AN INTRODUCTION TO MANAGEMENT SCIENCE

MUNISHA PHOGAT

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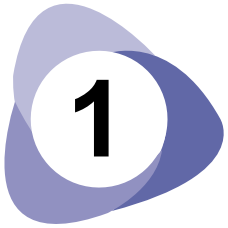


INTRODUCTION TO MANAGEMENT

Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization - Types of organization structure.

1.1 Introduction To Management: Concept – Nature And Importance Of Management, Functions of Management

"Management is the process of obtaining things done through the efforts of other people so as to achieve the predetermined objectives of organization".

Management may also be defined as, "The process by which the execution of the given purpose is put into operation and supervise".

Another statement:

Management is also defined as, "A technique by which the purpose and objectives of particular human group are determined, defined, clarified and completed".

According to Harold Koontz, “Management is an art of getting things done through others and with formally organized groups. It is an art of creating the environment in which people can perform and individuals can co-operate towards the attainment of group goals”.

Management is the process of designing and maintaining an environment in which individuals work together in groups efficiently to accomplish the selected aims.

Levels of Management:

1. Top Management
2. Upper Middle management
3. Middle Management
4. Lower Management
5. Operating Force or Rank and file workmen

Top Management includes:

a) Managing directors

b) Board of directors

c) General Manager

d) Chief executives

e) Share holders

f) Owners

Functions:

a) Expanding or contracting activities.

b) Setting basic goals and objectives.

c) Monitoring performance.

d) Establishing policies.

e) Shouldering financial responsibilities.

f) Designing/Redesigning organization system etc.

Upper Middle Management includes:

a) Production executives

b) Sales executives

c) Accounts executives

d) R & D executives

e) Finance executives

Functions:

a) Selection of staff for lower levels of management.

b) Establishment of organization.

c) Designing operating policies and routines.

d) Installing different departments.

e) Assigning duties to their subordinates.

Middle Management includes:

a) Branch Managers

b) Superintendent etc.

Functions:

a) To understand the interlocking of department in major policies.

b) To cooperate to run organization smoothly.

c) To conduct training for employee development.

d) To build an efficient company's team spirit.

e) To achieve coordination between different parts of the organization.

Lower Management includes:

a) Supervisors or charge-hands

b) Foremen

c) Inspectors

d) Office Superintendent etc.

Functions:

a) Developing and improving the work method operations.

b) Direct supervision of workers and their work.

c) Imparting instruction to workers.

d) Inspection function.

e) To act as link between top management and operating force.

f) To give the finishing touch to the plans and policies of top management.

g) To communicate the feelings of workers to the top management.

Operating force includes:

a) Rank and file workman

b) Workers

c) Unskilled workers

d) Skilled and Semi-skilled workers

Functions:

a) To work independently (in case of skilled workers) or under the guidance of supervisor.

b) To do work on machines or manually, using tools etc.

Functions Of Management:

There are five functions of management. They are:

1. Planning
2. Organizing
3. Staffing
4. Leading
5. Controlling

The function of manager provides an useful structure for organizing the management knowledge.

(1) Planning

Planning involves selecting the missions and objectives and the action to achieve them requires decision making and choosing future course of action from among alternatives.

There are five types of planning:

1. Missions and objectives

2. Strategies and polices

3. Procedures and rules

4. Programs

5. Budgets

(2) Organizing

Organizing is the part of managing that involves establishing an internal structure of roles for people to fill in an organization. The purpose of an organization structure is to create an environment helpful for human performance.

(3) Staffing

Staffing involves filling the positions in the organization. This is done by identifying the work-force requirement, inventorying the people available, recruiting, selecting, placing, promoting, appraising, planning the careers, compensating and training.

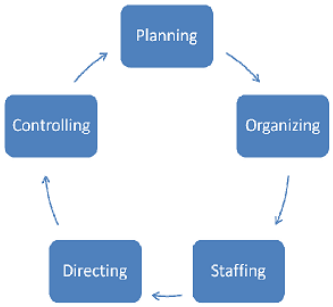
(4) Leading

Leading is to influence people so that they will contribute to the organizational and group goals.All managers would agree that their most problems arises from people, their desires and problems as well as their behavior as individuals and in groups, that effective managers also need to be effective leaders.Leading involves motivation, leadership styles, approaches and communications.

(5) Controlling

Controlling is measuring and correcting individuals and organizational performance. It involves measuring performance against goals and plans, showing where the deviations from standards exit and helping to correct them.

The short controlling facilitates the accomplishment of plans. Control activity generally relate to the measurement of achievement. Some means of controlling like the budget for expenses, inspection, record of labors-hours lost are generally familiar. Each shows whether plans are working out.



Function of management

1.2 Evaluation Of Management Thought

Evolution of management thought is divided into the following four stages:

1. Pre scientific or Pre classical management period

2. Classical Management Theory

a) Scientific management of Taylor

b) Administrative Management of Fayol

c) Bureaucratic Model of Max Weber

3. Neo classical Theory or Behavioural Theory

4. Modem Theory

a) Systems approach

b)Contingency approach

PRE-SCIENTIFIC OR PRE-CLASSICAL MANAGEMENT PERIOD:

The advent of industrial revolution in the middle of the 18th century had its impact on management. During the period following the industrial revolution, certain pioneers tried to challenge the traditional character of management by introducing new ideas and approaches. The notable contributors of this period are:

1. Robert Owen (1771 -1858):

He emphasized the recognition of human element in industry. He firmly believed that workers performance in industry was influenced by the working conditions and treatment of workers. He introduced new ideas of human relations such as housing facilities, shorter working hours, education of their children, training of workers in hygiene, provision of canteen etc. Though his approach was very strict, he came to be regarded as the father of personnel management.

2. Charles Babbage (1792 -1871):

He advocated the use of accurate observations, measurement and precise knowledge for taking business decisions. His management ideas also anticipated the concept of profit sharing to improve the productivity.

3. Henry Robinson Towne (1844 -1924):

He was the president of the famous lock manufacturing company "Yale and Town". He advised the combination of engineers and economists as industrial managers. This combination of qualities together with at least some skill as an accountant is essential to the successful management of industrial workers.

CLASSICAL MANAGEMENT THEORY

The classical management theory developed during the industrial revolution when new problems related to the factory system started to appear. Managers were unsure of how to train employees or deal with increased labour dissatisfaction, so they began to test solutions.

As a result, the classical management theory developed from efforts to find the "one best way" to perform and manage tasks. A classical management theory is made up of three parts:

Scientific management theory

Administrative management theory

Bureaucratic management theory

Scientific Management Theory

Scientific management is defined as the use of the scientific method to define the"one best way" for a job to be done.

The scientific management theory was developed due to the need to increase productivity and efficiency. The emphasis was trying to find the best way to get the most work done by using any of the methods mentioned below.

- By examining how the work process was actually accomplished.
- By scrutinizing the skills of the workforce.

The major contributors of this scientific management theory are:

F.W.Taylor's Scientific Management

Taylor attempted a more scientific approach to management as well as the problems and the approach was based upon four basic principles:

1. Study each part of the task scientifically and develop the best method to perform it.

2. Carefully select workers and train them to perform a task using the scientifically developed method.

3. Cooperate fully with workers to ensure they use the proper method.

4. Divide work and responsibility. So management is responsible for planning work methods using scientific principles and workers are responsible for executing the work accordingly.

A mental revolution in the form of constant cooperation between the employer and employees should be given the benefits of scientific management.

Fayol's Administrative Management Theory

Scientific management focused on the productivity of individuals, whereas the administrative management theory concentrates on developing organizational structure that leads to high efficiency and effectiveness.

Organizational structure is the system of task and authority relationships that control how employees use resources to achieve the organization's goals. The emphasis is on the development of managerial principles rather than work methods. Henry Fayol was the most important exponent of this theory.

Bureaucratic Management Theory

Max Weber (1864 1920):

A well known German sociologist, coined the term "bureaucracy" to apply to the large organizations operating on a rational basis. Many European organizations were managed on a "personal" family basis and the employees were loyal to individual supervisors rather than the organization.

He believed that organizations should be managed impersonally and a formal organizational structure where specific rules were followed was important.

In other words, he did not think that authority should be based on a person's personality. He thought that the authority should be something that was part of a person's job and passed from individual to individual as one person left and another took over. This non personal objective form of organization was called a bureaucracy.

BEHAVIOURAL MANAGEMENT THEORY

Management principles developed during the classical period were simply not useful in dealing with many management situations and could not explain the behavior of individual employees.

In short the classical theory ignored employee motivation and behavior. As a result, the behavioral theory was a natural outcome of this revolutionary management experiment. It modified, improved and extended the classical theory.

The behavioral theory pointed out the role of psychology and sociology in understanding of individual and group behaviour in an organization. Several individuals and experiments contributed to this theory.

Systems Approach to Management

System is a set of interrelated and interdependent parts arranged in a manner that produces a unified whole.

While an organization as a whole is a system, the various components or parts within it are called the subsystem. Thus a department is a subsystem of the organization.

The systems approach to management is based on the belief that organizations can be visualized as systems of interrelated parts or subsystems that operate as a whole in pursuit of common goals. An organization as a system is composed of five elements:

1. Input

2. Transformation processes

3. Output

4. Feedback

5. Environment

Contingency Approach to Management

The contingency approach is also called as situational approach. It was developed by managers, consultants and researchers who tried to apply for real life situations. In the 1960s Contingency theory was developed by Tom Bums and G.M. Stalker in the United Kingdom and Paul Lawrence and Jay Lorsch in the United States.

The crucial message of contingency theory is that there is no one best way to organize. According to contingency theory, the characteristics of environment affect an organization's ability to obtain resources.

For example, some management concepts are more effective in one situation. The same management concept may fail in another situation. Results or solutions differ because situations differ.

The contingency approach theory favor to the modem management theory. Modem management theory suggests the psychological approach to the employees. The contingency approach is highly dependent on the experience and judgment of the manager in a given organizational environment.

1.3 Theories of Motivation

Motivation Theories are:

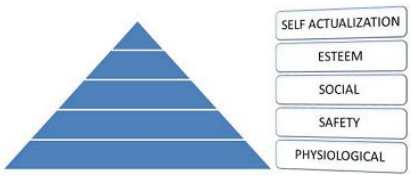
1. Maslow's need hierarchy theory (priority model).

2. Herzberg's two factor theory.

3. McGregor's theory X and Theory Y.

4. MacClelland achievement theory of motivation.

1. Maslow identified the basic human needs are:



Basic human needs

(a) Physiological Needs:

According to this hierarchy, our first need is survival which includes the clothing, food, shelter, water, sleep and air etc. These are called as physiological needs, the need for those things which will keep us alive and functioning physiologically.

(b) Safety Needs:

Security and safety needs are secondary in priority. Everybody needs economic security and physical protection. These needs includes protection against threat, job security, property, insurance, provisions for old age. Management can offer pension, insurance and job security to fulfill their needs.

(c) Social Needs:

Social needs are the needs for the sense of belongingness and acceptance by others. These needs can be fulfilled by effective communication, supervision, good co-workers (peers), superior etc.

(d) Esteem Needs:

Esteem needs are related to the two prolonged desire to have a positive self-image and to have our contribution appreciated by others. They are of two types:

(i) Self-esteem.

(ii) Public esteem.

(e) Self-Actualization Needs:

Maslow regards this as the highest need in this hierarchy. Self-actualization pertains to the requirements of developing capability and reaching full potential.

2. McGregor's theory X and theory Y:

McGregor states that people inside the organization can be managed in two ways. The first is basically negative which falls under the category X and the other is basically positive which falls under the category Y. After viewing the way in which the manager deals with his/her employees, McGregor concluded that a manager's view on the nature of human beings is based on a certain grouping of assumptions and that he or she tends to mould his or her behaviour towards subordinates according to these assumptions.

Under the assumptions of theory X:

• Employees inherently do not like work and whenever possible will attempt to avoid it.

• They have to be forced, coerced or threatened with punishment to achieve the goals.

• Employees avoid responsibilities and do not work till formal directions are issued.

• Most workers place a greater importance on security over all other factors and display little ambition.

In contrast, under the assumptions of theory Y:

• People do exercise self-control and self-direction if they are committed to those goals.

• Physical and mental effort at work is as natural as rest or play.

• The way the things are organized, the average human being's brainpower is only partly used.

• Average human beings are willing to take responsibility and exercise imagination, ingenuity and creativity in solving the problems of the organization.

On the analysis of the assumptions, it can be detected that theory X assumes that lower-order needs dominate individuals and theory Y assumes that higher-order needs dominate individuals.

An organization that is run on theory X lines tends to be authoritarian in nature. The word "authoritarian" suggests such ideas as the "power to enforce obedience" and the "right to command."

In contrast, Theory Y organizations can be described as "participative", where the aims of the organization and of the individuals in it are integrated. Individuals can achieve their own goals best by directing their efforts towards the success of the organization.

3. Stacey Adams' Equity Theory:

As per the equity theory of J. Stacey Adams, people are motivated by their beliefs about the reward structure as being fair or unfair, relative to the inputs. People have a tendency to use subjective judgment to balance the outcomes and inputs in the relationship for comparisons between different individuals.

Accordingly: If people feel that they are not equally rewarded they either reduce the quality or quantity of work or migrate to some other organization. However, if people perceive that they are rewarded higher, they may be motivated to work harder.

1.4 Decision Making Process

Decision-making

The word decision has been derived from the Latin word "decidere" which means "cutting off". Thus, decision involves cutting off of alternatives between those that are desirable and those that are not desirable.

In the words of George R. Terry, "Decision-making is the selection based on some criteria from two or more possible alternatives".

Characteristics of Decision Making

• Decision-making is goal-oriented.

• It implies that there are various alternatives and the most desirable alternative is chosen to solve the problem or to arrive at expected results.

• Decision-making may not be completely rational but may be judgmental and emotional.

• The decision-maker has freedom to choose an alternative.

• Decision-making is a mental or intellectual process because the final decision is made by the decision-maker.

• Decision making is rational. It is taken only after a thorough analysis and reasoning and weighing the consequences of the various alternatives.

• Choosing from among the alternative courses of operation implies uncertainty about the final result of each possible course of operation.

• A decision may be expressed in words or may be implied from behaviour.

Types of Decision making:

1. Major and Minor Decisions

2. Programmed and Non-programmed Decisions

3. Policy and Operative Decisions

4. Routine and Strategic Decisions

5. Individual and Group Decisions

6. Organizational and Personal Decisions

7. Initiative and Forced Decisions

8. Long term, Departmental and Non-economic Decisions

a) Programmed and Non-Programmed Decisions

Herbert Simon has grouped organizational decisions into two categories based on the procedure followed. They are as follows:

i) Programmed decisions:

Programmed decisions are routine and repetitive and are made within the framework of organizational policies and rules. These policies and rules are well established in advance to solve the recurring problems in the organization.

Programmed decisions have short-run impact. They are generally taken at the lower level of management.

ii) Non-Programmed Decisions:

Non-programmed decisions are decisions taken to meet the non-repetitive problems. Non-programmed decisions are relevant for solving the unique/unusual problems in which various alternatives cannot be decided in advance. A common feature of non-programmed decisions is that they are novel and non-recurring and hence, ready made solutions are not available. Since these decisions are of high importance and have long-term consequences, they are made by the top level management.

b) Strategic and Tactical Decisions

Organizational decisions may also be classified as strategic or tactical.

i) Strategic Decisions: Basic decisions or strategic decisions are decisions which are of crucial importance. Strategic decisions are major choice of actions concerning allocation of resources and contribution to the achievement of organizational objectives. Decisions like product diversification, plant location, selection of channels of distribution entering into new markets, capital expenditure etc are the examples of basic or strategic decisions.

ii) Tactical Decisions: Routine decisions or tactical decisions are the decisions which are routine and repetitive. They are derived out of strategic decisions. The various features of a tactical decision are as follows:

• Tactical decision is mostly a programmed one. Therefore, the decision can be made within the context of these variables.

• Tactical decision relates to day-to-day operation of the organization and has to be taken very frequently.

• The authority for making tactical decisions can be delegated to lower level managers because First, the impact of the tactical decision is narrow and of short-term nature and Second, by delegating authority for such decisions to lower-level managers, higher level managers are free to devote more time on the strategic decisions.

• The outcome of tactical decision is of short-term nature and affects a narrow part of the organization.

Techniques of Decision making

1. Break-Even Analysis

2. Marginal analysis

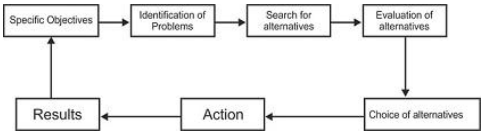
3. Financial analysis

4. Operational research

5. Ratio analysis

6. Pareto analysis

Decision Making Process:



Decision Making Process

1. Specific Objective:

The need for decision making arises in order to achieve certain specific objectives. The starting point in any analysis of decision making involves the determination of whether a decision needs to be made.

2. Problem Identification:

In the words of Joseph L Massie, “A good decision is dependent upon the recognition of the right problem”.

The objective to problem identification is that if the problem is precisely and specifically identified, it will provide a clue in finding a possible solution.

A problem can be identified clearly, if managers go through diagnosis and analysis of the problem.

Diagnosis:

Diagnosis is the process of identifying a problem from its signs and symptoms. A symptom is a condition or set of conditions that indicates the existence of a problem.

Diagnosing the real problem implies knowing the gap between what is and what ought to be, identifying the reasons for the gap and understanding the problem in relation to higher objectives of the organization. Diagnosis gives rise to analysis.

Analysis of the problem requires:

• Who would make decision?

• What information would be needed?

• From where the information is available?

Analysis helps managers to gain an insight into the problem.

3. Search for Alternatives:

A problem can be solved in several ways, however all the ways cannot be equally satisfying. Thus, the decision maker must try to determine the various alternatives available to get the most satisfactory result of a decision.

A decision maker can use several sources for identifying the alternatives such as:

• Practices followed by others.

• His own past experiences.

• Using creative techniques.

4. Evaluation of Alternatives:

After the various alternatives are identified, the next step is to evaluate them and select the one that will meet the choice criteria, the decision maker must check proposed alternatives against limits and if an alternative does not meet them, he can discard it.

Having narrowed down the alternatives which needs serious considerations, the decision maker will go for evaluating how each alternative may contribute towards the objective supposed to be achieved by implementing the decision.

5. Choice of Alternative:

The evaluation of various alternatives presents a clear picture as to how each one of them contribute to the objectives under question. A comparison is made among the likely outcomes of various alternatives and the best among them is chosen.

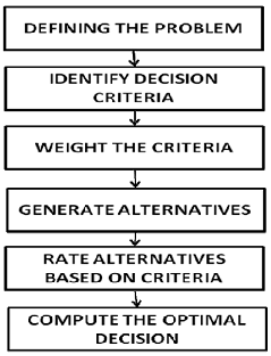
6. Action:

Once the alternative is selected, it is put into action. The actual process of decision making ends with the choice of an alternative through which the objectives can be achieved.

7. Results:

When the decision is put into action, it brings certain results. These results must correspond with objectives, the starting point of decision process, if good decision has been made and it is implemented properly. Thus results provide indication whether decision making and its implementation is proper.

Steps in decision making:



Steps in decision making

1) Defining the problem:

This is the initial step of the rational decision making process. First the problem is identified and then defined to get a clear view of the situation.

2) Identify decision criteria:

Once a decision maker has defined the problem, he or she needs to identify the decision criteria that will be important in solving the problem. In this step, the decision maker determines what is

relevant in making the decision. This step brings the decision maker's interests, values and personal preferences into the process.

Identifying criteria is important because what one person thinks is relevant, another may not. Also keep in mind that any factors not identified in this step are considered as irrelevant to the decision maker.

3) Weight the criteria:

The decision-maker weights the previously identified criteria in order to give them correct priority in the decision.

4) Generate alternatives:

The decision maker generates possible alternatives that could succeed in resolving the problem. No attempt is made in this step to appraise these alternatives only to list them.

5) Rate each alternative on each criterion:

The decision maker must critically analyze and evaluate each one. The strengths and weakness of each alternative becomes evident as they are compared with the criteria and weights established in second and third steps.

6) Compute the optimal decision:

Evaluating each alternative against the weighted criteria and selecting the alternative with the highest total score.

1.5 Designing Organization Structure, Principles of organization And Types of organization structure

An organization structure is a type of the framework that allots a particular space for a particular department or an individual and shows its relationship to the other.

An organization structure shows the authority and responsibility relationships between various positions in the organization by showing who reports to whom. It is an established pattern of relationship among the components of organization.

March and Simon have stated that, "Organization structure consists simply of those aspects of pattern of behavior in the organization that are relatively stable and change only slowly."

The authority and responsibility relationships between the various positions in the organization while designing the organization structure, due attention should be given to the principles of sound organization.

Design an Organizational Structure:

Organizational structure is used for developing how groups and individuals are arranged or departmentalized to help and meet an organization's goals. It defines a reporting structure, jobs, compensation and responsibilities for each role. Designing an organizational structure requires the consideration of an organization's values, financial and business goals. It should allow for growth for the organization and the ability to add additional jobs or departments.

Step 1:

Define business units or departments. Each of the business unit should have similar goals and responsibilities that can be overseen and directed by one or several managers. The business units or departments will then align to assist in creating an appropriate organizational structure. Based on which type of organizational structure is used, departments may align laterally with other departments or one may oversee another.

Step 2:

Determine which type of organizational structure best fits our business needs. Various types of organizational structure ensure an organization can successfully function with its reporting structure, expand if necessary and successfully meet its goals. For example, if our organization is small, it may simply require the organizational structure be broken into departments, such as production, human resources and finance. Our organization's business type, units and how it operates will determine which type of organizational structure to choose.

Step 3:

Define the executive and management teams. Executives and managers are responsible for ensuring each business unit meets the organization's goals. This may include one or several top executives to oversee the entire organization and managers to direct each business unit within the organizational structure. the organization may require one supervisor to oversee all the operations or several supervisors to direct each business unit, ultimately reporting to a top executive or owner.

Step 4:

Establish performance metrics and compensation. When the organizational structure is determined, job descriptions can be clearly defined and where each job fits in the hierarchy. Each job description should reflect competencies required to do the job and the expectations of each job to meet the

organization's goals. After each job within the structure is defined, compensation should be defined based on the responsibilities of each job.

Principles of organization:

1. Principle of unity of objectives:

Organizational goals, departmental goals and individual goals must be clearly defined. All goals and objectives must have uniformity. When there is contradiction among different level of the goals desired goals can't be achieved. Therefore, unity of objectives is necessary

2. Principle of specialization:

Sound and effective organization believes on organization. The term specialization is related to work and employees. When employee takes special type of knowledge and skill in any area, it is known as specialization. Modern business organization needs the specialization, skill and knowledge by this desired sector of economy and thus, efficiency would be established.

3. Principle of coordination:

In an organization many equipment, tools are used. Coordination can be obtained by group effort that emphasize on the unity of action. Therefore, coordination facilitates in several management concepts.

4. Principle of authority:

Authority is a kind of right and power through which it guides and directs the actions of others so that organizational goals can be achieved. It is also related with decision making. It is vested in particular position, not to person because authority is given by an institution and therefore it is legal. It generally flows from higher level to the lowest level of management. There should be unbroken line of authority.

5. Principle of responsibility:

Authentic body of an organization is the top level management, top level management direct the subordinates. Departmental managers and other personnel take direction from top level management to perform the task. Authority is necessary to perform work only authority is not provided to the people but obligation is also provided. So the obligation to perform duties and task is called as responsibility. Responsibility can't be delegated. It can't be avoided.

6. Principle of delegation:

Process of transferring authority and creation of responsibility between superior and subordinates to accomplish a certain task is called delegation of authority. Authority is only delegated, not responsibilities in all levels of the management. The authority delegated should be equal to responsibility

7. Principle of efficiency:

In enterprise different resources are used. These resources must be used in effective manner. When the organization fulfill the objectives with a minimum cost, it is effective. Organization must always concentrate on efficiency.

8. Principle of unity of command:

Subordinates should receive orders from a single superior at a time and all subordinates should be accountable to that superior. More superior leads to the confusion, delay and so on.

9. Principle of span of control:

Unlimited subordinates cant be supervised by manager, this principle thus helps to determine numerical limit if subordinates are to be supervised by a manager. This improves efficiency.

10. Principle of balance:

The functional activities their establishment and other performances should be balanced properly. Authority, centralization, decentralization must be balance equally. This is very challenging job but efficient management must keep it.

11. Principle of communication:

Communication is process of transformation of information from one person to another of different levels. It involves systematic and continuous process of telling, listening and understanding opinions ideas, feelings, information, views etc, in flow of information. Effective communication is important.

12. Principle of personal ability:

For sound organization, human resources is important. Employees must be capable. Able employees can perform higher. Mainly training and development programs must be encouraged to develop the skill in the employees

13. Principle of flexibility:

Organizational structure must be flexible considering the environmental dynamism. Sometimes, dramatically change may occur in the organization and in that condition, organization should be ready to accept the change

14. Principle of simplicity:

This principles emphasizes the simplicity of organizational structure, the structure if organization should be simple with minimum number of levels do that its member an understand duties and authorities.

Types of Business Organizational Structures:

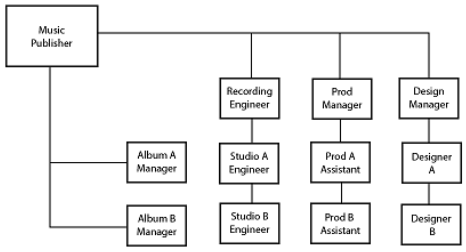
There are 5 Common Business Organizational Structures and are as explained below:

1. Matrix Organizational Structure:

A matrix structure provides for the reporting levels both horizontally as well as vertically. Employeesmay be part of a functional group but may serve on a team that supports new product development. This kind of the structure may have members of different groups working together to develop a new product line.

For example, a recording engineer who works for a music publisher, may have engineers who report to him but may also use his expertise and work with teams to develop new music albums.

The advantage of a matrix organizational structure is that employees have responsibility not only for their department but for the organizational projects. A challenge with this type of structure presents itself when employees are given direction from two different managers and they need to prioritize their work responsibilities.



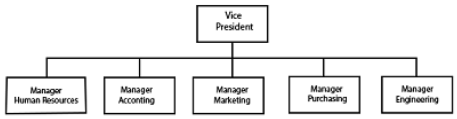
Matrix Organizational Structure

2. Functional Organizational Structure:

Functional organizational structures are the most common. A structure of this type groups individuals by specific functions performed. Common departments such as human resources, accounting and purchasing are organized by separating each of these areas and managing them independently of the others.

For example, the managers of different functional areas all report up to one director or vice president who has responsibility for all of the operational areas.

The advantage of this type of structure is that functions are separated by expertise but the challenges comes in when different functional areas turn into silos that focus only on area of their responsibility and don’t support the function of other departments.



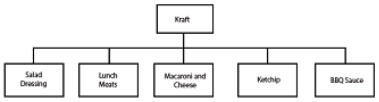
Functional Organizational Structure

3. Product Organizational Structure:

Another common structure is to be organized by a specific product type. Each product group falls within the reporting structure of an executive and that person oversees everything related to that particular product line.

For example an executive over the Kraft products would be responsible for every product under that label dressings, meats, sauces, etc.

The advantage of this type of structure is that it organizes products by category but can create completely separate processes from other product lines within the organization.



Product Organizational Structure

4. Customer Organizational Structure:

Certain type of industries will organize by customer type. This is done in an effort to ensure specificcustomer expectations are met by a customized service approach.

An example of this would be in healthcare. A patient seen as an outpatient has very different needs than those of patients who spend time in the hospital as inpatients. A structure which is customer centered creates customized care for those patients.

The advantage of this type of structure is that it specializes in the needs of each customer group but can ignore the needs of different customer types.

Customer Organizational Structure

5. Geographic Organizational Structure:

For organizations that cover a span of geographic regions, it sometimes makes sense to organize by region. This is done to better support logistical demands and differences in geographic customer needs.

Typically a structure that is organized by geographical regions reports up to a central oversight person. We see this type of structure in companies that go beyond a city or state limit and may have customers all across the country or in multiple states.

Geographic Organizational Structure

Deliberate time and thought should go into design of an organization's structure. This is important so employees have a visual of how the organization functions and understands chain of command. Operating within a defined structure, with good communication processesand work-flows, help to ensure efficient management of resources people, time and money.

Significance of Organization Structure:

• Organization structure determines the location of decision-making in the organization.

• A sound organization structure facilitates growth of enterprise by increasing its capacity to handle increased level of authority.

• Sound organization structure stimulates creative thinking among organizational members by providing well defined patterns of authority.

• Organization structure provides the pattern of communication and coordination.

• Properly designed organization can help improve teamwork and productivity by providing a framework within which the people can work together most effectively.

• The organization structure helps a member to know what his role is and how it relates to other roles.

2

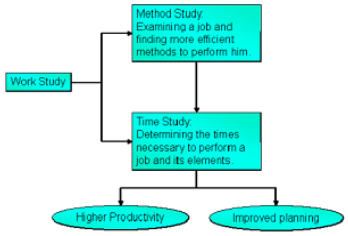
OPERATIONS MANAGEMENT

Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart).

Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

2.1 Operations Management: Work-Study-Statistical Quality Control Through Control Charts

Work Study is that the systematic examination of the strategies of carrying out activities such as to enhance the effective use of resources and to set up standards of performance for the activities carried out.



Quality is the determining factor the success of any product or service, large resource are committed in every organization to ensure quality

Components of Work Study :

Another definition of Work Study could be a generic term for those techniques, particularly method study and work measurement, which are used in the examination of human work in all its contexts, and which lead systematically to the investigation of all the factors which affect the efficiency and economy of the situation being reviewed, in order to effect improvement. This has to do with Productivity Improvement, but also the improvement of Quality and Safety.

Operations Management - Work Study

Managing people within operations involves actual design decisions about jobs, methods, relationships between jobs and machines and systems of control and communication.

Work design involves complex "people" relationships between operative staff, supervisors and specialists (for example, engineering managers) and staff who commission new machines and maintain them. Other specialists may co-ordinate health and safety systems or monitor performance and plan maintenance

People are not mere extensions to machines or horsepower to be switched on and off. A worker's performance may be better than a machine's capability, yet a machine may outstrip the human being for many tasks.

People may be hurt or injured physically by operating environments or trapped socially and psychologically in them/by them. How operational systems are designed and the jobs and performance relationships within them are of great operational, economic and social importance.

Work study is a collection of techniques used to examine the work - what is done and how it is done, so that there is systematic analysis of all the elements, factors, resources and relationships affecting the efficiency and effectiveness of the work being studied.

Considerable diplomacy and sensitivity is needed by the industrial engineer or operations manager who becomes involved in work study investigations.

In the Path of F. W. Taylor

Method study and work measurement are two principal activities of work study which originated in the work of F. W. Taylor .

FW's "scientific management" imperatives are:

• Investigate the work situation and identify weaknesses - where and why is poor performance happening? The "scientific" title for this approach to management means placing emphasis on data gathering and rational analysis.

• The existence of direct, deterministic relationships between worker performance and incentive payments.

• Certain narrow assumptions about the objectivity of efficiency criteria.

• Consideration of the worker to some extent as a machine. Hence, we can evaluate and introduce the improvements in operating methods. This includes type of equipment, its use, layout of operations, supply and use of materials, materials handling, work organisation, effectiveness of planning procedures and so on. Productivity improvement is the aim.

• We can select staff with characteristics that fit the job, train and reward them using the payment schemes, the offer particular economic incentive by linking payment to measured performance. Such propositions are commonly the stuff of the managerial populists and "how-to" texts on human resource management.

Methods study approach is an analysis of ways of doing work.

The memonic SREDIM represents the method study stages such as:

1. Select the tasks to study.

2. Record the facts about it.

3. Examine these.

4. Develop a new method.

5. Install or implement it.

6. Maintain it.

Work measurement considers assessing the time a job should take to complete its task. Similar steps are involved in method study such as:

1. Select the tasks.

2. Record the facts.

3. Analyse them.

4. Calculate the basic and standard times for the task.

5. Agree the method and its related time.

In the 1950's and 1960's the work study officer or O&M Person (organization and methods) gathered the data and gave advice. In the 1970's the titles evolved e.g. to that of management services officer.

Work-study and methods study came within the scope of the industrial engineer. Today the techniques of method study are inclusive within the tool-kits and applications of business systems analyst.

The most modern application of some of the techniques of work study is the early 1990's managerial recipe; "business process re-engineering" i.e. re-designing business processes which have developed to the extent that they mismatch the needs of the situation today.

Efficiency Indices

Using data on unmeasured work, measured work and idle time, we can attempt to derive the effectiveness indices.

A. Efficiency

While performing measured work, efficiency is expressed as

Efficiency = (ratio of standard/measured hours of work produced and the actual time taken).

B. Effectiveness

Effectiveness includes:

• Accounting for work done for which no measured time exists. Such work is typically paid by an agreed hourly or day rate i.e. there is no direct, measured relationship between pay and how much work is actually completed in that hour. Of course a supervisor may pass a judgment or state that the amount of work and its quality are inadequate.

• Recognition of possible idle time caused e.g. by management not allocating any work, supplier/materials delays, machine breakdowns etc.

Statistical Quality Control Through Control Charts

Definition: It is defined as customer satisfaction in general and fitness for use in particular. Both the external consumer who buy the product and services and the internal consumers that is, all divisions or departments of the business organization are equally interested in the quality.

Statistical quality control: The process of applying statistical principles to solve the problem of controlling the quality control of the product or service is termed as statistical quality control.

Quality elements:

a) Quality design

b) Quality conformance

a) Quality design: Quality of design refers to product feature such as performance, reliability durability, ease of use, serviceability

b) Quality conformance: Quality conformance means whether the product meets the given quality specification or not

Inspection: The process of measuring the output and comparing it to check whether it meets the given specified requirements or not, is called inspection.

Inspection Methods:

The following are the methods of inspection based on merits

1) Incoming inspection: In this method, the quality of the goods and services arriving into the organization is inspected. This ensures that the material suppliers adhere to the given specifications with this defective material cannot enter into the production process. This focuses on the vendor's quality and ability to supply acceptable raw materials.

2) Critical point inspection: Inspecting at the critical points of a product manufacture gives valuable insight into the completely functional process. At the points of manufacture that involve high costs or which offer no possibility for repair or rework, inspection is crucial further operation depend on these results critical point inspection helps to drop the defective production, and thereby, facilitate avoiding unnecessary further expenditure on them.

3) Process inspection: This is also called patrolling inspection or floor inspection or roving inspection. Here the inspector goes around the manufacturing points in the shop floor to inspect the goods produced on random sample basis from time to time.

4) Fixed inspection: It provides for a centralized and independent process where work is brought for inspection from time to time. This method is followed where inspection equipment cannot be moved to the points of productions.

5) Final inspection: This is centralized inspection making use of special equipment.

This certifies the quality of the goods before they are shipped.

Elements of statistical Quality Control: The technique under SQC can be divided in to two parts

a) Process control

b) Acceptance sampling

Process control:

Process control is a technique of ensuring the quality of the products during the manufacturing process itself. If a process consistently produces items with acceptable or tolerable range of specification. It is said to be statically under control. Process control is achieved through control charts. Process control aims to control and maintain the quality of the products in the manufacturing process.

Statistical control charts:

A control chart compares graphically the process performance data to computed statistical control limits. These control limits act as limit lines on the chart. Control chats are the tools to determine whether the process is under control or not. The quality of the production process may be affected by chance cause or assignable cause.

Chance cause:

Such causes, which may or may not affect the manufacturing process are called chance cause, chance cause cannot even be identified. It is not possible to always maintain the given specification.

Assignable Cause:

Assignable causes affect the quality of the production process. These causes can be identified and specified. Causes such as change in the labor shift, power fluctuations, or excessive tool wear are said to be assignable causes as they affect the quality of manufacturing process in different ways.

Process capability:

Process capability refers to the ability to achieve measurable results from a combination of machines, tools, methods, materials and people engaged in production.

Confidence limits and control limit:

Confidence limit:

It indicate the range of confidence level. A confidence level refers to the probability that the value of measurement or parameter, such as length of screw, is correct.

Example : If a component is required with measurement of 50 mm across, then the buyer accepts all the components measuring between 48 mm and 52 mm across, considering a five percent confidence level.

Control limit:

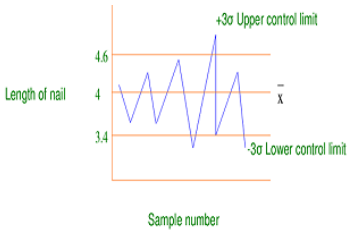
Control limits are found in the control charts. There are two control limits

1) Upper control limit (UCL) and

2) Lower control limit (LCL).

These are determined based on the principles of normal distribution.

Example : In a pilot investigation of the length of the nails produced in the shop floor, it was found that the mean length is X cm, the S.D is 3σ, the measure of variability of the nails produced is 0.2 cm. How do you construct the control chart for this data.



Control charts for variables:

A variable is one whose quality measurement changes from unit to unit. The quality of these variables is measured in terms of thickness, hardness, length and so on. The control charts for variables are drawn using the principles of normal distribution. There are two types of control charts for variables x and R chart.

X and R Chart:

X chart is used to show the process variations based on the average measurement of the samples collected. It shows more light on diagnosing quality problem when read along with R chart. It shows the erratic or cyclic shifts in the manufacturing process. It can also focus on when to take a remedial measure to set right the quality problems. However, collecting data about all the variables involves a large amount of time and resources.

The R chart is based on the range of the items in the given sample. It highlights the changes in the process variability. It is a good measure of spread or range. It shows better results when read along with the X chart.

For $\bar{x}$ charts: UCL = $\bar{x} + A_2\bar{R}$ When $\bar{x}$ = Mean of Means

LCL = $\bar{x} - A_2\bar{R}$ $\bar{R}$ = Mean of sample range

A_2= Constant

For R chart: UCL = $D_4\bar{R}$ D_4, D_3 are constants

LCL = $D_3\bar{R}$

R is the average of sample ranges (Ranges is the difference between the maximum variable and minimum variable)

Example : Let us construct x and R charts from the following information and state whether the process is in control for each of the following x has been computed from a sample of 5 units drawn at an interval of half an hour from an ongoing manufacturing process.

Samples	1	2	3	4	5	6	7	8	9	10
$\bar{x}$	24	34	35	39	26	29	13	34	37	29
R	23	39	14	5	20	17	21	11	40	10

Solution :

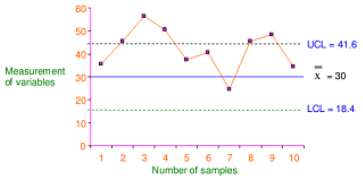
The mean of means $\bar{\bar{x}} = \frac{\sum \bar{x}}{n} = \frac{300}{10} = 30$

$\bar{R}$ is calculated as $\bar{R} = \frac{\sum R}{n} = \frac{200}{10} = 20$

$\bar{x}$ Chart: $\bar{x}$ chart UCL and LCL compute at sample size 5 A_2 table value is 0.58

$UCL = \bar{\bar{x}} + A_2\bar{R} = 30 + (0.58x20) = 41.6$

$LCL = D_3\bar{R} = 30 - (0.58x20) = 18.4$

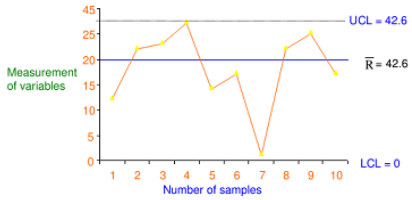


R Chart:

R chart UCL and LCL compute at sample size 5, D_4 table value is 2.11 and D_3 table value is 0

$UCL = D_4\bar{R} = 2.11 \times 20 = 42.2$

$LCL = D_3\bar{R} = 0 \times 20 = 0$



Therefore 3, 7 points the process is out of control.

Control charts for attributes:

The quality of attributes can be determined on the basis of 'Yes' or 'No', 'Go' or 'No go'. In other words, in case of a mirror glass, even if there is one scratch it is not considered to be a quality mirror, in such a case quality is decided base on whether the mirror has any scratch or not.

The control charts for attributes are 'C' chart and 'P' charts 'C' Chart: 'C' chart is use where there a number defects per unit. This control charts controls the number of defects per unit. Here the sample size should be constant. This calculate as below.

$UCL = \bar{c} + 3\sqrt{\bar{c}}$ and $LCL = \bar{c} - 3\sqrt{\bar{c}}$

Where the $\bar{c} = \frac{Total\ number\ of\ defects\ in\ all\ the\ samples}{Total\ number\ of\ samples\ inspected}$

Example:

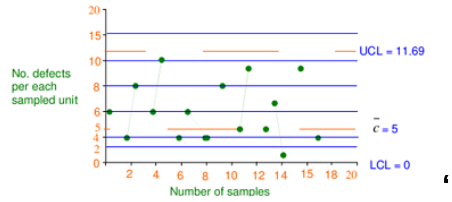
Sample Number	No. of defects	Sample Number	No. of defects
1	5	11	4
2	4	12	6
3	9	13	7
4	7	14	3
5	8	15	5
6	9	16	3
7	4	17	3
8	5	18	1
9	2	19	7
10	6	20	2
Total number of defects			= 100

$$\bar{c} = \frac{100}{20} = 5$$

$$UCL = \bar{c} + 3\sqrt{\bar{c}} = 5 + 3\sqrt{5} = 11.69$$

$$LCL = \bar{c} - 3\sqrt{\bar{c}} = 5 - 3\sqrt{5} = 0$$

LCL = 0 means, LCL got negative value, take it as equal to zero



P' Chart:

'P' Chart is used where there is data about the number of defectives per sample. It is also called fraction defective chart or percentage defectives chart. Here each item is classified on 'go or no go' basis that is good or bad.

Hence if the sample size is larger, the results could be better.

$$\text{Where average defective } (\bar{p}) = \frac{Total\ no.\ of\ defective\ found}{Total\ no.\ of\ pieces\ inspected}$$

'n' = Number of pieces inspected per day

Example : For each of the 14 days a number of magnets used in electric relays are inspected and the number of defectives is recorded. The total number of magnets tested is 14,000. The following are the particular of the number of defectives found every day.

Day number	Number of defective	Day number	Number of defective
1	100	8	120
2	50	9	60
3	150	10	140
4	200	11	50
5	150	12	70
6	50	13	40
7	80	14	40

Solution:

Total number of defectives = 14000

The average sample size(n) per day= 14000/14 days = 1000

Percentage of defective per day = $\frac{Total\ no.\ of\ defective\ found\ per\ day}{Total\ no.\ of\ pieces\ inspected\ per\ day}$

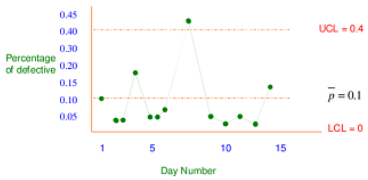
Day number	Percentage of defectives	Number of defective	Percentage of defectives	Day number	Number of defective
1	100/1000=0.10	100	120/1000=0.12	8	120
2	50/1000 =0.05	50	60/1000 =0.06	9	60
3	150/1000=0.15	150	140/1000=0.14	10	140
4	200/1000=0.20	200	50/1000 =0.05	11	50
5	150/1000=0.15	150	70/1000 =0.07	12	70
6	50/1000 =0.05	50	40/1000 =0.04	13	40
7	80/1000 =0.08	80	140/1000=0.14	14	40

$$(\bar{p}) = \frac{Total\ no.\ of\ defective\ found}{Total\ no.\ of\ pieces\ inspected}$$

1400/14000 = 0.1

$$UCL = 0.1 + 3\sqrt{\frac{0.1(1-0.1)}{1000}} = 0.4$$

$$LCL = 0.1 - 3\sqrt{\frac{0.1(1-0.1)}{1000}} = 0$$



2.2 Material Management: Inventory Control

Inventory:

It defined as a comprehensive list of movable items which are required for manufacturing the products and to maintain the plant facilities in working conditions.

Inventory Control:

The systematic location, storage and recording of goods in a way such that the desired degree of service can be made to the operating shops at minimum ultimate cost.

Objectives of Inventory Control:

1. To minimize investments in the materials by ensuring the economies of storage and ordering costs.

2. To support the production departments with materials of the right quality in the right quantity, at the right time and the right price, and from the right supplier.

3. To ensure the economy of costs by processing economic order quantities.

4. To avoid accumulation of work in process.

5. To contribute directly to the overall profitability of the enterprise.

6. To maintain the adequate inventories at the required sales outlets to meet the market needs promptly, thus avoiding both excessive stocks or shortages at any given time.

Functions of inventory control:

- To build up a logical and workable plan of organization for doing the job satisfactory.
- To develop plans, policies and standards essential to achieve the objectives.
- To provide the necessary physical facilities.
- To develop procedure and methods that will produce the desired results economically.
- To maintain the overall control by checking results and taking corrective actions.

Inventory Management System or Level:

The objects of inventory control is to establish level of inventory which will serve to minimize the company's costs and maximize its revenue.

It is determined by five basic variables such as:

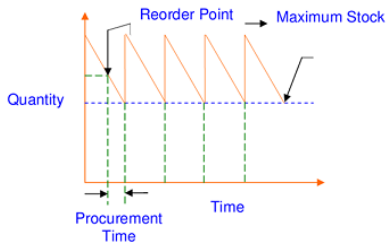
a) Reorder point

b) Minimum inventory

c) Procurement lead time

d) Maximum inventory

e) Recorder quantity



a) Reorder point:

It is sufficiently above the minimum inventory to allow for issuing the purchase order and for delivery by a vendor. Reorder point stock level is equal to the minimum stock plus the expected consumption during the procurement lead time.

b) Minimum inventory:

Minimum inventory is needed to take care of any temporary unpredictable increase in part usage or in procurement lead time.

c) Procurement lead time:

This comprises the time required for preparing the purchase order, the time gap between placing an order and receiving supplies and time required for inspection etc.

d) Maximum inventory:

It is approximately equal to the sum of the order quantity and minimum inventory. It exactly equals the sum of these two quantities if the ordered material is received just when the minimum stock is reached.

e) Reorder Quantity:

This is the fixed quantity of item for which order can be placed every time the stock drops to the reorder point. This quantity is fixed either on the basis of experience or calculated.

2.2.1 EOQ & Abc Analysis (Simple Problems)

Economic Order Quantity (EOQ):

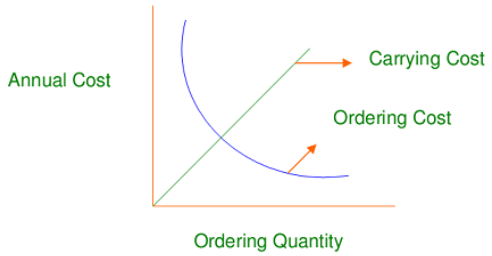
Economic order quantity is defined as the quantity of materials, which can be ordered at one time to minimize the cost of ordering and carrying the stocks. In other words, it refers to size of each order that keeps the total cost low.

Inventory costs:

The inventory costs can be classified into two categories,

1) Inventory ordering cost

2) Inventory carrying cost.



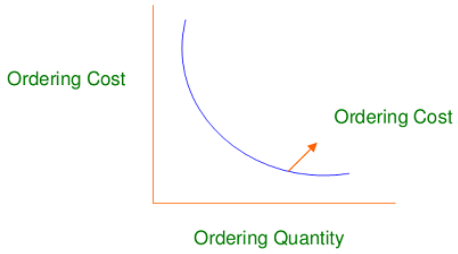
Inventory Ordering Costs (C_o):

Inventory Ordering Costs refers to the cost incurred to procure the materials particularly in large organizations, where these cost are significant. This is also called as procurement cost.

Definition:

It is the cost of placing an order from a vendor. This includes all costs incurred from calling for quotation to the point at which the item is taken into stock.

Example: Receiving quotations, Processing purchase requisition, Receiving materials and then inspecting it , Follow up and expediting purchase order, Processing sellers invoice.

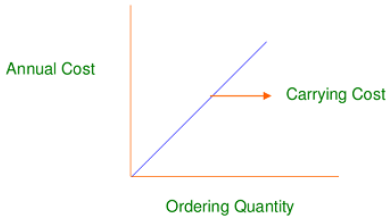


Inventory Carrying cost:

Carrying cost which are also known as holding costs are the costs incurred in maintaining the stores in the firm. They are based on the average inventory.

Example:

Storage cost includes Salary of person, Rent for storage facilities and related storage expenses, Cost of capital and Cost of insurance.



Determine EOQ:

Step1:

Total Ordering cost per year = Number of orders placed per year x ordering cost per Order

= (A/S) x O

where,

A = Annual demand

S = Size of each order (units per order)

O = Ordering cost per order

Step2:

Total Carrying cost per year = Average inventory level x Carrying cost per year

= (S/2) x C

where,

A = Annual demand

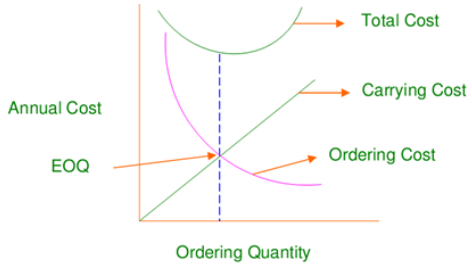
S = Size of each order (units per order)

C = Carrying cost per unit

Step3:

EOQ is one where the total ordering is equal to total carrying cost.

$$\frac{A}{S} \times O = \frac{S}{2} \times C$$
$$2AO = S^2 \times C$$
$$S^2 = \frac{2AO}{C}$$
$$S = \sqrt{\frac{2AO}{C}}$$



where,

S is the Economic order quantity.

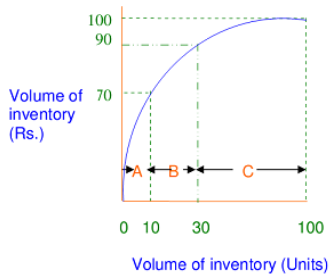
A is the annual demand in units.

O is the ordering cost per order.

C is the carrying cost per unit

ABC Analysis:

ABC analysis is a technique of controlling inventories based on their value and quantities. It is more remembered as an analysis for 'Always Better Control' of inventory. Here all items of the inventory are listed in the order of descending values, showing quantity held and their corresponding value. Then, the inventory is divided into three categories such as A, B and C based on their respective values.



A – Refers to high value item.

B – Refers to medium value item.

C – Refers to low value item.

A category comprises of inventory, which is very costly and valuable. Normally 70% of the funds are tied up in such costly stocks, which would be around 10% of the total volume of stocks. Because the stocks in this category are very costly, these require strict monitoring on day-to-day basis.

B category comprises of inventory, which is less costly. Twenty percent of the funds are tied up in such stocks and these accounts for over 20% of the volume of stocks. These items require monitoring on a weekly or fortnightly basis.

C category consists of such stocks, which are of least cost. Volume-wise, they form 70% of the total stocks but value-wise, they do not cost more than 10% of the investment in the stocks. This category of stocks can be monitored on monthly or bi-monthly basis.

The following table summarizes the concept of ABC analysis;

Category	Value (%)	Volume (%)	Desired Degree of Control
A	70	10	STRICT
B	20	20	MODERATE
C	10	70	LOW

Problems

A biscuit manufacturing company buys a lot of 10,000 bags of wheat per annum. The cost per bag is Rs.500 and ordering cost is Rs.400. The inventory carrying cost is estimated at 10% of the price of the wheat. Let us determine EOQ and number of orders required per year.

Solution:

Given:

Annual demand (A) = 10,000 bags

Ordering cost per order (O) = Rs.400

Carrying cost per unit (C) = 10% of Cost price

= 0.10 x 500 = Rs.50/-

Formula to be used:

$$EOQ = \sqrt{\frac{2AO}{C}}$$

$$\text{The number of orders to be placed during the year} = \frac{\text{Annual demand (units)}}{EOQ}$$

$$EOQ = \sqrt{\frac{2AO}{C}}$$

$$= \sqrt{\frac{2 \times 10,000 \times 400}{50}}$$

$$= \sqrt{1,60,000}$$

$$EOQ = 400 \text{ bags}$$

$$\text{The number of orders to be placed during the year} = \frac{\text{Annual demand (units)}}{EOQ}$$

$$\frac{10,000}{400} = 25 \text{ orders}$$

In the above case, the company has to place 25 orders to optimize its ordering and carrying costs.

2.2.2 Types of ABC analysis (HML, SDE, VED, and FSN analysis)

ABC Analysis:

The analysis of the store item cost criteria is done by using the ABC analysis.

1. It is a very simple approach, which avoids being money wise.

2. The cost of the each item is multiplied by the number used in a given period and then these items are then tabulated in descending numerical value order.

3. It will be seen that first 10% of the items approximately account for 70%, the next 20% for 20% of the value and the last 70% account for 10% of the value.

4. It has been seen that a large number of the items consume only a small percentage of resources and vice- versa.

5. A-items represent the high cost centre, while B-items represent the immediate cost centres, and C- items represent the low cost centres.

6. A very close control is exercised over A items while a less stringent control is adequate for those in category B, and further less attention for category C.

A-Items:

- Safety stocks should be low
- Tight controls
- Strict and close watch
- Rigid estimates of requirements
- Management of items should be done at top management level.

B-Items:

- Purchase based on rigid requirements
- Safety stocks moderate
- Management be done at middle level
- Moderate control
- Reasonably strict watch and control

C-Items:

- Purchase based on usage estimates
- Ordinary control measure
- Safety stocks high
- Controls exercises by store keeper.
- Management be done at lower levels.

HML analysis:

Items are classified as three groups labeled High – Medium – Low. The HML analysis is very similar to that of ABC Analysis, the difference is that instead of usage value, the price criterion is used. In their classification, the items used by the company are arranged in the descending orders of their unit price. After this, management of the company uses its discretion and judgment to decide the cut off lines for deciding the three categories. For example, management may decide that all items of unit price value above Rs 500 should be categorized as H items, items whose, unit price falls between the range of Rs 50 and Rs 500 should be categorized as M items and those items whose unit price falls below Rs 50 should be categorized as L items. The categorization therefore is decided by the management.

The HML analysis helps an organization to take decisions on the following:

a) It helps to assess the security requirements and the type of storage for high priced items. For example, expensive ball bearings can be kept under lock and key in a cupboard.

b) The frequency of the stock checking is decided on the basis of the cost item. In other words, the more expensive the item, more frequent will be its stock-checking.

c) A control on purchases and buying policies can be exercised by the company. This means H and M items will not be ordered in excess of the required minimum quantity. However, in the case of L items, they may be purchased in bulk in order to avail the benefits of bulk purchase.

FSN Analysis:

The FSN analysis is based on the rate of consumption.

The items are classified into:

- Fast moving
- Slow moving

● Non- moving

● Obsolete

An understanding of the movement of items helps to keep proper levels of inventories by deciding a rational policy or reordering. This method is based on the fact that some stock items have a much higher annual usage value than others. This after doing a cost analysis, stock items are separated into three classes with the following characteristics

VED ANALYSIS:

The stores when subjected to analysis based on their criticality can be classified as vital, essential and desirable stores. This type of analysis is termed as VED analysis.

Vital:

The items without which the treatment comes to standstill i.e. their non- availability cannot be tolerated are classified as vital.

Essential:

The items whose non availability can be tolerated for 2-3 days, because the similar or alternative items are available are classified as essential.

Desirable:

The items whose non availability can be tolerated for a long period are classified into this type. Although the proportion of vital, essential and desirable items varies from hospital to hospital depending on the type and the quantity of workload, on an average vital items are 10%, essential items are 40% and desirable items make 50% of total items that are available.

Although not included in the scientific VED analysis, in some public organizations which are static or inefficiently managed, there is a peculiar category of 'U' items which is grouped as unnecessary. These unnecessary items get purchased due to the following reasons.

1. Unfair practice due to vested interest.

2. Thoughtless continuation of previous purchase.

3. Fear of change

4. Poor supervision and control

5. Indifferent attitude towards hospital formulary

The vital items are stocked in abundance; the essential items are stocked in medium amounts, and desirable items are stocked in small amounts.

By stocking the items in the order of priority, vital and essential items are always in stock which means a minimum disruption in the services that is offered to the people.

SDE Analysis:

Unit value forms the basis of this analysis and not the annual consumption value.

- H - Unit value > 1000 (Sanctioned by higher officials)
- M - Unit value 100 to 1000
- L - Unit value < 100

ABC & VED Analysis (Matrix module: criticality Vs cost):

It is possible to conduct a two dimensional analysis taking into consideration the cost on one hand, i.e. A,B,C categories and the critically VED on the other. Findings of ABC and VED analysis can be coupled and further grouping can be done to evolve a priority system of management of stores.

An example for the coupling matrix model for equipment between criticality and cost.

	V	E	D
H	Defibrillator 1	X-ray machine 2	Air- curtains 3
M	Ventilator 4	Electric cautery 5	Ultrasonic wash machine 6
L	Oxygen regulator 7	Patient trolley 8	Electronic BP machine 9

Cell 1 contains the vitals and high cost items like the defibrillator. It must be noted that a material manager has to comprehensively supervise the category 1 items since an item may be a low cost one but critical for patient care.

Category I items:

These items are the most important ones and requires control by the administrator himself.

Category II items:

These items are of intermediate importance and they should be under control of the officer in charge of the stores.

Category III items:

These items are of least importance which can be left under the control of the store keeper.

The grouping will essentially depend upon the strategy of the management and the environment of functioning. However these simple techniques can be effective in material management system.

Items with high criticality (V), but required in small quantity (A) should receive the highest priority. Items with low criticality (D) and which are required in large quantity should receive least priority.

3

FUNCTIONAL MANAGEMENT

Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans(Simple Problems)- – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions.

3.1 Concept of HRM, HRD and PMIR

Human Resource Management (HRM):

Human Resource Management (HRM) deals with hands-on management, manpower planning and other employee related activities in an organization. Therefore, we can say that it is a special branch of the management where ethics play a crucial role. HRM concerns human issues, especially those that are related with compensation, industrial relations, development, health and safety issues. However, there are enough disagreements in managing HRM issues that stem from various quarters.

Objectives:

The primary objective of the HRM is to ensure the availability of the right people for right jobs so as the organizational goals are achieved effectively.

The primary objective can further be broken down into the following sub-objectives:

1. To help organization to attain its goals effectively and efficiently by providing competent and motivated employees.

2. To increase to the fullest the employee's job satisfaction and self-actualization.

3. To utilize the available human resources effectively and efficiently.

4. To establish and maintain cordial relations between employees and management.

5. To develop and maintain the Quality of the Work Life (QWL) which makes employment in the organization a desirable personal and a social situation.

6. To help maintain ethical policies and behaviour inside and outside of the organization.

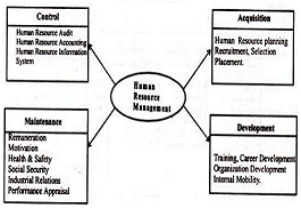
7. To reconcile individual/group goals with the organizational goals.

HRM Objectives and Functions:

HRM Objectives	*Supporting Functions*
1. Societal Objectives	1. Legal compliance 2. Benefits 3. Union-management relations
2. Organisational Objectives	1. Human resource planning 2. Employee relations 3. Selection 4. Training and development 5. Appraisal 6. Placement 7. Assessment
3. Functional Objectives	1. Appraisal 2. Placement 3. Assessment
4. Personal Objectives	1. Training and development 2. Appraisal 3. Placement 4. Compensation 5. Assessment

Scope:

The scope of HRM is, indeed, very vast and wide. It includes all the activities starting from manpower planning till employee leaves the organization. Accordingly, the scope of HRM consists of acquisition, development, maintenance or retention, and control of human resources in the organization . The same forms the subject matter of HRM.



Scope of HRM

The National Institute of personnel Management, Calcutta has specified the scope of HRM as shown below:

1. The Labor or Personnel Aspect:

This is concerned with the manpower planning, recruitment, selection, placement, transfer, promotion, training and development, remuneration, incentives, productivity, lay-off and retrenchment, etc.

2. Welfare Aspect:

It deals with working conditions, and amenities such as canteen, creches, medical assistance, rest and lunch rooms, housing, health and safety, transport, education, recreation facilities, etc.

3. Industrial Relations Aspects:

This covers union-management relations, joint consultation, grievance and disciplinary actions, collective bargaining, settlement of disputes, etc.

Functions:

The definition of HRM is based on what the managers do. The functions performed by managers are common to all organizations. For the convenience of study, the function performed by the resource management can broadly be classified into two categories.

(1) Managerial functions.

(2) Operative functions.

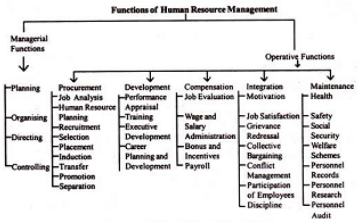
(1) Managerial Functions:

Planning:

Planning is a predetermined course of actions. It is a process of determining the organizational goals and formulation of policies and programme for achieving them. Thus planning is a future oriented concerned with clearly charting out desired direction of the business activities in future. Forecasting is one of the most important elements in the planning process. Other functions of managers depends upon the planning function.

Organizing:

Organizing is a process by which the structure and allocation of jobs are determined. Thus organizing involves giving each subordinate a specific task establishing departments, delegating authority to subordinates, establishing channels of authority and communication, coordinating the work of subordinates, and so on.



Functions of Human Resource Management

Staffing:

TOS is a process by which managers select, train, promote and retire their subordinates. This involves deciding what type of people should be hired, recruiting prospective employees, selecting employees, setting performance standard, compensating employees, evaluating performance, counseling employees, training and developing employees.

Directing/Leading:

The process of activating group efforts to achieve the desired goals is known as directing. It includes activities like getting subordinates to get the job done, maintaining morale, motivating subordinates etc. for achieving the goals of the organization.

Controlling:

It is the process of setting standards for the performance, checking to see how actual performance compares with these set standards, and taking the necessary corrective actions as needed.

(2) Operative Functions:

The operative, also called, service functions are those which are relevant to specific department. These functions vary from department to department depending on the nature of department viewed from this standpoint, the operative functions of HRM relate to ensuring right people for right jobs at right times. These functions include procurement, development, compensation, and maintenance functions of HRM.

A detailed description of these are as follows:

Procurement:

It involves procuring the right kind of people in appropriate number to be placed in the organization. It consists of the activities such as recruitment, selection placement, manpower planning, and induction or orientation of new employees.

Development:

This function involves activities meant to improve the knowledge, skills aptitudes and values of employees so as to enable them to perform their jobs in a better manner in future. These functions may comprise training to employees, executive training to develop managers, organization development to help and strike a better fit between organizational climate or culture and employees.

Compensation:

Compensation function involves determination of wages and salaries matching with contribution made by employees to organizational goals. In other words, this function ensures equitable and fair

remuneration for employees in the organization. It consists of activities such as job evaluation, wage and salary administration, bonus, incentives, etc.

Maintenance:

It is concerned with promoting and protecting employees while at work. For this purpose virus benefits such as housing, medical, educational, transport facilities, etc. are provided to the employees. The various social security measures such as provident fund, pension, gratuity, group insurance, etc. are also arranged.

It is important to note that the operative and managerial functions of HRM are performed in conjunction with each other in an organization, be large or small organizations. Having discussed the scope and functions of HRM.

Human Resource Development (HRD):

Concept And Meaning Of HRD:

The active resource of an organization is human resource. Other resources remain inactive unless there are competent people to utilize the available resources for the production of goods and services. The human brain has a limitless energy to think and act in a productive way. Hence, competent and qualified human resource is a key factor of organizational success. In this regard, the emergence of human resource development (HRD) plays a vital role in enhancing the entrepreneurial skill of people.

Human Resource Development (HRD) is a process of developing skills, competencies, knowledge and attitudes of people in an organization. The people become human resource only when they are competent to perform organizational activities. Therefore, HRD ensures that the organization has such competent human resource to achieve its desired goals and objectives. HRD imparts the required knowledge and skill in them through effective arrangement of training and development programs. HRD is an integral part of Human Resource Management (HRM) which is more concerned with training and development, career planning and development and the organization development. The organization has to understand the dynamics of HR and attempt to cope with changing situation in order to deploy its HR effectively and efficiently. And HRD helps to reach this target.

Hence, HRD is a conscious and proactive approach applied by employers which seeks to capacitate employees through training and development to give their maximum to the organization and to fully use their potential to develop themselves.

Nature Of HRD:

1. HRD is a continuous process

2. HRD concerned with behavioral knowledge.

3. HRD is a well integrated system

4. HRD provides better quality of life.

5. HRD focuses on all round development of human resources.

Personnel management and industrial relations(PMIR):

Personnel management and industrial relations are two related concepts that deal with various aspects of the relationship between the management of organizations and their employees as well as the relation ship between other parties with a vested interest, such as labor unions. The main difference between personnel managementand industrial relations is that while personnel management is more focused on the recruitment, training and proper relations with employees, industrial relations is more concerned with trade unions and other forms of organized labor, in relation to employment issues. In that sense, it can be said that the relationship between personnel management and industrial relations is the shared concern for the welfare of employees and other forms of labor.

Organizations are well aware that the human capital invested in labor is the main engine that drives the organization since no company can function without some of form of input by its workers. It is this realization that makes it imperative for organizations to actively look for means of engaging the type of human capital required by the organization, a duty that falls within the ambit of the functions of personnel management.

It is here that another link between personnel management and industrial relations can be seen, because management must also introduce standards to ensure that the welfare of employees are met. Failure to do so may lead to actions against the management of the company, either by the employees on their own or by the various trade unions or labor unions as part of industrial relations. Where the management and labor are able to successfully resolve the issue by coming to a mutually beneficial understanding, then the cordial industrial relationship is restored. Assuming the company and the labor unions cannot come to some sort of understanding or compromise, then there is a situation that is referred to as a break down in industrial relations.

Usually, the personnel management will be the main department to handle the dispute with labor or unions. Personnel management will also be the department to take proactive steps to ensure that such situations do not come up, and also to try and make certain that any such incidence that does occur is attended to so as to prevent any form of escalation. Part of the process of making sure that such rifts do not arise include ensuring that the organization adheres to the applicable labor laws for that industry and also that they treat their employees in an equitable manner.

3.1.1 Functions Of HR Manager

Managers can be classified by their level in the organization, particularly in traditionally structured organizations those shaped like a pyramid.

● **First-line managers** are located on the lowest level of management.

● **Middle managers** includes all levels of management between the first-line level and the top level of the organization.

● **Top managers** includes managers at or near the top of the organization who are responsible for making organization-wide decisions and establishing plans and goals that affect the entire organization.

The changing nature of organization and work often requires employees in formerly non-managerial jobs to perform managerial activities. Non managerial jobs are those where one works directly on a job and had no one reporting to him.

Management Functions

According to the functions approach managers perform certain activities to efficiently and effectively coordinate the work of others. They can be classified as

1) Planning , which involves defining goals, establishing strategies for achieving those goals, and developing plans to integrate and coordinate activities.

2) Organizing , which involves arranging and structuring the work to accomplish the organization's goals.

3) Leading , which involves working with and through people to accomplish organizational goals.

4) Controlling , which involves monitoring, comparing, and correcting work performance.

Since these four management functions are integrated into the activities of managers throughout the workday, they should be viewed as an ongoing process and they need not be done in the above sequence.

Concept And Functions Of Finance

Financial management deals with the study of procuring funds and its effective and judicious utilization, in terms of the overall objectives of the firm, and expectations of the providers of funds. The basic objective is to maximizing the value of the firm. The purpose is to achieve maximization of share value to the owners i.e. equity shareholders

"Financial Management is concerned with the managerial decisions that results in acquisition and financing of short-term and long-term credits for the firm".

"Business finance is that business activity which is concerned with the conservation and acquisition of capital funds in meeting financial needs and overall objectives of a business enterprise"

HR

1. Employing the skills and the activities of the workforce efficiently.

2. Helping the organization to search its goal.

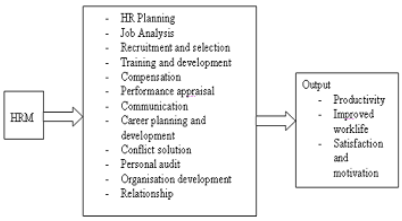
3. Increasing to the fullest the employee job satisfaction.

4. Providing the organization with well trained and well motivated employee.

5. Communication.

6. Developing and maintaining the quality of work life.

7. Helping to other department and function.



HRM includes the very Interesting phenomena that is HRD. Human resource development (HRD) is phenomenal for the manufacturing and service industry.

HRD deals with up gradation of skills for labors and executives, planning and allocation of work, monitoring and assessment of performance. One of the most important tasks is upgrading the skills and knowledge of the human resource from time to time with the development of technology and trade.

This upgradation is done through training and workshop/seminars. Collectively, HRD activities result in increased productivity, reduced cost and wastage, rightsizing of labour and staffs at the organization, organizational stability and flexibility to adapt to future changes.

3.1.2 Wage payment plans(Simple Problems)

Concept And Meaning Of Wage Payment System: The system of wage payment is the method adopted by manufacturing concerns to remunerate workers. It is the way of giving financial compensation to the workers for the time and effort invested by them in converting materials into finished products. It indicates the basis of making payment to the workers, which may be either on time basis or output basis. The selection of the system depends on the type and nature of the concern and its products. The wage payment systems can be divided into two main systems as follows.

1. Piece rate system

2. Time rate system

Importance Of Wage Payment System:

The amount of wages paid to the workers is one of the major elements of cost. It has a great bearing on the cost of production and profitability of the concern. Hence, every concern is required to adopt a fair system of wage payment.

The importance of wage payment system can be summarized as follows:

1. Wage payment system facilitates the preparation of wage plan for future.

2. Wage payment system helps to determine the cost of production and the profitability of the organization.

3. Wage payment system determines the amount of earning of the workers and their living standards.

4. Wage payment system affects the interest and attitude of the workers.

5. Wage payment system determines the level of satisfaction of the workers and affects the rate of labor turnover.

6. Wage payment system helps in recruiting skilled, experienced and trained workers.

7. Wage payment system helps to increase the productivity and goodwill of the organization.

Essential Characteristics Of A Good Wage Payment System:

A sound system of wage payment is one that satisfies employer and employee by fulfilling following criteria.

1. Wage payment system should be fair and justifiable to the workers and organization.

2. Wage payment system should help in maximizing workers' satisfaction and minimizing labor turnover.

3. Wage payment system should assure minimum guaranteed wages to all workers.

4. Wage payment system should assure equal pay for equal work.

5. Wage payment system should provide more wages to efficient and skilled workers.

6. Wage payment system should follow government policy and trade union's norms.

7. Wage payment system should be simple and understandable to all the workers.

8. Wage payment system should help in improving performance and productivity of the workers.

9. Wage payment system should be flexible enough to suit the needs of the organization.

Wage Statement Requirements:

The wage statement an employer gives its employee must include information about:

● The pay period for which the wages are being paid.

● The employee's wage rate.

● The gross amount of wages before taxes and other deductions and how it was calculated.

● The amount and purpose of each wage deduction.

● Amounts deemed to have been paid to the employee because of room and board provisions and the net amount of wages.

● The wage statement must be in writing.

● An employer must keep a copy of the information contained in an employee's wage statement for three years from the time it was given.

Example of Pay Period:

In this example, the pay period runs from Friday the 11th to Thursday the 17th, and the payday for this period is the following Wednesday the 23rd.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23*	24	25	26
27	28	29	30			

In this example, all the employee's earnings during the pay period from the 11th to the 17th of the month must be paid on the 23rd. (Earnings from the 18th to the 24th will be paid on the 30th).

3.2 Job Evaluation and Merit Rating

Job evaluation is a technique to rate a job. Therefore, after the job is evaluated, it becomes the starting point to fix the base wage for a worker so that the wage is fair and equitable. Job evaluation is the criterion for relative differentiation of base-wage rates by establishing the relative worth of various jobs in an organization.

The bases for semi-skilled or unskilled worker's job evaluation are the factors related to job, such as effort, skill, job risk, responsibility, job conditions, hazard, etc. For skilled jobs, factors related to experience, qualification, dynamics of responsibility and complexity in decision-making, leadership quality accountability, etc., are the major factors in job evaluation.

Job evaluation is an attempt to determine and compare the demands which the normal performance of particular jobs makes on average workers, without taking into account the individual abilities or the performance of the workers concerned.

Job evaluation is used to analyse and assess the job for ascertaining its relative worth by objective assessment and comparison for determining the basis for a rational wage structure.

For an effective job evaluation, proper description and specification of the job are needed. The main purpose of job evaluation is to decide the base for wage-payment for different categories of jobs.

1. Purpose:

The purpose of the job evaluation is to fix wages for the jobs by considering certain factors such as skill, responsibility etc. In case of merit rating, the purpose is to evaluate the employee for the purpose of training, promotion, pay increase or incentives etc.

2. Rating or job/Employees:

Job evaluation is related with the rating of the job whereas merit rating is a systematic process or evaluation of the capacities and abilities of the man doing the job.

3. Performance of individual versus job:

Job evaluation becomes the basis of determining wages whereas merit rating is undertaken to find the efficiency of the individual for doing specific jobs.

4. Job difference/Individual differences:

Job evaluation considers the differences in jobs whereas merit rating recognizes the individual differences.

5. Objectives/Subjective Qualities:

The type of the factors to be considered are objective in case of job evaluation, whereas in case of merit rating subjective qualities are considered.

6. Uses:

Job evaluation is meant for determining the wages on an employee. On the other hand, merit rating is utilized for placement and training etc.

7. Test of worth versus merit:

In job evaluation, an attempt is made to know the worth of a job in terms of certain factors such as responsibility and effort. Merit rating identifies the capacity and capability of an individual for doing specific job.

3.3 Marketing Management And Functions of Marketing

Marketing Management And Services

Marketing:

Marketing as a social process by which individuals and groups obtain what they need and want through creating, offering exchanging products and services of value with others.

Selling versus Marketing:

Selling refers to the act of transferring the ownership of the goods and services from the seller to the buyer. Marketing refers to the whole process encompassing the entire range of activities starting from identifying the customers requirements to satisfying these in a mutually beneficial manner.

Selling	Marketing
1. Product enjoys the supreme importance	1. Customer enjoys unique importance
2. Emphasis on company (sellers)needs	2. Emphasis an market customers needs
3. Company oriented selling effects	3. Market oriented selling effects
4. Goods are already produced and then sold as profit	4. Customers demand determines production supply is adjusted to demand
5. Selling aims at short-term objectives	5. Marketing aims as long-term objectives
6. Top priority is given to sales Volume rather than profits increasing sales	6. To priority is given to profitable Volume of sales and market share at fair prices and reasonable risk
7. Production oriented	7. Customer oriented

Marketing Function:

Buying:

Buying involves both the marketing and the customers. The marketing manager must know about the type of customers, their consuming habits demands and buying pattern.

Selling:

It creates a demand for a product selling function, it involves:

1. Product planning and development

2. Finding out or locating buyers

3. Demand creation through salesmanship, advertising and sales promotion

4. Negotiation of terms of sales such as price, quantity and quality etc

Transporting:

It involves the creation of place utility. In order to have value goods must first be transported from the place they are produced to the place where they are needed.

Storage:

It concerned with storing finished products properly without any damage, until they are dispatched to the customers it is also concerned to the customers it is also concerned with maintaining stock of raw materials with maintaining stock of raw materials, components etc. to meet production schedules.

Standardization and grouping:

These two functions are supplementary and complementary to each other. A standard is a measure of fixed value. The standard could be based on colour, weight, quality, and number of items, price, or any other parameter. Both domestic and export markets rely extensively on this function. Grading is the process of sorting the goods. The price varies with the grade of the goods. This function enables the marketer to fix a uniform price for a given grade of the goods. It further promotes good understanding between the buyer and the seller.

Finance:

Finance is the life blood of business, value of goods is expressed in terms of money and it is denoted by price to be paid by buyer to seller. Credit is necessary in marketing it plays all important role in retail trade particularly in the sales of costly consumer goods.

Marketing research:

The marketing personnel must study the trends in market demand, supply prices and related market information. The knowledge about the latest market information may help the firm to reduce risk loss in purchasing, in pricing, in forecasting market demand and in facing competition in the market.

Marketing Mix:

It refers to the combination of four basic elements, viz., product, price, promotion and the place, known as the four P's of marketing.

Product Mix:

It is used to describe the assortment of different product types (product lines) and their varieties (product depth). In addition, different tangible and intangible features of the product also form the product mix.

Price Mix: Price mix refers to the decisions relating to the price charged for the product, service or idea.

Promotion Mix: Refers to the activities relating to promotion of the product, service or idea.

Place Mix: Place or physical distribution mix refers to the activities that are involved in transferring ownership to consumers at the right time and price.

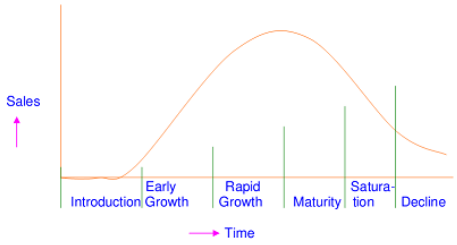
3.3.1 Marketing strategies based on product Life Cycle

Product life cycle:

1. Products have limited life.

2. Products sales pass through distinct stages, each passing different challenges, opportunities and problems to seller.

3. Profits rise and fall at different stages of product life cycle.



Early growth:

When the results of usage of the product starts flowing into the market and the results are encouraging, more and more buyers come forward to try. The sales revenue remains very low till this point of time. This is also a very critical stage, as the manufacturer cannot avail scale economies.

Rapid growth:

A new product enters the stage of rapid growth when it satisfies the needs of the customers. The sales start picking up with repeat purchases and by word of mouth publicity, coupled with continued promotion outlay from the manufacturer's side. As new customers get attracted to the product for the first time, sales soar, sales revenues increase faster than costs, and profits start accruing. This trend attracts the attention of the competitors who release a similar product copying the best features of the new product.

Maturity:

When the product's sales growth slows down, it is called maturity. Due to this slow down, the industry as a whole suffers from overcapacity. At this stage, firms tend to attract the customers

away from their competitors through cheaper prices and larger promotional efforts and outlay those who cannot afford such large promotional outlay and woo customers of the competitors.

Marketing Strategies for Maturity Stage:

In this stage, competitors have entered the market. There is severe fight among them for more market share. The company adopts offensive/aggressive marketing strategies to defeat the competitors.

Following possible strategies are followed:

1. To Do Nothing:

To do nothing can be an effective marketing strategy in the maturity stage. New strategies are not formulated. Company believes it is advisable to do nothing. Earlier or later, the decline in the sales is certain. Marketer tries to conserve money, which can be later on invested in new profitable products. It continues only routine efforts, and starts planning for new products.

2. Market Modification:

This strategy is aimed at increasing sales by raising the number of brand users and the usage rate per user. Sales volume is the product of number of users and usage rate per users. So, sales can be increased either by increasing the number of users or by increasing the usage rate per user or by both. Number of users can be increased by variety of ways.

There are three ways to expand the number of users:

i. Convert non-users into users by convincing them regarding uses of products

ii. Entering new market segments

iii. Winning competitors' consumers

Sales volume can also be increased by increasing the usage rate per user.

This is possible by following ways:

i. More frequent use of product

ii. More usage per occasion

iii. New and more varied uses of product

3. Product Modification:

Product modification involves improving product qualities and modifying product characteristics to attract new users and/or more usage rate per user.

Product modification can take several forms:

i. Strategy for Quality Improvement:

Quality improvement includes improving safety, efficiency, reliability, durability, speed, taste, and other qualities. Quality improvement can offer more satisfaction.

ii. Strategy for Feature Improvement:

This includes improving features, such as size, colour, weight, accessories, form, get-up, materials, and so forth. Feature improvement leads to convenience, versatility, and attractiveness. Many firms opt for product improvement to sustain maturity stage.

Product improvement is beneficial in several ways like:

(1) It builds company's image as progressiveness, dynamic, and leadership

(2) Product modification can be made at very little expense

(3) It can win loyalty of certain segments of the market

(4) It is also a source of free publicity and

(5) It encourages sales force and distributors

4. Marketing Mix Modification:

This is the last optional strategy for the maturity stage. Modification of marketing mix involves changing the elements of marketing mix. This may stimulate sales. Company should reasonably modify one or more elements of marketing mix (4P's) to attract buyers and to fight with competitors. Marketing mix modification should be made carefully as it is easily imitated.

Saturation:

When the sales growth slows down to zero, such a stage is called saturation. This size of the market does not increase beyond this stage. In other words, old customers who have stopped buying the product replace any new customer entering the market. All sales are simply replacement sales or repeat purchases by the same customers.

Decline:

When sales of a product tend to fall, such a stage is called decline. When a product ceases to satisfy the customer's needs in relation to those available in the market, it is no more preferred. As a result, its competing products offering superior benefits take over the market. This leads to weakened profitability

Company may follow any of the following strategies:

1. Continue with the Original Products:

This strategy is followed with the expectations that competitors will leave the market. Selling and promotional costs are reduced. Many times, a company continues its products only in effective segments and from remaining segments they are dropped. Such products are continued as long as they are profitable.

2. Continue Products with Improvements:

Qualities and features are improved to accelerate sales. Products undergo minor changes to attract buyers.

3. Drop the Product:

When it is not possible to continue the products either in original form or with improvement, the company finally decides to drop the products.

Product may be dropped in following ways:

i. Sell the production and sales to other companies

ii. Stop production gradually to divert resources to other products

iii. Drop product immediately.

3.3.2 Channels Of Distribution

Type of Channels of Distribution:

Channels of distribution refer to the ways and means of reaching the customer through the intermediaries such as wholesalers, retailers, and other agencies, if any.

Manufacturer - consumer:

This is a direct marketing channel where the manufacturer contacts the customer directly without involving middlemen or intermediaries. The manufacturers of industrial goods such as aero planes turbo-engines, ships, and other high-value capital goods mostly follow this route. However, consumer product manufacturers also through Internet, mail order operations, and door-to-door selling are following this method. It is common sight to find the representatives of the manufacturers going from house to house to sell their products, which are normally used in the households.

Manufacturer - wholesaler - consumer:

This channel is primarily used in the case of industrial goods and high-value consumer durable products. The wholesaler, who may also be called as distributor in this channel, carries out the functions of retailing to large customers who may in themselves be the manufacturers also. The wholesalers in this channel buy goods from many manufacturers, stock, and subsequently, sell them through internet or directly to the customers in a wider geographical area. An example of the use of this method can be observed in the computer hardware industry.

Manufacturer - retailer - consumer:

Here, the large retailing chains, including supermarkets, use this channel to buy products in large quantities from manufacturers at a very competitive price and sell the same to the ultimate consumers. As the retailers enjoy large discounts in this process, they share this benefit with their customers by keeping their products competitively priced. The consumers patronage this channel because they can buy in small quantities from a wide variety at lower prices.

Manufacturer - wholesaler - retailer - consumer:

This is a chain widely followed for fast moving consumer goods, which are likely to have mass markets. When the consumers are large in number, widely dispersed geographically, and products are of low value, this channel is favored. Manufacturers would find it prohibitively expensive to set up their own outlets in such circumstances. For manufacturers of consumer goods such as hosiery, food items, confectionery, clothes, and ready made garments, cosmetics, and so on, intermediaries are indispensable in the distribution chain.

4

PROJECT MANAGEMENT

(PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems).

4.1 PERT AND CPM

PERT:

Programme evaluation and review technique (PERT) is a tool to evaluate a given programme and review the progress made in it from time to time. A programme is also called a project.

A set of activities with a specific goal occupying a specific period is known as a project. It may be a small or big project, such as construction of a college building, roads, marriage, picnics etc.

It is concerned with estimating the time for different stages in such a programme or a project and find out what the critical path is, which consumes a maximum resources.

CPM:

Critical path method assumes that the time that is required to complete an activity can be predicted fairly and accurately and thus, the costs involved can be quantified once the critical path has been identified. Since time is an important factor, CPM involves a trade-off between costs and time. It involves determining an optimum duration for the project, that is, a minimum duration that involves the lowest overall costs.

Applications of PERT and CPM:

- Preparation of bids and proposals for large projects such as multipurpose projects.

● Construction of projects such as building, highways, houses or bridges.

● Development of new weapon systems and new products and services.

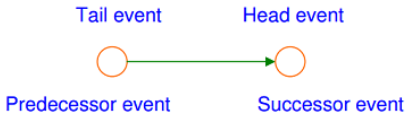
● Maintenance and planning of oil refineries, ship repairs and other such as large operations.

● Simple projects such as house keeping, home remodeling or painting and so on.

● Manufacture and assembly of large items such as aeroplane or ships repairs and other such as large operations.

PERT Basic Terminology:

Event: A event is specific instant of time which indicates the beginning or end of the activity ,event is also known as a junction or node. It is represented by a circle and the event number is written with in the circle.



Activity:

Every project consists of number of jobs, operations or tasks which are known as activity.

Example:

Classification of activities:

Critical activity

Non-Critical activity

Dummy activity

Critical activity:

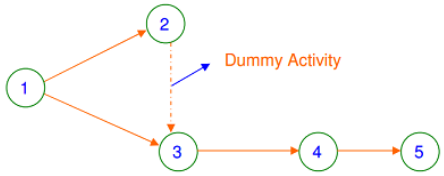
In a network diagram critical activities are those which consumes more than their estimated time, the project will be delayed. It is shown with a thick arrow. As shown in the figure below

Non-critical activity:

Such activities have a provision of float or slack so that, if they consume a specified time over and above the estimated time.

Dummy activity:

When two activities start at the same instant of time like A and B the head event are jointed by dotted arrows and this is known as dummy activity.



CPM Basic terminology:

Critical Path:

Critical path is that path which consumes the maximum amount of time or resources. It is that path which has zero slack value.

Slack:

The time taken to delay a particular event without affecting the project completion time is known as slack. If a path has zero slack that means it is the critical path.

Slack = LFT – EFT

Earliest Start Time (EST):

The earliest possible time at which an activity can start is known as EST and is calculated by moving from first to last event in the network diagram.

Earliest Finish Time (EFT):

It is the earliest possible time at which an activity can finish.

EFT = EST + Duration of activity.

Latest Start Time (LST):

It is the latest possible time at which an activity can start without delaying the date of completion of project.

LST = LFT – Duration of the activity

Latest Finish Time (LFT):

It is the latest time by which the activity must be completed. So that the scheduled date for the completion of the project may not be delayed. It can be calculated by moving backwards.

Float:

Floats in the network analysis represents the difference between the maximum time available to finish the activity and time required to complete it.

The basic difference between slack and float times is that a slack is used with reference to event, float is used with reference to activity.

Types of Floats

Floats are of three types such as:

1) Total float

2) Free float

3) Independent float

Total float:

It is the additional time which a non critical activity can consume without increasing the project duration. However total float may affect the floats in previous and subsequent activities.

1. Total float = LST – ESTorLFT – EFT

2. Free float:Free float refers to the time by which an activity can expand without affecting succeeding activities.

Free float = EST of Head Event – EST of Trail Event – Activity duration

3. Independent float: The time by which activity may be delayed or extended without affecting the preceding or succeeding activities in any away is known as independent float.

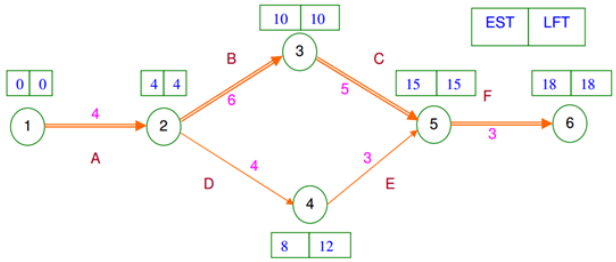
Independent float = EST of Head event – LFT of Trail event – Activity duration

Problems:

A small engineering project consists of 6 activities namely ABCDE & F with duration of 4, 6, 5, 4, 3 and 3 days respectively. Let us draw the network diagram and calculate EST, LST, EFT, LFT and floats also we shall mark the critical path and total project duration.

Activity	A	B	C	D	E	F
Preceding activity	-	A	B	A	D	C,E
Duration	4	6	5	4	3	3

Solution:



Critical path = A-B-C-F Project duration = 18 days

Activity	Duration	EST	LST	EFT	LFT	Total float	Free float	Independent float
A B C D E F	4	0	0	4	4	0	0	0
	6	4	4	10	10	0	0	0
	5	10	10	15	15	0	0	0
	4	4	8	8	12	4	0	0
	3	8	12	11	15	4	4	0
	3	15	15	18	18	0	0	0

LST = LFT – activity duration LFT = EST + activity duration

Total float = LST – ESTor LFT – EFT

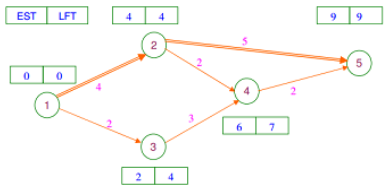
Free float = EST of Head Event – EST of Trail Event – Activity duration Independent float = EST of Head event – LFT of Trail event – Activity duration home remodeling house.

The following table gives the information relating to a project. By using the given data we can calculate the optimum duration of the project. Where indirect cost is estimated Rs.2,000 per day.

Activity	Normal		Crash	
	Time(days)	Cost(Rs.)	Time(days)	Cost(Rs.)
1-2	4	1000	3	2000
1-3	2	1500	1	3500
2-4	2	500	1	900
2-5	5	1000	3	4000
3-4	3	1000	1	2000
4-5	2	800	1	1000

Solution:

Activity	Normal		Crash		$Cost\ Slope = \frac{C_c - N_c}{N_t - C_t}$	Priorities
	Time (days)	Cost (Rs.)	Time (days)	Cost (Rs.)		
1-2	4	1000	3	2000	1000	1
1-3	2	1500	1	3500	1000	
2-4	2	500	1	900	400	
2-5	5	1000	3	4000	1500	2
3-4	3	1000	1	2000	500	
4-5	2	800	1	1000	200	
Total direct cost		5800				

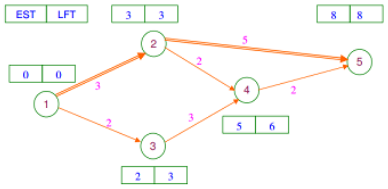


Critical path is 1-2-5 and Project Duration is 9 days Total cost is = Direct cost + Indirect cost

= 5800+(2000x9)

=23,800/-

1-2 crashing by 1 day:

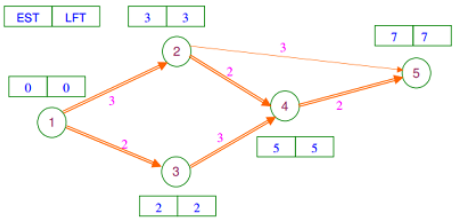


Critical path is 1-2-5 and Project Duration is 8 days Total cost is = Direct cost + Indirect cost

= (5800+(1x1000))+(2000x8)

=22,800/-

2-5(a) crashing by 2 days:



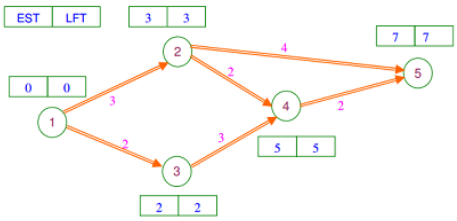
Critical paths are 1-2-4-5 and 1-3-4-5 and duration is 7 days only. Total cost= Direct cost + Indirect cost

= (6800+(2x1500))+(2000x7)

= 23,800/-

Here project crashed by 2 days and total cost incurred by the firm is 23,800/- but duration is reduced by only one day. So it is suggested to crash the network by only one day, It can help to reduce the cost. So that 2-5 activity crashing by only 1 day.

2-5(b) activity crashing by 1 day only



Duration is 7 days

Total cost= Direct cost + Indirect cost

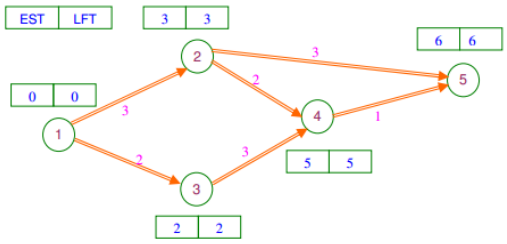
= (6800+(1x1500))+(2000x7)

= 8300 + 14000

= 22,300/-

All activities comes under the critical activities, the priority are changed according to the cost slope 4-5 activity having minimum cost slope. So that it is possible to crash out 4-5 activity by one day only and 2-5 by one day simultaneously

4-5 activity crashing by 1 day and 2-5 crashing by 1 day only:



Duration is 6 days

Total cost = Direct cost + Indirect cost

= (8,300+(1x1500)+(1x200))+(2000x6)

= (8300 + 1700) + (12000)

= 22,000/-

This network diagram not possible to crashing further, So that the project duration is 6 days and optimum cost is Rs.22,000/-

Optimum cost = 22,000/-

Optimum Duration = 6 days

4.1.1 Development of Network

Network Analysis:

• Network is a graphical representation of all the Activities and Events arranged in a logical and sequential order.

• Network analysis plays an important role in the project management.

• A project is a combination of interrelated activities all of which must be executed in a certain order for its completion.

Activity:

Activity is the actual performance of the job. This consumes resources.

Event:

An event refers to start or completion of a job. This does not consume any resources.

• Analyzing network, the planning, scheduling and control of a project becomes easier.

• PERT and CPM are the two popular network analysis technique used to assist managers in planning and controlling large scale projects.

• PERT- (Programme Evaluation Review Technique)

• CPM - (Critical Path Method)

Applications:

● Construction of a Residential complex

● Petro-chemical complex

● Satellite mission development

● Installation of a pipe line project

● Commercial complex

● Ship building

Rules for drawing the network diagrams:

•In a network diagram, arrows represent the activities and circles represent the events.

•The tail of an arrow represents the start of an activity and the head represent the completion of the activity.

•The event numbered 1 denotes the start of the project and is called initial event.

• Event carrying the highest number in the network denotes the completion of the project and is called terminal event.

•Each defined activity is represented by one and only arrow in the network.

•Determine which operation must be completed immediately before other can start.

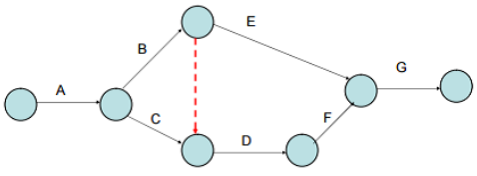
•Determine which other operation must follow the other given operation.

•The network should be developed on the basis of logical, analytical and technical dependencies between various activities of the project.

Problem:

Construct an arrow diagram for the following project.

Activities	Relationship
A	Precedes B,C
B	Precedes D,E
C	Precedes D
D	Precedes F
E	Precedes G
F	Precedes G



4.1.2 Difference between PERT and CPM

PERT vs CPM:

CPM and PERT (Program Evaluation and Review Technique) are most commonly used methods for project management. There are some similarities and differences between PERT and CPM. PERT can

be applied to any field requiring planned, controlled and integrated the work efforts to accomplish defined objectives.

● The CPM is a kind of technique commonly known for its use in constructions project, whereas the PERT mostly used in research and in development projects like the projects considered being a kind of non-repetitive nature.

● Both techniques have different concept of working like CPM uses deterministic concept for its work whereas a probabilistic concept is used by PERT.

● Networking approach also varies in both techniques like CPM uses networking which is based upon activity oriented, on contrary PERT uses networking that based on event.

● CPM is known for controlling both time and cost for planning purposes whereas the PERT uses its well defined tool for this purpose.

● In PERT technique, an estimation of time for different activities is not perfect and accurate whereas in CPM activities duration are estimated with the quality of accuracy.

● Both of the techniques used for same purpose but the nature of their working is different and some do their work efficiently with CPM and some can do same with PERT.

● Cost optimization is a main point in any of the project and In CPM, this step has prime importance on other steps because time required for the completion of project is totally dependent on the cost optimization stats, as we all know that cost is not directly proportional to time that is why the cost is said to be a controlling factor. On contrary, this concept is totally opposite in PERT, it is assumed that time and the cost are interlinked and cost varies with time.

● The most important thing to solute is to cut down time which can provide with good result for their cost factor. In PERT, time is said to be a controlling factor.

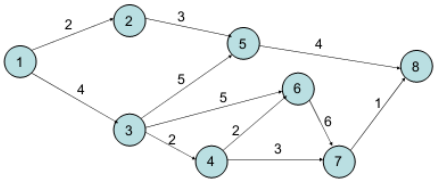
● Unpredicted activities are managed with help of Program Evaluation and Review Technique (PERT), whereas CPM is used while dealing with those projects that have some alarmed activities. These two techniques said to be a key element for the management of any project.

4.1.3 Identifying Critical Path, Probability

CRITICAL PATH:

The longest path in a project network which determines the duration of the project is known as critical path.

Determination of Critical Path



Involving Steps are given below:

Step 1:

List all the possible sequences from start to finish.

Step 2:

For each sequence determine the total time required from the start to finish.

Step 3:

Identify the longest path (Critical Path)

Explanation of diagram given below:

Step 1:

List all the possible sequences from start to finish.

Path A : 1 – 2 – 5 – 8

Path B : 1 – 3 – 5 – 8

Path C : 1 – 3 – 6 – 7 – 8

Path D : 1 – 3 – 4 – 7 – 8

Path E : 1 – 3 – 4 – 6 – 7 – 8

Step 2:

For each sequence determine the total time required from start to finish.

Path A : 2 + 3 + 4 = 9 days

Path B : 4 + 5 + 4 = 13 days

Path C : 4 + 5 + 6 + 1 = 16 days

Path D : 4 + 2 + 3 + 1 = 10 days

Path E : 4 + 2 + 2 + 6 + 1 = 10 days

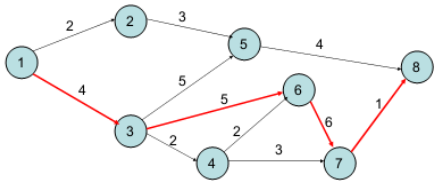
Step 3:

Identify the longest path (Critical Path)

Path C : 4 + 5 + 6 + 1 = 16 days

Path C : 1 – 3 – 6 – 7 – 8

Determination of Critical Path



Step 1: List all the possible sequences from start to finish

Step 2: For each sequence determine the total time required from start to finish.

Step 3: Identify the longest path (Critical Path)

Float (Slack):

• Float (Slack) refers to the amount of time by which a particular event or an activity can be delayed without affecting the time schedule of the network.

Float (Slack) is defined as the difference between latest allowable and the earliest expected time.

Event Float/Slack = LS – ES

Where LS = Latest start time

ES = Early start time.

Earliest start : It is denoted as 'ES'

The earliest possible time by which the activity can be started is known as Earliest start time.

Early finish time : It is denoted as 'EF'

The earliest possible time by which the activity can be completed is known as the Early Finish time.

Latest start time : It is denoted as 'LS'

The latest possible time by which the activity can be started is known as the Latest start time.

Late finish time : It is denoted as 'LS'

The latest possible time by which the activity can be completed is known as the Late finish time.

Total float (TF) / Total slack (TS):

Total float of the job is the differences between its Late start and Early start 'or' Late finish and Early finish

i.e.

TF(CA) = LS (CA) - ES (CA)

Or

TF(CA) = LF (CA) - EF (CA)

CA = Current activity

Free float (FF):

Free float is the amount of time a job can be delayed without affecting the Early start time of any other job.

FF(CA) = ES(SA) – EF (CA)

CA = Current Activity

SA = Succeeding Activity

Independent Float (IF):

Independent Float is the amount of time that can be delayed without affecting either predecessor or successor activities.

IF = ES(SA) – LF(PA) - Duration of CA

ES = Early Start

LF = Late Finish

SA = Succeeding Activity

PA = Preceding Activity

CA = Current Activity

Example 1:

Construct the Network for the following

Project and determine the following

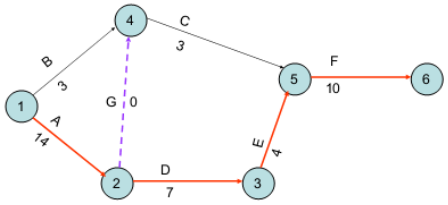
i) Critical Path

ii) ES,EF,LS,LF

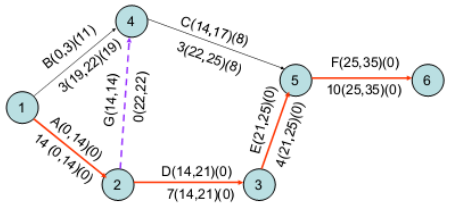
iii) TF,FF

Activity	Duration
1-2	14
1-4	3
2-3	7
2-4	0
3-5	4
4-5	3
5-6	10

Construction of the Network and Determination Critical Path:



Determination of TF and FF



TF(CA) = LS (CA) - ES (CA)

FF(CA) = ES(SA) – EF (CA)

IF = (ES(SA) – LF(PA)) - Duration of CA

Key: Job (ES,EF)(FF) → Duration (LS,LF)(TS)

Activity	Duration	ES	EF	LS	LF	TF	FF
1-2	14	0	14	0	14	0	0
1-4	3	0	3	19	22	19	11
2-3	7	14	21	14	21	0	0
2-4	0	14	14	22	22	0	0
3-5	4	21	25	21	25	0	0
4-5	3	14	17	22	25	8	8
5-6	10	25	35	25	35	0	0

4.1.4 Project Crashing (Simple Problem)

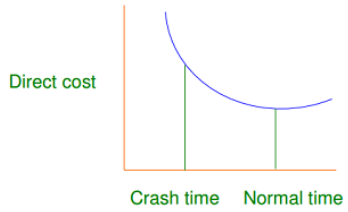
Project costs:

The costs associated with any project can be classified into two categories

a) Direct cost

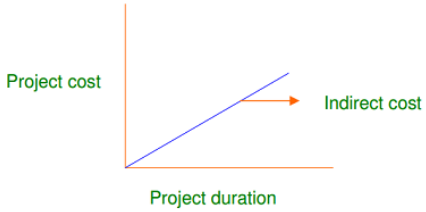
b) Indirect cost

Direct cost: These costs are those, which are directly proportional to the number of activities involved in the project Ex: Raw material cost



Indirect cost: Those costs that are determined per day are known as indirect cost.

Some of examples for indirect costs are supervisory personnel salary, supplies, rent, interest an borrowings, ads, depreciation. These costs are directly proportional to the number of days of the duration of the project. If the project duration is reduced the indirect cost also comes down.



Normal cost (N_c): It is the lowest cost of completing an activity in the minimum time, employing normal means i.e. not using overtime or other special resource.

Normal time (N_T): It is the minimum time required to achieve the normal cost.

Crash cost (CC): It is the least cost of completing an activity by employing all possible means like overtime, additional machinery, proper materials etc.

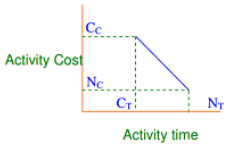
Crash time (C_T): It is the absolute minimum time associated with the crash cost.

Cost Slope: The amount that has to be spent over and above the normal direct cost for reducing the duration by one unit of time (day, week etc.) is known as cost slope.

Cost slope is defined as the additional cost for reducing one unit of time, assuming a given rate of increase in direct cost with a decrease in one unit of time.

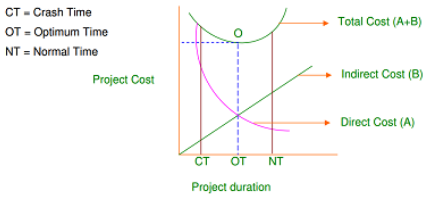
$$Cost\ slope = \frac{Crash\ cost - Normal\ cost}{Normal\ time - Crash\ time}$$

$$S = \frac{C_C - N_C}{N_T - C_T}$$



Crashing of Network: After identifying critical path, it is necessary to identify the priority to crash the activities by calculating the cost slope.

For reducing the duration extra expenditure to be incurred, but to save resources, organizations keep this extra expenditure at a minimum.



When the direct cost (A) decrease with an increase in time, as the project duration increase, the indirect cost (B) like overheads, depreciation, insurance etc. increases.

The total cost (A+B) curve is a flat U-shaped curve, with implies that only up to particular point (O) the crashing is economical, not beyond. The time duration, which involves the least total cost, is the optimum duration at optimum cost. Crashing the duration of a project may not be possible beyond a particular point.

Problems:

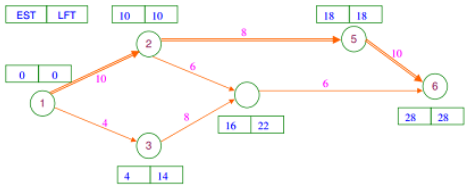
Given the following data,lets work out the minimum duration of the project and corresponding cost.

Activity	Job	Normal time	Crashing time	Normal cost	Crashing cost
A	1-2	10	6	400	600
B	1-3	4	2	100	140
C	2-4	6	4	360	440
D	3-4	8	4	600	900

E	2-5	8	6	840	1100
F	4-6	6	2	200	300
G	5-6	10	8	1200	1400

Solution:

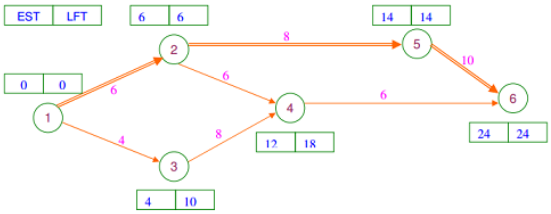
Activity	Job	Normal time (N_T)	Crashing time (C_T)	Normal cost (N_C)	Crashing cost (C_C)	Cost Slope $= \frac{C_c - N_c}{N_t - C_t}$	Priorities
A	1-2	10	6	400	600	50	1
B	1-3	4	2	100	140	20	
C	2-4	6	4	360	440	40	
D	3-4	8	4	600	900	75	
E	2-5	8	6	840	1100	130	2
F	4-6	6	2	200	300	50	
G	5-6	10	8	1200	1400	100	3



Critical path is 1-2-5-6 and Duration is 28 days Total cost is = Direct cost + Indirect cost

= (10+4+6+8+8+6+10) + 0 = 52/-

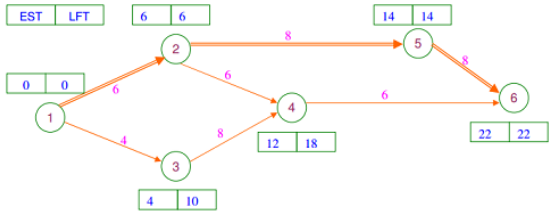
1-2 activity crashing by 4 days:



Critical path is 1-2-5-6 and Duration is 24 days Total cost is = Direct cost + Indirect cost

=(52 + (4 x 50) + 0) = 252/-

5-6 activity crashing by 2 days:

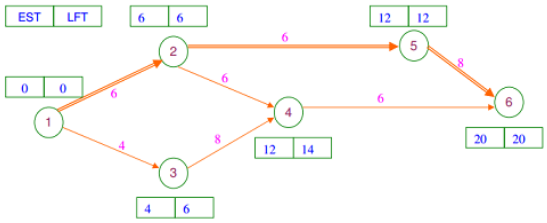


Critical path is 1-2-5-6 and Duration is 22 days

Total cost is = Direct cost + Indirect cost

=(252 + (2 x 100) + 0) = 452/-

2-5 activity crashing by 2 days:



Critical path is 1-2-5-6 and Project Duration is 20 days Total cost is = Direct cost + Indirect cost

=(452 + (2 x 130) + 0) = 712/-

Optimum cost= 712/- Optimum Duration = 20 days

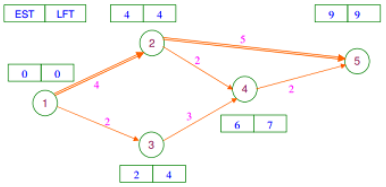
2. The following table gives the information relating to a project. By using the given data we can calculate the optimum duration of the project. Where indirect cost is estimated Rs.2,000 per day.

Activity	Normal		Crash	
	Time(days)	Cost(Rs.)	Time(days)	Cost(Rs.)
1-2	4	1000	3	2000
1-3	2	1500	1	3500

2-4	2	500	1	900
2-5	5	1000	3	4000
3-4	3	1000	1	2000
4-5	2	800	1	1000

Solution:

Activity	Normal		Crash		$Cost\ Slope = \frac{C_C - N_C}{N_T - C_T}$	Priorities
	Time (days)	Cost (Rs.)	Time (days)	Cost (Rs.)		
1-2	4	1000	3	2000	1000	1
1-3	2	1500	1	3500	1000	
2-4	2	500	1	900	400	
2-5	5	1000	3	4000	1500	2
3-4	3	1000	1	2000	500	
4-5	2	800	1	1000	200	
Total direct cost		5800				

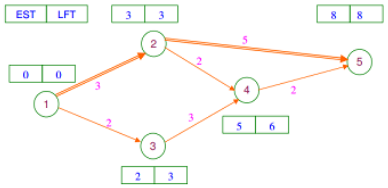


Critical path is 1-2-5 and Project Duration is 9 days Total cost is = Direct cost + Indirect cost

= 5800+(2000x9)

=23,800/-

1-2 crashing by 1 day:

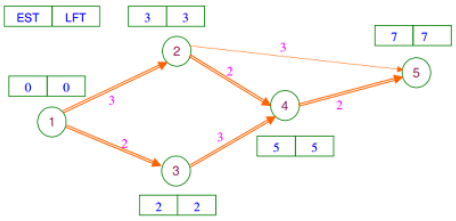


Critical path is 1-2-5 and Project Duration is 8 days Total cost is = Direct cost + Indirect cost

= (5800+(1x1000))+(2000x8)

=22,800/-

2-5(a) crashing by 2 days:



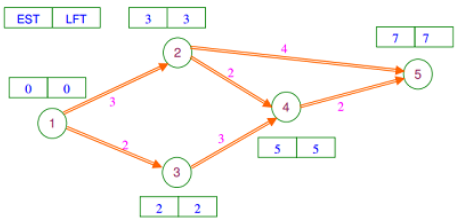
Critical paths are 1-2-4-5 and 1-3-4-5 and duration is 7 days only. Total cost= Direct cost + Indirect cost

= (6800+(2x1500))+(2000x7)

= 23,800/-

Here project crashed by 2 days and total cost incurred by the firm is 23,800/- but duration is reduced by only one day. So it is suggested to crash the network by only one day, It can help to reduce cost. So that 2-5 activity crashing by only 1 day.

2-5(b) activity crashing by 1 day only



Duration is 7 days

Total cost= Direct cost + Indirect cost

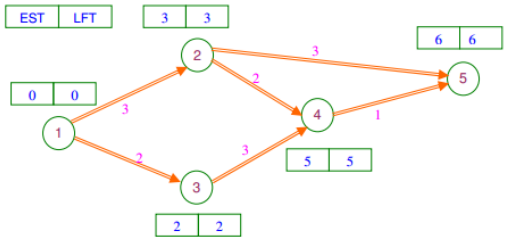
= (6800+(1x1500))+(2000x7)

= 8300 + 14000

= 22,300/-

All the activities comes under the critical activities, the priority is changed according to the cost slope 4-5 activity having a minimum cost slope. So that it is possible to crash out 4-5 activity by one day only and 2-5 by one day simultaneously

4-5 activity crashing by 1 day and 2-5 crashing by 1 day only:



Duration is 6 days

Total cost= Direct cost + Indirect cost

= (8,300+(1x1500)+(1x200))+(2000x6)

= (8300 + 1700) + (12000)

= 22,000/-

This network diagram not possible to crashing further, So that the project duration is 6 days and optimum cost is Rs.22,000/-

Optimum cost = 22,000/- Optimum Duration = 6 days

5

STRATEGIC MANAGEMENT

Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

5.1 Strategic Management: Vision, Mission, Goals, Strategy

The term 'Strategy' has been adapted from war and is being increasingly used in business to reflect broad overall objectives and policies of an enterprise.

Literally speaking, the term 'Strategy' stands for the military general, compelling the enemy to fight as per out chosen terms and conditions.

According to Koontz and O' Donnell, "Strategies must often denote a general programme of action and deployment of emphasis and resources to attain comprehensive objectives".

Strategies are the plans made in the light of the plans of the competitors because a modern business institution operates in the competitive environment. They are a useful framework for guiding enterprise thinking and action.

Characteristics of Strategy :

- It relates the business organization to the environment.
- It is the right combination of different factors.
- Strategy is a means to an end and not an end in itself.

• It is an action to meet a particular challenge, to solve particular problems or to attain desired objectives.

• It involves assumption of certain calculated risks.

• It is formulated at the top management level.

a) Strategic plans:

A strategic plan is an outline of steps designed with the goals of the entire organization as a whole in mind, rather than with the goals of specific divisions or departments.

It is further classified as:

i) Mission:

The mission is a statement which reflects the basic purpose and focus of the organization which normally remains unchanged. Properly crafted mission statements serves as the filters to separate what is important from what is not, clearly state which markets will be served and how, and communicate a sense of intended direction to the entire organization.

Mission of Ford: “We are a global, diverse family with a proud inheritance, providing exceptional products and services”.

ii) Objectives or goals:

Both goal and objective can be defined as the statements that reflect the end towards which the organization is aiming to achieve.

A goal is an abstract and general umbrella statement under which specific objectives can be clustered.

Objectives are statements that describe measurable and obtainable terms which reflect the desired organization’s outcomes.

iii) Strategies:

Strategy is the determination of the basic long term objectives of an organization and the adoption of action and collection of action and allocation of resources necessary to achieve these goals.

Strategic planning begins with an organization's mission. Strategic plans look ahead over the next two, three, five or even more years to move the organization from where it currently is to where it wants. Requiring multilevel involvement, these plans demand harmony among all the levels of management within the organization.

Top level management develops the directional objectives for the entire organization while lower levels of management develop compatible objectives and plans to achieve them. Top

management's strategic plan for the entire organization becomes the framework and sets dimensions for the lower level planning.

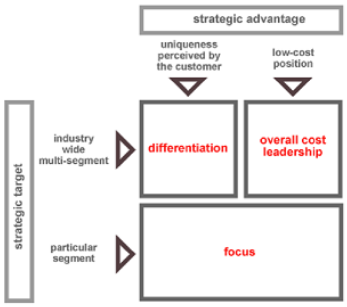
TYPES OF STRATEGIES

According to Michel Porter, the strategies can be classified into three types. They are:

a) Cost leadership strategy

b) Differentiation strategy

c) Focus strategy



Porter's generic strategies

a) Cost Leadership Strategy:

This generic strategy calls for being the low cost producer in an industry for a given level of quality. The firm sells its products either at average industry prices to earn a profit higher than that of the rivals or below the average industry prices to gain the market share. In the event of a price war, the firm can maintain some profitability while the competition suffers losses. Even without a price war, as the industry matures and prices decline, the firms that can produce more cheaply will remain profitable for a longer period of time. The cost leadership strategy usually targets a broad market.

Some of the ways that firms acquire cost advantages are by improving the process efficiencies, gaining unique access to a large source of lower cost materials, making optimal outsourcing and vertical integration decisions or avoiding some costs altogether. If competing firms are unable to lower their costs by the similar amount, the firm may be able to sustain a competitive advantage based on cost leadership.

Firms that succeed in cost leadership have the following internal strengths such as:

• Skill in designing products for efficient manufacturing, for example, having a small component count to shorten the assembly process.

• Access to the capital required to make the significant investment in production assets this investment represents a barrier to entry that many firms may not overcome.

• Efficient distribution channels.

• High level of expertise in manufacturing process engineering.

Each generic strategy has its risks, including the low cost strategy. For example, other firms may be able to lower their costs as well. As technology improves the competition may be able to leapfrog the production capabilities, thus eliminating the competitive advantage. Additionally, several firms following the focus strategy and targeting various narrow markets may be able to achieve the lower cost within their segments and as a group gain significant market share.

b) Differentiation Strategy:

A differentiation strategy calls for the development of a product or service that offers unique attributes which are valued by the customers and that customers perceive to be better than the products of the competition. The value added by the uniqueness of the product may allow the firm to charge a premium price for it. The firm hopes that higher price will cover more than the extra costs incurred in offering the unique product. Because of the product's unique attributes, if suppliers increase their prices the firm may be able to pass the costs to the customers who cannot find substitute products easily.

Firms that succeed in a differentiation strategy often have the following internal strengths:

• Highly skilled and creative product development team.

• Access to leading scientific research.

• Corporate reputation for quality and innovation.

• Strong sales team with the ability to successfully communicate the perceived strengths of the product.

The risks associated with a differentiation strategy include imitation by the competitors and changes in the customer tastes. Additionally, various firms pursuing focus strategies may be able to achieve even greater differentiation in their market segments.

c) Focus Strategy :

The focus strategy concentrates on the narrow segment and within that segment attempts to achieve either cost advantage or differentiation. The premise is that the needs of the group can be better serviced by focusing entirely on it. A firm using a focus strategy often enjoys a high degree of customer loyalty and this entrenched loyalty discourages other firms from competing directly.

Because of its narrow market focus, firms pursuing a focus strategy have lower volumes and thus, less bargaining power with their suppliers. However, firms pursuing a differentiation-focused strategy may be able to pass higher costs on to customers since close substitute products do not exist.

Firms that succeed in a focus strategy are able to tailor the broad range of product development strengths to a relatively narrow market segment which they know very well. Some risks of focus strategies includes the imitation and changes in the target segments. Furthermore, it may be fairly easy for a broad market cost leader to adapt its product to compete directly. Finally, other focusers may be able to carve out the sub segments that they can serve even better.

Combination of Generic Strategies :

These generic strategies are not necessarily compatible with one another. If a firm attempts to achieve an advantage on all fronts, in this attempt it may achieve no advantage at all.

For example, if a firm differentiates itself by supplying the high quality products, it risks undermining that quality if it seeks to become the cost leader. Even if the quality did not suffer, the firm would risk projecting a confusing image. For this reason, Michael Porter argued that to be successful over such long term, a firm must select only one of these three generic strategies. Otherwise, with more than one single generic strategy the firm will be "stuck in the middle" and will not achieve a competitive advantage.

Porter argued that the firms that are able to succeed at multiple strategies often do so by creating separate business units for each of the strategies. By separating the strategies into many different units having different policies and even different cultures, a corporation is less likely to become "stuck in the middle."

However, there exists a viewpoint that a single generic strategy is not always best because within the same product customers often seek multi dimensional satisfactions such as the combination of quality, style, convenience and price. There have been some cases in which the high quality producers faithfully followed a single strategy and then suffered greatly when another firm entered the market with a lower quality product that better met the overall needs of the customers.

5.2 Elements of Corporate Planning Process

Planning process:

Planning is the management function that involves setting of goals and deciding the best method to achieve them.

The various steps involved in planning are given below :

Planning process

Perception of Opportunities:

Awareness of an opportunity is the real starting point for planning.

It includes a preliminary look at possible future opportunities and the ability to see them clearly and completely, knowledge of where we stand in the light of our strengths and weaknesses and an understanding of why we wish to solve the uncertainties and a vision of what we expect to gain.

Setting realistic objectives depends on this awareness. Planning requires realistic diagnosis of the opportunity.

Establishing Objectives:

The first step in planning itself is to establish objectives for the entire enterprise and then for each subordinate unit. Objectives specifying the results expected indicates the end points of what to be done, where the primary emphasis is to be placed and what is to be accomplished by the network of policies, strategies, rules, procedures, budgets and programs.

Enterprise objectives should give direction to the nature of all major plans which by reflecting these objectives, define the objectives of major departments.

Major department objectives, in turn control the objectives of subordinate departments and so on down line.

Considering the Planning Premises:

Another logical step in planning is to establish, obtain agreement to utilize and disseminate critical planning premises. These includes forecast data of a factual nature, applicable basic policies and existing company plans.

Premises, then are planning assumptions in other words, the expected environment of plans in operation. It leads to one of the major principles of the planning. The more the individuals charged with planning understand and agree to utilize consistent planning premises, the more coordinated the enterprise planning will be.

Planning premises include far more than the usual basic forecasts of population, production, prices, costs, markets. Because the future environment of plan is very complex, it would not be profitable or realistic to make assumptions about every detail of the future environment of a plan.

Since agreement to utilize the given set of premises is very important to coordinate the planning, it becomes a major responsibility of managers starting with those at the top to make sure that subordinate managers understand the premises upon which they are expected to plan.

Identification of alternatives:

Once the organizational objectives have been clearly stated and the planning premises have been developed, the manager should list as many available alternatives for reaching the objectives.

The focus of this step is to search for and examine alternative courses of action especially those not immediately apparent.

The more common problem is not finding the alternatives but reducing the number of alternatives so that the most promising may be analyzed. Even with mathematical techniques and the computer, it has a limit to the number of alternatives that may be examined. It is therefore necessary for the planner to reduce by preliminary examination the number of alternatives to those promising the most fruitful possibilities or by mathematically eliminating by the process of approximation, the least promising ones.

Evaluation of alternatives:

Having sought out alternative courses and examined their strong and weak points, the following step is to evaluate them by weighing the various factors in the light of the premises and goals.

If the only objective were to examine profits in a certain business immediately, if the future were not uncertain, if cash position and capital availability were not worrisome and if most factors could be reduced to the definite data, it should be relatively easy.

But typical planning is replete with uncertainties, problems of capital shortages and intangible factors and so evaluation is usually very difficult.

A company may wish to enter a new product line primarily for purposes of prestige, the forecast of expected results may show a clear financial loss but the question is still open as to whether the loss is worth the gain.

Choice of alternative plans:

An evaluation of alternatives must include an evaluation of the premises on which the alternatives are based. A manager usually finds that some premises are unreasonable and can therefore be excluded from further consideration. This process helps the manager determine which alternative would best accomplish organizational objectives.

Formulating of Supporting Plans:

After decisions are made and plans are set, the final step to give them meaning is to number them by converting them to budgets. The overall budgets of an enterprise represent the sum total of

income and expenses with resultant profit or surplus and budgets of major balance sheet items such as cash and capital expenditures.

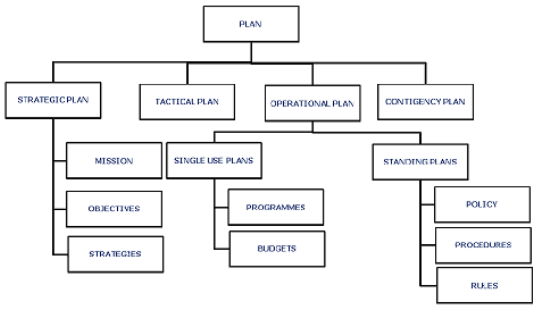
Each department or program of a business or other enterprise can have its own budgets, usually of capital expenditures and expenses, which tie into the overall budget.

If this process is done well, budgets become a means of adding together the various plans and also important standards against which planning progress can be measured.

Establishing sequence of activities:

Once plans that furnish the organization with both long-range and short range direction have been developed they must be implemented.

In the process of planning, several plans are prepared which are known as components of planning.



Types of planning

Plans can be classified as:

a) Strategic plans

b) Tactical plans

c) Operational plans

Operational plans lead to the achievement of tactical plans, which in turn lead to the attainment of strategic plans. In addition to these three types of plans, managers should also develop a contingency plan in case their original plans fail.

a) Strategic plans:

Strategic plan is the outline of steps designed with the goals of the entire organization as a whole in mind, rather than with the goals of specific divisions or departments.

b) Tactical plans:

A tactical plan is concerned with what the lower level units within each division must do, how they must do it and who is in charge at each level. It is the means needed to activate a strategy and make it work.

Tactical plans are concerned with shorter time frames and narrower scopes. These plans usually span one year or less because they are considered short term goals.

Long term goals, on the other hand can take several years or more to accomplish. Normally, it is the middle manager's responsibility to take the broad strategic plan and identify specific tactical actions.

c) Operational plans:

The specific results expected from the departments, work groups and individuals are the operational goals. These goals are precise and measurable. “Process 150 sales applications each week” or “Publish 20 books this quarter” are examples of operational goals.

An operational plan is one that a manager uses to accomplish his or her job responsibilities. Supervisors, team leaders and facilitators develop operational plans to support tactical plans.

Operational plans can be a single use plan or a standing plan.

d) Contingency plans:

Intelligent and successful management depends upon a constant pursuit of adaptation, flexibility and mastery of changing conditions. Strong management requires “keeping all options open” approaches at all times and that's where contingency planning comes in.

Contingency planning involves identifying alternative courses of action that can be implemented if and when the original plan proves inadequate because of changing circumstances.

Unexpected problems and events may frequently occur. When they do, managers may need to change their plans. Anticipating change during the planning process is best in case things don't go as expected.

Management can then develop alternatives to the existing plan to be used when and if circumstances make these alternatives appropriate.

5.3 Environmental Scanning

Environmental Scanning:

Environmental scanning is a vital part of the corporate planning process. Effective planners try to anticipate what is likely to happen or attempt to influence the environment in favourable directions. This requires long-term strategic vision and commitments to corporate planning.

Strategic Management

Importance of Environmental scanning:

● The banks and business enterprises in the public sector are being disinvested by the government.

● The government policies keeping changing the current focus of the government of India has been an globalization, privatization, deregulation. As a results foreign goods are being dumped into the markets.

● Computers have wiped out the market for typewriters and electronic type writers.

● Info tech industry, which was very strong for over decades, suddenly revealed downtrend.

● The advent of television channels has almost zeroed down the market for VCR and significantly affected the flow of film viewer traffic.

Environmental analysis:

Refers to the process of analyzing the environment, component wise or sector wise to provide a basis for further diagnosis. It interrelates the formation of objectives, generation of alternative strategies and other related issues.

Environmental diagnosis:

Comprises the managerial decisions based on the perceived opportunities and threats of the firm. In effect, it helps to determine the nature of the impending tasks to take advantage of opportunity or to effectively manage threat.

External Environment Analysis (Opportunity and Threat):

The external environment has a profound impact on the business operations irrespective of the nature of the business. The business has to monitor the key forces both in to micro and macro environment. The forces in the micro environment may be customer competitors and other.

The forces in the macro environment may be demographic, economic, technological sociocultural, political or legal. All these factors and parties affect the business operations both in the short and long run. These factors can be grouped under three parts of the environment.

General environment

Industry environment

International environment

1. General environment:

A firm is said to be more effective when its strategy caters to the needs effective when its strategy caters to the needs of the environment. The additional features added to the main product at times could provide a new life to the main product. The corporate units, which realize this, will survive in the longrun.

Thus, the major causes of growth, decline and other large scale changes in firms are the factor in the external environment, not internal development.

- Socio economic sector
- The technological sector
- The government sector

2. Industry environment:

It is an important component of the overall environmental analysis as input for corporate planning. Industry refers to the group of firms carrying on similar activity. It has three sectors, customers, suppliers and competitors.

Customers:

The strategist must identify and analyze the customers for the organization locates the potential customers and the emerging changes in their buying pattern. It is necessary to identify the profile of buyers in terms of their needs and preferences based on the basic demographic factors such as age, income size of household and consumption pattern. These factors create the primary demand for products or service and help to scan the geographical environment for potential market and customers.

Suppliers:

Strategist also must determine the availability and costs of supply condition including raw materials, energy, prevailing technology, money and labour. The supplier can influence a firm and its strategy, particularly when the firm is outsourcing its logistic requirements.

Competition:

The strategist moulds his strategy in the light of the competitor's strategy, the exit or entry of competitors to be analyzed and diagnosed.

3. International Environment:

The strategy of globalization implies a great source of opportunities and also threats to business firms. Such firms, which an make use of the opportunities, would flourish and those, which cannot gear up, would demise.

Internal Environment analysis and diagnosis:

Internal environmental analysis and diagnosis is a process of analyzing and diagnosing the firm's internal strengths and weaknesses. By identifying its strength and weaknesses, the firm can strategically exploit the available opportunities, overcome threats and correct weaknesses placing itself at a competitive advantage.

Conducting internal analysis and diagnosis:

Identify first the internal strength and weaknesses. The strength and weaknesses may include the following.

- Marketing factors
- Research and development
- Engineering design and management
- Production management
- Managerial personnel
- Accounting and financial policies and procedures.

Profile of research and development:

- Financial resources
- Infrastructure
- Human resources
- Organizational system

Strategy advantage profile:

The ultimate result of such a detailed internal analysis to build a strategic advantage profile strategic advantage profile is a tool used to evaluate systematically the enterprises internal factors the competitive strengths or weaknesses for each internal area such as marketing, R &D and others.

5.4 Swot Analysis

SWOT Analysis:

SWOT analysis is defined as the rational and overall evaluation of a company's strength, weakness, opportunities and threats which are likely to affect the strategic choice significantly.

External environment analysis (Opportunities and Threats):

The external environment has a profound impact on the business operations irrespective of the nature and size of the business. The business has to monitor its key macro environment forces and micro economic parties.

Opportunities:

It necessary should identify what opportunities are available to it to focus upon. The latest technology, deregulated or free markets, liberalized rules and regulations and other may make a lot of difference for a business organization provided it can envision how to avail these visionary identify opportunities from treats.

Threats:

Some development in the external environment represents threats. A threat is a challenge posed by an unfavorable trend or a development that results in the loss of sales or profit till a defensive

marketing action is initiated. A few example of threat could be outlined as change in government policy such as liberalization privatization and globalization, changing technology changing value systems environmental constraints law and order.

Internal environment analysis (Strength and Weakness):

It is necessary to analyze one's own strength and weakness periodically to sustain the degree of its competitive strength. Generally top management or an outside consultant reviews competencies pertaining to marketing, financial, manufacturing and organizational system and rates each factor as a major strength, minor strength, mental, factor, minor weakness or major weakness.

Strength:

It is not necessary that a business organization has to correct all its weakness nor that its propagate its strength. The big question is whether the business should limit itself to those opportunities, where its possesses the required strength or should it consider better opportunities where it might have to develop certain strength.

Weakness:

Some times the company may not do well not because its departments lack the required motivation but because they do not work together as a team for example consider the case of an electronics company which employs engineers, sales and service staff for its operations. It is not adequate if they keep on doing their work. The organization becomes more effective only when they work as a team. It is therefore, critically important to build effective teams and assess the effectiveness of these teams. This is a part of the internal environmental audit. Progressive companies adopt this strategy.

Strength:

1. Value for money programme.

2. Pool of trained faculty.

3. Wide choice of offering.

4. National network of well equipped training centre.

Weakness:

1. Not aggressive in selling.

2. Course differentials not sharp.

3. Counselor enthusiasm in adequate.

4. Customers service not focused enough.

Opportunities:

1. Growing demand for computer education.

2. Computer library be coming a necessity.

3. Growth of rich training needs.

4. Need for customized training modules.

Threats:

1. Rise in number of competitions.

2. High rate of technological obsolescence.

3. Commoditization of training under cutting of fees.

5.5 Steps In Strategy Formulation, Implementation And Generic Strategy alternatives

Strategic Formulation Process:

1. Input to the Organization:

Various Inputs such as Capital, People, Management and Technical skills, others including goals input of claimants like Consumers, Employees, Stockholders, Suppliers, Community, Government and others need to be elaborated.

2. Industry Analysis:

Formulation of strategy requires the evaluation of attractiveness of industry by analyzing the external environment. The focus should be on the possibility of new firms which are entering the market, the kind of competition within an industry, the availability of substitute products or services, the bargaining positions of the suppliers and buyers or customers.

3. Enterprise Profile:

Enterprise profile is usually the starting point for determining where the company is and where it has go. Top managers determine the basic purpose of the enterprise and clarify the firm's geographic orientation.

4. Orientation, Values and Vision of Executives:

The enterprise profile is shaped by people, especially executives and their orientation and values are important for the formulation of strategy. They set the organizational climate and they determine the direction of firm though their vision. Consequently their values, their preferences and their attitudes towards the risk have to be carefully examined because they have an impact on the strategy.

5. Mission (Purpose), Major Objectives and Strategic Intent:

The major objectives are the end points towards which the activities of the enterprise are directed. Strategic intent is the commitment to win in the competitive environment, not only at the top level but also throughout the organization.

6. Present and Future External Environment:

The present and future external environment must be assessed in terms of threats and opportunities.

7. Internal Environment:

Internal Environment should be audited and evaluated with respect to its resources and its weaknesses and strengths in research and production, development, procurement, operation, marketing.

Other internal factors includes human resources and financial resources as well as the company image, the planning and control system, the organization structure and climate and relations with customers.

8. Development of Alternative Strategies:

Strategic alternatives are developed on the basis of the analysis of external and internal environment. Examples of possible strategies are joint ventures and strategic alliances which may be an appropriate strategy for some firms.

9. Evaluation and Choice of Strategies:

Strategic choices must be considered in the light of risk involved in a particular decision. Some profitable opportunities may not be pursued because a failure in a risky venture could results in bankruptcy of the firm.

Another critical element in choosing the strategy is timing. Even the best product may fail if it is introduced to the market at an inappropriate time.

10. Medium/Short Range Planning, Implementation through Reengineering the Organization Structure, Leadership and Control:

Implementation of the Strategy often requires staffing the organization structure, re-engineering the organization and providing leadership. Controls must also be installed monitoring performance against plans.

11. Consistency Testing and Contingency Planning:

The last key aspect of the strategic planning process is the testing for consistency and preparing for the contingency plans.

Implementation of strategies:

- Institutionalization of strategy.
- Setting proper organizational climate.
- Developing appropriate operating plans.
- Developing appropriate organizational structures.
- Periodic review of strategy.

Generic Strategy alternatives:

Cost Leadership:

The cost leadership strategy is a good option for companies that are able to consistently reduce the costs of doing business. Maintaining low overhead costs and negotiating favorable acquisitions costs with suppliers are key to making this strategy work. We can apply cost leadership in one of two ways. We either generate higher profit margins by charging industry average prices despite our low cost basis or we pass the savings onto customers and build market share through high sales volume.

Differentiation:

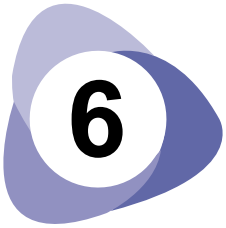
A differentiation strategy is a better alternative for a company which does not have strong cost advantages or prefers to emphasize strengths in production or resale. The key to this approach is to research customer needs, design and develop quality products or service which proceeds to match and effectively market and sell solutions by stressing the differences from competing brands. Product quality, elite service, unique features and environmental responsibility are common ways to separate ourself with a differentiated approach.

Cost Focus:

In general, the focus strategy is distinct because it is used when we serve a niche target market. The cost-focus approach means we use the principles of a low-cost operation to market affordability to a niche market. In case of supermarket, for instance, German chain Aldi's drives business from lower to middle income buyers by maintaining a low-cost operation. This enables them to offer low prices to the most budget conscious grocery shoppers.

Differentiation Focus:

A differentiated focus approach means we market a bigger or better solution to a smaller market segment. Local businesses commonly rely on this strategy when competing against larger box retailers. For instance, a small electronics retailer, could promote the best selection of high-tech products or the most knowledgeable service staff as a way to attract business from general-merchandise retailers and discount stores. This strategy offers a way to build strong loyalty since we focus specifically on the needs of a select group of customers.



CONTEMPORARY MANAGEMENT PRACTICE

Basic concepts of MIS, MRP, Justin- Time (JIT) system, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levies, Supply Chain Management, Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

6.1 Contemporary Management Practices: Basic Concepts Of MIS, MRP, Just-In-Time (JIT)System

Management Information System(MIS):

MIS refer to the process of covering the application of people technology and procedures to solve business problems.

MIS distinct from regular information systems in that they are used to analyze other information systems applied in operational activities in the organization.

It is also commonly used to refer to the group information management methods tied to the automation or support of human decision making.

Ex: Decision support systems, expert systems earlier, when computers were newly launched, business computers were use for the practical business of computing the Payroll and keeping track of account payable and receivable. As applications were developed that provided managers with information about sales, inventories and other data that would help in managing the enterprise, the term “MIS” arose to describe there kind of applications.

Definition: It can be defined as “Research in the information systems field examines more than that the technological system, or just the social system, or even the two side by side, in addition, it investigates the phenomena that emerge when the two interact”.

End use Computing: This term broadly meaning that there are no intermediary services for making use of computer, the end-user acquires the hardware and software and run their applications without the services of the specialist IS department

Factors for its growth:

Basic concepts of TQM: Total Quality Management is the management approach of an organization, centered on good quality based on the participation of all its members and aiming at long-term success through customer satisfaction and benefits to all members of the organization and to society.

● Growth of Micro Computers.

● Dissatisfaction delays, poor quality of centralized application systems built by the IT specialist.

● Increase in computer literacy among end users.

Material Requirement Planning(MRP):

MRP is a software base production planning and inventory control system used to manage manufacturing processes.

Objectives:

● To ensure the availability of materials and products for production, delivery to customers.

● To maintain the lowest possible level of inventory.

● To plan manufacturing activities, delivery schedules and purchasing activities.

Just In Time(JIT):

When components arrive as and when required in a manufacturing operation by workers. It is called just-in-time.

Some we would at a stroke eliminate any inventory of parts, they would simply arrive just-in-time. Similarly we could produce finished goods just-in-time to be handed to a customer who wants them. So at conceptual extremes. JIT has no need for inventory or stock, either of raw materials or work in progress or finished goods.

6.1.1 Total Quality Management (TQM)

Basic concepts of TQM:

Total Quality Management is the management approach of an organization, centered on good quality based on the participation of all its members and aiming at long-term success through customer satisfaction and benefits to all members of the organization and to society.

TQM is the management philosophy that seeks to integrate all organizational functions (engineering, marketing, design, and production, finance, customer service, etc.) to focus on meeting customer needs and organizational objectives.

TQM views an organization as a collection of processes. It maintains that organizations must strive to continuously improve the processes by incorporating the knowledge and experiences of workers. The simple objective of TQM is "Do the right things, right the first time, every time." TQM is infinitely variable and adaptable. Although originally applied to the manufacturing operations, and for a number of years only used in that area, TQM is now becoming recognized as a generic management tool, just as applicable in service and public sector organizations. There are a number of evolutionary strands, with different sectors creating their own versions from the common ancestor. TQM is the foundation for activities, which include:

- Just in time/demand flow manufacturing
- Meeting customer requirements
- Reducing development cycle times
- Improvement teams
- Reducing product and service costs
- Line management ownership
- Systems to facilitate improvement
- Employee involvement and empowerment
- Challenging quantified goals and benchmarking
- Recognition and celebration
- Specific incorporation in strategic planning
- Focus on processes / improvement plans
- Commitment by senior management and all employees

1. Focus on the customer:

Achieving customer satisfaction is the heart of TQM. Customers include both internal and external customers. So, focus on the customer is the key for any TQM programme.

2. Top management commitment:

Top management should participate completely.

3. Continuous improvement:

TQM is based on the quest for progress and improvements in TQM believes that there is always a better way of doing things, way to make better use of the company's total quality resources and a way to be more productive. For this purpose, various quality tools and techniques may be used.

4. Effective involvement and utilization of the entire work force:

This concept is sometimes referred as 'principle of employee's involvement' or 'respect for people'. TQM is a team work. Total quality recognizes that each person is responsible for the quality of his work and for the work of the group.

All persons must be trained in TQM, Statistical Process Control (SPC) and other appropriate quality improvement skills so that they can effectively participate on quality teams.

5. Establishing performance measures for the process:

Quantitative data are necessary to measure the continuous quality improvement activity. Therefore, performance measures such as up time, productivity, sales turnover, absenteeism, percent nonconforming, customer satisfaction, *etc.*, should be determined for each functional area. These results can be used for further improvement activities.

6. Treating suppliers as partners: Since the suppliers influence the company's quality, therefore a partnering relationship should be developed between the all management and the suppliers.

Elements of TQM:

I. TQM principle and practices:

1. Leadership

2. Customer focus

3. Employee involvement

4. Supplier partnership

5. Continuous process improvement

6. Performance measures

II. TQM tools and techniques:

1. Seven Tools of quality

2. Six signs

3. Bench marking

4. FMEA

5. QFD

6. TPM

TQM is mainly concerned with continuous improvement in all work, from high level strategic planning and decision-making, to detailed execution of work elements on the shop floor. It stems from the belief that mistakes can be avoided and defects can be prevented. It leads to the continuous improving results, in all aspects of work, as a result of continuously improving capabilities, people, processes, technology and machine capabilities.

Continuous improvement must deal not only with improving results, but more importantly with improving capabilities to produce better results in the future. The five major areas of focus for the capability improvement are demand generation, supply generation, technology, operations and people capability.

A central principle of TQM is that mistakes may be made by people, but most of them are caused, or at least permitted, by faulty systems and processes. This means that the root cause of such mistakes can be identified and eliminated, and repetition can be prevented by changing the process.

There are three major mechanisms of prevention:

1. Preventing mistakes from occurring .

2. Where mistakes can’t be absolutely prevented, detecting them early to prevent them being passed down the value-added chain.

3. Where mistakes recur, stopping production until the process can be corrected, to prevent the production of more defects.

Benefits of TQM:

• Improved the product quality.

• Improved the productivity.

• Reduced the quality costs.

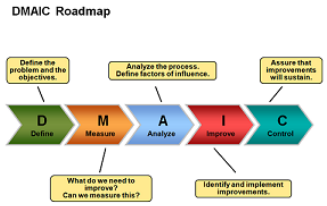
• Increased profitability.

6.1.2 Six Sigma And Capability Maturity Models (CMM) Levies

Six-sigma: Concepts, methodology:

Six sigma concept is a set of activities, an organization uses to win and retain customer's satisfaction. It can be provided either before, during or after the sale of the product.

Six sigma is described by acronym DMAIC. In DMAIC,



Six-sigma

1. Define:

Define is the first step of DMAIC, The definition step identifies activities and quality tools.

Define Activities:

- Identify project, champion and project owner
- Determine customer requirements and critical to quality (CTQs)
- Define problem, objective, goals and benefits
- Define stakeholder/resource analysis
- Develop project plan

Define quality tools:

- Project charter and plans
- Effort/impact analysis
- Process mapping

• Tree diagram

2. Measure:

It enables the benchmarking of process using actual data and quantify it.

Measure Activities:

• Define project scope

• Select output characteristic (Y's)

• Determine project critical Xs and Ys

• Assess performance specification

• Validate measurement systems

• Establish initial capability (Y's)

• Determine process capability.

Measure Quality tools:

• Quality function deployment (QFD)

• Measurement system analysis (MSA)

• Check sheet

3. Analyze:

It's necessary to analyze the process applying statistical tools.

Analyze activities:

• Define performance objectives

• Analyze sources of variability

• Determine root causes using data

Analyzing quality tools:

• Statistical analysis of data

• Cause and effect or event diagram

- Histogram
- Pareto diagram
- Run chart
- Scatter diagram.

4. Improve:

Improve activities:

- Develop solution alternatives
- Screen potential causes
- Identify appropriate operating conditions
- Implement solution
- Determine solution effectiveness using data

Improve quality tools:

- Design of experiments (DOE)
- Brain storming
- FMEA (Failure Mode Effect Analysis)

5. Control: Success is the control step depends on previous steps. Tools are put in place to process improvement gains are maintained.

Control activities:

- Determine process capability (X's)
- Realize benefits of implementing solution
- Finish the project and communicate results

Control quality tools:

- Statistical process control (SPC)
- Out of control action plan (OCAP)

• Design changes for the defects to be eliminated

Capability Maturing Model:

Capability maturity Model (CMM) is a collection of instruction organization that can be followed with the purpose to gain better control over its software development process.

The CMM ranks software development organizations in a hierarchy of five levels each with a progressively greater capability of producing quality software. Each level is described as a level of maturity. Those 5 levels are equipped with different number of instruction to follow.

Level 1-Initial :

At maturity level-1 processes are usually ad hoc and the organization usually does not provide a stable environment

Level 2-Repeatable:

At this maturity level-2, software development successes are repeatable. The organization may use some basic project management to track cost and schedule.

Level 3-Defined:

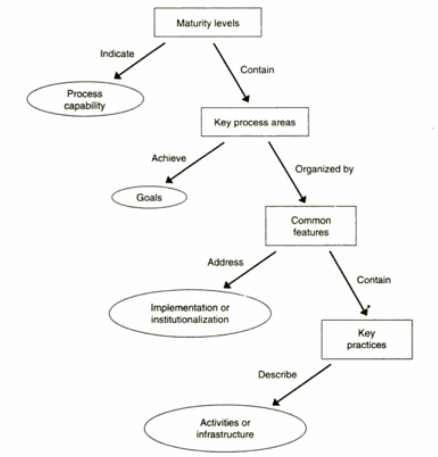
A maturity level-3, processes are well characterized and understood, and are described in standards procedure, tools, and methods.

Level 4-Managed:

Using precise measurement, management can effectively control the software development effort. In particular, management can identify ways to adjust and adopt the process to particular projects without measurable losses of quality or deviations from specifications.

Level 5-Optimizing:

This maturity level focuses on continually improving process performance through both incremental and innovative technological improvement.



Structure of CMM

6.1.3 Supply Chain Management, Enterprise Resource Planning (ERP)

Supply Chain Management:

It is the process of planning, implementing and controlling the operations of the supply chain as efficiently as possible. The supply chain management spans all the movements and storage of raw materials, work-in-process inventory, and finished goods from point-of-origin to the point-of consumption.

Scope of supply chain management

SCM Processes

The various supply chain processes are as listed below:

● Demand Management

- Customer Order Fulfillment
- Customer Relationship Management
- Product Development and Commercialization
- Manufacturing Flow Management
- Customer Service Management
- Procurement Management
- Returns Management

Advantages of SCM

The supply chain management has the following advantages:

- Inventory Economy:
- Low cost of handling inventory
- Low cost of stock outage by deciding optimum size of replenishment orders
- Achieve excellent logistical performance such as just in time
- To the suppliers:
- Help in giving clear-cut instruction
- Online data transfer reduce paper work
- Channel Management:
- Reduce total number of transactions required to provide product assortment
- Organization is logically capable of performing customization requirements
- Distribution Point:
- Satisfied distributor and whole seller ensure that the right products reach the right place at right time
- Clear business processes subject to fewer errors
- Easy accounting of stock and cost of stock
- Financial management:

- Low cost
- Realistic analysis
- Operational performance:
- It involves delivery speed and consistency.
- External customer:
- Conformance of product and services to their requirements
- Competitive prices
- Quality and reliability
- Delivery
- After sales services
- To employees and internal customers:
- Teamwork and cooperation
- Efficient structure and system
- Quality work
- Delivery

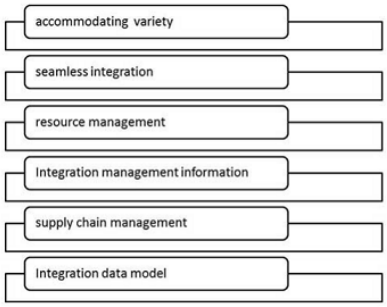
Enterprise Resource Planning (ERP):

It integrate all data processes of an organization into a unified system. A typical ERP system will use multiple components of computer software and hardware to achieve the integration 4 key ingredient of most ERP systems is the use of a unified database to store date.

ERP systems cover all basic functions of an organization, regardless of the organizations business, non-profit organization, non-governmental organization or government.

ERP is very helpful in the various areas as listed below:

- Business integration and automated data update
- Flexibility in business operations and more agility to the company
- Critical decision-making
- Better analysis and planning capabilities
- Linkage between all core business processes and easy flow of integration
- Use of latest technologies
- Competitive advantage



Features of ERP

Advantages of ERP

- Better transparency
- Increased flexibility, quality, and efficiency
- Improved resource utilization
- Improved information accuracy and decision making capability

- Better customer satisfaction
- Reduction of cycle time
- Reduction of lead time
- Improve supplier performance
- Onetime shipment
- Reduced quality costs
- Quick decision-making
- Forecasting and optimization

Disadvantage of ERP

- Difficulty in implementation change
- Risk of implementation failure
- Expense and time in implementation
- Risk in using one vendor
- Difficulty in integration with other system

Performance Management:

Performance Management is covered with communication. This is done by creating a climate in which a continuing dialogue between managers and the members of their teams takes place to define expectations and share information on the organizations mission, values and objectives. This establishes mutual understanding of what is to be achieved and a framework for managing and developing people to ensure that it will be achieved

6.2 Business Process Outsourcing (BPO), Business Process Re-Engineering And Bench Marking, Balance Score Card

Business Process Outsourcing (BPO):

BPO refers to a decision to sub-contract some or all non-core processes. The main motive for business process outsourcing is allow the company to invest more money, time and human resources into core activities and building strategies, which fuel company growth.

The global market is highly competitive and ever-changing. The company must focus on improving productivity and yet, cut down costs. There, a lot of tasks that use up precious time, resources and energy, are being outsourced. BPOs or the units to which work is being outsourced, are flexible, quicker, cheaper and very efficient.

BPO is the contracting of specific business task, such as payroll to a third-party service provider.

BPO is often divided into two categories.

1. Front Office Outsourcing:

This includes customer-related services such as marketing or technical support.

2. Back Office Outsourcing:

This includes internal business functions such as billing or purchasing.

Business Process Re-engineering (BPR):

Definition: The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality service and speed.

BPR is a management approach aiming at improvements by means of elevating efficiency and effectiveness of the processes that exist within and across organizations. The key to BPR is for organizations to look at their business processes form a “clean slate” perspective and determine how they can best construct these processes to improve their business.

Bench marking:

A measurement of the quality of an organization's policies, products, programs, strategies, etc. and their comparison with standard measurements, or similar measurements of its peers.

It is a systematic method by which organization can measure themselves against the best industry practices.

Example: Comparing a new product with standard product available in market.

Benchmarking Process usually involves the following steps:

1. Identify a critical process usually that needs improvement (Example: order entry, distribution, service after sale).

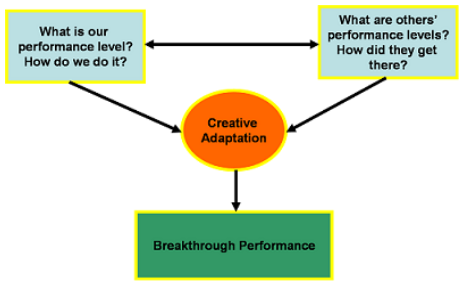
2. Identify an organization that excels in the process, preferably the best.

3. Contact the benchmark organization, visit and study the benchmarking activity.

4. Analyze the data.

5. Improve the critical process at our own organization.

6. Identify an organization that excels in the process, preferably the best.



Bench marking

Classification Based on the Organizations against whom one is Benchmarking:

1. Internal Benchmarking: It refers to comparison of performance between departments, plants, subsidiaries, etc. within the organization.

2. Industry Benchmarking: It refers to comparison of performance by the organizations producing the same class of products and services.

3. Competitive Benchmarking: It refers to comparison of performance against direct competitors.

4. Best-in-class Benchmarking: It refers to comparison of performance with best practices prevalent in an organization irrespective of products.

Reason to bench mark:

Objectives of Benchmarking

• Benchmarking aims at a goal setting process to facilitate comparison with the best.

• Motivating stimulating employees for the goal of continuous quality improvement.

• Aims at external orientation of the organization.

• Identifying a technological break-through.

• Aims at searching for industry training.

Bench marking process:

Steps in Benchmarking Process: The figure illustrates the twelve steps in benchmarking process (proposed by Robert C. Camp).

Phases	**Steps**
Planning	● Earmark what is to be benchmarked? ● Identify the best competitor. ● Determine the data collector method and start collecting data.
Analysis	● Determine the current performance 'GAP'. ● Project future performance levels. ● Communicate benchmark findings and gain acceptance. ● Establish functional goals.
Integration	● Develop action plans.
Action	● Implement specific actions and monitor progress ● Recalibrate benchmarks.

Maturity	● Attain the leadership position. ● Integrate practices into the process.

Table: step in benchmarking process

Phase I: Planning

The planning phase involves these steps:

To identify

(i) What is to be benchmarked?

(ii) To whom or what shall we compare?

(iii) How will the data be collected?

Step 1: What can be benchmarked? (i.e., deciding what to benchmark)

Benchmarking can be applied to any business or production process. During this step, determine which functions, tasks, processes or activities within the own organization will be subjected to benchmarking. Appoint a benchmarking team that will pilot the activity within the organization.

In this stage, formulate the project goals, determine the data to be collected and prepare a tentative list of questions.

Step 2: To whom or what shall we compare? (i.e., identifying benchmark partners)

Identify the world-class or leading edge companies that have a similar product or process. Important criteria for the selection of benchmark partners are that the partners should be best-in-class regarding the benchmark subject, competitiveness of activities and availability of the reliable information about the partners.

Step 3: Determine data collection method and collect data

• Gather both qualitative and quantitative data about the process performances of partners based on interviews, surveys and consultation of contacts and technical magazines.

• Examine the process and underlying working methods of partners.

Phase II: Analysis

The analysis phase involves a careful understanding of current process practices as well as those of benchmarking partners. This phase consists of the following two steps:

Step 4: Determine the current performance gap

Determine the gap between the performance level of the organization and that of its benchmark partner. After the data is gathered, measured and analyzed, compare these to the data of the own organization. Based on this, determine the current performance gap between the own organization and that of the benchmark partners.

Document the differences in underlying working methods and the causes of the differences in performance.

Step 5: Project future performance levels

The gap is a projection of performance. Therefore, the performance will change as industry practices change. So keeping the future in mind, project the performance levels.

Phase III: Integration

Integration is the process of using benchmark findings to get operational targets for change. It involves careful planning to incorporate new practices in the operation and ensures that benchmarking findings are incorporated in all formal planning process. This phase consists of the following two steps:

Step 6: Communicate benchmark findings and gain acceptance

• Demonstrate the benchmark findings to the management for their acceptance.

• Communicate the benchmark findings to all organizational levels to obtain support, commitment and ownership.

Step 7: **Establish functional goals**

On the base of communicated data and acceptance of analysis, functional goals will be established.

Phase IV: Action

This consists of 3 steps.

Step 8: Developing action plans.

Step 9: Implementing specifies actions and monitor the progress.

Step 10: Recalibrate benchmarks.

Phase V: Maternity

This will be reached when the best industry practices are incorporated in business processes. It consists of two steps:

Step 11: Attain the leadership position.

Step 12: Integrate practices into the process.

Benchmarking is based on learning from others, rather than developing new and improved approaches. It also leads to stagnation of idea strategies, best industry practices, etc.

Balance scorecard:

It is a management system that enables organizations to clarify their vision and strategy and translate them into action. It provides feedback around both the internal business processes and external outcomes in order to continuously improve strategic performance and result. When full deployed, the balance scorecard transforms the strategic planning from an academic exercise into the nerve center of the enterprise.