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MANAGEMENT SCIENCE

,

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Unit-1
Introduction to Management

- When human being started group activities for the attainment of same common objectives whenever a group formed and a group activity is organized to achieve certain common objectives management is needed to direct, co-ordinate and integrate the individual activities of a group and secure teams work to accomplish organizational objectives.
- The objectives of all business are attained by utilizing the scare resources like men, materials, machines, money etc.
- In process of management, a manage uses human skills, material resources and scientific methods to perform all the activities leading to the achievement of goods.

Definition:

- "Management is knowing exactly what you want men to do and then seeing that they do it the best and cheapest ways".

- F.W.Taylor "Management is defined as the creation and maintenance of an internal environment in an enterprise where individuals working together in groups, can perform efficiently and effectively towards the attainment of group goals".

Nature of Management:

- Multidisciplinary
- Dynamic nature of principle
- Relative, not absolute principles:
- Management Science or Art:
- Management as profession

Characteristics of Management

- Setting goals for organizations:
- Awareness of opportunities and resources:
- Management is transformation process
- System of authority: System of authority means a hierarchy of command and control. Managers at different levels possess varying degrees of authority.
- Co – Ordination:
- Management is Dynamic:
- Management is decision making:
- Management is a profession:

Levels of Management

- Top Management
- Upper Middle management
- Middle Management
- Lower Management
- Operating Force or Rank and file workmen

Functions of Management

- PLANNING
- ORGANISING
- STAFFING
- COORDINATING
- ORGANISING

Organization

- Organization refers to the institution where in the management functions are performed.
- Organizing is one of the functions of management means to achieve the plans.
- This organizational structure promotes internal competition. Inefficient components of the organization starve, while effective ones get more work. Everybody is paid for what they actually do, and so runs a tiny business that has to show a profit, or they are fired.

BASICS CONCEPTS RELATED TO THE ORGANIZATION

- Organizational Hierarchy
- Authority and Responsibility
- Authority is the power to give commands and to use discretion vested in that particular position or Job.
- Responsibility is the obligation on the part of the subordinate to complete the given job.

BASICS CONCEPTS RELATED TO THE ORGANIZATION

- DELEGATION OF AUTHORITY

  The process of transferring authority from top to the lower levels in the organization is called delegation.

Two types of Delegation

I. Centralized
II. De-centralized
III. Span of Management

Number of all kinds of relationships (N)=n(2n-1+n-1)

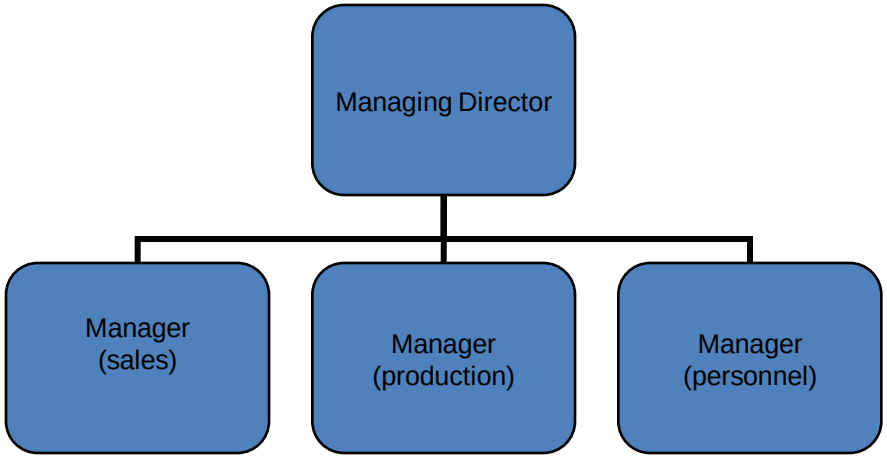
Where n=number of subordinates reporting to a manager

FLAT AND TALL ORGANIZATIONS

Flat organization:-Which have relatively few or even one level of management.

Flat is also known as wider span of control

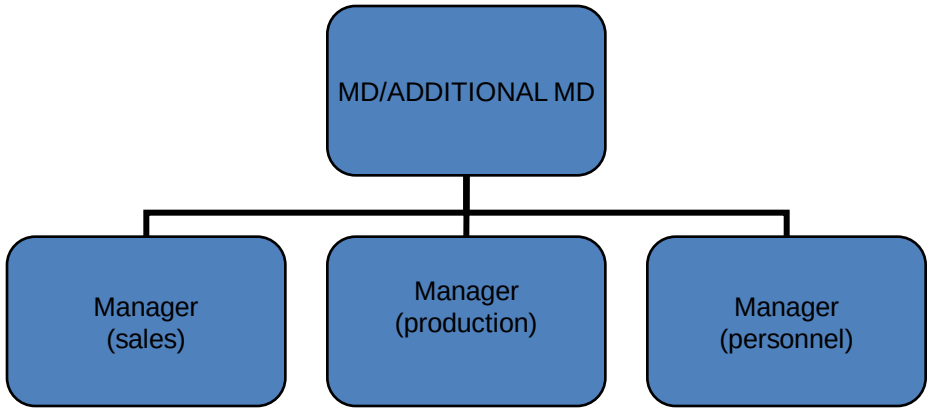
Flat organization



TALL ORGANIZATION

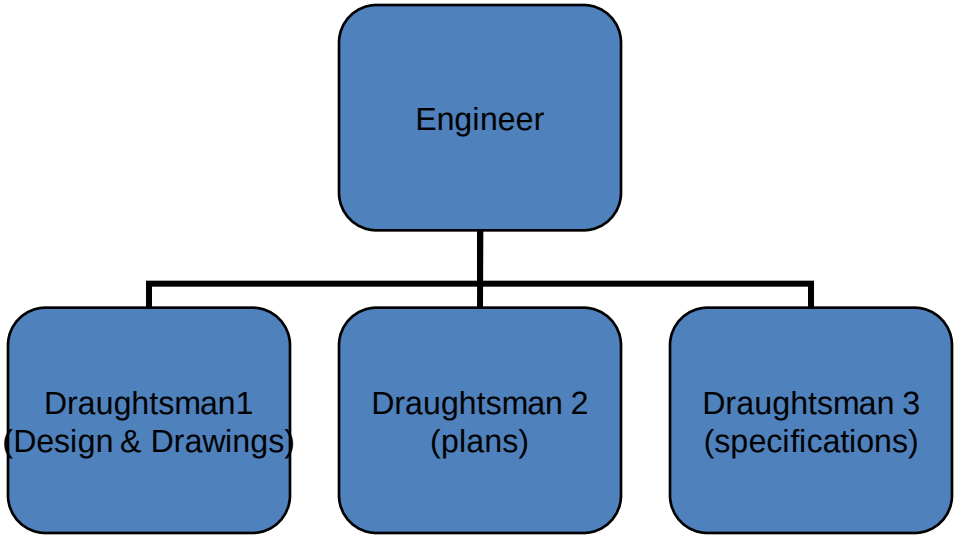
Tall organization:-have many levels of management

-involves narrow span of management



Types of Organizations

1. Line organizations:- is also called military or scalar organization. is said to be the oldest and most traditional type of organizations. Managers in this organizations have direct responsibility for the results.



2.Line and Staff Organization:-

- Drawn from earlier civilization and armies.
- Staff managers support the functions of the line managers.
- Line and staff organization is a service organization.
- Line and staff organization in a manufacturing unit.
- Line and staff in the armed forces.
- Line relationships in staff positions.

3.Functional organization:-

- F.W.Taylor suggested functional organization in his theory of Scientific management in support of his ‘one best way’ of doing things.
- The planning and implementation tasks are divided to ensure the division of labor.
- The foremen involved in the planning task.

4.Committee Organization

- A committee is formed when two or more persons are appointed to work as a team to arrive at a decision on the matters referred to it.
- A committee is a body of people appointed or elected to meet on an organized basis for the consideration matters brought before it." "Committee as a group of people specifically designated to perform some **administrative** act.

5.Matrix organization:-

- Also called Project organization.
- It is a combination of all relationships in the organization vertical, horizontal and diagonal.
- It is mostly used in complex projects.
- It provides a high degree of operational freedom.

6.Virtual Organization:-

- Virtual organization structure does not physically exist, but its effect is felt.
- Example: Bata Shoes

Merits:-

- Enable for doing business with less capital, less HR and other inputs.
- Provide flexibility of operations.
- React to the environment demands most efficiently.

7.Team Organization Structure:-

- Team structure takes three forms

1. Project team
2. The task force team
3. Venture team

Unit-2
Principles and types of Plant Layout

Plant Layout:- is physical arrangements,
either existing or in industrial facilities.

Mainly plant layout begins with plant location.

Objectives:

- Economics in handling materials, semi-finished and finished goods.
- Proper and efficient utilization of available floor space.
- Provision for better supervision and control.
- Careful planning
- To provide adequate safety
- To meet the quality and capacity requirements.
- Provision for medical and cafeteria at suitable and convenient places.

Advantages of good layout:-

- Economies in handling.
- Effective use of available area.
- Minimizes production delays.
- Improves quality control.
- Avoids bottlenecks.
- Controls production in a better way.
- Better supervision.
- Improved utilization of labour
- Improves employee morale.
- Avoids unnecessary and costly changes.

Types of layouts:-

Lay out types:

1. Product layout
2. Process or functional layout
3. fixed layout

Product layout:-

- This layout is followed by only by such industries where the product decisions are finalized and may not change at least in the near future. It is because a change in the product will call for a change in the plant layout.
- In manufacturing engineering, a product layout refers to a production system where the work stations and equipment are located along the line of production, as with assembly lines.

Process or functional layout:-

- The equipment is arranged as per the nature or types of the given set of products operations major it is called process layout.
- In manufacturing engineering, process layout is a design for the floor plan of a plant which aims to improve efficiency by arranging equipment according to its function. The production line should ideally be designed to eliminate waste in material flows, inventory handling and management.

Fixed layout:-

- The manufacturing facilities are fixed in their position. They cannot be shifted from one place to another place. This type of layout is used in case of large projects.
- Fixed-position layouts are typical of projects in which the product produced is too fragile, bulky, or heavy to move. In this layout, the product remains stationary for the entire manufacturing cycle. Equipment, workers, materials, and other resources are brought to the production site.

Methods of production:-

Production is an act of transformation and inputs are processed and transformed into some output.

Methods of production are of 2 types:

1. Intermittent or interrupted production
2. Continuous production

Intermittent or interrupted production:-

- The goods are manufactured specially to fulfill the order made by the customers rather than for stock.

This is of two types

1. Job production
2. Batch production

Job production:-

- This is the production of single complete unit by one operator or group of operators.
- Ex:-Construction of a bridge, construction of dam, ship building etc
- In this process goods are produced to definite customers orders.
- Each production is a class by itself and requires a distinct and separate job for production purposes.

Batch production:-

- The production schedule can be chalked out according to specific orders or on the basis of demand forecasts.
- In batch system new batch is undertaken for production only when the work on all items of a batch is complete.

Ex:-Pharmaceuticals, ready made garments, Paints, mineral water bottles.

Continuous production:-

- In this system items are produced for the stocks and specific orders.
- In continuous manufacturing systems each production run manufacturers in large lot sizes and the production process is carried on in a definite sequence of operation in a pre-determined order.

Mass production:-

- Also called as flow production
- The production can be undertaken on large and specialized machines and processes.

Characteristics:-

- Mechanization and division of labor
- Large-scale economies
- Sophisticated material handling systems to minimize the cost
- Work study techniques
- ISO 9000 like sophisticated quality control techniques.

Work study:-

- According to British Standard (BS 3138), work study refers to the method study and work measurement which are used to examine human work in all its contexts by systematically investigating into all factors affecting its efficiency and economy to bring forth the desired improvement.

Components of work study:-

- Method study
- Work measurement

Method study:-

Is also called as Motion study.

Method study is the systematic recording and critical examination of the existing and proposed ways of doing work.

Basic procedure of method study:-

- Aim: to develop better working methods
- Select: the task to be studied
- Record: all related facts
- Examine: the critical facts should be examined
- Develop: the best possible method
- Define: the best method so developed
- Install: the new method
- Maintain: the installed method
- Result: increased efficiency, cost effectiveness and good productivity

Work measurement:-

Also called Time study, establishes the time taken by a qualified worker to complete a specified job at a defined level of performance.

Time measuring devices:-

1. Stop watch
2. Motion picture camera
3. Time recording machine
4. Electronic timer

Statistical Quality Control:-

- Quality is some prescribed or desired characteristics present in raw material, semi-finished or finished goods.
- Control is the process of verification or correction of the product when the deviations in the quality are found to be more than expected.
- Quality control is of great value to both producer and customer
- SQC is applied by taking samples and drawing conclusions by means of some mathematical analysis.

Objectives:-

- To support the production departments with materials.
- To minimize investments.
- To avoid accumulation of work in process.
- To maintain adequate inventories.
- To contribute direct profitability.
- To ensure economy of costs by processing EOQ

Need for Inventory control:-

INVENTORY:-It refers to all the idle physical stocks, which have economic value.

INVENTORY CONTROL:- It is defined as the scientific method of providing the right type of material at the right time in the right quantities and at right price to sustain the given production schedules.

Economic Order Quantity (EOQ):-

- EOQ is defined as that quantity of material, which can be ordered at one time to minimize the cost of ordering and carrying the stocks.
- EOQ=$\sqrt{2Ao/c}$

Where A=Annual Demand

O=Ordering cost per order

C=Carrying cost per unit

Purchase Procedure:-

Purchasing is a specialized job.

Objectives:-

- To purchase the right quantity and quality of materials.
- To ensure continuous flow of supplies.
- To explore and develop other sources of supply.
- To obtain the best value for the money spent.
- To maintain functional relations.
- To train staff, make policies and procedures.

Stores Management:-

- Facilitates the maintenance of accounts for each item of inventory.

- Position of inventory can be updated from time to time.
- In other words, storekeeping relates to art of preserving raw materials, work-in-progress and finished goods in the stores. 2. Storehouse is a building provided for preserving materials, stores and finished goods. The in-charge of store is called storekeeper or stores manager.

Stores Records:-

Common used store records:-

1. Material requisition note
2. Purchase order
3. Invoice
4. Goods received note
5. Goods returned note
6. Stores ledger account
7. Bin card

Marketing:-

Definition:-

- Marketing is an essential function of a modern organization whether it deals in products or services.
- **According to Philip Kotler:-** Marketing as a societal process by which individuals and groups obtain what they need and want through creating, offering, and freely exchanging products and services of value with others.

Marketing Mix:-

Marketing is the mixture of four p’s

1. Product
2. Promotion
3. Place
4. price

Stages in Product Life Cycle:-

- Introduction
- Early growth
- Rapid growth
- Maturity
- Saturation
- Decline

Channels of distribution:-

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

Types of Channels of distribution:

1. Manufacturer ------ consumer
2. Manufacturer ---wholesaler---- consumer
3. Manufacturer--- retailer---- consumer
4. Manufacturer---wholesaler--- retailer---consumer

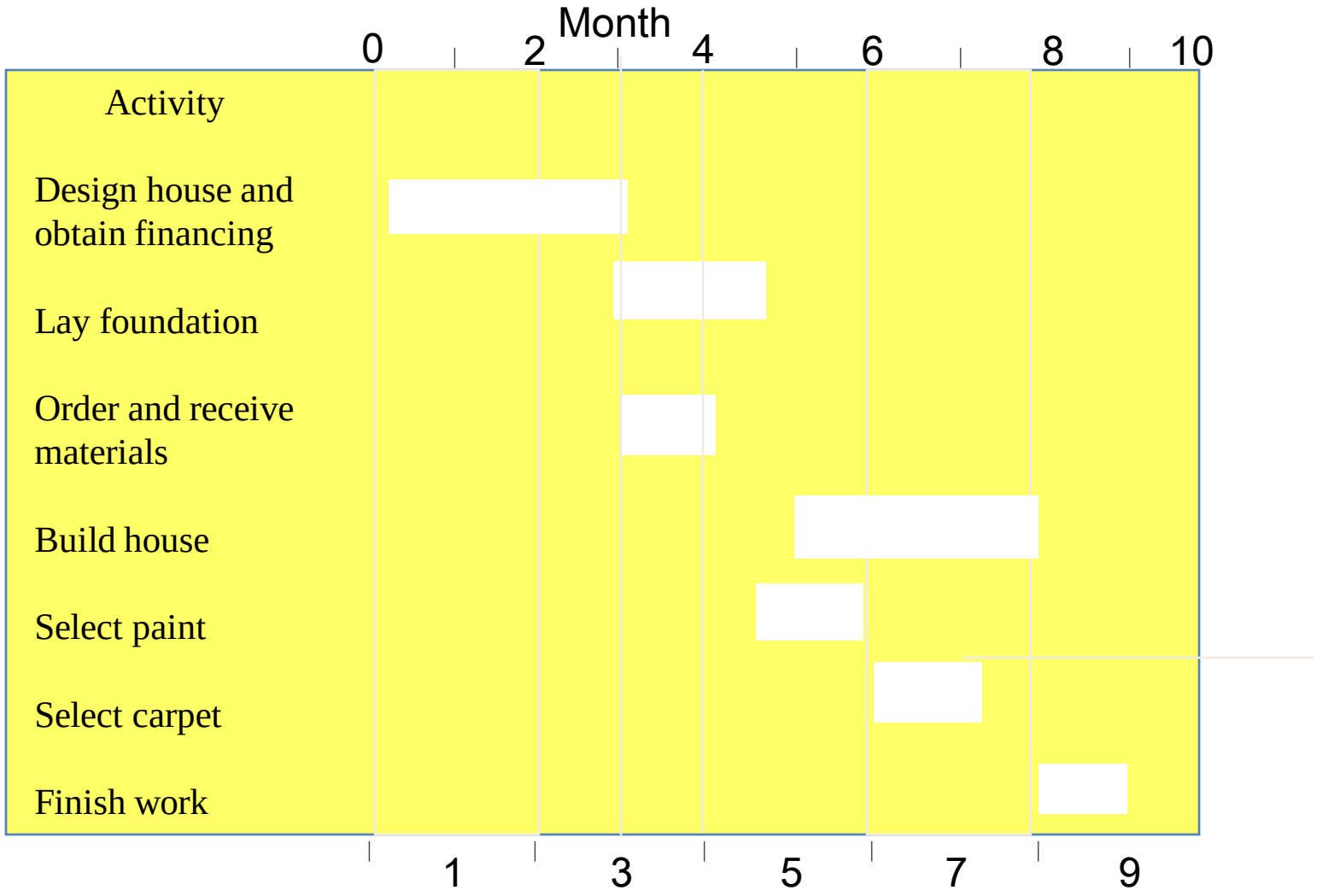
Project Planning

- Given:
  - Statement of work
    - written description of goals
    - work & time frame of project
  - Work Breakdown Structure
- Be able to: develop precedence relationship diagram which shows sequential relationship of project activities

Gantt Chart

- Popular tool for project scheduling
- Graph with bar representing time for each task
- Provides visual display of project schedule
- Also shows slack for activities
  - (amount of time activity can be delayed without delaying project)

A Gantt Chart



UNIT-3
HUMAN RESOURCE MANAGEMENT

- Critical Path Method (CPM)
  - - DuPont & Remington-Rand (1956)
  - - deterministic task times
  - - activity-on-node network construction (AON)

- Project Evaluation & Review Technique (PERT)
  - - U.S. Navy, Booz, Allen & Hamilton
  - - multiple task time estimates(probabilistic)
  - - activity-on-arrow network construction (AOA)

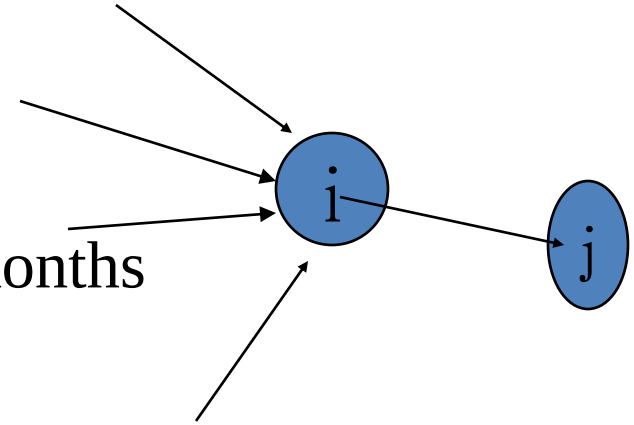
Network Construction

- In AON, nodes represent activities & arrows show precedence relationships
- In AOA, arrows represent activities & nodes are events for points in time
- An event is the completion or beginning of an activity
- A dummy shows precedence for two activities with same start & end nodes

Early Times

(House building example)

- ES - earliest time activity can start
- Forward pass starts at beginning of network to determine ES times
- EF = ES + activity time
  - ES_{ij} = maximum (EF_i)
  - $EF_{ij} = ES_{ij} + t_{ij}$
  - $ES_{12} = 0$
  - $EF_{12} = ES_{12} + t_{12} = 0 + 3 = 3$ months



Computing Early Times

- ES_{23} = max (EF_2) = 3 months

- ES_{46} = max (EF_4) = max (5,4) = 5 months

- $EF_{46} = ES_{46} + t_{46} = 5 + 3 = 8$ months

- EF_{67} =9 months, the project duration

Late Times

- LS - latest time activity can be started without delaying the project
- Backward pass starts at end of network to determine LS times
- LF - latest time activity can be completed without delaying the project
  - $LS_{ij} = LF_{ij} - t_{ij}$
  - $LF_{ij} = \text{minimum } (LS_j)$

Activity Slack

- Slack is defined as the LS-ES or LF-EF
- Activities on critical path have ES = LS & EF = LF (slack is 0)

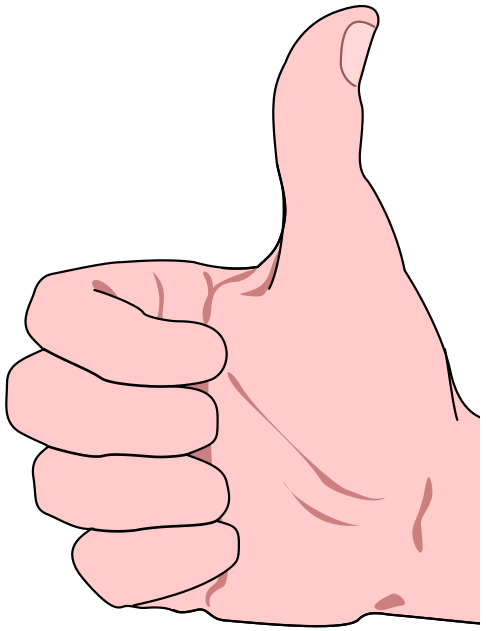
- Activities not on critical path have slack
  - $S_{ij} = LS_{ij} - ES_{ij}$
  - $S_{ij} = LF_{ij} - EF_{ij}$
  - $S_{24} = LS_{24} - ES_{24} = 4 - 3 = 1$ month

Total slack/float or Slack of an activity

- Total slack/ float means the amount of time that an activity can be delayed without affecting the entire project completion time.
- The activity on a given path share the maximum possible slack of the activity along that path according to its share.
- Sum of the possible slacks of the activities can not exceed the maximum slack along that path.

Benefits of PERT/CPM

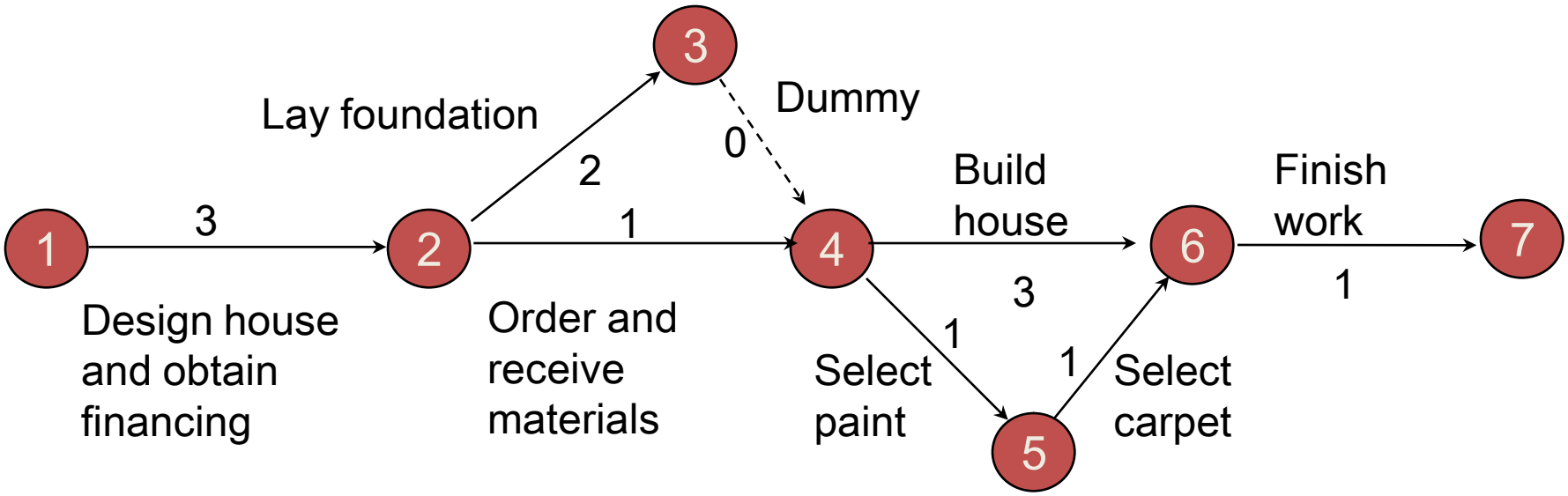
- Useful at many stages of project management
- Mathematically simple
- Uses graphical displays
- Gives critical path & slack time
- Provides project documentation
- Useful in monitoring costs



Advantages of PERT/CPM

- Networks generated provide valuable project documentation and graphically point out who is responsible for various project activities
- Applicable to a wide variety of projects and industries
- Useful in monitoring not only schedules, but costs as well

Identifying Critical path:-



Project crashing:-

When the two methods like work study, trade off and other possible ones fail, we go for crashing.

- Crashing includes:
- Normal cost
- Normal Time
- Crash cost
- Crash Time
- Direct cost
- Indirect cost
- optimization cost

Mission:-

- Also called ‘overall objective’ or ‘overall goal’
- Mission statement defines the basic reason for the ‘existence of organization’ .
- A mission statement defines why the organization exists. It describes the customer needs, both present and future.

Characteristics:-

- It must be clear enough to trigger action.
- It focuses on customer needs and utilities, not products.
- It should be capable of being measured in terms of specific targets.
- It should focus on limited number of goals.
- It is a facilitator.
- It provides for shared vision.
- It should be flexible.
- It also identifies the core principles to guide decision making

Goals:-

- Goals are the overall objectives of a department or an organization.
- Goal is defined as what an organization wants to achieve during or by the end of a given period.

Policy

- Policy is a broad guideline set by the top management for the purpose of making decisions at different levels in the organization.

Features of policy:-

- It expresses organizational culture.
- It is a guide to managerial performance.
- It brings out uniformity in action.
- It provides discretion to managers.
- It creates and sustains good conduct and character.

Strategy:-

- **Strategy** (from Greek στρατηγία *stratēgia*, "art of troop leader; office of general, command, generalship" is a high-level plan to achieve one or more goals under conditions of uncertainty. In the sense of the "art of the general", which included several subsets of skills including "tactics", siege craft, logistics etc., the term came into use in the 6th century AD in East Roman terminology, and was translated into Western vernacular languages only in the 18th century. From then until the 20th century, the word "strategy" came to denote "a comprehensive way to try to pursue political ends, including the threat or actual use of force, in a dialectic of wills" in a military conflict, in which both adversaries interact.

Programmes

- Refer to the logical sequence of operations to be performed in a given project or job.
- A program me is based on a set of goals, policies, procedures, rules and task assignments.

Corporate planning:-

The top level planning associated with realization of these goals is called ‘corporate planning’.

Definition:- can be defined as the process of formulating the corporate mission, scanning the business environment, evolving strategies, creating necessary infrastructure and assigning resources to achieve the given mission.

Environmental Scanning:-

- A major purpose of environmental scanning is to identify and understand the new opportunities in which the company can perform profitability.
- Environmental scanning involves an analysis and diagnosis of the external and internal environments of the business firm.

SWOT Analysis:-

Is defined as the rational and overall evaluation of a company's strengths, weaknesses, opportunities and threats which are likely to affect the strategic choices significantly.

Some sources of threats:-

1. political risks
2. Social risks
3. Economic risks
4. Financial risks

UNIT-4
PROJECT MANAGEMENT

Stages:

1. Identification of mission and objectives
2. Environmental scanning
3. Generic strategy alternatives
4. Strategy variations
5. Strategic choice
6. Allocation of resources and formulation of organizational structure
7. Formulation of plans, policies, programmes and administration
8. Evaluation and control

Generic Strategy Alternatives:-

There are four strategic alternatives for any business

1. Expansion strategy
2. Stability strategy
3. Retrenchment strategy
4. Combination strategy

Just-In-Time (JIT)

- JIT is an alternative to MRP system for certain type of production and as a bridge between management and work guide lines.
- JIT is applied systematically can have wide range of implications on marketing and transportation besides economizing production.
- JIT is defined as an approach to minimize waste in manufacturing in the fore of time, energy and errors.

Total Quality Management (TQM)

- TQM is a total management system that sets the direction and focus the vision on the company.
- TQM allows to identify and develop an interaction among corporate problems for solutions.
- TQM specify policy management , team efforts, vendor quality, education and training.

Six sigma and Capability Maturity Model (CMM)

- Six sigma is a tool that must be wielded both at the design stage and at the process stage.
- Six sigma is converting defect prove business in to power of performance.
- Objectives of six sigma are: design, operate and control everyone of the processes in such a way that more of them yield more than 3,4defects out of every 1 million units of outputs

Supply Chain Management

- Supply chain is the entire process of accepting a customer order through to delivery of the product to the customer inclusive of supply procurement and production of the product.
- SCM is the overall system of coordinating closely with suppliers so that both the firm and its supplier reap the benefit of smaller inventories, some other production and less waste.

Enterprise Resource Planning (ERP)

- ERP is an integrated cross functional software that re-engineers manufacturing, distribution, finance, human resources and other basic business processes of a company to improve its efficiency, agility and profitability
- RP is usually referred to as a category of business-management software typically a suite of integrated applications that an organization can use to collect, store, manage, and interpret data from these many business activities..

Performance Management

- Displays the performance outcomes calculated for quarter's exciters, where all UI wage data has NOT been posted.
- It is the process of purchasing products or services from another firm.

Business Process Outsourcing (BPO)

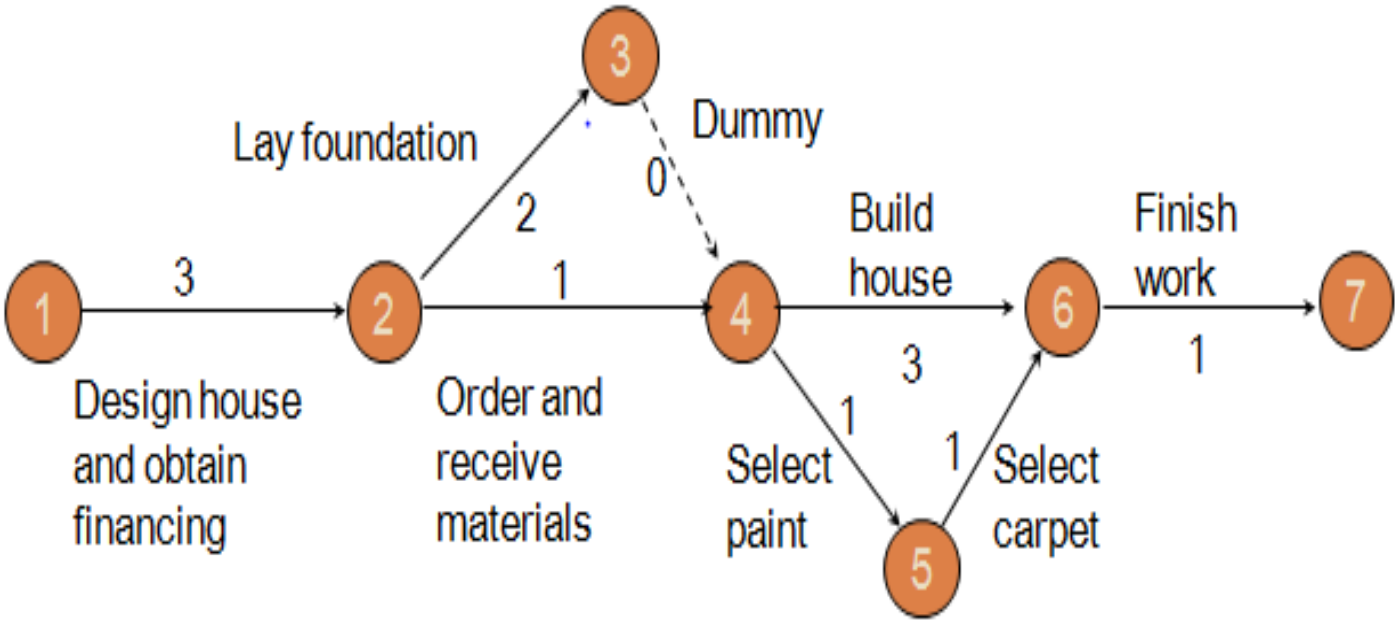
- It is the process of purchasing products or services from another firm.
- It is the practice of contracting computer center operations, telecommunication networks, or applications development to external vendors.
- Eg:-All major auto companies outsource manufacturing of many components.

Balanced Score Card:-

- The Balanced Scorecard Toolkit reviews the history of Balanced Scorecard concept, compares this concept with other management concepts, gives a detailed ideas on how to develop, implement and use Balanced Scorecard to improve business productivity.

UNIT-5
STRATEGIC MANAGEMENT AND CONTEMPORARY STRATEGIC ISSUES

- Identifying Critical path:-



STRATEGIC MANAGEMENT

- Useful at many stages of project management
- Mathematically simple
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- Gives critical path & slack time
- Provides project documentation
- Useful in monitoring costs

STRATEGY

- It is drawn from the armed forces.
- It is a strategic plan that interlocks all aspects of the corporate mission designed to overpower the enemy or the competitor.
- Purpose:-A strategy is an operational tool to achieve the goals, corporate mission

Quality assesment

- Quality is some prescribed or desired characteristics present in raw material, semi-finished or finished goods.
- Control is the process of verification or correction of the product when the deviations in the quality are found to be more than expected.
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SWOT ANALYSIS

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Generic Strategy alternatives.

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Objectives:-

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- To explore and develop other sources of supply.
- To obtain the best value for the money spent.
- To maintain functional relations.
- To train staff, make policies and procedures

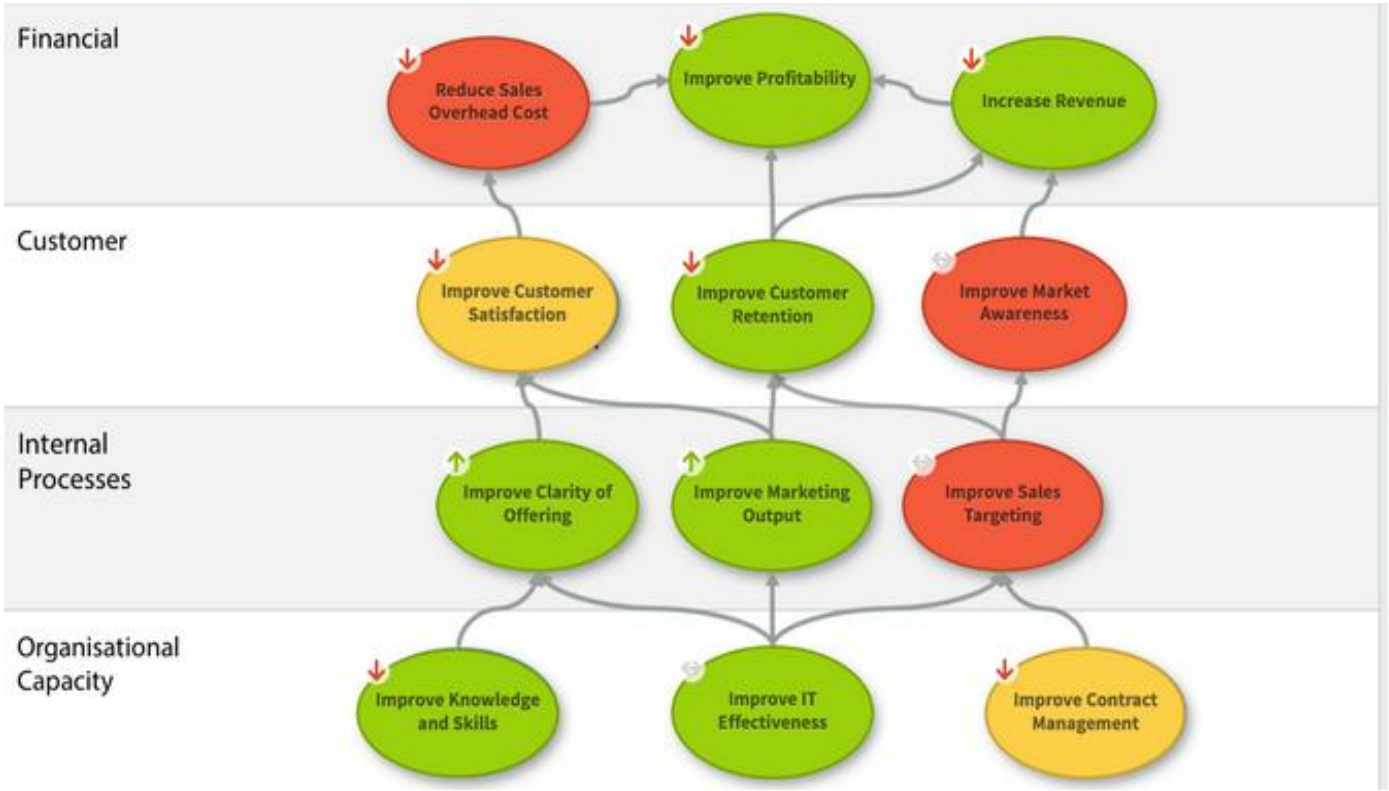
Bench Marking

- **Benchmarking** is comparing ones business processes and performance metrics to industry bests and best practices from other companies. In project management benchmarking can also support the selection, planning and delivery Of projects.
- Mission and Vision Statements and Customer (Client) Surveys are the most used (by 77% of organizations) of 20 improvement tools, followed by SWOT analysis (strengths, weaknesses, opportunities, and threats) (72%), and Informal Benchmarking (68%). Performance Benchmarking was used by 49% and Best Practice Benchmarking by 39%.

Bench Marking

- The 12 stage methodology consists of:
- Select subject
- Define the process
- Identify potential partners
- Identify data sources
- Collect data and select all partners
- Determine the gap
- Establish process differences
- Target future performance

Balanced Score Card



Balanced Score Card

The balanced scorecard (BSC) is a strategic planning and management system that organizations use to:

- Communicate what they are trying to accomplish
- Align the day-to-day work that everyone is doing with strategy
- Prioritize projects, products, and services
- Measure and monitor progress towards strategic targets

Contemporary business strategies

Formulation

Formulation of strategy involves analyzing the environment in which the organization operates, then making a series of strategic decisions about how the organization will compete. Formulation ends with a series of goals or objectives and measures for the organization to pursue.

Environmental analysis includes the:

Remote external environment, including the political, economic, social, technological, legal and environmental landscape (PESTLE)

THANK YOU