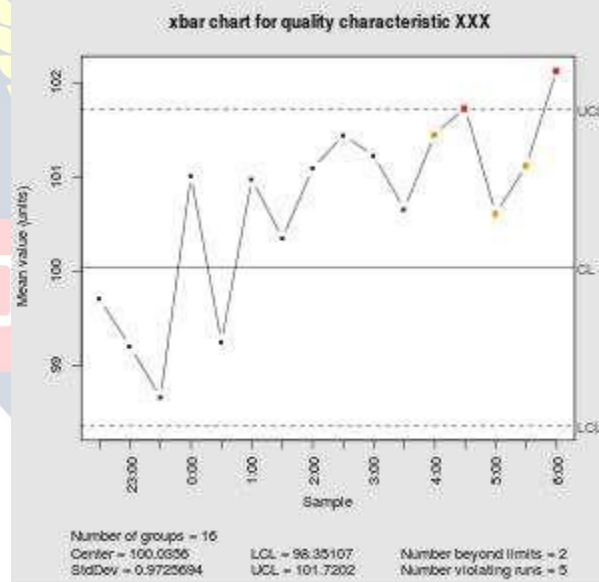
Modeling

There are also fields of mathematical theory which have found applications in the field of operations management such as operations research, mainly mathematical optimization problems and queue theory. Queue theory is employed in modeling queue and processing times in production systems while mathematical optimization draws heavily from multivariate calculus and linear algebra. Queue theory is based on Markov chains and stochastic processes. It also worth noticing that computations of safety stocks are usually based on modeling demand as a normal distribution.

When analytical models are not enough, managers may resort to using simulation. Simulation has been traditionally done through the Discrete event simulation paradigm, where the simulation model possesses a state which can only change when a discrete event happens, which consists of a clock and list of events. The more recent Transactionlevel modeling paradigm consists of a set of resources and a set of transactions: transactions move through a network of resources (nodes) according to a code, called process.



Illustration of the Simplex method, a classical approach to solving LP optimization problems and also integer programming (ex:branch and cut). Mainly used in push approach ^[19] but also in production system configuration.^[20] The interior of the green polypore geometrically represents the feasible region, while the red line indicates the sequence of pivot operations required to reach the optimal solution.



A control chart: process output variable is modeled by a probability density function and for each statistic of the sample an upper control line and lower control line are fixed, when the statistic moves out of bounds, an alarm is given and possible causes are investigated. In this drawing the statistic of choice is the mean and red points represent alarm points.

Since real production processes are always affected by disturbances in both inputs and outputs, many companies implement some form of Quality management or quality control. Quality control tools include check sheets, pareto charts, Ishikawa diagrams, control charts, which are used in approaches like Total quality management and Six

Sigma. Keeping quality under control is relevant to both increasing customer satisfaction and reducing processing waste.

Operations management textbooks usually cover demand forecasting, even though it is not strictly speaking an operations problem, because demand is related to some production systems variables. For example, a classic approach in dimensioning safety stocks requires calculating standard deviation of forecast errors. Demand forecasting is also a critical part of push systems, since order releases have to be planned ahead of actual clients orders. Also any serious discussion of capacity planning involves adjusting company outputs with market demands.

Safety, Risk and Maintenance

Other important management problems involve maintenance policies (see also reliability engineering and maintenance philosophy), safety management systems (see also safety engineering and Risk management), facility management and supply chain integration.



ORGANISATION BEHAVIOUR

INTRODUCTION

Organizations are social systems. If one wishes to work in them or to manage them, it is necessary to understand how they operate. Organizations combine science and people – technology and humanity. Unless we have qualified people to design and implement, techniques alone will not produce desirable results. Human behavior in organizations is rather unpredictable. It is unpredictable because it arises from people's deep-seated needs and value systems. However, it can be partially

understood in terms of the framework of behavioral science, management and other disciplines. There is no idealistic solution to organizational problems. All that can be done is to increase our understanding and skills so that human relations at work can be enhanced

ORGANISATION BEHAVIOUR - CONCEPTS

Organizational Behavior is field of study that investigates the impact that individuals, groups and structure have on behavior within organization. It is the study and application of knowledge about how people act within organizations. It is a human tool for human benefit. It applies broadly to the behavior of people in all types of organizations, such as business, government, schools and services organizations. It covers three determinants of behavior in organizations: individuals, groups, and structure. OB is an applied field. It applies the knowledge gained about individuals, and the effect of structure on behavior, in order to make organizations work more effectively. OB covers the core topics of motivation, leadership behavior and power, interpersonal communication, group structure and process, learning, attitude development and perception, change process, conflict, job design and work stress. Before studying organizational behavior, it is desirable to know the meanings of organization and management.

Organization

Organization as a purposeful system with several subsystems where individuals and activities are organized to achieve certain predetermined goals through division of labor and coordination of activities. Division of labor refers to how the work is divided among the employees and coordination refers to how all the various activities performed by the individuals are integrated or brought together to accomplish the goals of the organization. The term organizing is used to denote one aspect of the managerial activities when he or she is preparing and scheduling the different tasks that need to be completed for the job to be done.

Management

It refers to the functional process of accomplishing the goals of the organization through the help of others. A manager is an individual who is given the responsibility for achieving the goals assigned to him or her as part of the overall goals of the organization and who is expected to get the job done. The terms of top management, lower management are frequently used to indicate the hierarchical levels of those who are engaged in the process of getting the goals of the organization accomplished.

Key Elements of Organizational Behavior

The key elements in organizational behavior are people, structure, technology and the external elements in which the organization operates. When people join together in an organization to accomplish an objective, some kind of infrastructure is required. People also use technology to help get the job done, so there is an interaction of people, structure and technology. In addition, these elements are influenced by the external environment, and they influence it. Each of the four elements of organizational behavior will be considered briefly.

People

People make up the internal social system of the organization. They consist of individuals and groups, and large groups as well as small ones. People are the living, thinking, feeling beings who created the organizations. It exists to achieve their objectives. Organizations exist to serve people. People do not exist to serve organizations. The work force is one of the critical resources that need to be managed. In managing human resources, managers have to deal with:

- i) Individual employee who are expected to perform the tasks allotted to them
- ii) Dyadic relationships such as superior-subordinate interactions
- iii) Groups who work as teams and have the responsibility for getting the job done,
- iv) People outside the organization system such as customers and government officials

Structure

Structure defines the official relationships of people in organizations. Different jobs are required to accomplish all of an organization's activities. There are managers and employees, accountants and assemblers. These people have to be related in some structural way so that their work can be effective. The main structure relates to power and to duties. For example, one person has authority to make decisions that affect the work of other people. Some of the key concepts of organization structure are listed as below:

- a) **Hierarchy of Authority:** This refers to the distribution of authority among organizational positions and authority grants the position holder certain rights including right to give direction to others and the right to punish and reward.
- b) **Division of Labor:** This refers to the distribution of responsibilities and the way in which activities are divided up and assigned to different members of the organization is considered to be an element of the social structure.
- c) **Span of Control:** This refers to the total number of subordinates over whom a manager has authority
- d) **Specialization:** This refers to the number of specialties performed within the organization.
- e) **Standardization:** It refers to the existence of procedures for regularly recurring events or activities

- f) **Formalization:** This refers to the extent to which rules, procedures, and communications are written down
- g) **Centralization:** This refers to the concentration of authority to make decision.
- h) **Complexity:** This refers to both vertical differentiation and horizontal differentiation. Vertical differentiation: outlines number of hierarchical levels; horizontal differentiation highlights the number of units within the organization (e.g. departments, divisions) Organizations can be structured as relatively rigid, formalized systems or as relatively loose, flexible systems. Thus the structure of the organizations can range on a continuum of high rigidity to high flexibility. There are two broad categories of organization:
- Mechanistic form of organization
 - Organic form of Organization

Mechanistic form of Organization

It is characterized by high levels of complexity, formalization and centralization. A highly mechanistic system is characterized by centralized decision making at the top, a rigid hierarchy of authority, well but narrowly defined job responsibilities especially at lower levels, and extensive rules and regulations which are explicitly make known to employees through written documents. In mechanistic organization, labor is divided and subdivided into many highly specialized tasks (high complexity), workers are granted limited discretion in performing theirs t a skis and rules and procedures are carefully defined (high formalization); and there is limited participation in decision making which tends to be conducted at the highest levels of management high centralization.

Organic form of Organization

A highly organic system is characterized by decentralized decision-making which allows people directly involved with the job to make their own decisions, very few levels in the hierarchy with flexible authority and reporting patters, loosely defined job responsibilities for members, and very few written rules and regulations. It is relatively simple, informal and decentralized. Compared with mechanistic organizations, employees in organic organizations, such as design firms or research labs, tend to be more generalist in their orientation.

Jobs and Tasks

Job refers to the sum total of an individual's assignment at the workplace. Tasks refer to the various activities that need to be performed to get the job done. The nature of tasks, it's executives by various individuals, nature of interdependence and inter-relatedness, group activities etc have implication for organizational effectiveness. Thus the jobs and tasks have to be designed and managed properly

Core Job Characteristics: There are five job characteristics which are central to providing potential motivation to workers. They are: Skill variety, Task identity, Task significance, Autonomy, and Feedback from the job itself.

i) **Task Variety:** This denotes the extent to which any particular job utilizes a range of skills, abilities and talents of the employees. If number of different skills is used by the employee on the job, the job is going to provide challenge and growth experience to the workers.

ii) **Task Identity:** This indicates the extent to which the job involves a 'whole' and identifiable piece of work. If the job involves the whole components (eg – painting a portrait), then the individual can identify with the ultimate creation turned out by him and derive pride and satisfaction from having done a good job.

iii) **Task significance:** This refers to the meaningfulness or significance of the impact that a job has on the lives of others – both inside and outside of the organization. If what one does has an impact on the well being of others, the job becomes psychologically rewarding to the person who performs it.

iv) **Autonomy:** This refers to the extent to which the job provides an employee the freedom, independent and discretion to schedule work and make decision and formulate the procedures to get the job done without interference from others. The greater the degree of autonomy, the more the person doing the job feels in control.

v) **Feedback from the Job itself:** This indicates the extent to which the person who is working on the job can assess whether they are doing things right or wrong even as they are performing the job. That is, the job itself is stimulating one and enjoyable.

Job Design: Jobs can be designed to range from highly simple to highly complex tasks in terms of the use of the workers skill. Some of the job design options are as follows:

i) **Job Simplification:** The jobs are broken down into very small parts as in the assembly line operations where a fragmented task is repeatedly done over and over again by the same individual.

ii) **Job Rotation:** This involves moving employees among different tasks over a period of time. Management does not have to bother with combining tasks, but at the same time, the workers do not get bored with doing one simple task over several years. The employee is periodically

Rotated from one job to another within the work setting

iii) **Job Enlargement:** This involves simply adding more tasks to the job so that the workers have a variety of simple tasks to perform rather than doing just one task repetitively. Two or more tasks are combined and the individual does the combined tasks altogether.

iv) Job Enrichment: This offers a greater challenge to the workers because it requires the use of variety of skills possessed by them. This involves building in motivating factors into the job, giving the workers more responsibility and control over work, and offering learning opportunities for the individual on the job.

Technology

Organizations have technologies for transforming inputs and outputs. These technologies consist of physical objects, activities and process, knowledge, all of which are brought to bear on raw materials labor and capital inputs during a transformation process. The core technology is that set of productive components most directly associated with the transformation process, for example, production or assembly line in manufacturing firm. Technology provides the physical and economic resources with which people work. They cannot accomplish much with their bare hands, so they build buildings, design machines, create work processes and assemble resources. The technology that results has a significant influence on working relationships. An assembly line is not the same as a research laboratory, and a steel mill does not have the same working conditions as a hospital. The great benefit of technology is that it allows people to do more and better work, but it also restricts people in various ways. It has costs as well as benefits.

Classification of Technology:

Thomson classified technology into three categories: Long-linked technology, Mediating Technology and Intensive Technology.

- i) **Long linked Technology:** In this, tasks are broken into a number of sequential and interdependent steps, where the outputs of one unit become the input of the next. (E.g. Assembly line) this facilitates to have high volume of output and efficiency. This technology calls for mechanistic structures with high levels of specialization, standardization and formalization.
- ii) **Mediating Technology:** This links different parties who need to be brought together in a direct or indirect way (eg. Banks – use mediating technology to lend money to borrowers by taking money from depositors)
- iii) **Intensive Technology:** It is used when a group of specialists are brought together to solve complex problems using a variety of technologies (eg. Hospital – parties are treated with the help of experts drawn from different fields of specialization). Coordination of the different activities is achieved in the system primarily through mutual adjustment among those engaged in solving the problem in the different units. Organic structures would fit in this system using intensive technology.

Environment

All organizations operate within an external environment. A single organization does not exist alone. It is part of a larger system that contains thousand of other elements. All these mutually influence each other in a complex system that becomes the life style of the people. Individual organization, such as a factory or school cannot escape from being influenced by this external environment. It influences the attitudes of people, affects working conditions, and provides competition for resources and power. Every organization interacts with other members of its environment. The interactions allow the organization to acquire raw material, hire employees, secure capital, obtain knowledge, and build, lease or buy facilities and equipment. Since the organization process a product or service for consumption by the environment, it will also interact with its customers. Other environmental actions, who regulate or over see these exchanges, interact with the organization as well (distributors, advertising agencies, trade associations, government of the countries in which business is conducted)

Two Distinct Sets of Environment:

- i) **Specific Environment:** This includes the suppliers, customers, competitors, governments' agencies, employees, unions, political parties etc.
- ii) **General Environment:** It includes the economic, political, cultural, technological and social factors in which the organization embedded. Organizations are embedded in an environment within which they operate. Some of the external factors may be completely beyond the control of the organization to change, such as the cultural, social or economic, or governmental aspects. However, many of the other factors such as sizing up the market, being in tune with the technological changes takes place, being a step ahead of competition, or stocking up and buffering supplies when certain materials are likely to be in short supply, are all within the control of the organization. Effectively managing these situations, however, requires constant and close vigilance, adaptability to changes, and being able to manage problematical situations through good decisions making. Those organizations which are proactive (that is, watchful and take action before crisis situations occur) and can manage their external environment are more effective than those that are reactive (that is, caught off guard and wake up after facing the crises situation) and are unable to cope effectively.

Basic Approaches of Organizational Behavior

- i) **An Interdisciplinary Approach:** It is integrating many disciplines. It integrates social sciences and other disciplines that can contribute to the Organizational Behavior. It draws from these disciplines any ideas that will improve the relationships between people and organization. Its interdisciplinary nature is similar to that of medicine, which applies physical, biological and social science into a workable medical practice. Organizations must have people, and people working toward goals must have organizations, so it is desirable to treat the two as a working unit.
- ii) **Scientific Management Approach:** The fundamental concern of the scientific management school was to increase the efficiency of the worker basically

through good job design and appropriate training of the workers. Taylor is the father of the scientific management movement and he developed many ideas to increase organizational efficiency. Taylor showed that through proper job design, worker selection, employee training and incentives, productivity can be increased. The scientific management school advocated that efficiency can be attained by finding the right methods to get the job done, through specialization on the job, by planning and scheduling, by using standard operating mechanisms, establishing standard times to do the job, by proper selection and training of personnel and through wage incentives.

- iii) **A Human Resources (Supportive) Approach:** It is a developmental approach concerned with the growth and development of people toward higher levels of competency, creativity and fulfillment, because people are the central resource in any organizations and any society. It helps people grow in self-control and responsibility and then it tries to create a climate in which all employees may contribute to the limits of their improved abilities. It is assumed that expanded capabilities and opportunities for people will lead directly to improvements in operating effectiveness. Work satisfaction will be a direct result when employees make fuller use of their capabilities. Essentially, the human resources approach means that better people achieve better results.
- iv) **A Contingency Approach:** Traditional management relies on one basic principle – there is one best way of managing things and these things can be applied across the board in all the instances. The situational effect will be totally ignored in this traditional management. Situations are much more complex than first perceived and the different variables may require different behavior which means that different environments required different behavior for effectiveness. Each situation must be analyzed carefully to determine the significant variables that exist in order to establish the kinds of practices that will be more effective. Contingency theorists argue that the external environment and several aspects of the internal environment govern the structure of the organization and the process of management. Effective management will vary in different situations depending on the individual and groups in the organization, the nature of jobs, technology, the type of environment facing the organization and its structure. For example, if the employees are highly matured and willing to take more responsibility, the managers can follow delegating style and give full freedom to their employees. If the employees are not so matured and avoid taking any responsibility, the managers must follow directing style. Depends upon the situation, that is, employees level of maturity, managers will adopt different style of leadership to ensure more successful results.
- v) **A Systems Approach:** This implies that organization consists of many inter related and inter dependent elements affecting one another in order to achieve the overall results. Conceptually a system implies that there are a multitude of variables in organization and that each of them affects all the others in complex relationships. An event that appears to affect one individual or one department actually may have significant influences elsewhere in the organization. Systems theorists describe the organization as “open to its external environment”, receiving certain inputs from the environment such as human resources, raw materials etc,

and engaging in various operations to transform those raw materials into a finished products and finally turning out the “outputs” in its final form to be sent to the environment. The organization, since it is open to the environment, also receives feedback from the environment and takes corrective

action as necessary. This input-transformation process-output model with the feedback mechanism can be illustrated through a simple example.

MANAGEMENT FUNCTIONS

Management is the process of designing and maintaining an environment for the purpose of efficiently accomplishing selected aims. Managers carry out the functions of planning, organizing, staffing, leading and controlling. Managing is an essential activity at all organizational level. However, the managerial skills required vary with organizational levels. The functions of managers’ provide a useful framework for organizing management knowledge.

MANAGEMENT FUNCTIONS

Henri Fayol proposed that all managers are required to perform five management functions in order to execute their day-to-day activities. They are: planning, organizing, commanding, coordinating and controlling.

- **Planning:** The planning function involves the process of defining goals, establishing strategy for achieving those goals, and developing plans to integrate and coordinate activities.
- **Organizing:** It includes the process of determining what tasks are to be done, who is to do them, how the tasks are to be grouped, who reports to whom at what level decisions are made.
- **Commanding:** It is the influencing of people so that they will contribute to organization and group goals. Leading involves motivating, communicating employees to accomplish goals and objectives of an organization
- **Controlling:** It is the measuring and correcting of activities of subordinates to ensure that events conform to plans. It measure performance against goals and plans, shows negative deviations exit and by putting in motion actions to correct deviation, helps ensure accomplishment of plans.

Planning

It is a process that involves defining the organization’s objectives or goals, establishing an overall strategy for achieving those goals, and developing a comprehensive hierarchy of plans to integrate and coordinate activities. It is concerned with both what is to be done (ends) as well as how it is to be done (means). The purposes of the planning are:

- i) It establishes coordinated effort. It gives direction to managers and no managers alike.
- ii) It reduces uncertainty by forcing managers to look ahead, anticipate change, consider the impact of change and develop appropriate response
- iii) It reduces overlapping and wasteful activities.
- iv) It establishes objectives or standards that are used in controlling.

Planning process

The following four steps of planning process can be adapted to all activities at all organizational levels.

Step 1: Establish a goal or set of goals: Planning begins with decision about what the organization or department wants to achieve. Identifying priorities and being specific about their aims are key factors in planning.

Step 2: Define the present situations. The current state of affairs has to be analyzed considering the availability of resources and the goals to be achieved before drawing up the planning process..

Step 3: Identify the aids and barriers to the goals: Anticipating internal and external problems and opportunities likely to arise in the future is an essential part of planning.

Step 4: Develop a plan or set of actions for reaching the goals: It involves developing various alternative courses of action for reaching the desired goals, evaluating these alternatives, and choosing from among them the most suitable alternative for reaching the goal.

Major components of planning

- i) Goal: A future target or end result that an organization wishes to achieve
- ii) Plan: The means devised for attempting to reach a goal
- iii) Mission: The organizations purpose or fundamental reason for existence.

Types of Planning

Based on the length of the planning horizon, planning may be classified as Strategic Planning, Tactical Planning and Operational Planning.

- 1) **Strategic Planning:** These plans are organization-wide, establish overall objectives, and position an organization in long term of its environment such as

- i) Long range issues with broader technological and competitive aspects of the organization as well as allocations of resources
 - ii) Long term actions to be taken to achieve the goals between five and fifteen years.
 - iii) Developed by top management in consultation with the board of directors and middle level managers.
- 2) **Tactical Planning:** It typically addresses intermediate issues involving periods between two and five years which are relatively specific, concrete and more detailed such as
- i) outline the steps for particular departments to achieve the goals
 - ii) Generally developed by middle managers who weigh the pros and cons of several possibilities before settling on one issue.
 - iii) Important to strategic plan success.
- 3) **Operational Planning:** These plans specify details on how overall objectives are to be achieved. The key aspects of operational planning are
- i) Focuses mainly for short-range issues usually developed by lower-level managers in conjunction with middle management.
 - ii) Identify what must be accomplished over a short period, mostly day-to-day operational activities such as work methods, inventory planning etc.

Organizing

Organizing refers to the way in which work is arranged and allocated among members of the organization so that the goals of the organization can be efficiently achieved.

Steps involved in Organizing Process:

- i) Assign tasks and responsibilities associated with individual jobs.
- ii) Dividing the total work load into activities that can logically and comfortably be performed by one person or group of individuals.
- iii) Combining the work of employees into units in a logical and efficient manner.
- iv) Delegating appropriate authority and power to an individual to discharge his duties.
- v) Setting up a mechanism to coordinate the work of employees into a unified, harmonious whole.
- vi) Monitoring the effectiveness of the organization and making adjustments to maintain or increase effectiveness.

Key elements of Organization Structure

1) Work Specialization: It deals with division of labor. The whole job is not done by one person but instead is broken down into steps and each step is completed by a different persons. Some Key characteristics are:

i) It increases employees skill and efficiency at performing a task,
ii) Generates higher employee productivity

iii) In some jobs employees are likely to get boredom, fatigue, stress, poor quality work, increased absenteeism, higher turnover due to repetitive nature of work.

2) Departmentalization. It refers to the basis on which jobs are grouped in order to accomplish organizational goals. Some key characteristics are:

i) Grouping can be done by the homogeneity of tasks (Functional, departmentalization),
ii) Grouping jobs by product line (Product departmentalization)

iii) Grouping jobs on the basis of territory or geography (Geographic, departmentalization)
iv) Grouping jobs on the basis of product or customer flow

v) Facilitates utilization of common skills, knowledge and orientation together into Common units.

3) Chain of command: This shows the flow of authority directed from the upper levels of the organization to the lowest levels and delineates who reports to whom. This concept incorporates three key elements:

i) Authority (right to issue order and expecting the orders to be obeyed),
ii) Responsibility (obligation to perform assigned duties)
iii) Unity of command (reporting authority to whom they are responsible)

4) Span of control: This deals with how many subordinates one can effectively manage under his/her control. There are two types of span of control.

- i) Wider span of control which has fewer levels and each level managers are controlling more people
- ii) Narrow span of control has more levels and in each level managers have limited number of people to supervise.
- iii) The effectiveness of narrow or wider span of control depends upon task structure, employee's maturity, environmental uncertainty, technology, work culture etc. **5) Centralization and decentralization:** The decision making latitude given at the top or lower level determines whether the organization is centralized or decentralized.

- i) If top management makes key decisions with no input from lower level employees, then the organization is centralized.
- ii) If lower level employees are provided more input and given more discretion to make decision, it is decentralized.
- iii) The effectiveness of centralization or decentralization depends upon so many factors such as environment, technology, employees, size of the company, strategies etc.

6) Formalization: This refers to the extent, to which the employees are governed by rules, Regulations and standardized operating procedures to maintain consistency and uniformity in maintaining the output.

- i) In a highly formalized organization, there are explicit job descriptions, lots of rules and clearly defined procedures covering work process.
- ii) This eliminates flexibility, innovativeness and freedom in discharging the duties and responsibilities.

Commanding

It is the process of influencing a group towards the achievement of goals. There are certain characteristics that differentiate leaders from non-leaders There are three categories of leadership theories which highlight the key determinants of leadership effectiveness. They are Trait Theories, Behavioral Theories and Situational Theories.

Trait Theories:

There are six traits associated with effective leadership include drive, the desire to lead, honesty and integrity, self-confidence, intelligence and job-relevant knowledge.

- i) **Drive:** Leaders exhibit a high effort level. They have a relatively high desire for achievement, they are ambitious, they have a lot of energy, they are tirelessly persistent in their activities and they show initiative.
- ii) **Desire to lead:** Leaders have a strong desire to influence and lead others. They demonstrate the willingness to take responsibility

- iii) **Honesty and Integrity:** Leaders build trusting relationship between themselves and followers by being truthful and non-deceitful and by showing high consistency between word and deed.
- iv) **Self-confidence:** Followers look to leaders for an absence of self-doubt. Leaders therefore need to show self-confidence in order to convince followers of the rightness of goals and decisions.
- v) **Intelligence:** Leaders need to be intelligent enough to gather synthesize and interpret large amounts of information; and to be able to create vision, solve problems and make correct decision.
- vi) **Job-relevant knowledge:** Effective leaders have a high degree of knowledge about the company, the industry and technical matters. In-depth knowledge allows leaders to make well-informed decision and to understand the implications of those decisions.

Controlling

The control process is a three-step process that involves measuring actual performance, comparing actual performance against a standard, and taking managerial action to correct deviations or inadequate standards. Before considering each step in detail, we should be aware that the control process assumes that performance standards already exist. These standards are the specific goals created during the planning against which performance progress can be measured.

Step I: Measuring: This is the first step in the control process. Four common source of information frequently used by managers to measure actual performances are personal observation, statistical reports, oral reports and written reports. Each has particular advantage and drawbacks; however, a combination of information sources increases both the number of input sources and the probability of getting reliable information. It is desirable to use both quantitative and qualitative criteria to measure the actual performance. For instance, a production manager use number of paper cups produced per hour, percentage of rejects returned by customers, scrap rate etc. Similarly, marketing managers often use measures such as percentage of market held, average dollar per sale, number of customer visits per sales person etc.

Step II: Comparing: The comparing step determines the degree of variation between actual performance and the standard. Some variation in performance can be expected in all activities. It is critical, therefore, to determine the acceptable range of variation. Deviation that exceeds this range become significant and need the manager's attention. In the comparison stage, managers are particularly concerned with the size and direction of the variation.

Step III: Taking Managerial Action: Managers can choose among three possible course of action:

- they can do nothing,
- they can correct the actual performance

- they can revise the standards.

Correct Actual Performance: If the source of performance variation is unsatisfactory work, the manager will want to take corrective action. Examples of such corrective action might include changing the strategy, the structure, compensation practices or training programs, redesigning jobs or firing employees etc. A manager who decides actual performance has to make another decision: Should immediate or basic corrective action be taken?

Immediate corrective action corrects problems at once to get performance back on track. Basic corrective action looks at how and why performance has deviated and then proceeds to correct the source of the deviation. It is not unusual for managers to rationalize that they do not have the time to take basic corrective action and, therefore, must be content to perpetually 'put out fires' with immediate corrective action. Effective managers analyze deviations and, when the benefits justify it, take the time to pinpoint and correct the causes of variance.

2.2 Management Roles:

Mintzberg proposed ten managerial roles a typical manager has to perform in discharging his day-to-day activities. Mintzberg's ten managerial roles can be grouped as those concerned with interpersonal relationships, those concerned with transfer of information, and those concerned with decision-making.

1 Interpersonal Role:

This refers to those types of managerial roles that involve people and other duties that are ceremonial and symbolic in nature. There are three types of interpersonal roles:

- i) **Figure head Role:** Manager performs a role as symbolic head and accordingly he is obliged to perform a number of routine duties of a legal or social nature. The typical activities include greeting visitors, signing legal documents etc.
- ii) **Leader Role:** As a leader of the department, manager gives direction to his employees and other subordinates to fulfill the assigned goals and objectives. He is responsible for the motivation and activation of subordinates. Also he is responsible for staffing, training and associated activities. Some of the typical activities include goals setting, providing guidance, review the progress of work etc.
- iii) **Liaison Role:** The manager is required to maintain contact with external sources that provide valuable information. These sources are individual or groups outside the manager's unit and may be inside or outside the organization. For this he has to maintain self-developed network of outside contacts and informers who provide favors and information, for example, acknowledging mail, doing external board work etc.

2 Informational Roles:

This refers to those types of managerial roles that involve receiving, collecting and disseminating information. There are three types of informational roles:

Monitor: Typically, manager is spanning the boundaries of the organization and trying to get information from outside through various sources such as reading magazines, taking with other to learn current developments, movements of competitors planning, program etc. Manager seeks and receives variety of special information (much of it current) to develop thorough understanding of organization and environment. He emerges as nerve centre of internal and external information about the organization.

Disseminator: Manager acts as conduits of information to organizational members. He is expected to transmit information received from outside or from subordinates to member of the organization. Some information is factual and some may involve interpretation and integrating of diverse value positions of organizational influencers. Some of the typical activities of this role include holding informational meetings, making phone calls to relay information etc.

Spokesman: Manager represents the organization to outsiders by performing the role as spokesman. . In this context, the manager transmits information to outsiders on organization's plans, policies, results, achievements, serves as expert on the chosen field by giving value suggestion to the community etc. As mentioned earlier, he holds board meeting periodically and gives information to the media.

3 Decisional Roles:

This refers to those types of managerial roles that revolve around making decision. There are four types of decisional roles.

Entrepreneur: As entrepreneur, manager initiates and oversees new projects that will improve their organization's performance. He thoroughly analyses the strengths of the organization and the opportunities available in the environment and takes initiative to implement improvement projects to bring about worthwhile changes within the organization and continuously supervise designing new developmental projects. Some of the typical activities include organizing strategy and review sessions to develop new programs, instrumental in venturing novel projects etc.

Disturbance Handler: As disturbance handler, managers take corrective action in response to unforeseen problems within as well as outside the organization. Whenever any conflicts occur among the subordinates regarding the sharing of resources, allocation of funds etc, and the manager intervene appropriately and resolve those issues. He is responsible for corrective action when organization faces important, unexpected disturbances.

Resources Allocator: Manager is responsible for the allocation of organizational resources – physical, human, monetary resources of all kind and in effect, the making or approval of all significant organizational decision. In order to perform this activity, he will be schedule meetings, requesting authorization, and performing any activity that involves budgeting and the programming of subordinates work.

Negotiator: Manager also performs as negotiators when they discuss and bargain with other groups to gain advantage for their own units. Manager will negotiate with

business partners in case the organization is seeking alliances to venture projects or extend their operation in new marketing.

CHALLENGES AND OPPORTUNITIES FOR ORGANISATIONAL BEHAVIOR

There are many challenges and opportunities for managers to use Organizational Behavior concepts to enhance the overall effectiveness of individuals, groups and organization. The following are some of the critical issues confronting managers for which the knowledge of Organizational Behavior offers worthy solutions based on behavioral science and other interdisciplinary fields.

SIGNIFICANT PROBLEMS IN MANAGEMENT

The following are some of the significant problems: i) Improving People Skills ii) Improving Quality and Productivity iii) Managing Workforce Diversity iv) Responding to Globalization v) Empowering People vi) Coping with Temporariness vii) Stimulating Innovation and Change viii) Emergence of the e-organization ix) Improving Ethical Behavior

- 1. Improving People Skills:** Technological changes, structural changes, environmental changes are accelerated at a faster rate in business field. Unless employees and executives are equipped to possess the required skills to adapt those changes, the achievement of the targeted goals cannot be achieved in time. There two different categories of skills – managerial skills and technical skills. Some of the managerial skills include listening skills, motivating skills, planning and organizing skills, leading skills, problem solving skill, decision making skills etc. These skills can be enhanced by organizing a series of training and development programmers, career development programmers, induction and socialization etc. **Implications for Managers:** Designing an effective performance appraisal system with built-in training facilities will help upgrade the skills of the employees to cope up the demands of the external environment. The lower level cadre in management is required to possess more of technical skills. As they move towards upward direction, their roles

will be remarkably changed and expected to have more of human relations and conceptual skills

2. **Improving Quality and Productivity:** Quality is the extent to which the customers or users believe the product or service surpasses their needs and expectations. For example, a customer who purchases an automobile has certain expectation, one of which is that the automobile engine will start when it is turned on. If the engine fails to start, the customer's expectations will not have been met and the customer will perceive the quality of the car as poor. Deming defined quality as a predictable degree of uniformity and dependability, at low cost and suited to the market. Juran defined it as fitness for use. The key dimensions of quality as follows:
 - **Performance:** Primary operating characteristics of a product such as signal coverage, audio quality, display quality etc
 - **Features:** Secondary characteristics, added features, such as calculators, and alarm clock features in hand phone
 - **Conformance:** Meeting specifications or industry standards, workmanship of the degree to which a product's design or operating characteristics match reestablished standards
 - **Reliability:** The probability of a product's failing within t a specified period of time
 - **Durability:** It is a measure of product's life having both economic and technical dimension
 - **Services:** Resolution of problem and complaints, ease of repair
 - **Response:** Human to human interface, such as the courtesy of the dealer
 - **Aesthetics:** Sensory characteristics such exterior finish
 - **Reputations:** Past performance and other intangibles, such as being ranked first. More and more managers are confronting to meet the challenges to fulfill the specific requirements of customers. In order to improve quality and productivity, they are implementing programs like total quality management and reengineering programs that require extensive employee involvement.
3. **Managing Workforce Diversity:** This refers to employing different categories of employees who are heterogeneous in terms of gender, race, ethnicity, relation, community, physically disadvantaged, homosexuals, elderly people etc. The primary reason to employ heterogeneous category of employees is to tap the talents and potentialities, harnessing the innovativeness, obtaining synergetic effect among the divorce workforce. In general, employees wanted to retain their individual and cultural identity, values and life styles even though they are working in the same organization with common rules and regulations. The major challenge for organizations is to become more accommodating to diverse groups of people by addressing their different life styles, family needs and work styles. Implications for Managers: Managers have to shift their philosophy from treating everyone alike to recognizing individual differences and responding to those differences in ways that will ensure employee retention and greater productivity while, at the same time not discriminating. If work force diversity

is managed more effectively, the management is likely to acquire more benefits such as creativity and innovation as well as improving decision making skills by providing different perspectives on problems. If diversity is not managed properly and showed biases to favor only a few categories of employees, there is potential for higher turnover, more difficulty in communicating and more interpersonal conflicts.

4. **Responding to Globalization:** Today's business is mostly market driven; wherever the demands exist irrespective of distance, locations, climatic conditions, the business operations are expanded to gain their market share and to remain in the top rank etc. Business operations are no longer restricted to a particular locality or region. Company's products or services are spreading across the nations using mass communication, internet, faster transportation etc. An Australian wine producer now sells more wine through the Internet than through outlets across the country. More than 95% of Nokia hand phones are being sold outside of their home country Finland. Japanese cars are being sold in different parts of globe. Sri Lankan tea is exported to many cities across the globe. Executives of Multinational Corporation are very mobile and move from one subsidiary to another more frequently.

Implications for Managers: Globalization affects a managerial skills in at least two ways:

- i) an Expatriate manager have to manage a workforce that is likely to have very different needs, aspirations and attitudes from the ones that they are used to manage in their home countries.
- ii) Understanding the culture of local people and how it has shaped them and accordingly learn to adapt ones management style to these differences is very critical for the success of business operations. One of the main personality traits required for expatriate managers is to have sensitivity to understand the individual differences among people and exhibit tolerance to it.

5. **Empowering People** The main issue is delegating more power and responsibility to the lower level cadre of employees and assigning more freedom to make choices about their schedules, operation, procedures and the method of solving their work-related problems. Encouraging the employees to participate in work related decision will sizably enhance their commitment at work. Empowerment is defined as putting employees in charge of what they do by eliciting some sort of ownership in them. Managers are doing considerably further by allowing employees full control of their work. An increasing number of organizations are sing self-managed teams, where workers operate largely without boss. Due to the implementation of empowerment concepts across all the levels, the relationship between manager and the employees is reshaped. Managers will act as coaches, advisors, sponsors, facilitators and help their subordinates to do their task with minimal guidance

Implications for Manager: The executive must learn to delegate their tasks to the subordinates and make them more responsible in their work. And in so doing, managers have to learn how to give up control and employees have to learn how to take responsibility for their work and make appropriate decision. If all the employees are empowered, it drastically changes the type of

leadership styles, power relationships, the way work is designed and the way organizations are structured.

6. **Coping with ‘Temporariness’**:- In recent times, the Product life cycles are slimming, the methods of operations are improving, and fashions are changing very fast. In those days, the managers needed to introduce major change programs once or twice a decade. Today, change is an ongoing activity for most managers. The concept of continuous improvement implies constant change. In yester years, there used to be a long period of stability and occasionally interrupted by short period of change, but at present the change process is an ongoing activity due to competitiveness in developing new products and services with better features. Everyone in the organization faces today is one of permanent temporariness. The actual jobs that workers perform are in a permanent state of flux. So, workers need to continually update their knowledge and skills to perform new job requirements.
Implications for Manager: Managers and employees must learn to cope with temporariness. They have to learn to live with flexibility, spontaneity, and unpredictability. The knowledge of Organizational Behavior will help understand better the current state of a work world of continual change, the methods of overcoming resistance to change process, the ways of creating a better organizational culture that facilitates change process etc.
7. **Stimulating Innovation and Change**:- Today’s successful organizations must foster innovation and be proficient in the art of change; otherwise they will become candidates for extinction in due course of time and vanished from their field of business. Victory will go to those organizations that maintain flexibility, continually improve their quality, and beat the competition to the market place with a constant stream of innovative products and services. For example, Compaq succeeded by creating more powerful personal computers for the same or less money than IBNM or Apple, and by putting their products to market quicker than the bigger competitors. Amazon.com is putting a lot of independent bookstores out of business as it proves you can successfully sell books from an Internet website. **Implications for Managers:** Some of the basic functions of business are being displaced due to the advent of a new systems and procedures. For example – books are being sold only through internet. Internet selling an organization’s employees can be the impetus for innovation and change; otherwise they can be a major hindrance. The challenge for managers is to stimulate employee creativity and tolerance for change.
8. **Emergence of E-Organization**:-
 - **E- Commerce:** It refers to the business operations involving electronic mode of transactions. It encompasses presenting products on websites and filling order. The vast majority of articles and media attention given to using the Internet in business are directed at on-line shopping. In this process, the marketing and selling of goods and services are being carried out over the Internet. In e-commerce, the following activities are being taken place quite often - the tremendous numbers of people who are shopping on the Internet, business houses are setting up websites where they can sell goods, conducting the following transactions such as getting paid and fulfilling orders. It is a dramatic change in the way a

company relates to its customers. At present e-commerce is exploding. Globally, e-commerce spending was increasing at a tremendous rate from US\$ 111 billion in 1999 to US\$ 1.3 trillion by 2003.

- **E-business:** It refers to the full breadth of activities included in a successful Internet based enterprise. As such, e-commerce is a subset of e-business. E-business includes developing strategies for running Internet-based companies, creating integrated supply chains, collaborating with partners to electronically coordinate design and production, identifying a different kind of leader to run a 'virtual' business, finding skilled people to build and operate intranets and websites, and running the back room or the administrative side. E-business includes the creation of new markets and customers, but it's also concerned with the optimum ways to combine Computers, the Web and Application Software. A sizable number of multinational corporations are selling goods and services via the Internet.
- **Growth rate of e-business:** The application of Internet operations are initially covers a small part of the business. At this point, their e-commerce operations are secondary to their traditional business. An increasingly popular application of e-business is merely using the Internet to better manage an ongoing business. Later, there are millions of firms that are now selling anything over the Internet, but they are using e-business applications to improve communications with internal and external stakeholders and to better perform traditional business functions. Some companies are putting maximum effort in improving its internal efficiency and providing support to its wide-reaching dealer network and to on-line sellers by creating a shared and integrated network. The companies wanted to make creating
- **E-Organizations:** This embraces e-commerce and e-business. State and central governments, municipal corporations are using the Internet for extending all the public utility services more efficiently through internet.
- **Implications for Managers:** The employees must acquire skills, knowledge, attitudes in learning new technology, overcoming any resistance

9. **Improving Ethical behavior:** The complexity in business operations is forcing the workforce to face ethical dilemmas, where they are required to define right and wrong conduct in order to complete their assigned activities. For example, Should the employees of chemical company blow the whistle if they uncover the discharging its untreated effluents into the river are polluting its water resources?

Do managers give an inflated performance evaluation to an employee they like, knowing that such an evaluation could save that employee's job? The ground rules governing the constituents of good ethical behavior has not been clearly defined. Differentiating right things from wrong behavior has become more blurred. Following unethical practices have become a common practice such as successful executives who use insider information for personal financial gain, employees in competitor business participating in massive cover-ups of defective products etc. **Implications for Managers:** Managers

must evolve code of ethics to guide employees through ethical dilemmas. Organizing seminars, workshops, training programs will help improve ethical behavior of employees. Retaining consultants, lawyers, voluntary service organizations to assist the company in dealing with ethical issues will ensure positive ethical behavior. Managers need to create an ethically healthy climate for his employees where they can do their work productively and confront a minimal degree of ambiguity regarding what constitutes right and wrong behavior.



Introduction to Human Resource Management

Introduction

Human beings are social beings and hardly ever live and work in isolation. We always plan, develop and manage our relations both consciously and unconsciously. The relations are the outcome of our actions and depend to a great extent upon our ability

to manage our actions. From childhood each and every individual acquire knowledge and experience on understanding others and how to behave in each and every situations in life. Later we carry forward this learning and understanding in carrying and managing relations at our workplace. The whole context of Human Resource Management revolves around this core matter of managing relations at work place. Since mid 1980's Human Resource Management (HRM) has gained acceptance in both academic and commercial circle.

HRM is a multidisciplinary organizational function that draws theories and ideas from various fields such as management, psychology, sociology and economics. There is no best way to manage people and no manager has formulated how people can be managed effectively, because people are complex beings with complex needs. Effective HRM depends very much on the causes and conditions that an organizational setting would provide. Any Organization has three basic components, People, Purpose, and Structure. In 1994, a noted leader in the human resources (HR) field made the following observation: Yesterday, the company with the access most to the capital or the latest technology had the best competitive advantage;

Today, companies that offer products with the highest quality are the ones with a leg up on the competition; But the only thing that will uphold a company's advantage tomorrow is the caliber of people in the organization. That predicted future is today's reality. Most managers in public- and private sector firms of all sizes would agree that people truly are the organization's most important asset.

Having competent staff on the payroll does not guarantee that a firm's human resources will be a source of competitive advantage. However in order to remain competitive, to grow, and diversify an organization must ensure that its employees are qualified, placed in appropriate positions, properly trained, managed effectively, and committed to the firm's success. The goal of HRM is to maximize employees' contributions in order to achieve optimal productivity and effectiveness, while simultaneously attaining individual objectives (such as having a challenging job and obtaining recognition), and societal objectives (such as legal compliance and demonstrating social responsibility).

What is Human Resource Management?

HRM is the study of activities regarding people working in an organization. It is a managerial function that tries to match an organization's needs to the skills and abilities of its employees.

Definitions of HRM

Human resources management (HRM) is a management function concerned with hiring, motivating and maintaining people in an organization. It focuses on people in organizations. Human resource management is designing management systems to ensure that human talent is used effectively and efficiently to accomplish organizational goals.

HRM is the personnel function which is concerned with procurement, development, compensation, integration and maintenance of the personnel of an organization for

the purpose of contributing towards the accomplishments of the organization's objectives.

Therefore, personnel management is the planning, organizing, directing, and controlling of the performance of those operative functions (Edward B. Philippon).

According to the Invancevich and Glueck, "HRM is concerned with the most effective use of people to achieve organizational and individual goals. It is the way of managing people at work, so that they give their best to the organization".

According to Dessler (2008) the policies and practices involved in carrying out the "people" or human resource aspects of a management position, including recruiting, screening, training, rewarding, and appraising comprises of HRM.

Generally HRM refers to the management of people in organizations. It comprises of the activities, policies, and practices involved in obtaining, developing, utilizing, evaluating, maintaining, and retaining the appropriate number and skill mix of employees to accomplish the organization's objectives. The goal of HRM is to maximize employees' contributions in order to achieve optimal productivity and effectiveness, while simultaneously attaining individual objectives (such as having a challenging job and obtaining recognition), and societal objectives (such as legal compliance and demonstrating social responsibility). In short Human Resource Management (HRM) can be defined as the art of procuring, developing and maintaining competent workforce to achieve the goals of an organization in an effective and efficient manner.

Nature of HRM

HRM is a management function that helps manager's to recruit, select, train and develop members for an organization. HRM is concerned with people's dimension in organizations. The following constitute the core of HRM

- 1. HRM Involves the Application of Management Functions and Principles.**
The functions and principles are applied to acquiring, developing, maintaining and providing remuneration to employees in organization.
- 2. Decision Relating to Employees must be integrated.** Decisions on different aspects of employees must be consistent with other human resource (HR) decisions.
- 3. Decisions Made Influence the Effectiveness of an Organization.** Effectiveness of an organization will result in betterment of services to customers in the form of high quality products supplied at reasonable costs.
- 4. HRM Functions are not Confined to Business Establishments Only** but applicable to no business organizations such as education, health care, recreation and like. HRM refers to a set of programmes, functions and activities designed and carried out in order to maximize both employee as well as organizational effectiveness.

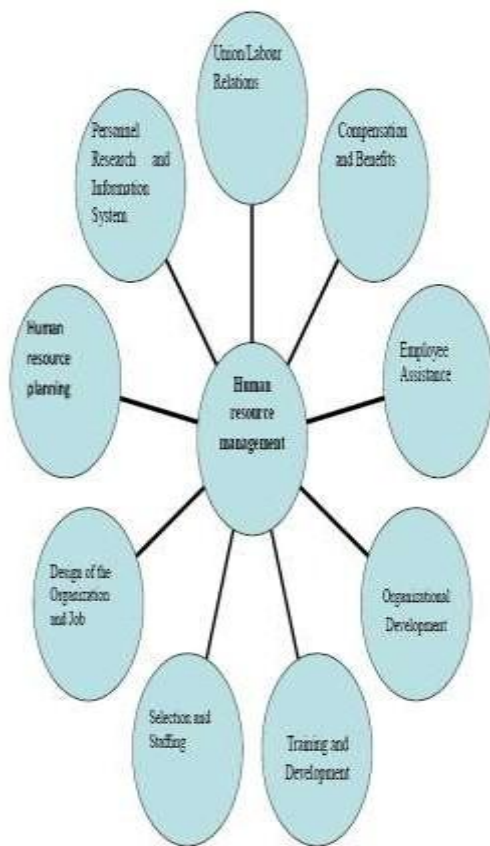


Figure 1.1: Scope of HRM

Scope of HRM

The scope of HRM is indeed vast. All major activities in the working life of a worker – from the time of his or her entry into an organization until he or she leaves the organizations comes under the purview of HRM. The major HRM activities include HR planning, job analysis, job design, employee hiring, employee and executive remuneration, employee motivation, employee maintenance, industrial relations and prospects of HRM.

The scope of Human Resources Management extends to:

- All the decisions, strategies, factors, principles, operations, practices, functions, activities and methods related to the management of people as employees in any type of organization.
- All the dimensions related to people in their employment relationships, and all

the dynamics that flow from it.

The scope of HRM is really vast. All major activities in the working life of a worker – from the time of his or her entry into an organization until he or she leaves it comes under the purview of HRM. American Society for Training and Development (ASTD) conducted fairly an exhaustive study in this field and identified nine broad areas of activities of HRM.

These are given below:

- Human Resource Planning
- Design of the Organization and Job
- Selection and Staffing
- Training and Development
- Organizational Development
- Compensation and Benefits
- Employee Assistance

- Union/Labour Relations
 - Personnel Research and Information System
- a) **Human Resource Planning:** The objective of HR Planning is to ensure that the organization has the right types of persons at the right time at the right place. It prepares human resources inventory with a view to assess present and future needs, availability and possible shortages in human resource. Thereupon, HR Planning forecast demand and supplies and identify sources of selection. HR Planning develops strategies both long-term and short-term, to meet the manpower requirement.
 - b) **Design of Organization and Job:** This is the task of laying down organization structure, authority, relationship and responsibilities. This will also mean definition of work contents for each position in the organization. This is done by “job description”. Another important step is “Job specification”. Job specification identifies the attributes of persons who will be most suitable for each job which is defined by job description.
 - c) **Selection and Staffing:** This is the process of recruitment and selection of staff. This involves matching people and their expectations with which the job specifications and career path available within the organization.
 - d) **Training and Development:** This involves an organized attempt to find out training needs of the individuals to meet the knowledge and skill which is needed not only to perform current job but also to fulfill the future needs of the organization.
 - e) **Organizational Development:** This is an important aspect whereby “Synergetic effect” is generated in an organization i.e. healthy interpersonal and inter-group relationship within the organization.
 - f) **Compensation and Benefits:** This is the area of wages and salaries administration where wages and compensations are fixed scientifically to meet fairness and equity criteria. In addition labor welfare measures are involved which include benefits and services.
 - g) **Employee Assistance:** Each employee is unique in character, personality, expectation and temperament. By and large each one of them faces problems every day. Some are personal some are official. In their case he or she remains worried. Such worries must be removed to make him or her more productive and happy.
 - h) **Union-Labour Relations:** Healthy Industrial and Labour relations are very important for enhancing peace and productivity in an organization. This is one of the areas of HRM.
 - i) **Personnel Research and Information System:** Knowledge on behavioral science and industrial psychology throws better insight into the workers expectations, aspirations and behavior. Advancement of technology of product and production methods have created working environment which are much different from the past.

Globalization of economy has increased competition many fold. Science of ergonomics gives better ideas of doing a work more conveniently by an employee. Thus, continuous research in HR areas is an unavoidable requirement. It must also take special care for improving exchange of information through effective communication systems on a continuous basis especially on moral and motivation. HRM is a broad concept; personnel

management (PM) and Human resource development (HRD) are a part of HRM.

Objectives of HRM

The primary objective of HRM is to ensure the availability of competent and willing workforce to an organization. The specific objectives include the following:

- 1) Human capital : assisting the organization in obtaining the right number and types of employees to fulfill its strategic and operational goals
- 2) Developing organizational climate: helping to create a climate in which employees are encouraged to develop and utilize their skills to the fullest and to employ the skills and abilities of the workforce efficiently
- 3) Helping to maintain performance standards and increase productivity through effective job design; providing adequate orientation, training and development; providing performance-related feedback; and ensuring effective two-way communication.
- 4) Helping to establish and maintain a harmonious employer/employee relationship
- 5) Helping to create and maintain a safe and healthy work environment
- 6) Developing programs to meet the economic, psychological, and social needs of the employees and helping the organization to retain the productive employees
- 7) Ensuring that the organization is in compliance with provincial/territorial and federal laws affecting the workplace (such as human rights, employment equity, occupational health and safety, employment standards, and labour relations legislation). To help the organization to reach its goals
- 8) To provide organization with well-trained and well-motivated employees
- 9) To increase the employees satisfaction and self-actualization 10) To develop and maintain the quality of work life 11) To communicate HR policies to all employees.
- 12) to help maintain ethical polices and behavior.

The above stated HRM objectives can be summarized under four specific objectives: societal, organizational, and functional and personnel.

- 1) **Societal Objectives:** seek to ensure that the organization becomes socially responsible to the needs and challenges of the society while minimizing the negative impact of such demands upon the organization. The failure of the organizations to use their resources for the society's benefit in ethical ways may lead to restriction.
- 2) **Organizational Objectives:** it recognizes the role of HRM in bringing about organizational effectiveness. It makes sure that HRM is not a standalone



department, but rather a means to assist the organization with its primary objectives. The HR department exists to serve the rest of the organization.

- 3) **Functional Objectives:** is to maintain the department's contribution at a level appropriate to the organization's needs. Human resources are to be adjusted to suit the organization's demands. The department's value should not become too expensive at the cost of the organization it serves.
- 4) **Personnel Objectives:** it is to assist employees in achieving their personal goals, at least as far as these goals enhance the individual's contribution to the organization. Personal objectives of employees must be met if they are to be maintained, retained and motivated. Otherwise employee performance and satisfaction may decline giving rise to employee turnover.

Functions of HRM

Human Resources management has an important role to play in equipping organizations to meet the challenges of an expanding and increasingly competitive sector. Increase in staff numbers, contractual diversification and changes in demographic profile which compel the HR managers to reconfigure the role and significance of human resources management. The functions are responsive to current staffing needs, but can be proactive in reshaping organizational objectives. All the functions of HRM are correlated with the core objectives of HRM For example personal objectives is sought to be realized through functions like remuneration, assessment etc.

Functions of HRM

HRM Objectives and Functions

HRM Objectives		Supporting Functions
1.	Societal Objectives	Legal compliance Benefits Union- management relations
2.	Organizational Objectives	Human Resource Planning Employee relations Selection Training and development Appraisal Placement Assessment
3.	Functional Objectives	Appraisal Placement Assessment
4.	Personal Objectives	Training and development Appraisal Placement Compensation Assessment

Functions of HRM

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- **Strategic HR Management:** As a part of maintaining organizational competitiveness, strategic planning for HR effectiveness can be increased through the use of HR metrics and HR technology. Human resource planning (HRP) function determine the number and type of employees needed to accomplish organizational goals. HRP includes creating venture teams with a balanced skillmix, recruiting the right people, and voluntary team assignment. This function analyzes and determines personnel needs in order to create effective innovation teams. The basic HRP strategy is staffing and employee development.
- **Equal Employment Opportunity:** Compliance with equal employment opportunity (EEO) laws and regulations affects all other HR activities.
- **Staffing:** The aim of staffing is to provide a sufficient supply of qualified individuals to fill jobs in an organization. Job analysis, recruitment and selection are the main functions under staffing.

Workers job design and job analysis laid the foundation for staffing by identifying what diverse people do in their jobs and how they are affected by them. Job analysis is the process of describing the nature of a job and specifying the human requirements such as knowledge, skills, and experience needed to perform the job. The end result of job analysis is job description. Job description spells out work duties and activities of employees. Through HR planning, managers anticipate the future supply of and demand for employees and the nature of workforce issues, including the retention of employees. So HRP precedes the actual selection of people for organization. These factors are used when recruiting applicants for job openings. The selection process is concerned with choosing qualified individuals to fill those jobs. In the selection function, the most qualified applicants are selected for hiring from among the applicants based on the extent to which their abilities and skills are matching with the job.

- **Talent Management and Development:** Beginning with the orientation of new employees, talent management and development includes different types of training. Orientation is the first step towards helping a new employee to adjust himself to the new job and the employer. It is a method to acquaint new employees with particular aspects of their new job, including pay and benefit

programmers', working hours and company rules and expectations. Training and Development programs provide useful means of assuring that the employees are capable of performing their jobs at acceptable levels and also more than that. All the organizations provide training for new and in experienced employee.

In addition, organization often provides both on the job and off the job training programmed for those employees whose jobs are undergoing change. Likewise, HR development and succession planning of employees and managers is necessary to prepare for future challenges. Career planning has developed as result of the desire of many employees to grow in their jobs and to advance in their career. Career planning activities include assessing an individual employee's potential for growth and advancement in the organization. Performance appraisal includes encouraging risk taking demanding innovation, generating or adopting new tasks, peer evaluation, frequent evaluations, and auditing innovation processes. This function monitors employee performance to ensure that it is at acceptable levels. This strategy appraises individual and team performance so that there is a link between individual innovativeness and company profitability. Which tasks should be appraised and who should assess employees' performance are also taken into account.

- **Total Rewards:** Compensation in the form of pay, incentives and benefits are the rewards given to the employees for performing organizational work. Compensation management is the method for determining how much employees should be paid for performing certain jobs. Compensation affects staffing in that people are generally attracted to organizations offering a higher level of pay in exchange for the work performed. To be competitive, employers develop and refine their basic compensation systems and may use variable pay programs such as incentive rewards, promotion from within the team, recognition rewards, balancing team and individual rewards etc.

This function uses rewards to motivate personnel to achieve an organization's goals of productivity, innovation and profitability. Compensation is also related to employee development in that it provides an important incentive in motivating employees to higher levels of job performance to higher paying jobs in the organization. Benefits are another form of compensation to employees other than direct pay for the work performed. Benefits include both legally required items and those offered at employer's discretion. Benefits are primarily related to the area of employee maintenance as they provide for many basic employee needs.

- **Risk Management and Worker Protection:** HRM addresses various workplace risks to ensure protection of workers by meeting legal requirements and being more responsive to concerns for workplace health and safety along with disaster and recovery planning.
- **Employee and Labor Relations:** The relationship between managers and their employees must be handled legally and effectively. Employer and employee rights must be addressed. It is important to develop, communicate, and update HR policies and procedures so that managers and employees alike

know what is expected. In some organizations, union/management relations must be addressed as well. The term labor relation refers to the interaction with employees who are represented by a trade union. Unions are organization of employees who join together to obtain more voice in decisions affecting wages, benefits, working conditions and other aspects of employment. With regard to labor relations the major function of HR personnel includes negotiating with the unions regarding wages, service conditions and resolving disputes and grievances.

Role of HRM

The role of HRM is to plan, develop and administer policies and programs designed to make optimum use of an organizations human resources. It is that part of management which is concerned with the people at work and with their relationship within enterprises.

Its objectives are:

- a) effective utilization of human resources,
- b) Desirable working relationships among all members of the organizations, and
- (c) maximum individual development. Human resources function as primarily administrative and professional. HR staff focused on administering benefits and other payroll and operational functions and didn't think of themselves as playing a part in the firm's overall strategy.

HR professionals have an all encompassing role. They are required to have a thorough knowledge of the organization and its intricacies and complexities. The ultimate goal of every HR person should be to develop a linkage between the employee and organization because employee's commitment to the organization is crucial.

The first and foremost role of HR personnel is to impart continuous education to the employees about the changes and challenges facing the country in general and their organization in particular. The employees should know about the balance sheet of the company, sales progress, and diversification of plans, share price movements, turnover and other details about the company. The HR professionals should impart such knowledge to all employees through small booklets, video films and lectures.

The primary responsibilities of Human Resource managers are:

- To develop a thorough knowledge of corporate culture, plans and policies. □ To act as an internal change agent and consultant
- To initiate change and act as an expert and facilitator
- To actively involved in company's strategy formulation
- To keep communication line open between the HRD function and individuals and groups both within and outside the organization
- To identify and evolve HRD strategies in consonance with overall business strategy.
- To facilitate the development of various organizational teams and their working relationship with other teams and individuals.

- To try and relate people and work so that the organization objectives are achieved efficiently and effectively.
- To diagnose problems and determine appropriate solution particularly in the human resource areas.
- To provide co-ordination and support services for the delivery of HRD programmer and services
- To evaluate the impact of an HRD intervention or to conduct research so as to identify, develop or test how HRD In general has improved individual and organizational performance.

Different management gurus have deliberated different roles for the HR manager based on the major responsibilities that they full fill in the organization. Few of the commonly accepted models are enumerated below.

Pat Mc Lagan has suggested nine roles that are played by HR practitioners

1. To bring the issues and trends concerning an organization's external and internal people to the attention of strategic decision makers and to recommend long term strategies to support organizational excellence and endurance.
2. To design and prepare HR systems and actions for implementation so that they can produce maximum impact on organizational performance and development.
3. To facilitate the development and implementation of strategies for transforming one's own organization by pursuing values and visions.
4. To create a positive relationship with the customer's by providing them with the best services; to utilize the resources to the maximum and to create commitment among the people who help the organization to meet the customer's needs whether directly connected or indirectly connected to the organization.
5. To identify the learning needs hence to design and develop structured learning programmers and materials to help accelerate learning for individuals and groups.
6. To enable the individuals and groups to work in new situations and to expend \and change their views so that people in power move from authoritarian to participative models of leadership.
7. To help employees to assess their competencies, values and goals so that they can identify, plan and implement development plans.
8. He also assists the individual employee to add values in the workplace and to focus on the interventions and interpersonal skills for helping people change and sustain change.
9. He assesses the HRD practices and programmer and their impact and to communicate results so that the organization and its people accelerate their change and development.

According to Dave Ulrich HR play's four key roles.

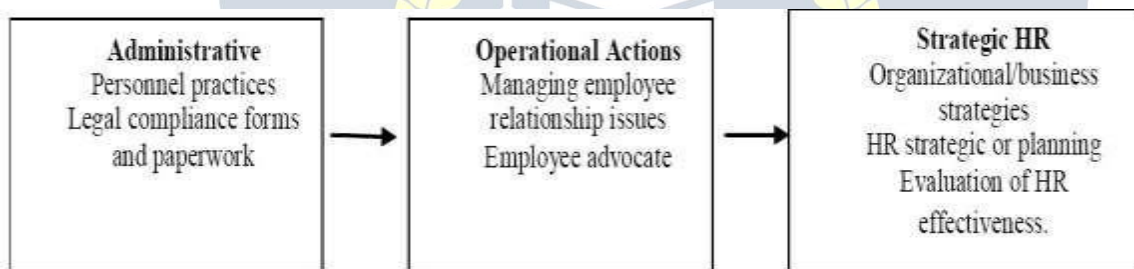
1. **Strategic Partner Role**-turning strategy into results by building organizations that create value;
2. **Change Agent Role**- making change happen, and in particular, help it happen fast

3. **Employees Champion Role**—managing the talent or the intellectual capital within a firm
4. **Administrative Role**—trying to get things to happen better, faster and cheaper.

The role HR in organizations has undergone an extensive change and many organizations have gradually oriented themselves from the traditional personnel management to a human resources management approach. The basic approach of HRM is to perceive the organization as a whole. Its emphasis is not only on production and productivity but also on the quality of life. It seeks to achieve the paramount development of human resources and the utmost possible socio-economic development.

Current Classification of HR roles

According to R.L Mathis and J. H. Jackson (2010) several roles can be fulfilled by HR management. The nature and extent of these roles depend on both what upper management wants HR management to do and what competencies the HR staff have demonstrated. Three roles are typically identified for HR.



1. Administrative Role of HR

The administrative role of HR management has been heavily oriented to administration and recordkeeping including essential legal paperwork and policy implementation. Major changes have happened in the administrative role of HR during the recent years. Two major shifts driving the transformation of the administrative role are: Greater use of technology and Outsourcing. Technology has been widely used to improve the administrative efficiency of HR and the responsiveness of HR to employees and managers, more HR functions are becoming available electronically or are being done on the Internet using Web-based technology.

Technology is being used in most HR activities, from employment applications and employee benefits enrollments to e-learning using Internet-based resources. Increasingly, many HR administrative functions are being outsourced to vendors. This outsourcing of HR administrative activities has grown dramatically in HR areas such as employee assistance (counseling), retirement planning, benefits administration, payroll services, and outplacement services.

2. Operational and Employee Advocate Role for HR

HR managers manage most HR activities in line with the strategies and operations that have been identified by management and serves as employee “champion” for employee issues and concerns HR often has been viewed as the “employee advocate” in organizations. They act as the voice for employee concerns, and spend considerable time on HR “crisis management,” dealing with employee problems that are both work-related and not work-related. Employee advocacy helps to ensure fair and equitable treatment for employees regardless of personal background or circumstances. Sometimes the HR’s advocate role may create conflict with operating managers. However, without the HR advocate role, employers could face even more lawsuits and regulatory complaints than they do now.

The operational role requires HR professionals to cooperate with various departmental and operating managers and supervisors in order to identify and implement needed programs and policies in the organization. Operational activities are tactical in nature. Compliance with equal employment opportunity and other laws is ensured, employment applications are processed, current openings are filled through interviews, supervisors are trained, safety problems are resolved, and wage and benefit questions are answered. For carrying out these activities HR manager matches HR activities with the strategies of the organization.

3. Strategic Role for HR

The administrative role traditionally has been the dominant role for HR. However, as figure indicates that a broader transformation in HR is needed so that significantly less HR time and fewer HR staffs are used just for clerical work. Differences between the operational and strategic roles exist in a number of HR areas. The strategic HR role means that HR professionals are proactive in addressing business realities and focusing on future business needs, such as strategic planning, compensation strategies, the performance of HR, and measuring its results. However, in some organizations, HR often does not play a key role in formulating the strategies for the organization as a whole; instead it merely carries them out through HR activities. Many executives, managers, and HR professionals are increasingly seeing the need for HR management

to become a greater strategic contributor to the “business” success of organizations. HR should be responsible for knowing what the true cost of human capital is for an employer. For example, it may cost two times key employees’ annual salaries to replace them if they leave. Turnover can be controlled through HR activities, and if it is successful in saving the company money with good retention and talent management strategies, those may be important contributions to the bottom line of organizational performance.

The role of HR as a *strategic business partner* is often described as “having a seat at the table,” and contributing to the strategic directions and success of the organization. That means HR is involved in *devising* strategy in addition to *implementing* strategy. Part of HR’s contribution is to have financial expertise and to produce financial results, not just to boost employee morale or administrative efficiencies. Therefore, a significant concern for chief financial officers (CFOs) is whether HR executives are equipped to help them to plan and meet financial requirements. However, even though

this strategic role of HR is recognized, many organizations still need to make significant progress toward fulfilling it.

Some examples of areas where strategic contributions can be made by HR are:

- Evaluating mergers and acquisitions for organizational “compatibility,” structural changes, and staffing needs
- Conducting workforce planning to anticipate the retirement of employees at all levels and identify workforce expansion in organizational strategic plans
- Leading site selection efforts for new facilities or transferring operations to international outsourcing
- locations based on workforce needs
- Instituting HR management systems to reduce administrative time, equipment, and staff by using HR technology
- Working with executives to develop a revised sales
- compensation and incentives plan as new products

It is the era when for the competitive triumph of the organization there is a need to involve HRM significantly in an integrated manner, which demands such capabilities from the HR specialists. The role of HR shifted from a facilitator to a functional peer with competencies in other functions, and is acknowledged as an equal partner by others. The HR is motivated to contribute to organizational objectives of profitability and customer satisfaction, and is seen as a vehicle for realization of quality development. The department has a responsibility for monitoring employee satisfaction, since it is seen as substitute to customer satisfaction.

According to McKinsey’s 7-S framework model HR plays the role of a catalyst for the organization. According to this framework, effective organizational change is a complex relationship between seven S’s. HRM is a total matching process between the three Hard S’s (Strategy, Structure and Systems) and the four Soft S’s (Style, Staff, Skills and Superordinate Goals). Clearly, all the S’s have to complement each other and have to be aligned towards a single corporate vision for the organization to be effective. It has to be realized that most of the S’s are determined directly or indirectly by the way Human Resources are managed, and therefore, *HRM must be a part of the total business strategy.*

HRM in the New Millennium

Human Resources have never been more indispensable than today. The competitive forces that we face today will continue to face in the future demanding organizational excellence. In order to achieve this extended quality, organization’s need to focus on learning, quality development, teamwork, and reengineering. These factors are driven by the way organizations implement things and how employees are treated.

- 1. HR Can Help in Dispensing Organizational Excellence:** To achieve this paradigm shift in the organization excellence there is a need for organizations to reform the way in which work is carried out by the Human Resource department. By designing an entirely new role and agenda that results in enriching the

organization's value to customers, investors and employees, HR can help in delivering organizational excellence.

This can be carried out by helping line managers and senior managers in moving planning from the conference room to the market place and by becoming an expert in the way work is organized and executed. HR should be a representative of the employees and should help the organization in improving its capacity for change. HR will help the organizations in facing the competitive challenges such as globalization, profitability through growth, technology, intellectual capital, and other competitive challenges that the companies are facing while adjusting to uncontrollably challenging changes in business environment. The novel role of HR is to rapidly turn strategy into action; to manage processes intelligently and efficiently; to maximize employee contribution and commitment and to construct favorable conditions for flawless change.

- 2. Human Resource Should be a Strategy Partner:** HR should also become a partner in strategy executions by propelling and directing serious discussions of how the company should be organized to carry out its strategy. Creating the conditions for this discussion involves four steps.

First HR need to define an organizational architecture by identifying the company's way of doing business. Second, HR must be held responsible for conducting an organizational audit. Third, HR as a strategic partner needs to identify methods for restoring the parts of the organizational architecture that need it. Fourth and finally, HR must take stock of its own work and set clear priorities. In their new role as administrative experts they will need to shed their traditional image and still make sure all routine work for the company is done well.

- 3. HR Accountability Should be Fixed to Ensure Employee Commitment:** HR must be held accountable for ensuring that employees feel committed to the organization and contribute fully. They must take responsibility for orienting and training line management about the importance of high employee morale and how to achieve it. The new HR should be the voice of employees in management discussions. The new role for HR might also involve suggesting that more teams be used on some projects or that employees be given more control over their own work schedules.
- 4. The New HR Must Become a Change Agent:** The new HR must become a change agent, which is building the organization's capacity to embrace and capitalize on change. Even though they are not primarily responsible for executing change it is the duty of the HR manager to make sure that the organization carries out the changes framed for implementation.
- 5. Improving the Quality of HR:** The most important thing that managers can do to drive the new mandate for HR is to improve the quality of the HR staff itself. Senior executives must get beyond the stereotypes of HR professionals as incompetent support staff and unleash HR's full potential.
- 6. Change in Employment Practices:** The balance sheet of an organization shows human resource as an expense and not as a Capital. In the information age, it is

perceived that the machines can do the work more efficiently than most people however; technology to work is dependent on people. The challenges for Employment Practice in the New Millennium will require that there should be strategic involvement of the people and labour-management partnerships as they both have to take organization ahead.

7. **Benchmarking Tool Must be Mastered by HR Professionals:** HR professionals must master benchmarking, which is a tool for continuous improvement- directing the human side associated with the strategic path adopted by the organization. Through this, HR department will start appreciating the changes happening within and outside the environment while expanding the knowledge about how to add value to decision making at the highest level of the organization.
8. **Aligning Human Resources to Better Meet Strategic Objectives:** Too often organizations craft their strategy in a vacuum. Some organizations don't even include key people during strategy formulation resulting in lacunae between the actual problems and the solutions implemented- as critical inputs are not sought from those individuals who are supposed to implement the new strategies. A past CEO of Sony once said that organizations have access to the same technology and the same information.

The difference between any two organizations is the "people"- the human resource. Empowering the workforce is an essential tool for aligning human resources with the achievement of corporate objectives. It is the duty of HR manager to hire talented human resource and to provide them with a positive environment where they will be able to utilize their skills and potentials and to create an environment in which these individuals are comfortable taking risks.

9. **Promote From Within and Invest in Employees:** Promoting employees from within sends a powerful message that the organization's employees are valued. New blood and fresh ideas often come from newcomers to the organization. To avoid stagnation of the firm, new ideas and approaches are critical. Yet to improve employee morale, promoting individuals from within the organization is essential. This communicates that the organization values their employees and invests in their human resources.
10. **Review the Recruitment and Selection Process:** A key element of human resource planning is ensuring that the supply of appropriate employees (with the right skill mix) is on board when needed. This requires a proactive approach whereby the organization anticipates its needs well in advance. It is important to identify the competencies being sought. That is, the criteria upon which selection decisions are to be made should be decided in advance.

firm must identify those skill sets required by employees to be successful. Charles O'Reilly suggests that companies should hire for attitude (perhaps even more so than technical skills). That is, the fit of the individual with the values of the organization and the culture of the firm should also be considered when selecting employees. This has been referred to as the person-organization fit. It is no longer enough to simply

consider the person's fit (and technical skill set) with the job. Part of the employee's fit with the organization should focus on the core values and beliefs of the organization. This will increase employees' contributions to the overall success of the organization if they already embrace the core values of the organization prior to their selection.

11. Communicate Mission and Vision: If employees are expected to contribute to the attainment of the organization's strategic objectives, they must understand what their role is. This can be achieved in part by clearly communicating the mission and vision statements of the firm. The old adage is certainly true. If a person does not know where he or she is going, any road will get him or her there. The mission communicates the identity and purpose of the organization. It provides a statement of who the firm is and what their business is. Only those employees who understand this purpose can contribute to the fullest extent possible. The vision statement provides a picture of the future state of the firm. It should be a stretch to attain.

This keeps all the organization's employees pulling in the same direction with a common end point. It is much easier to align human resources with corporate objectives when these employees are familiar with the mission and vision of the firm. As the mission and vision statements are articulated, organizational members begin to more closely embrace their very meaning on an individual level. These statements provide a road map leading employees down the road to achieve organizational objectives. Employees then identify how they can contribute their unique talents toward the attainment of these goals.

12. Use Teams to Achieve Synergy: Synergy can be concisely defined as "two plus two equals five". In other words, the whole is greater than the sum of the parts. So much more can be achieved as people work together. Through the effective use of teams, organizations can often achieve synergy. Team goals, however, must be aligned with the organization's strategic objectives. Aligning team objectives with overall corporate objectives ensures that people are working toward the same goal.

Human Resource Planning

Introduction

As told in the last chapter Human resource management has started to play a significant role in the overall strategic development of the organization. At present HR strategies are designed in tune with the overall business strategy of the organization. HR strategy should sub serve the interest of the organization, translating firm's goals and objectives into a consistent, integrated and complimentary set of programmer and policies for managing people. First part of Human resource strategy is HRP – Human Resource Planning. All other HR activities like employee hiring, training and development, remuneration, appraisal and labour relations are derived from HRP. HR planning is important in a wide variety of industries and firms. HR planning affects what employers do when recruiting, selecting, and retaining people, and of course these actions affect organizational results and success. The challenges caused by changing economic conditions during recent year's show why HR workforce planning should occur. Staffing an organization is an HR activity that is both strategic and

operational in nature. As the HR Headline indicates, HR planning is important in a wide variety of industries and firms. HR planning affects what employers do when recruiting, selecting, and retaining people, and, of course these actions affect organizational results and success. Human Resources planning mean different means to different organizations. To some companies, human resources planning mean management development. It involve helping executives to make better decisions, communicate more effectively, and know more about the firm. The purpose of HRP is to make the manager a better equipped for facing the present and future.

Human Resource Planning (HRP)

Human resource planning is important for helping both organizations and employees to prepare for the future. The basic goal of human resource planning is to predict the future and based on these predictions, implement programmed to avoid anticipated problems. Very briefly humans resource planning is the process of examining an organization's or individual's future human resource needs for instance, what types of skills will be needed for jobs of the future compared to future human resource capabilities (such as the types of skilled employees you already have) and developing human resource policies and practices to address potential problems for example, implementing training programmers to avoid skill deficiencies.

Definition of Human Resource Planning

According to Vetter, "HRP is the process by which management determines how the organization should move from its current man power position to desired manpower position. Through planning, management strives to have the right time, doing things which result in both the organization and individual receiving maximum long run benefits". According to Gordon Mc Beath, "HRP is concerned with two things: Planning of manpower requirements and Planning of Manpower supplies".

According to Beach, "HRP is a process of determining and assuming that the organization will have an adequate number of qualified persons, available at proper times, performing jobs which meet the needs of the enterprise and which provides satisfaction for the individuals involved" Simply HRP can be understood as the process of forecasting an organization's future demands for and supply of the right type of people in the right number. In other words HRP is the process of determining manpower needs and formulating plans to meet these needs.

HRP is a Four-Phased Process.

- **The first phase** involves the gathering and analysis of data through manpower inventories and forecasts,
- **The second phase** consists of establishing manpower objectives and policies and gaining top management approval of these.
- **The third phase** involves designing and implementing plans and promotions to enable the organization to achieve its manpower objectives.
- **The fourth phase** is concerned with control and evaluation of manpower plans to facilitate progress in order to benefit both the organization and the individual. The long run view means that gains may be sacrificed in the short run for the future grounds. The planning process enables the organization to identify what its

manpower needs is and what potential manpower problems required current action. This leads to more effective and efficient performance.

Nature of HRP

Human resource planning is the process of analyzing and identifying the availability and the need for human resources so that the organization can meet its objectives. The focus of HR planning is to ensure that the organization has the right number of human resources, with the right capabilities, at the right times, and in the right places. In HR planning, an organization must consider the availability and allocation of people to jobs over long periods of time, not just for the next month or the next year. HRP is a sub system in the total organizational planning. Actions may include shifting employees to other jobs in the organization, laying off employees or otherwise cutting back the number of employees, developing present employees, and/or increasing the number of employees in certain areas. Factors to consider include the current employees' knowledge, skills, and abilities and the expected vacancies resulting from retirements, promotions, transfers, and discharges. To do this, HR planning requires efforts by HR professionals working with executives and managers.

Objectives of Human Resource Planning

1. To ensure optimum utilization of human resources currently available in the organization.
2. To assess or forecast the future skill requirement of the organization.
3. To provide control measures to ensure that necessary resources are available as and when required.
4. A series of specified reasons are there that attaches importance to manpower planning and

forecasting exercises. They are elaborated below:

- To link manpower planning with the organizational planning □ To determine recruitment levels.
- To anticipate redundancies.
- To determine optimum training levels.
- To provide a basis for management development programs.
- To cost the manpower.
- To assist productivity bargaining.
- To assess future accommodation requirement.
- To study the cost of overheads and value of service functions.
- To decide whether certain activity needs to be subcontracted, etc.

HRP exists as a part of planning process of business. This is the activity that aims to coordinate the requirements for the availability of the different types of employers. The major activities are the forecasting, (future requirements), inventorying (present strength), anticipating (comparison of present and future requirements) and planning (necessary program to meet the requirements). The HR forecasts are responsible for estimating the number of people and the jobs needed by an organization to achieve its objectives and realize its plans in the most efficient and effective manner. HR needs are computed by subtracting HR supplies or number of the employees available from expected HR demands or number of people required to produce a desired level of outcome. The objective of HR is to provide right personnel for the right work and

optimum utilization of the existing human resources. The objectives of human resource planning may be summarized as below:

- **Forecasting Human Resources Requirements:** HRP is essential to determine the future needs of HR in an organization. In the absence of this plan it is very difficult to provide the right kind of people at the right time.
- **Effective Management of Change:** Proper planning is required to cope with changes in the different aspects which affect the organization. These changes need continuation of allocation/ reallocation and effective utilization of HR in organization.
- **Realizing the Organizational Goals:** In order to meet the expansion and other organizational activities the organizational HR planning is essential.
- **Promoting Employees:** HRP gives the feedback in the form of employee data which can be used in decision-making in promotional opportunities to be made available for the organization.
- **Effective Utilization of HR:** The data base will provide the useful information in identifying surplus and deficiency in human resources. The objective of HRP is to maintain and improve the organizational capacity to reach its goals by developing appropriate strategies that will result in the maximum contribution of HR.

Need for HRP in Organizations

Major reasons for the emphasis on HRP at the Macro level:

- 1) **Employment-Unemployment Situation:** Though in general the number of educated unemployment is on the rise, there is acute shortage for a variety of skills. This emphasizes on the need for more effective recruitment and employee retention.
- 2) **Technological Change:** The changes in production technologies, marketing methods and management techniques have been extensive and rapid. Their effect has been profound on the job contents and job contexts. These changes have caused problems relating to redundancies, retention and redeployment. All these suggest the need to plan manpower needs intensively and systematically.
- 3) **Demographic Change:** The changing profile of the work force in terms of age, sex, literacy, technical inputs and social background has implications for HRP.
- 4) **Skill Shortage:** Unemployment does not mean that the labour market is a buyer's market. Organizations generally become more complex and require a wide range of specialist skills that are rare and scarce. A problem arises in an organization when employees with such specialized skills leave.
- 5) **Governmental Influences:** Government control and changes in legislation with regard to affirmative action for disadvantages groups, working conditions and hours of work, restrictions on women and child employment, casual and contract labor, etc. have stimulated the organizations to be become involved in systematic HRP.
- 6) **Legislative Control:** The policies of "hire and fire" have gone. Now the legislation makes it difficult to reduce the size of an organization quickly and cheaply. It is easy to increase but difficult to shed the fat in terms of the numbers employed because of recent changes in labor law relating to lay-offs

and closures. Those responsible for managing manpower must look far ahead and thus attempt to foresee manpower problems.

- 7) **Impact of the Pressure Group:** Pressure groups such as unions, politicians and persons displaced from land by location of giant enterprises have been raising contradictory pressure on enterprise management such as internal recruitment and promotion, preference to employees' children, displace person, sons of soil etc.
- 8) **Systems Approach:** The spread of system thinking and advent of the macro computer as the part of the on-going revolution in information technology which emphasis planning and newer ways of handling voluminous personnel records.
- 9) **Lead Time:** The log lead time is necessary in the selection process and training and deployment of the employee to handle new knowledge and skills successfully.

Importance of HRP

HRP is the subsystem in the total organizational planning. Organizational planning includes managerial activities that set the company's objective for the future and determines the appropriate means for achieving those objectives. The importance of HRP is elaborated on the basis of the key roles that it is playing in the organization.

1. **Future Personnel Needs:** Human resource planning is significant because it helps to determine the future personnel needs of the organization. If an organization is facing the problem of either surplus or deficiency in staff strength, then it is the result of the absence of effecting HR planning. All public sector enterprises find themselves overstaffed now as they never had any planning for personnel requirement and went of recruitment spree till late 1980's. The problem of excess staff has become such a prominent problem that many private sector units are resorting to VRS 'voluntary retirement scheme'. The excess of labor problem would have been there if the organization had good HRP system. Effective HRP system will also enable the organization to have good succession planning.
2. **Part of Strategic Planning:** HRP has become an integral part of strategic planning of strategic planning. HRP provides inputs in strategy formulation process in terms of deciding whether the organization has got the right kind of human resources to carry out the given strategy. HRP is also necessary during the implementation stage in the form of deciding to make resource allocation decisions related to organization structure, process and human resources. In some organizations HRP play as significant role as strategic planning and HR issues are perceived as inherent in business management.
3. **Creating Highly Talented Personnel:** Even though India has a great pool of educated unemployed, it is the discretion of HR manager that will enable the company to recruit the right person with right skills to the organization. Even the existing staff hope the job so frequently that organization face frequent shortage of manpower. Manpower planning in the form of skill development is required to help the organization in dealing with this problem of skilled manpower shortage
4. **International Strategies:** An international expansion strategy of an organization is facilitated to a great extent by HR planning. The HR department's ability to fill key jobs with foreign nationals and reassignment of employees from within or across national borders is a major challenge that is

being faced by international business. With the growing trend towards global operation, the need for HRP will as well will be the need to integrate HRP more closely with the organizations strategic plans. Without effective HRP and subsequent attention to employee recruitment, selection, placement, development, and career planning, the growing competition for foreign executives may lead to expensive and strategically descriptive turnover among key decision makers.

5. **Foundation for Personnel Functions:** HRP provides essential information for designing and implementing personnel functions, such as recruitment, selection, training and development, personnel movement like transfers, promotions and layoffs.
6. **Increasing Investments in Human Resources:** Organizations are making increasing investments in human resource development compelling the increased need for HRP. Organizations are realizing that human assets can increase in value more than the physical assets. An employee who gradually develops his/ her skills and abilities become a valuable asset for the organization. Organizations can make investments in its personnel either through direct training or job assignment and the rupee value of such a trained, flexible, motivated productive workforce is difficult to determine. Top officials have started acknowledging that quality of work force is responsible for both short term and long term performance of the organization.
7. **Resistance to Change:** Employees are always reluctant whenever they hear about change and even about job rotation. Organizations cannot shift one employee from one department to another without any specific planning. Even for carrying out job rotation (shifting one employee from one department to another) there is a need to plan well ahead and match the skills required and existing skills of the employees.
8. **Uniting the Viewpoint of Line and Staff Managers:** HRP helps to unite the viewpoints of line and staff managers. Though HRP is initiated and executed by the corporate staff, it requires the input and cooperation of all managers within an organization. Each department manager knows about the issues faced by his department more than anyone else. So communication between HR staff and line managers is essential for the success of HR Planning and development.
9. **Succession Planning:** Human Resource Planning prepares people for future challenges. The 'stars' are picked up, trained, assessed and assisted continuously so that when the time comes such trained employees can quickly take the responsibilities and position of their boss or seniors as and when situation arrives.
10. **Other Benefits:** (a) HRP helps in judging the effectiveness of manpower policies and programmers of management. (b) It develops awareness on effective utilization of human resources for the overall development of organization. (c) It facilitates selection and training of employees with adequate knowledge, experience and aptitudes so as to carry on and achieve the organizational objectives (d) HRP encourages the company to review and modify its human resource policies and practices and to examine the way of utilizing the human resources for better utilization.

Factors Affecting HRP

HRP is influenced by several factors. The most important of the factors that affect HRP are

- (1) type and strategy of organization
- (2) organizational growth cycles and planning
- (3) environmental uncertainties
- (4) time horizons
- (5) type and quality of forecasting information
- (6) nature of jobs being filled and
- (7) off loading the work.

1. Type and Strategy of the Organization: Type of the organization determines the production processes involve, number and type of staff needed and the supervisory and managerial personnel required. HR need is also defined by the strategic plan of organization. If the organization has a plan for organic growth then organization need to hire additional employees.

On the other hand If the organization is going for mergers and acquisition, then organization need to plan for layoffs, as mergers can create, duplicate or overlap positions that can be handled more efficiently with fewer employees. Organization first decides whether to be reactive or proactive in HRP. Organizations either carefully anticipate the needs and systematically plan to fill the need in advance (proactive) or can simply react to the needs as they arise (reactive). Likewise, the organization must determine the width of the HR plan. Organization can choose a narrow focus by planning in only one or two HR areas like recruitment and selection or can have a broad perspective by planning in all areas including training and remuneration.

The nature of HR plan is also decides upon the formality of the plan. It can decides to have an informal plan that lies mostly in the minds of the managers and personnel staff or can have a formal plan which is properly documented in writing. The nature of HR plan is also depended upon the flexibility that is practiced in the organization. HR plan should have the ability to anticipate and deal with contingencies. Organizations frame HRP in such a way that it can contain many contingencies, which reflect different scenarios thereby assuring that the plan is flexible and adaptable.

determines the nature and extends of HRP. Small organizations in the earlier stages of growth may not have well defined personnel planning. But as the organization enters the growth stage they feel the need to plan its human resource. At this stage organization gives emphasis upon employee development. But as the organization reaches the mature stage it experience less flexibility and variability resulting in low growth rate. HR planning becomes more formalized and less flexible and less innovative and problem like retirement and possible retrenchment dominate planning.

Summarizes the five factors that influence an organization while framing it's strategic HRP.

2. Organizational growth Cycles and Planning: all organizations from the day of its inception. The stage of growth in which an organization is During the declining stage of the organization HRP takes a different focus like planning to do the layoff, retrenchment and retirement. In declining situation planning always becomes reactive in nature towards the financial and sales distress faced by the company.



Table 2.1 : Degree of Uncertainty and Length of Planning Period

Short Planning period- uncertainty/ instability	Long planning period- certainty/ stability
Many new competitors Rapid changes in social and economic conditions	Strong competitive position Evolutionary, rather than rapid social, political and technological change
Unstable product/ service demand patterns Small organizational size, poor management practices (crisis Management)	Stable demand patterns Strong management practices.

3. **Environmental Uncertainties:** Political, social and economic changes affect all organizations and the fluctuations that are happening in these environments affect organizations drastically. Personnel planners deal with such environmental uncertainties by carefully formulating recruitment, selection, training and development policies and programmes. The balance in the organization is achieved through careful succession planning, promotion channels, layoffs, flexi time, job sharing, retirement, VRS and other personnel related arrangements.
4. **Time Horizons:** HR plans can be short term or long term. Short term plans spans from six months to one year, while long term plans spread over three to twenty years. The extent of time period depends upon the degree of uncertainty that is prevailing in an organizations environment. Greater the uncertainty, shorter the plan time horizon and vice versa.
5. **Type and Quality of information:** The information used to forecast personnel needs originates from a multitude of sources. The forecast depends to a large extent upon the type of information and the quality of data that is available to personnel planners. The quality and accuracy of information depend upon the

clarity with which the organizational decision makers have defined their strategy, structure, budgets, production schedule and so on.

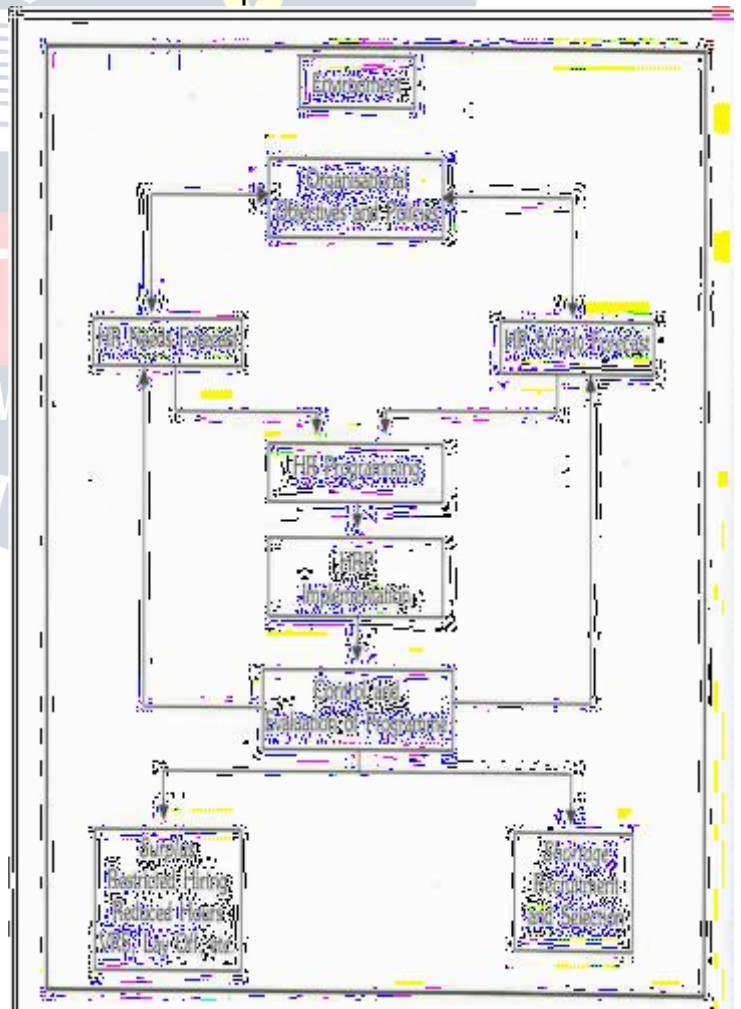
Strategic Information	General Organizational Information	Specific Information Necessary for HRP
Product mix Customer mix	Organizational structure Information flows	Job analysis Skills inventories
Competitive emphasis	Operating and capital budgets Functional area objectives	Management inventories
Geographic limits of market	Production schedules Distribution channels Sales territories Production processes Level of technology Planning horizons	Available training and development programmes Recruitment sources
		Labour market analysis Compensation programmes Constitutional provisions and labour laws Retirement plans Turnover data.

6. Nature of Jobs Being Filled: Personnel planners need to be really careful with respect to the nature of the jobs being filled in the organization. Employees belonging to lower level who need very limited skills can be recruited hastily but, while hiring employees for higher posts, selection and recruitment need to be carried out with high discretion. Organization need to anticipate vacancies far in advance as possible, to provide sufficient time to recruit suitable candidate.

7. Outsourcing: Several organizations outsource part of their work to outside parties in the form of subcontract. Outsourcing is a regular feature both in the public sector as well as in the private sector companies. Many of the organizations have surplus labor and hence instead of hiring more people they go for outsourcing. Outsourcing is usually done for non critical activities. Outsourcing of non-critical activities through subcontracting determines HRP.

HRP Process

HRP effectively involves forecasting personnel needs, assessing personnel supply and matching demand – supply factors through personnel related programmes. The HR planning process is influenced by overall organizational objectives and environment of business.



Environmental Scanning:

It refers to the systematic monitoring of the external forces influencing the organization. The following forces are essential for pertinent HRP.

- Economic factors, including general and regional conditions.
- Technological changes
- Demographic changes including age, composition and literacy, □ Political and legislative issues, including laws and administrative rulings □ Social concerns, including child care, educational facilities and priorities.

By scanning the environment for changes that will affect an organization, managers can anticipate their impact and make adjustments early.

Organizational Objectives and Policies: HR plan is usually derived from the organizational objectives. Specific requirements in terms of number and characteristics of employees should be derived from organizational objectives. Once the organizational objectives are specified, communicated and understood by all concerned, the HR department must specify its objective with regard to HR utilization in the organization.

HR Demand Forecast:

Demand forecasting is the process of estimating the future quantity and quality of people required to meet the future needs of the organization. Annual budget and long-term corporate plan when translated into activity into activity form the basis for HR forecast. For eg: in the case of a manufacturing company, the sales budget will form the basis for production plan giving the number and type of products to be produced in each period. This will form the basis upon which the organization will decide the number of hours to be worked by each skilled category of workers. Once the number hours required is available organization can determine the quality and quantity of personnel required for the task.

Demand forecasting is influenced by both internal factors and external factors: external factors include competition, economic climate, laws and regulatory bodies, changes in technology and social factors whereas internal factors are budget constraints, production level, new products and services, organizational structure and employee separations.

Demand forecasting is essential because it helps the organization to

1. Quantify the jobs, necessary for producing a given number of goods,
2. To determine the nature of staff mix required in the future,
3. To assess appropriate levels in different parts of organization so as to avoid unnecessary costs to the organization,
4. To prevent shortages of personnel where and when, they are needed by the organization.
5. To monitor compliances with legal requirements with regard to reservation of jobs. Techniques like managerial judgment, ratio- trend analysis, regression analysis, work study techniques, Delphi techniques are some of the major methods used by the organization for demand forecasting.

HR Supply Forecast:

Supply forecast determines whether the HR department will be able to procure the required number of workers. Supply forecast measures the number of people likely to be available from within and outside an organization, after making allowance for absenteeism, internal movements and promotions, wastage and changes in hours, and other conditions of work.

Supply forecast is required because it is needed as it

1. Helps to quantify the number of people and positions expected to be available in future to help the organization realize its plans and meet its objectives
 2. Helps to clarify the staff mixes that will arise in future
 3. It assesses existing staffing in different parts of the organization.
 4. It will enable the organization to prevent shortage of people where and when they are most needed.
 5. It also helps to monitor future compliance with legal requirements of job reservations.
- Supply analysis covers the existing human resources, internal sources of supply and external sources of supply.

HR Programming:

Once an organization's personnel demand and supply are forecasted the demand and supply need to be balanced in order that the vacancies can be filled by the right employees at the right time.

HR Plan Implementation:

HR implementation requires converting an HR plan into action. A series of action are initiated as a part of HR plan implementation. Programmes such as recruitment, selection and placement, training and development, retraining and redeployment, retention plan, succession plan etc when clubbed together form the implementation part of the HR plan.

Control and Evaluation:

Control and evaluation represent the final phase of the HRP process. All HR plan include budgets, targets and standards. The achievement of the organization will be evaluated and monitored against the plan. During this final phase organization will be evaluating on the number of people employed against the established (both those who are in the post and those who are in pipe line) and on the number recruited against the recruitment targets. Evaluation is also done with respect to employment cost against the budget and wastage accrued so that corrective action can be taken in future.

Requisites for Successful HRP

1. HRP must be recognized as an integral part of corporate planning
2. Support of top management is essential
3. There should be some centralization with respect to HRP responsibilities in order to have co-ordination between different levels of management.
4. Organization records must be complete, up to date and readily available.

5. Techniques used for HR planning should be those best suited to the data available and degree of accuracy required.
6. Data collection, analysis, techniques of planning and the plan themselves need to be constantly revised and improved in the light of experience.

Barriers to HRP

Human Resource Planners face significant barriers while formulating an HRP. The major barriers are elaborated below:

- 1) HR practitioners are perceived as experts in handling personnel matters, but are not experts in managing business.
- 2) The personnel plan conceived and formulated by the HR practitioners when enmeshed with organizational plan, might make the overall strategic plan of the organization ineffective
- 3) HR information often is incompatible with other information used in strategy formulation. Strategic planning efforts have long been oriented towards financial forecasting, often to the exclusion of other types of information. Financial forecasting takes precedence over HRP.
- 4) Conflict may exist between short term and long term HR needs. For example, there can be a conflict between the pressure to get the work done on time and long term needs, such as preparing people for assuming greater responsibilities. Many managers are of the belief that HR needs can be met immediately because skills are available on the market as long as wages and salaries are competitive. Therefore, long times plans are not required, short planning are only need.
- 5) There is conflict between quantitative and qualitative approaches to HRP. Some people view HRP as a number game designed to track the flow of people across the department. Others take a qualitative approach and focus on individual employee concerns such as promotion and career development. Best result can be achieved if there is a balance between the quantitative and qualitative approaches.
- 6) Non-involvement of operating managers renders HRP ineffective. HRP is not strictly an HR department function. Successful planning needs a co-ordinate effort on the part of operating managers and HR personnel.

Job Analysis and Job Design

Introduction

Manpower planning is concerned with determination of quantitative and qualitative requirements of manpower for the organization. Determination of manpower requirements is one of the most important problems in manpower planning. Job analysis and job design, provide this knowledge. Before going through the mechanism of job analysis and job design, it is relevant to understand the terms which are used in job analysis and job design.

- **Job:** A job may be defined as a “collection or aggregation of tasks, duties and responsibilities which as a whole, are regarded as a regular assignment to individual employees,” and which is different from other assignments, In other words, when the total work to be done is divided and grouped into packages, we call it a “job.” Each job has a definite title based upon standardized trade specifications within a job; two or more grades may be identified, where the work assignment may be graded according to skill, the difficulty of doing them, or the quality of workmanship. Thus, it may be noted

that a position is a “collection o tasks and responsibilities regularly assigned to one person;” while a job is a “group of position, which involve essentially the same duties, responsibilities, skill and knowledge.” A position consists of a particular set of duties assigned to an individual. Decenzo and P. Robbins define other terms as follows:

- **Task:** It is a distinct work activity carried out for a distinct purpose.
- **Duty:** It is a number of tasks.
- **Position:** It refers to one or more duties performed by one person in an organization, There are at least as many positions as there are workers in the organization; vacancies may create more positions than employees.
- **Job:** It is a type of position within the organization.
- **Job Family:** It is group of two or more jobs that either call for similar worker characteristics or contain parallel work tasks as determined by job analysis.
- **Occupation:** It is a group of similar jobs found across organizations.
- **Career:** It represents a sequence of positions, jobs, or occupations that a person has over his working life.

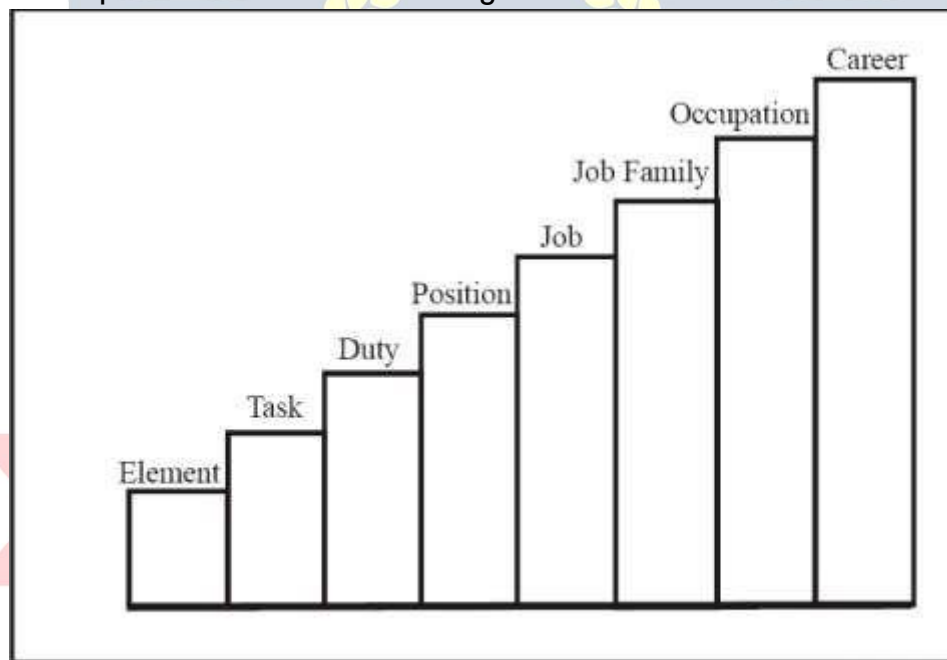


Figure 3.1: Job Analysis Information Hierarchy

Job Analysis Defined

Developing an organizational structure, results in jobs which have to be staffed. Job analysis is the procedure through which you determine the duties and nature of the jobs and the kinds of people (in terms of skills and experience) who should be hired for them. It provides you with data on job requirements, which are then used for developing job descriptions (what the job entails) and job specifications (what kind of people to hire for the job). Some of the definitions of job analysis are given as follows, to understand the meaning of the term more clearly:

According to Michael L. Jucius, “Job analysis refers to the process of studying the operations, duties and organizational aspects of jobs in order to derive specifications or as they called by some, job descriptions.”

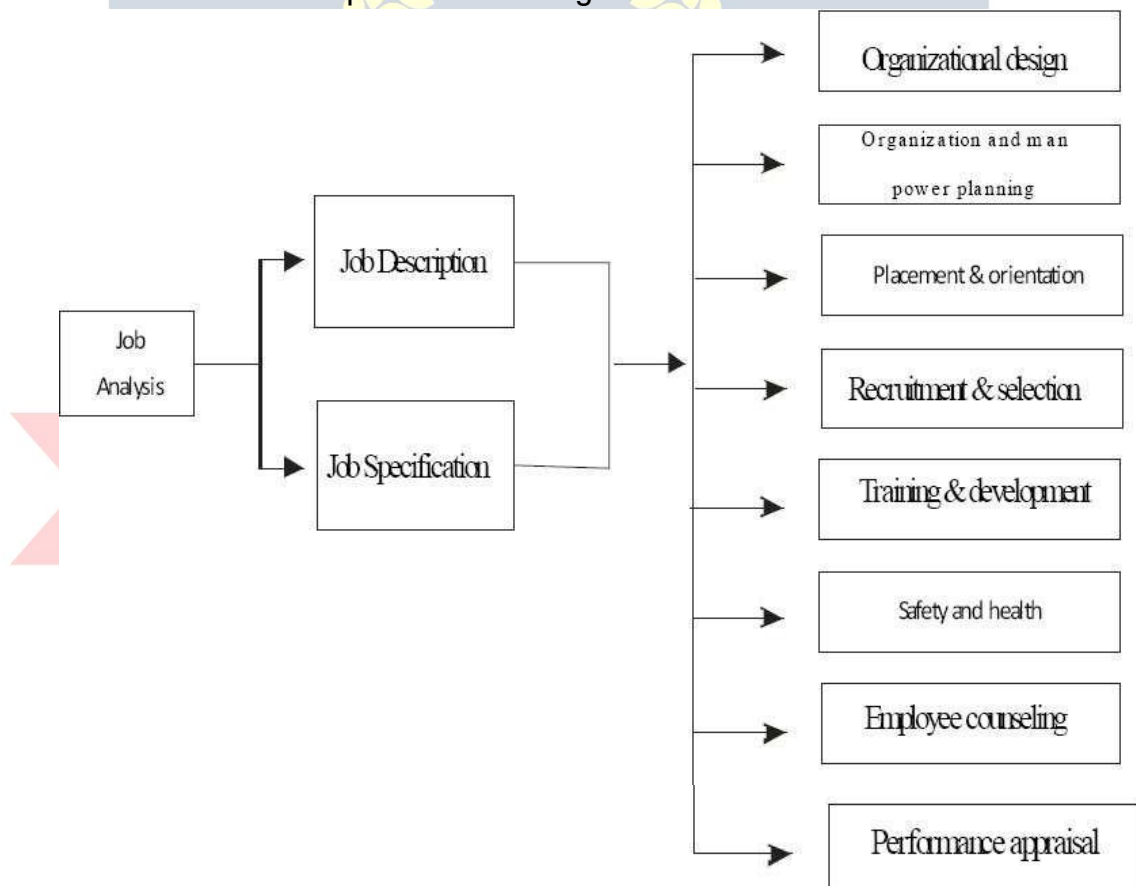
According to DeCenzo and P. Robbins, “A job analysis is a systematic exploration of the activities within a job. It is a basic technical procedure, one that is used to define the duties, responsibilities, and accountabilities of a job.”

According to Herbert G Herman “A job is a collection of tasks that can be performed by a single employee to contribute to the production of some product or service provided by the organization. Each job has certain ability requirements (as well as certain rewards) associated with it. Job analysis process used to identify these requirements.”

Flippo has offered a more comprehensive definition of job analysis as, “Job analysis is the process of studying and collecting information relating to the operations and responsibilities of a specific job. The immediate products of the analysis are job descriptions and job specifications” Thus, job analysis involves the process of identifying the nature of a job (job description) and the qualities of the likely job holder (job specification).

Uses of Job Analysis

As summarized in Figure 3.2 the information generated by the job analysis is used as a basis of several interrelated personnel management activities:



1. Achievement of Goals: Weather and Davis have stated, “Jobs are at the core of every organization’s productivity, if they are designed well and done right, the organization makes progress towards its objectives. Otherwise, productivity suffers, profits fall, and the organization is less able to meet the demands of society, customer, employees, and other with a stake in its success.”

2. Organizational Design: Job analysis will be useful in classifying the jobs and the interrelationships among the jobs. On the basis of information obtained through

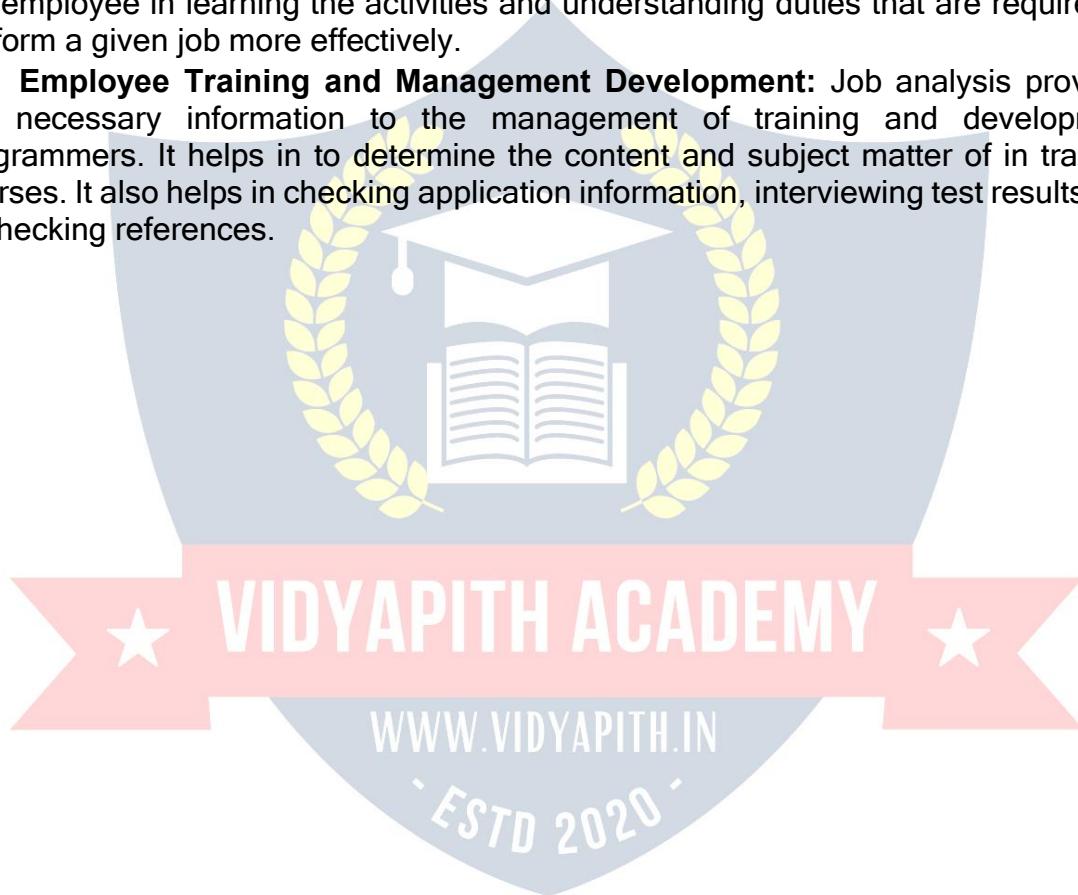
job analysis, sound decisions regarding hierarchical positions and functional differentiation can be taken and this will improve operational efficiency.

3. Organization and Manpower Planning: It is helpful in organization planning, for it defines labor in concrete terms and co-ordinates the activities of the work force, and clearly divides duties and responsibilities.

4. Recruitment and Selection: Job analysis provides you with information on what the job entails and what human requirements are required to carry out these activities. This information is the basis on which you decide what sort of people to recruit and hire.

5. Placement and Orientation: Job analysis helps in matching the job requirements with the abilities, interests and aptitudes of people. Jobs will be assigned to persons on the basis of suitability for the job. The orientation programmer will help the employee in learning the activities and understanding duties that are required to perform a given job more effectively.

6. Employee Training and Management Development: Job analysis provides the necessary information to the management of training and development programmers. It helps in to determine the content and subject matter of in training courses. It also helps in checking application information, interviewing test results and in checking references.



7. Job Evaluation and Compensation: Job evaluation is the process of determining the relative worth of different jobs in an organization with a view to link compensation, both basic and supplementary, with the worth of the jobs. The worth of

a job is determined on the basis of job characteristics and job holder characteristics. Job analysis provides both in the forms of job description and job specification.

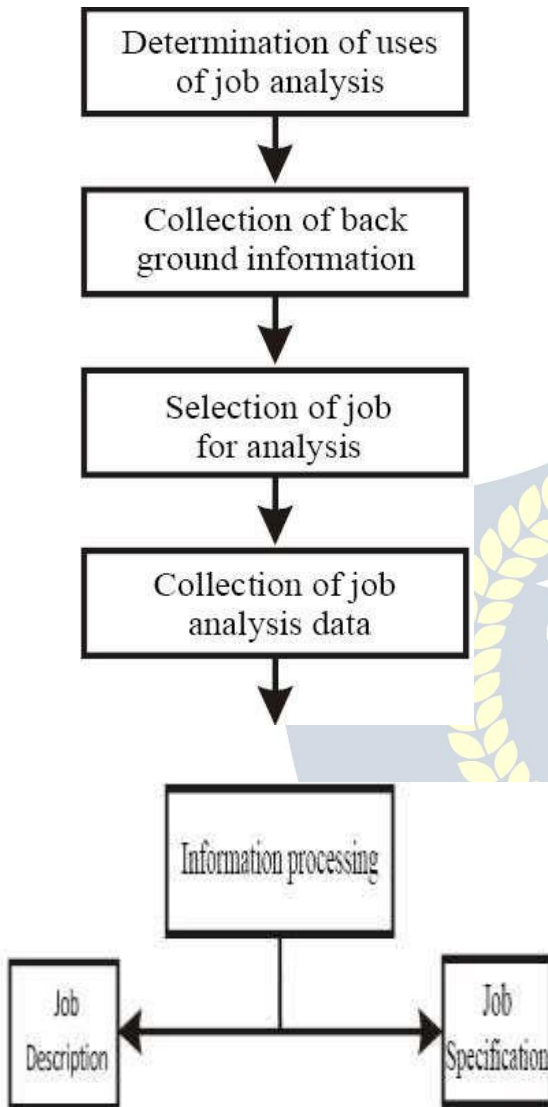
8.

Performance Appraisal:

Performance appraisal involves comparing each employee's actual performance with his or her desired performance. Through job analysis industrial engineers and other experts determine standards to be achieved and specific activities to be performed.

9. Health and Safety: It provides an opportunity for identifying hazardous conditions and unhealthy environmental factors so that corrective measures may be taken to minimize and avoid the possibility of accidents.

10. Employee Counseling: Job analysis provides information about career choices and personal limitation. Such information is helpful in vocational guidance and rehabilitation counseling. Employees who are unable to cope with the hazards and demands of given jobs may be advised to opt for subsidiary jobs or to seek premature



retirement.

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Steps in Job Analysis

The six steps of job analysis are shown in figure 3.3:

Job Analysis Process

1. Determine the Use of the Job Analysis Information:

Start by identifying the use to which the information will be put, since this will determine the type of data you collect and the technique you use to collect them.

2. Collection of Background Information: According to Terry, "The make-up of a job, its relation to other jobs, and its requirements for

competent performance are essential information needed for a job evaluation. This information can be had by reviewing available background information such as organization charts (which show how the job in question relates to other jobs and where they fit into the overall organization); class specifications (which describe the general requirements of the class of job to which the job under analysis belongs); and the existing job descriptions which provide a starting point from which to build the revised job description”.

3. **Selection of Jobs for Analysis:** To do job analysis is a costly and time consuming process. It is hence, necessary to select a representative sample of jobs for purposes of analysis. Priorities of various jobs can also be determined. A job may be selected because it has undergone undocumented changes in job content. The request for analysis of a job may originate with the employee, supervisor, or a manager. When the employee requests an analysis it is usually because new job demands have not been reflected in changes in wages. Employee’s salaries are, in part, based upon the nature of the work that they perform. Some organizations establish a *time cycle for the analysis of each job*. For example: A job analysis may be required for all jobs every three years. New jobs must also be subjected to analysis.
4. **Collection of Job Analysis Data:** Job data on features of the job, required employee qualification and requirements, should be collected either from the employees who actually perform a job; or from other employees (such as foremen or supervisors) who watch the workers doing a job and there by acquire knowledge about it; or from the outside persons, known as the trade job analysis who are appointed to watch employees performing a job. The duties of such a trade job analyst are
 - (i) To outline the complete scope of a job and to consider all the physical and mental activities involved in determining what the worker does.;
 - (ii) find out why a worker does a job; and for this purpose he studies why each task is essential for the overall result; and
 - (iii) The skill factor which may be needed in the worker to differentiate between jobs and establish the extent of the difficulty of any job.
5. **Processing the Information:** Once job analysis information has been collected, the next step is to place it in a form that will make it useful to those charged with the various personnel functions. Several issues arise with respect to this. First, how much detail is needed? Second, can the job analysis information be expressed in quantitative terms? These must be considered properly.
6. **Preparing Job Descriptions and Job Classifications:** Job information which has been collected must be processed to prepare the job description form. It is a statement showing full details of the activities of the job. Separate job description forms may be used for various activities in the job and may be compiled later on. The job analysis is made with the help of these description forms. These forms may be used as reference for the future.
7. **Developing Job Specifications:** Job specifications are also prepared on the basis of information collected. It is a statement of minimum acceptable qualities of the person to be placed on the job. It specifies the standard by which the qualities of the person are measured. Job analyst prepares such statement

taking into consideration the skills required in performing the job properly. Such statement is used in selecting a person matching with the job.

Methods for Collecting Job Analysis Data

As discussed earlier, information is to be collected for job analysis. Such information may be collected by the trained job analysis, superiors concerned and job holders themselves. Job information is collected through the following methods:

- 1. Participant Diary/Logs:** Workers can be to keep participant diary/long or lists of things they do during the day. For every activity he or she engages in, the employee records the activity (along with the time) in a log. This can provide you with a very comprehensive picture of the job, especially when it's supplemented with subsequent interviews with the worker and his or her supervisor. This method provides more accurate information if done faithfully. However, it is quite time consuming. Further, each job holder may maintain records according to his own way which presents problems in analysis at later stage. Therefore, it has limited application.



2. **Interview:** There are three types of interviews you can use to collect job analysis data: individual interviews with each employee; group interviews with groups of employees having the same job; and supervisor interviews with one or more supervisors who are thoroughly knowledgeable about the job being analyzed. The group interview is used when a large number of employees are performing similar or identical work, since this can be a quick and inexpensive way of learning about the job. As a rule, the worker's immediate supervisor would attend the group session; if not, you should interview the supervisor separately to get that person's perspective on the duties and responsibilities of the job.
3. **Critical Incidents:** In this method, job holders are asked to describe incidents concerning the job on the basis of their past experience. The incidents so collected are analyzed and classified according to the job areas they describe. A fairly picture of actual job requirements can be obtained by distinguishing between effective and ineffective behaviors of workers on the job. However, this method is time consuming. The analyst requires a high degree of skill to analyze the contents of descriptions given by workers.
4. **Technical Conference Method:** This method utilizes supervisors with extensive knowledge of the job. Here, specific characteristics of a job are obtained from the "experts." Although it is a good data gathering method, it often overlooks the incumbent worker's perception about what they do on their job.
5. **Job Performance:** Under this method, the job analyst actually performs the job under study to get first-hand experience of the actual tasks, and physical and social demands of the job. This method can be used only for jobs where skill requirements are low and can be learnt quickly and easily. This is a time consuming method and is not appropriate for jobs requiring extensive training.
6. **Functional Job Analysis:** Functional job analysis (FJA) is employee-oriented analytical approach of job analysis. This approach attempts to describe the whole person on the job. The main features of FJA include the following:
 - The extent to which specific instruction are necessary to perform the task
 - The extent to which reasoning and judgment are required to perform the task
 - The mathematical ability required to perform the task and
 - The verbal and language facilities required to perform the task.
7. **Observation Method:** Using this method, a job analyst watches employees directly on the job. Observations are made on various tasks, activities, the pace at which tasks are carried out, and the way different activities are performed. This method is suitable for jobs that involve manual, standardized, and short job cycle activities. This method also requires that the entire range of activities be observable; possible with some jobs.
8. **Questionnaires:** The method is usually employed by engineering consultants. Properly drafted questionnaires are sent out to job-holders for completion and are returned to supervisors. However, the information received is often unorganized and incoherent. The idea in issuing questionnaire is to elicit the necessary information from job -holders so that

any error may first be discussed with the employee and, after corrections, may be submitted to the job analyst

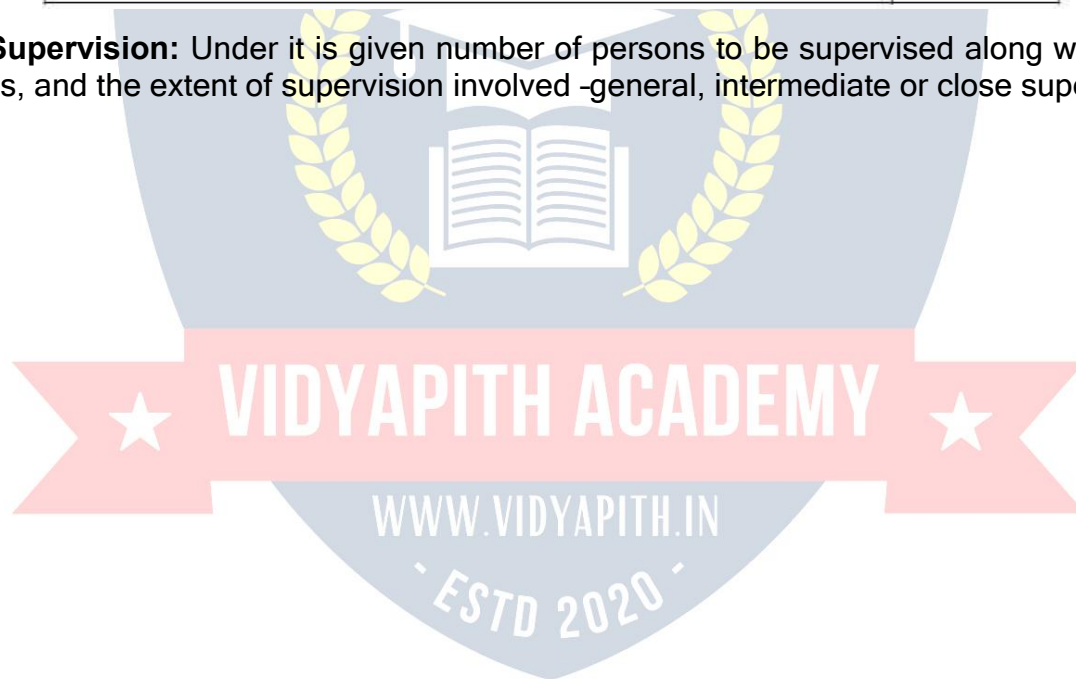
Questionnaire for Job Analysis	
1. Your Name
2. Title or Designation of your job
3. Regular or Extra
4. Your Department
5. To whom do you report directly (Name and Title):
6. Description of work: (a) Daily Duties:	
(b) Periodical Duties:	
(c) Occasional Duties:	
7. Your knowledge Requirements:	
(A) Store Procedure and Methods:	
(B) Merchandise:	
8. What Equipment do you use?	
9. What Materials do you work with or sell?	
10. If you supervise the work of others, state how many and what their jobs are.	
11. To what job would you normally expect to be promoted?	
12. From what job were you transferred to your present job?	

This technique is time consuming and generally does not yield satisfactory results because many employees do not complete the questionnaire or furnish incorrect information because of their own limitations. The use of questionnaire is recommended only in case of those technical jobs where the job contents are not completely known to the supervisor or the operation is too complex to observe. There are certain standardized questionnaires developed by a few agencies which are used by various organizations for job analysis. Most of these questionnaires are of two types: position analysis questionnaire and management position description questionnaire that are described as follows:

- a. **Position Analysis Questionnaire.** Position analysis questionnaire (PAQ) is a highly specialized instrument for analyzing a job in terms of employee activities. The PAQ developed by Purdue University is a comprehensive questionnaire for collecting information for job analysis. In this questionnaire, various job elements have been grouped into six categories with each category containing relevant job elements resulting into 195 elements

Job Aspects	No. of elements
Information input - Where and how do employee get information to do their job?	35
Mental processes- what reasoning, planning, organizing, and decision making is done?	14
Work output – what physical activities, tools and machines are used?	49
Relationships – what contact with other people, both in the company and outside is maintained or developed?	36
Job context- what is the physical and social context in which the job is maintained?	19
Other job characteristics – what other activities, conditions or Characteristics not covered by the categories are relevant?	42

4. Supervision: Under it is given number of persons to be supervised along with their job titles, and the extent of supervision involved -general, intermediate or close supervision.



Example of a Job Description

Job Title: Record Clerk **Job No.** 011

Supervisor: Record Supervisor

Job Grand -III

Supervises: None

Date: 2/21/12

Job Summary: Originate, process, and maintain comprehensive records; implement

required controls; collect and summarize data as requested.

Job Duties and Responsibilities :

- Review a variety of documents, listings, summarizes, etc, for completeness and accuracy.
- Check records against other current sources such as reports or summaries; investigate differences and take required action to ensure that records are accurate and up to date; compile and summarize data report format as required.
- Implement controls or obtaining, preserving, and supplying a variety of information. Prepare simple requisitions, forms, and other routine memoranda.
- Provide functional guidance to lower-level personnel as required.

Working Conditions: Normal working conditions. But visits sites on average twice a week.

Eight hours per day

Relationships:

- With equivalent officers in other departments.
- Maintains formal and social contacts with local officials.

Job Characteristics: Skilled operation of computer, calculating machine, or key punch machine is not necessarily a requirement of this job.

The above information is correct and approved by:

(Signed)

(Signed)

Job Analyst
Manager

In charge

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4. Supervision: Under it is given number of persons to be supervised along with their job titles, and the extent of supervision involved -general, intermediate or close supervision

5. Relation to Other Jobs: It describes the vertical and horizontal relationships of work flow. It also indicates to whom the jobholder will report and who will report to him. It gives an idea of channels of promotion.

6. Machine, tools and equipment define each major type or trade name of the machines and tools and the raw materials used.

7. Working Conditions: The working environment in terms of heat, light, noise, dust and fumes etc, the job hazards and possibility of their occurrence and working conditions should also be described. It will be helpful in job evaluation.

8. Social Environment: It specifies the social conditions under which the work will be performed. In this part the size of work group, interpersonal interactions required to perform the job and development facilities are mentioned

3.8 Job Specification

The job specification states the minimum acceptable qualifications that the incumbent must possess to perform the job successfully. Based on the information acquired through job analysis, the job specification identifies the knowledge, skills, and abilities needed to do the job effectively. Individuals possessing the personal characteristics identified in the job specification should perform the job more effectively than individuals lacking these personal characteristics. The job specification, therefore, is an important tool in the selection process, for it keeps the selector's attention on the list of qualifications necessary for an incumbent to perform the job and assists in determining whether candidates are qualified.

According to Dale Yoder, "The job specification, as such a summary properly described is thus a specialized job description, emphasizing personnel requirement and designed especially to facilitate selection and placement."

Flippo has defined job specification as, "Job specification is a statement of the minimum acceptable human qualities necessary to perform a job properly..... It is a standard of personnel and designates the qualities required for acceptable performance."

It is clear from the above definitions that job specification is a statement of summary of personnel requirements for a job. It may also be called "standard of personnel for the selection"

A Job Specification should include:

(i) Physical characteristics, which include health, strength, endurance, age, height, weight, vision, voice, eye, hand and foot co-ordination, motor co-ordination, and color discrimination.

(ii) Psychological and social characteristics such as emotional stability, flexibility, decision making ability, analytical view, mental ability, pleasing manners, initiative, conversational ability etc.

(iii) Mental Characteristics such as general intelligence, memory, judgment, ability to concentrate, foresight etc.

(iv) Personal Characteristics such as sex, education, family background, job experience, hobbies, extracurricular activities etc.

All these characteristics must be classified into three categories:

- Essential attributes which a person must possess.
- Desirable attributes which a person ought to possess.
- Contra indicators which will become a handicap to successful job performance.

Job Design

Job design is of comparatively recent origin. The human resource managers have realized that the design of a job has considerable influence on the productivity and job satisfaction; poorly designed jobs often result in boredom to the employees, increased turnover, job dissatisfaction, low productivity and an increase in overall costs of the organization. All these negative consequences can be avoided with the help of proper job design.

According to Jon Werner and DeSimone, “Job design is the development and alteration of the components of a job (such as the tasks one performs, and the scope of one’s responsibilities) to improve productivity and the quality of the employees’ work life.”

Job design has been defined by **Davis (1966)** as: “The specification of the contents, methods, and relationships of jobs in order to satisfy technological and organizational requirements as well as the social and personal requirements of the job-holder.”

Milkovich and Boudreau defined job design as, “Job design integrates work content (tasks, functions, and relationships), the rewards (extrinsic and intrinsic) and the qualifications required (skills, knowledge, abilities) for each job in a way that meets the needs of employees and the organization.”

Michael Armstrong has defined job design as “the process of deciding on the content of a job in terms of its duties and responsibilities, on the methods to be used in carrying out the job, in terms of techniques, systems and procedures, and on the relationships that should exist between the job holder and his superiors, subordinates and colleagues.”

Job design is an attempt to create a match between job requirements and human attributes. It involves organizing the components of the job and the interaction patterns among the members of a work group. It helps in developing appropriate design of job to improve efficiency and satisfaction

Principles of Job Design:

Principles are the bases of the approach used in job design. Robertson and Smith (1985) have suggested the following five principles of job design:

- To influence skill variety, provide opportunities for people to do several tasks and combine tasks.
- To influence task identity, combine tasks and form natural work units.
- To influence task significance, form natural work units and inform people of the importance of their work.
- To influence autonomy, give people responsibility for determining their own working systems.
- To influence feedback; establish good relationship and open feedback channels.

3.10 Methods of Job Design

The various techniques of job design and redesign are discussed below:

1. Job Simplification: In job simplification, the complete job is broken down into small subparts; this is done so that employee can do these jobs without much specialized training. Moreover, small operations of the job can also be performed simultaneously so that the complete operation can be done more quickly. For job simplification, generally time and motion studies are used.

2. Job Rotation: Another technique designed to enhance employee motivation is job rotation, or periodically assigning employees to alternating jobs or tasks. For example, an

employee may spend two weeks attaching bumpers to vehicles and the following two weeks making final checks of the chassis. During the next month, the same employee may be assigned to two different jobs. Therefore, the employee would be rotated among four jobs. The advantage of job rotation is that employees do not have the same routine job day after day. Job rotation only addresses the problem of assigning employees to jobs of limited scope; the depth of the job does not change. The job cycle of the actual daily work performed has not been lengthened or changed. Instead, employees are simply assigned to different jobs with different cycles. Because job rotation does not change the basic nature of jobs, it is criticized as nothing more than having an employee perform several boring and monotonous jobs rather than one. Some employees dislike job rotation more than being assigned to one boring job because when they are assigned to one job they know exactly where to report and what work to expect each day. Workers quickly realize that job rotation does not increase their interest in their work. Although it seldom addresses the lack of employee motivation, it give manages a means of coping with frequent absenteeism and high turnover. Thus when absenteeism or turnover occurs in the work force, managers can quickly fill the vacated position because each employee can perform several jobs. Job rotation is often effectively used as a training technique for new, inexperienced employees. At higher organizational levels, rotation also helps to develop managerial generalists because it exposes them to several different operations.

Advantage of Job Rotation Technique:

- The employee experiences variety of work, workplace and peer group.
- Job rotation helps to broaden the knowledge and skills of an employee.
- The main advantage of job rotation is that it relieves the employee from the boredom and monotony of doing the same job.
- With the help of this method, people become more flexible. They are prepared to assume responsibility especially at other positions.
- Job rotation broadens the work experience of employees and turns specialists into generalists.
- It is beneficial for the management also as the management gets employees who can perform a variety of tasks to meet the contingencies.
- This method improves the self image and personal worth of the employee.

Disadvantage of Job Rotation Technique:

- Job rotation also creates disruptions. Members of the work group have to adjust to the new employee.
- Productivity is reduced by moving a worker into new position just when his efficiency at the prior job was creating organizational economies.
- Training costs are increased.
- The supervisor may also have to spend more time answering question and monitoring the work of the recently rotated employee.
- It can demotivate intelligent and ambitious trainees who seek specific responsibilities in their chosen specialty.

3. Job Enlargement: Another means of increasing employee's satisfaction with routine jobs is job enlargement, or increasing the number of tasks performed (i.e. increasing the scope of the job). Job enlargement, like job rotation, tries to eliminate short job cycles that create boredom. Unlike job rotation, job enlargement actually increases the job cycle. When a job is enlarged, either the tasks being performed are enlarged or several short tasks are given to one worker. Thus, the scope of the job is increased because there are many tasks to be

performed by the same worker. Job enlargement programs change many methods of operation- in contrast to job rotation, in which the same work procedures are used by workers who rotate through work stations. Although job enlargement actually changes the pace of the work and the operation by reallocating tasks and responsibilities, it does not increase the depth of a job. The focus of designing work for job enlargement is the exact opposite of that for job specialization. Instead of designing jobs to be divided up into the fewest of tasks per employee, a job is designed to have many tasks for the employee to perform. An enlarged job requires a longer training period because there are more tasks to be learned. Worker satisfaction should increase because is reduced as the job scope is expanded. However, job enlargement programs are successful with jobs what have increased scope; such workers are less prone to resort to absenteeism, grievances, slowdowns and other means of displaying job dissatisfaction.

Enlargement is done only on the horizontal level. Thus, the job remains the same, but becomes of a larger scale than before. In the words of Geroge Strauss and L.R. Sayles “Job enlargement implies that instead of assigning one man to each job, a group of men can be assigned to a group of jobs and then allowed to decide for themselves how to organize the work. Such changes permit more social contacts and control over the work process.”

Job enlargement has the following advantages:

- Increase in diversity of jobs
- Job satisfaction
- Provides wholeness and identity with the task and increases the knowledge necessary to perform it.
- Provides variety of skills.
- Reduces tension and boredom.
- Trains and develops more versatile employees.

Despite these advantages this is not a completely satisfactory method of job design as it does not increase the depth of a job. Enlarged jobs require longer training period as there are more tasks to be learned.

4. Job Enrichment: The concept of job enrichment has been derived from Herzberg’s two-factor theory of motivation in which he has suggested that job content is one of the basic factors of motivation. If the job is designed in such a manner that it becomes more interesting and challenging to the job performer and provides him opportunities for achievement, recognition, responsibility, advancement and growth, the job itself becomes a source of motivation to the individual.

According to Richard W. Beatty and Graig Eric. Schneider, “Job enrichment is a motivational technique which emphasizes the need for challenging and interesting work. It suggests that jobs be redesigned so that intrinsic satisfaction is derived from doing the job. In its best applications it leads to a vertically enhanced job by adding function from other organizational levels, making it contain more variety and challenge and offer autonomy and pride to the employee.”

According to P. Robbins, “Job enrichment refers to the vertical expansion of the jobs. It increases the degree to which the worker controls the planning, execution and evaluation of his work.”

In the words of Robert Albanese, “Job enrichment sometimes called. “vertical job leading’ is a job redesign strategy that focuses on job depth.”

According to Mondy, Holmes, and Flippo, “Job enrichment refers to basic changes in the content and level of responsibility of a job so to provide for the satisfaction of the motivation needs of personnel.

Rebert Ford, who was associated with designing of jobs to make them more enriched, has provided some bases (though not exhaustive) for job enrichment as shown in Table 3.3.

Tasks	Motivator involved
Assign specific or specialized task to individuals enabling them to become expert	Responsibility, growth, advancement
Making periodic reports directly available to the individual himself rather than to the supervisor.	Internal recognition
Giving a person a whole, natural unit of work (module, exchange district, division, area, etc.)	Responsibility, achievement, recognition
Increasing the accountability of individuals for own work	Responsibility, recognition

Techniques of Job Enrichment: In order to enrich the jobs. The management should adopt the following measures:

- Freedom in decisions
- Assign a natural work unit to an employee.
- Encouraging participation
- Allow the employee to set his own standards of performance □ Minimize the controls to provide freedom to the employees □ Make an employee directly responsible for his performance.
- Encourage participation of employees in deciding organizational goals and policies.
- Expand job vertically
- Introducing new, difficult and creative tasks to the employees. □ Sense of achievement.

Advantages of Job Enrichment: The advantages of job enrichment are as follows:

- It enriches the role.
- Job enrichment is the most widely used of job design as it provides a meaningful learning to employees.
- It makes the work interesting and employee get motivated.
- It helps in reducing the rate of labor turnover and absenteeism.
- It increases skills of the employees.
- It increases morale and performance. □ Reduce Boredom and dissatisfaction.
- Increase in output both qualitative and quantitative.

Disadvantages of Job Enrichment: Dunham and Newstrom state, “Even the strongest supporters of job enrichment readily admit that there are limitations in its application.” Newstrom and Keith Davis also write, “Employees are the final judges of what enriches their jobs. All that management can do is to gather information about what tends to enrich jobs,

try these changes in the job system, and then determine whether employees feel that enrichment has occurred.” A few limitations of or problems with job enrichment are as follows:

JOB ENLARGEMENT vs. JOB ENRICHMENT

Job enlargement and job enrichment are both important forms of job design in order to enhance productivity and satisfaction of the employees. They differ from each other in the following respects:

- 1. Nature of Job:** The major difference between job enrichment and enlargement lies in the nature of additions to the job. Enlargement involves a horizontal loading or expansion, or addition of tasks of the same nature. Enrichment involves vertical loading of tasks and responsibility of the job holder; it improves the quality of the job in terms of its intrinsic worth.
- 2. Purpose:** The purpose of job enlargement is to reduce the monotony in performing repetitive jobs by lengthening the cycle of operation. On the other hand, the purpose of job enrichment is making the job lively, challenging and satisfying. It satisfies the higher level needs such as ego satisfaction, self expression, sense of achievement and advancement of Job holders.
- 3. Skill Requirement:** Job enlargement may not necessarily require the use of additional skills which the job holder was using in performing the job before the enlargement. This is due to similarity of additional tasks. Enrichment calls for development and utilization of higher skills, initiative, and innovation on the part of the job holder in performing the job.
- 4. Direction and Control:** Job enlargement requires direction and control from external sources, say supervisor. In fact, the job holder may require more direction and control because of enlargement of his responsibility. Enrichment does not require external direction and control as these come from the job holder himself. He requires only feedback from his supervisor.

