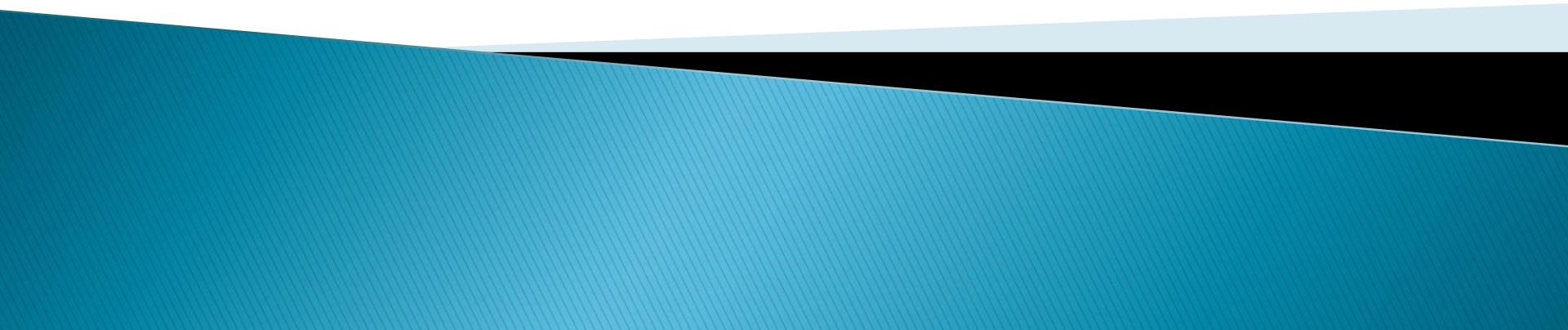


Fundamentals of planning



Definition of Planning

- ▶ Planning involves determination of future course of action to achieve the desired results.

Feature of planning

- ▶ Process rather than behaviour
- ▶ Forecasting future situation
- ▶ Involves selection of suitable course of action
- ▶ Undertaken at all levels of organizations
- ▶ Flexible as well as commitment
- ▶ Pervasive and continuous

Nature of planning

- ▶ Rational approach
- ▶ Open system approach
- ▶ pervasiveness

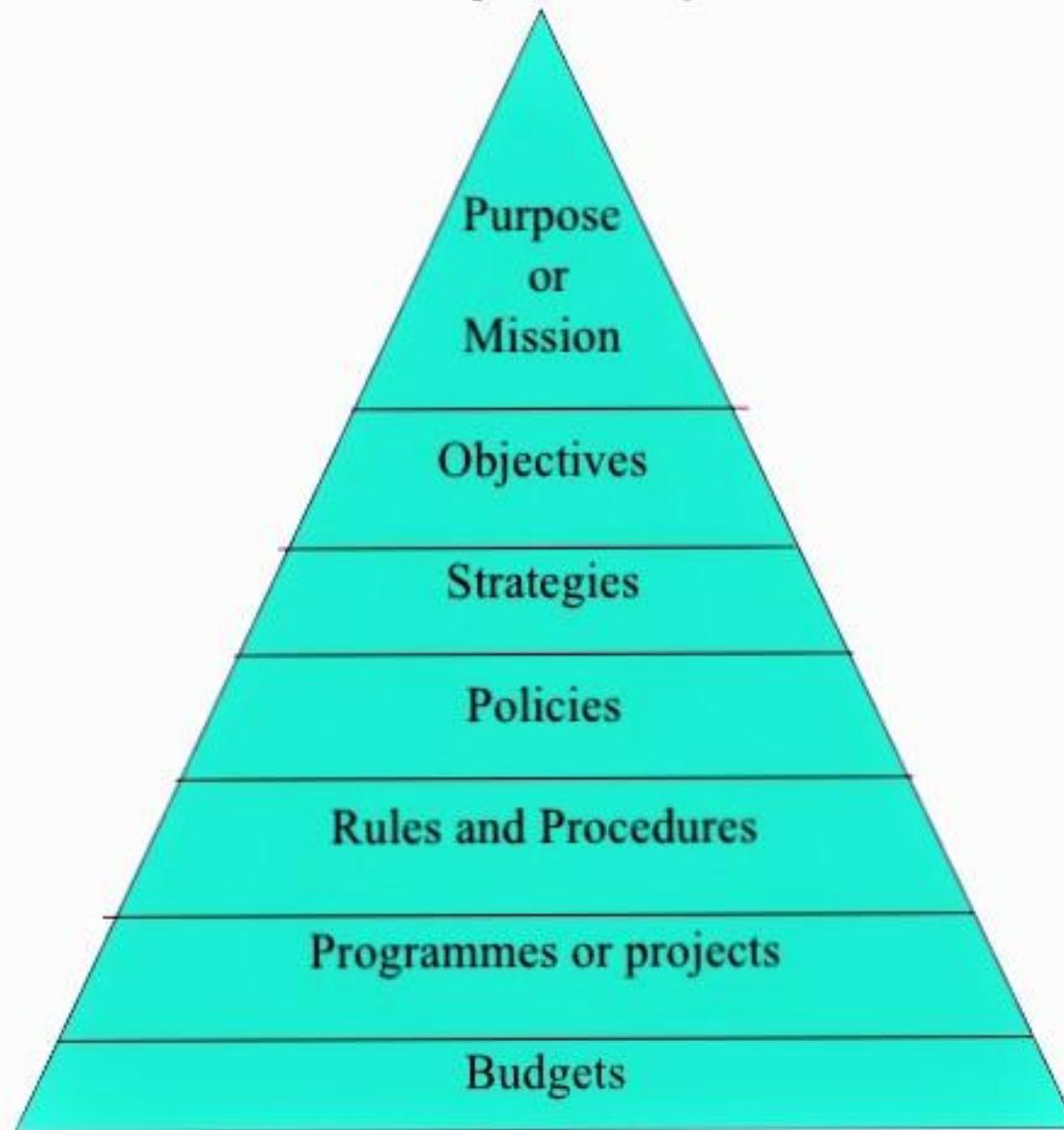
Importance of planning

- ▶ Primacy of planning
- ▶ To offset uncertainty and change
- ▶ To focus attention on objectives
- ▶ To help in coordination
- ▶ To help in control
- ▶ To increase organizational effectiveness

The Planning Process



Hierarchy of plans



Purpose or Mission

A **mission** statement is a simple statement that explains your **company's** goals. It's a summary of what your **company** does for its customers, employees, and owners. It explains how you do what you do. And, it focuses on why your **company** does what it does.

McDonald's Mission Statement

McDonald's brand mission is to be our customers' favorite place and way to eat and drink. Our worldwide operations are aligned around a global strategy called the Plan to Win, which center on an exceptional customer experience – People, Products, Place, Price and Promotion. We are committed to continuously improving our operations and enhancing our customers' experience.

Objectives

A specific result that a person or system aims to achieve within a time frame and with available resources.

In general, objectives are more specific and easier to measure than goals. Objectives are basic tools that underlie all planning and strategic activities. They serve as the basis for creating policy and evaluating performance. Some examples of business objectives include minimizing expenses, expanding internationally, or making a profit.

For example one of the objectives of an organization could be to increase sales by 20%.

The main objective of the McDonald's corporation is to be the customer's favorite place to eat. To achieve this, McDonald's created a global strategy called "Plan to Win," which focuses on creating an extraordinary customer experience.

Strategy

This obviously is the next type of plan, the next step that follows objectives. Strategy generally involves setting goals and priorities, determining actions to achieve the goals, and mobilizing resources to execute the actions. A strategy describes how the ends (goals) will be achieved by the means (resources).

McDonald's supports this intensive growth strategy by using low prices to compete in new markets. Product Development. McDonald's uses product development as its tertiary or supporting intensive strategy for growth.

Policies

A set of policies are principles, rules, and guidelines formulated or adopted by an organization to reach its long-term goals and typically published in a booklet or other form that is widely accessible.

It is an organization's general way of understanding, interpreting and implementing strategies. Like for example, most companies have a return policy or recruitment policy or pricing policy etc.

Policies are made across all levels of management, from major policies at the top-most level to minor policies. The managers need to form policies to help the employees navigate a situation with predetermined decisions. They also help employees to make decisions in unexpected situations.

Procedure

Procedures are the next types of plan. They are a stepwise guide for the routine to carry out the activities. These stepwise sequences are to be followed by all the employees so the activities can be fulfilled in an organized manner.

The procedures are described in a chronological order. So when the employees follow the instructions in the order and completely, the success of the activity is pretty much guaranteed

Take for example the procedure of admission of a student in a college. The procedure starts with filling out an application form. It will be followed by a collection of documents and sorting the applications accordingly

Rules

Rules are very specific statements that define an action or non-action. Also, rules allow for no flexibility at all, they are final. All employees of the organization must compulsorily follow and implement the rules. Not following rules can have severe consequences.

Rules create an environment of discipline in the organization. They guide the actions and the behavior of all the employees of the organization. The rule of “no smoking” is one such example

Programmes

Programmes are an in-depth statement that outlines a company's policies, rules, objectives, procedures etc. These programmes are important in the implementation of all types of plan. They create a link between the company's objectives, procedures and rules.

Primary programmes are made at the top level of management. To support the primary program all managers will make other programs at the middle and lower levels of management.

Budget

A budget is a statement of expected results the managers expect from the company. Budgets are also a quantitative statement, so they are expressed in numerical terms. A budget quantifies the forecast or future of the organization.

There are many types of budgets that managers make. There is the obvious financial budget, that forecasts the profit of the company. Then there are operational budgets generally prepared by lower-level managers. Cash budgets monitor the cash inflows and outflows of the company.

Types of planning

On the basis of	Types
Coverage of activities	Corporate planning Functional planning
Importance of contents	Strategic planning Operational planning
Time period involved	Long term planning Short term planning
Approach adopted	Proactive planning Reactive planning
Degree of formalization	Formal planning Informal planning

Difference between planning and plan

- ▶ Planning is an activity and process while plan is a commitment to a course of action

Types of plans

- ▶ Standing and single use plans
- ▶ Strategic and operational plans

Planning premises

- ▶ Refers to a proposition stated or assumed at the beginning of a deed

Types of planning premises

- ▶ External premises and internal premises
- ▶ Tangible and intangible premises
- ▶ Controllable and uncontrollable premises

Difference between planning and forecasting

PLANNING VERSUS FORECASTING		
Basis for comparison	Planning	Forecasting
Meaning	Planning is the process of identifying future goal and looking ahead for the future course of action.	Forecasting is prediction of future performance of a firm, taking into account past and present data.
Related with	Future course of action.	Prediction of future performance.
Based on	Objective, performance, and relevant information.	Certain degree of guess and assumption.
Responsibility of	Top level managers, CEO or president	Experts, Analysts or different level of managers employed by the firm.
Stresses on	Facts and Expectation	Facts

Effective planning

- ▶ Linked to long term objectives
- ▶ Direction for action
- ▶ Consistent
- ▶ Simplicity
- ▶ Flexible

Management by objective

Definition

- ▶ **Management by Objectives (MBO)** is a personnel management technique where managers and employees work together to set, record and monitor goals for a specific period of time.
- ▶ Organizational goals are translated into personal goals
- ▶ Peter Drucker
- ▶ 1960s.

Need for MBO

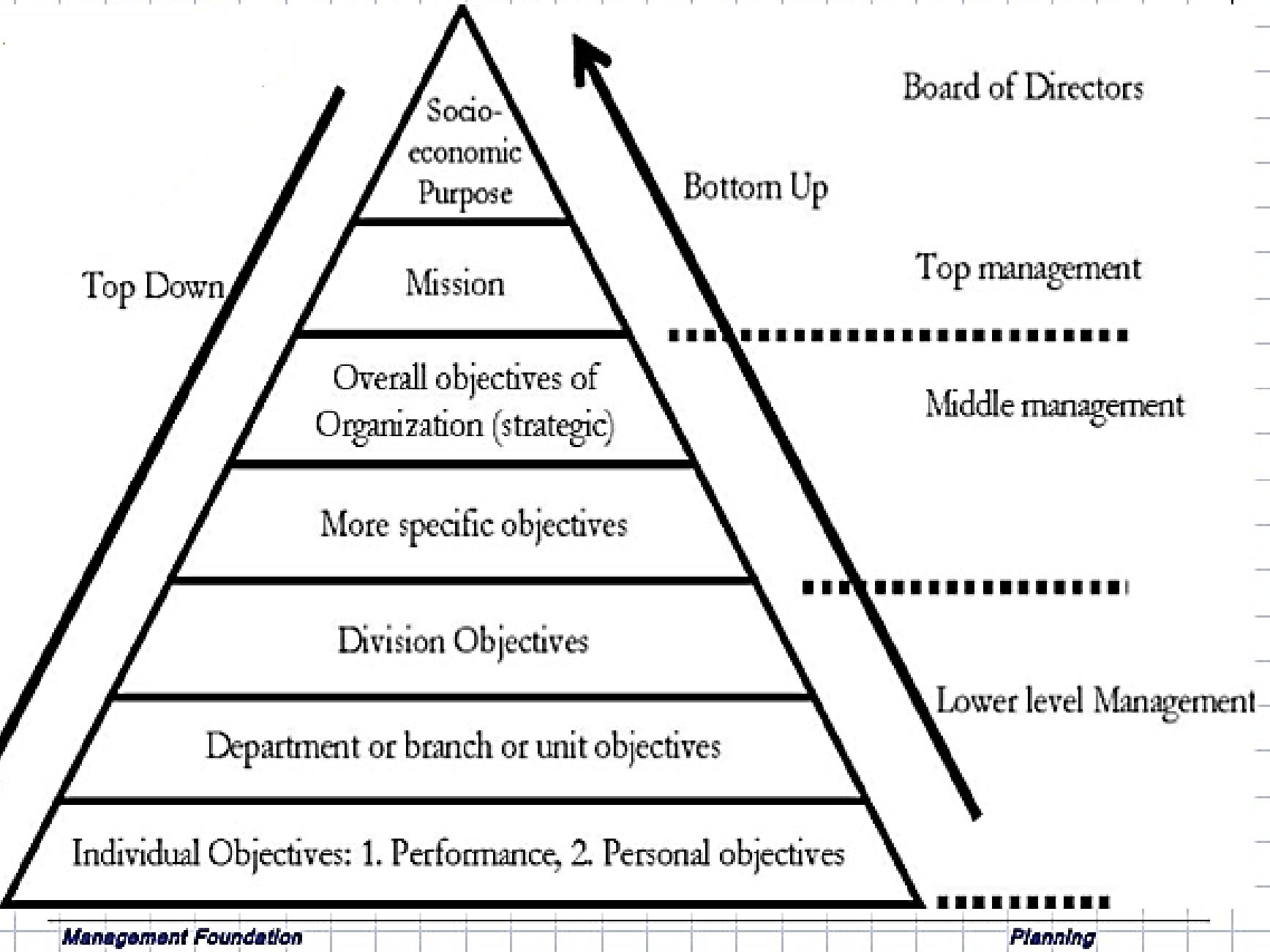
- ▶ Clarity
- ▶ Job satisfaction
- ▶ Avoid confusion
- ▶ Achievement of organizational goal
- ▶ Well defined role
- ▶ Low employee turnover
- ▶ Effective communication
- ▶ Positive ambience at the workplace.
- ▶ Well defined hierarchies at the workplace.
- ▶ Transparency
- ▶ Highly motivated and committed employees.

Sets a benchmark for every employee.

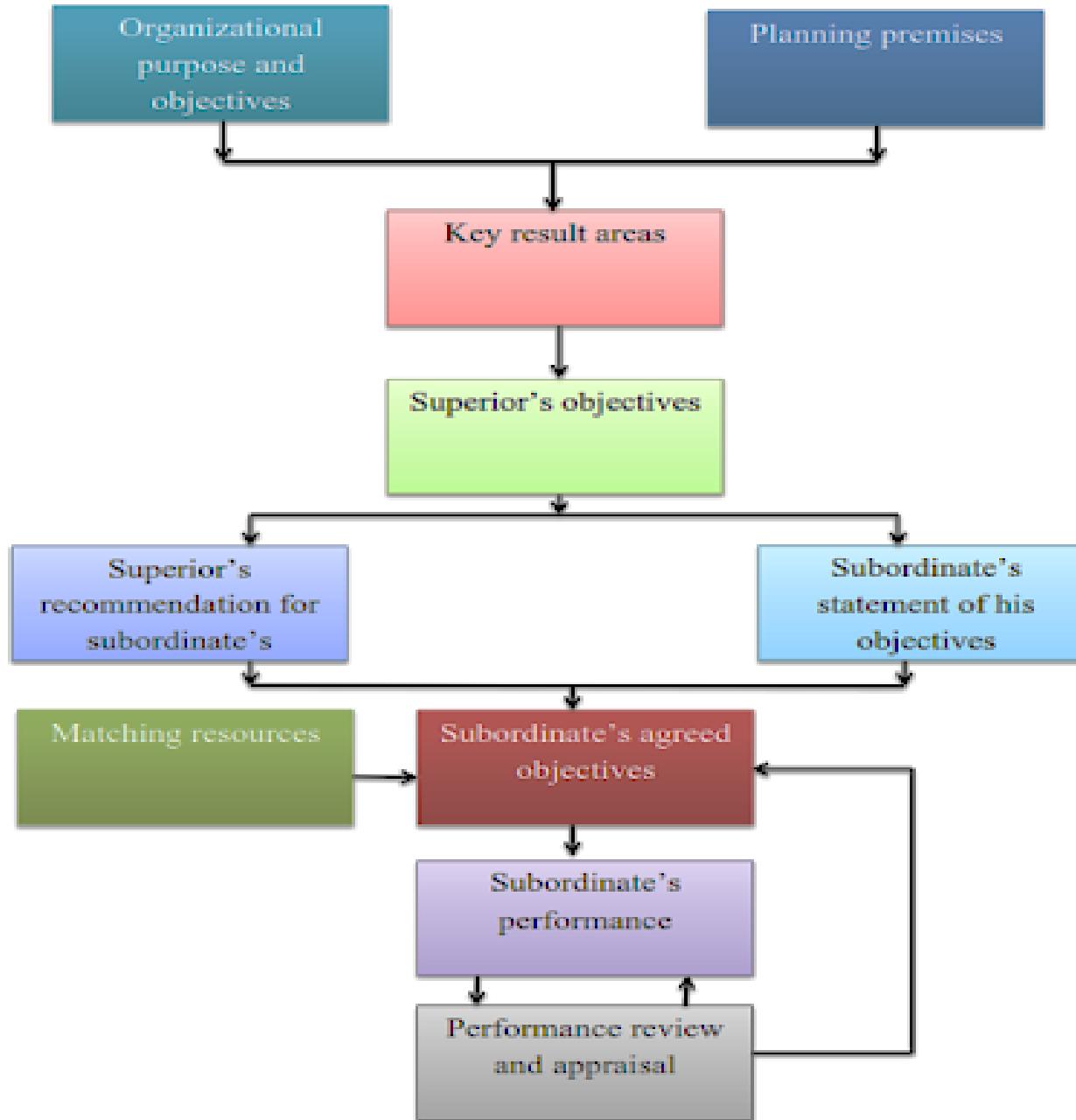
Assumption

- ▶ People tend to perform better when they are known about what is expected from them and when they can associate their personal goals with that of the objectives of the organization.

Relationship of Objectives and Organizational Hierarchy



Process of MBO



Benefits of MBO

- **Better Management**
 - Resources are put in such manner that they result into better performance.
 - Better management by clarity in objectives, role clarity, periodic feedback of performance, participation by managers in the management process, realisation that there is always scope for improvement, etc...
- **Clarity in Organizational action**
 - It provides Key Result Area(KRA) where organizational efforts are required

Benefits of MBO

Personal Satisfaction

- This is because of two closely related phenomena:
 - (1) Participation in objective setting
 - (2) Rational performance appraisal.

Basis for Organizational Change

- MBO stimulates the changes, and provides a framework and guidelines for planned change, enabling management to initiate, plan, direct and control the direction and speed of change.

Limitation of MBO

- **Time and Cost**
 - It is not as simple as it looks to be.
 - It requires large amount of scarce resources like time of senior managers
 - It is something over and above some normal work
 - It also generates paper work as so many forms are need to be filled by both.
 - It creates only in the initial phase of MBO and organization over a period of time it may be disappear.
- **Failure to teach MBO philosophy**
 - Managers fail to understand and appreciate the new approach by creating doubt in their mind like -
 - What purpose it served by MBO?
 - How the performance is to be appraised?
 - How organization will benefit?

Limitation of MBO

- **Problems in objective setting**
 - It requires objective must be set out in verifiable terms, against which performance can be measured.
 - It is again difficult to set in at least some of the area like innovation, technology, etc...
- **Emphasis on short term objectives**
 - It is very well suitable and dealt with short term objective its preciseness around for a year or even less.
 - It is danger to emphasis on short term objectives at the cost of long term objectives.

Limitation of MBO

- **Inflexibility**
 - In a dynamic environment, particularly objectives may not be valid forever. In the context of revised objectives, changed premises or modifies policies, it is useless to follow old objectives.
 - However, many managers often hesitate to change objectives during a period of time. Thus, inflexibility can really cause harm to the organization.
- **Frustration**
 - It may be because of two reasons:
 1. As lack of experiences, many organization could not implement MBO properly.
 2. Introduction to MBO tends to arouse high expectations for rapid change particularly among young junior managers in terms of organizations growth, profitability and in themselves in their career advancement. If rate of changes is slower than expected due to any reason, managers begin to feel frustration.

Demand Analysis

Demand Determinants (Factors Determining Demand)

1. General Factors :

- Price of a product itself
- Income of the consumer
- Taste and Preference of consumer
- Price of related goods (substitutes and complimentary goods)

2. Additional factors related to luxury good and durables

- Consumers expectations of future price
- Consumers expectations of future income

3. Factors related to market demand

- Population (Number of customers)
- Socio Economic and Demographic Distributions of consumers
- Advertising
- Sales Promotion

Price and Demand

- ▶ Demand: Demand in economics means desire to buy backed purchasing power.
- ▶ Demand Function:
A mathematical expression of the relationship between quantity of the commodity and its determinants is known as demand if it related to the market it is called Market Demand Functions

$$Q_{x,t} = f(P_{x,t}, Y_t, P_{r,t}, P_{x,t+i}^e, T)$$

where :

- $Q_{x,t}$ = The quantity purchased of good "x" in period "t"
- $P_{x,t}$ = The price of good "x" in period "t".
- Y_t = The consumers income in period "t".
- $P_{r,t}$ = The price of related goods in period "t"
(which may be substitutes, complements
or unrelated goods)
- $P_{x,t+i}^e$: The expected price of good x in some future period, $t+i$
- T = The taste and patterns of consumers .

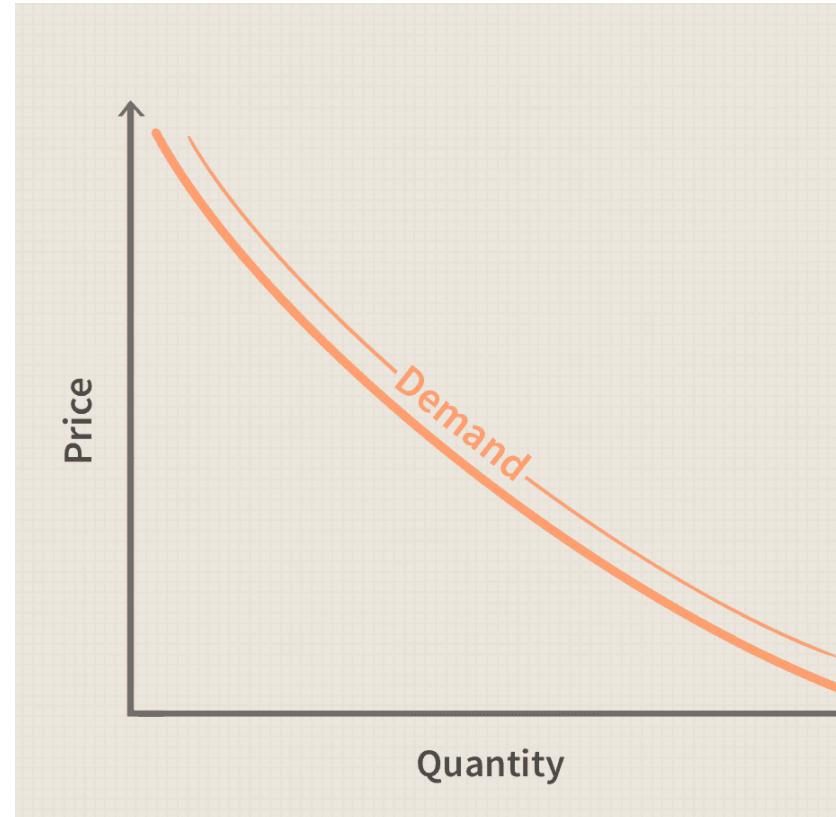
Market Demand Function

$$Q_d = f(P_x, Y, P_1, \dots, P_{n-1}, T, A, E_y, E_p, P, D, u)$$

P- Population (Size of the market)

D- Distribution of consumers in various categories depending on sex,... (Market Segments)

- ▶ The relation of price to sales is known in economics as the “law of demand”
- ▶ “Higher the price, lower the demand, and vice versa, other things remain the same”



Supply curve

- Whereas supply curve shows, willingness of producer (supplier) to offer quantity at particular price.
- From supply curve we can see that more the prove, more quantity will be offered by the producer (supplier) if stock exists.



Generally, Y a dependent variable shown on Y axis and independent variable, is shown on X axis. But here, Quantity (Q) on X axis and Price (P) on Y axis.

Demand Curve -

Price Quantity relation between Q and other variables are shown by “Demand Curve”, it

- a) At particular price - what is the max, a consumer can purchase?
- b) For particular Demand (Q), what price.

In algebraic form : $Q = f(P)$

Chief Characteristics of Law of Demand

- ▶ Inverse Relationship (Between price and quantity)
- ▶ Price, an independent variable and Demand, a dependent variable
the law of demand, the effect of price on demand which is explained by the law of demand (not the effect of demand on price)
- ▶ Other things remain the same. (eg. One or more such factors, substitute's price, consumer's taste and preferences, advertisements, promotion....)

Reasons underlying the law of demands

- A) Income Effect: The fall in the price of a commodity leads and therefore, is equivalent to an increase in the income of the consumer because now he has to spend less for purchasing the same quantity as before. So a part of money so gained can be used for purchasing some more units of the commodity. When price rises - reverses

- B) Substitution Effect: When the price of the commodity falls, consumer tends to substitute that commodity for other commodity (expensive). Conversely, when the price of a commodity rises, other commodities will be used in its place at least to some extent. Therefore, a fall in the price of a commodity increases demand and vice versa.

Exceptions to the law of demand

- ▶ There are some goods purchased mainly for their “Snob orientation. Veblen called “conspicuous consumption”.
- ▶ Price rises- snob appeal rises - rise in demand.
- ▶ If price falls - their capacity to perform the function of diminishes. (Veblen goods - diamond)
- ▶ Speculative market, a rise in price creates more purchase free vice versa. Eg. Share market, some industrial

The Giffen case:

- Giffen found - in 19th century - Ireland people were so poor spent major income on - potatoes
- Small part on meat.
- When price of potatoes increased, economized on meat consumption of potatoes
- Further to fill the resulting gap - they had to purchase more
- Thus the rise in price of potatoes increases its sales decrease.
- (but such case happen only when the considerable income inferior good)

Individual Demand and Market Demand

Demand at given price -by Individual purchaser – Individual demand

- ▶ Total Quantity Demanded by all purchasers – Market demand
- ▶ Market Research & Law of Demand

Price elasticity of Demand :

- ▶ Law of demand tells us about only direction of change, but not the extent to which the change takes place

“ The degree of responsiveness of quantity demanded to change in price gives rate of change

$ep =$ Proportionate change in the quantity demanded

Proportionate change in price change in price change in quantity demanded

Change in Quantity demanded / Quantity demanded

Therefore, $ep =$

Change in price / Price

$$\therefore e_p = \frac{\frac{Q_2 - Q_1}{Q_1}}{\frac{P_2 - P_1}{P_1}} \quad \text{--- } ①$$

where

Q_1 : Quantity demanded before price change

Q_2 : Quantity demanded after price change

P_1 : Price charged before price change.

Ex.
If

$$Q_1 = 2000 ; Q_2 = 2500$$

$$P_1 = 10 \quad P_2 = 9$$

P_2 : Price charged after price change.

$$e_p = \frac{\frac{(2500 - 2000)}{2000}}{\frac{9 - 10}{10}} = -\frac{2.5}{1} = -2.5$$

The negative sign indicates inverse relationship b/w price & demand. In practice, minus sign is omitted from the final result.

Modified formulae:

$$e_p = \frac{\frac{Q_2 - Q_1}{Q_2 + Q_1}}{\frac{\frac{P_2 - P_1}{P_2 + P_1}}{2}}$$

$$= \frac{\frac{Q_2 - Q_1}{Q_2 + Q_1}}{\frac{\frac{P_2 - P_1}{P_2 + P_1}}{2}} = \frac{\frac{\Delta Q}{Q_2 + Q_1}}{\frac{\Delta P}{P_2 + P_1}} \quad \text{--- (2)}$$

Now, $e_p = \frac{\frac{500}{4500}}{-\frac{1/19}{-1/19}} = \frac{1/9}{1/19} = -2.11$

Interpretation:

A one percent reduction in price will result in a 2.5 % increase in quantity demanded from 1st formula and 2.1 % increase in quantity demanded according to formula (2).

Here we are limiting ourselves to elasticity only. (2 finite points on curve)
Whereas at particular point, point elasticity can be found out by:

$$\text{Point elasticity} = \frac{dQ / Q}{\frac{dP / P}{Q}} = \frac{P}{Q} \cdot \frac{dQ}{dP}$$

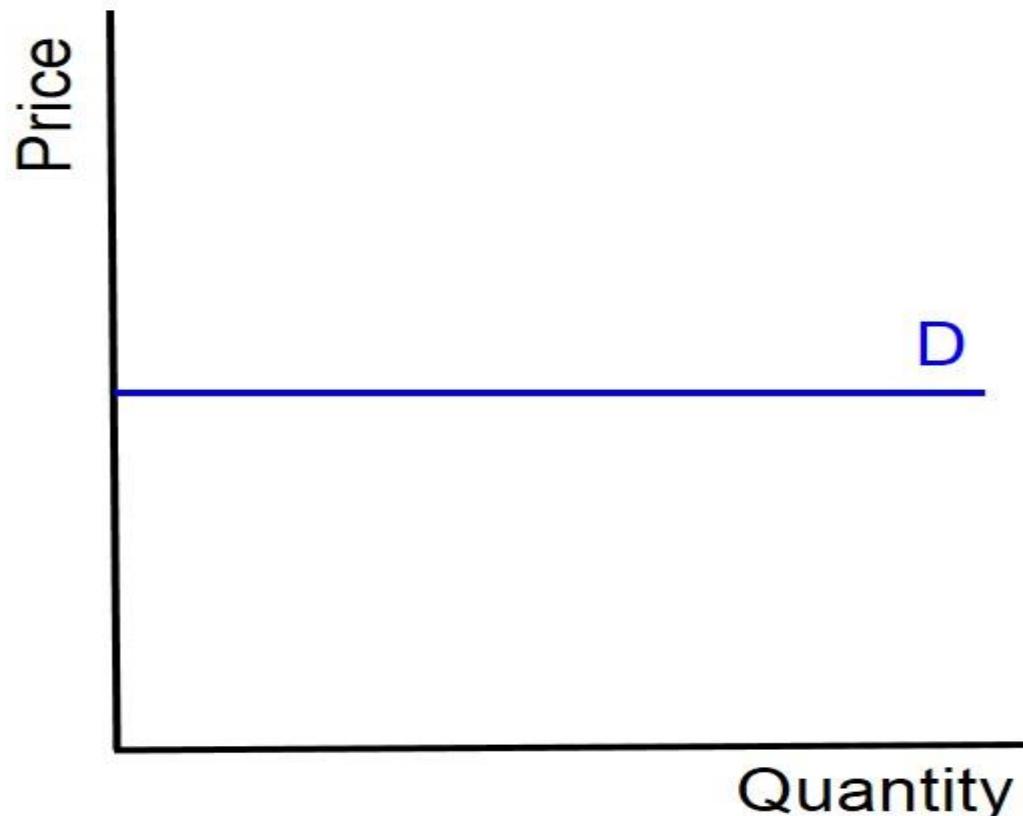
Types of Price Elasticity

1. Perfectly Elastic Demand

No reduction in price is needed to cause an increase in demand. Firm can sell the quantity it wants at the prevailing price but not at all even a slightly higher price.

Curve – Horizontal

Num. Expression - ∞

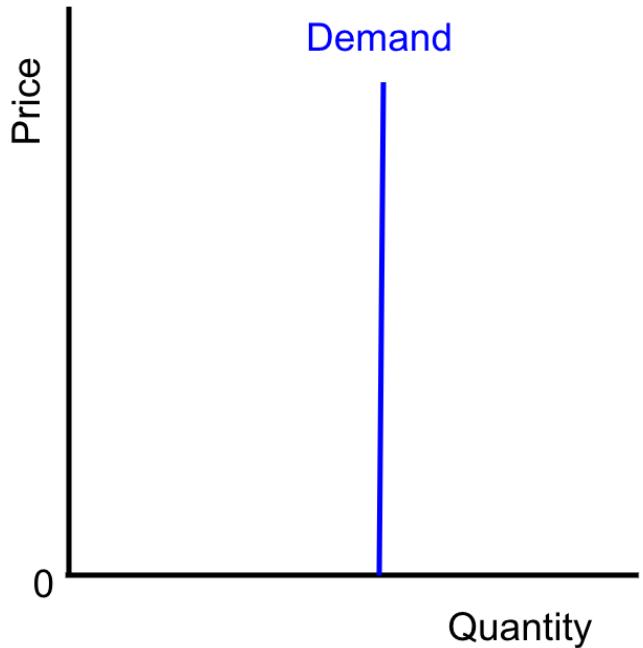


2. Perfectly inelastic Demand

Where a change in price is howsoever large, causes no change in quantity demand

Curve – Vertical

Num. expression - 0



3. Demand with unity elasticity:

Proportionate change in price cause an equal proportionate change in the demand shape of the demand curve- rectangular hyperbola.

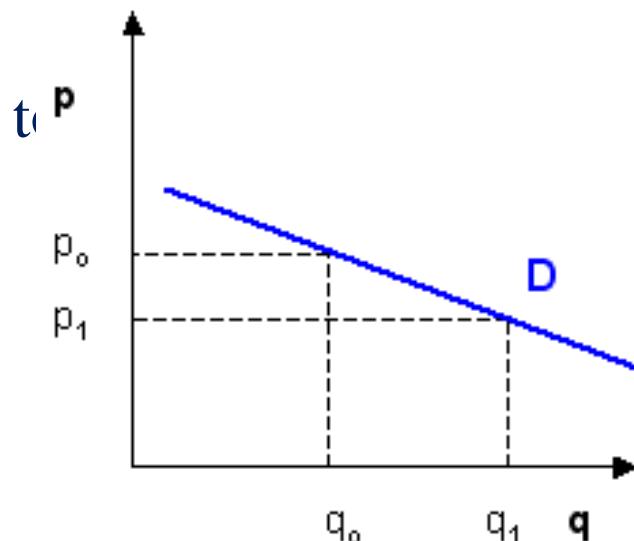
Num. Expression -1

4. Relatively elastic demand:

Reduction in price leads to a
proportionate change in demand

Curve – Flat

Num. Expression > 1

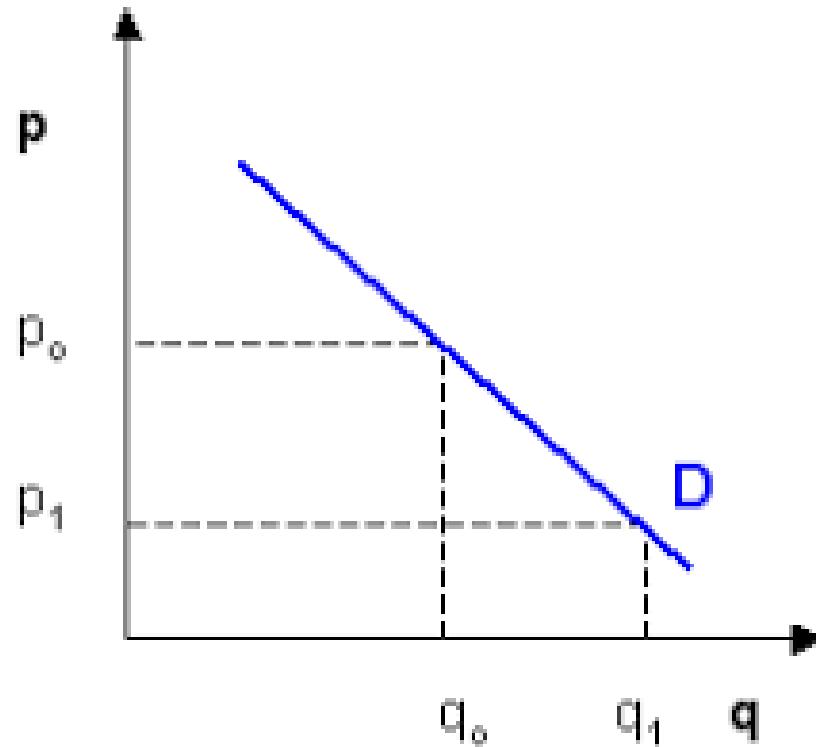


5. Relatively Inelastic Demand

Reduction in price less than proportionate increase in demand

Curve – Steep

Num. Expression < 1



Factors Determining Price Elasticity of Demand

Nature of commodity: Demand of necessities is generally inelastic (salt), demand of luxury goods – elastic generally

Extent of use: More use – more elastic (steel)

Range of substitutes: More substitutes - more elastic

Income level: People will high income less affected by price change

Proportion of Income Spent on the commodity:

Where an individual spends only a small part of his income on commodity, the price change does not materially affect his demand for the commodity. Eg. Match box, salt – inelastic

Urgency of Demand:

- The availability of substitutes
 - Habit and social custom
-
- Salt – less elastic – inelastic
 - Cigarettes – less elastic - inelastic

Durability of commodity: Durable or repairable more durable or repairable – more elastic the demand (or if price rise get repaired it and wait for reduction in price of at least we it for long time)

Purchase frequency of a product: If the frequency of purchase mix – high elastic

Revenue Relationships

Average Revenue: Total receipts from sales dividend by the number of unit sold.

$$AR = TR / Q$$

Total Revenue : $TR = P \cdot Q$ [P : Price, Quantity : Q]

Incremental Revenue: $IR = R_2 - R_1 = \Delta R$

Marginal Revenue: Additional revenue which would be earned by selling on additional (marginal) unit of a firm's product.

$$MR = R_2 - R_1 / Q_2 - Q_1 = \Delta R / \Delta Q$$

Difference between IR and MR

- 1) IR is the change in total revenue irrespective of the change in sales whereas MR is the change in total revenue per unit change in sales.

- 1) IR revenue is not confined to the effects of price change. It rather measures the effect of any kind of managerial decision on total revenue.

$$IR = R_2 - R_1 = \Delta R$$

$$MR = (R_2 - R_1) / (Q_2 - Q_1) = \Delta R / \Delta Q$$

Elasticity of Demand and Total Revenue

Change in Price	$e > 1$	$e = 1$	$e < 1$
Rises	TR falls	TR unchanged	TR rises
Falls	TR rises	TR unchanged	TR falls

Relationship between Average Revenue, MR and e:

$$1) \quad AR = MR \times e / e - 1$$

$$2) \quad MR = AR \times e - 1 / e$$

$$3) \quad e = AR / AR - MR$$

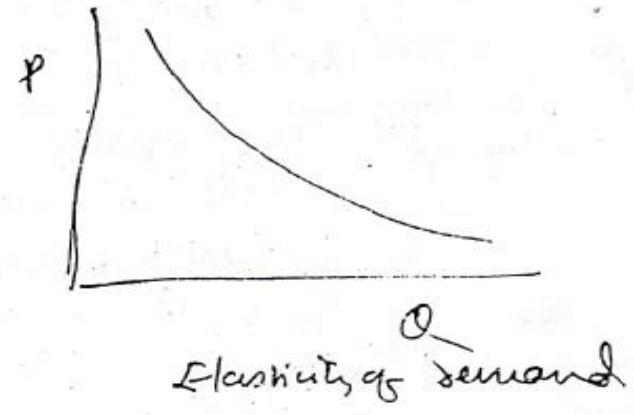
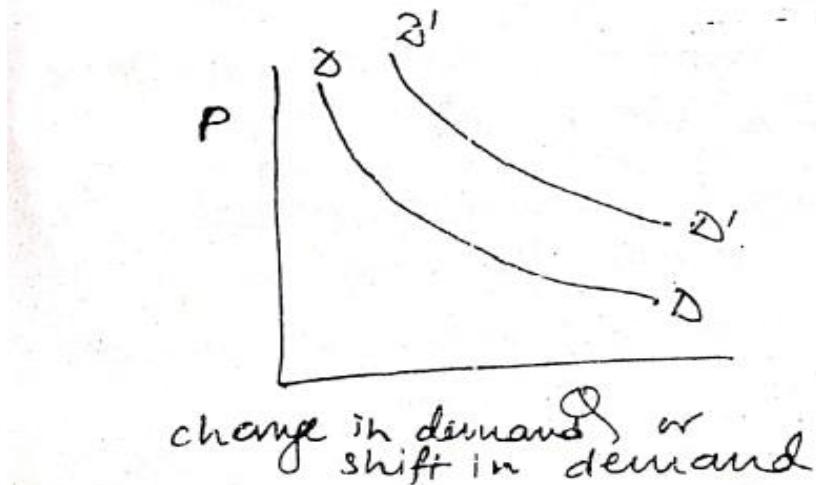
Change in demand and elasticity of demand

In economics, both are different “change in demand” occurs when change but demand changes due to some other factors.

(Income, etc)

Where as elasticity of demand refers to that change in demand which change in price, other factors remaining the same.

In former case, shift of entire demand curve and in later case, change in curve.



Some Business applications of price elasticity

- ▶ **Price discrimination:** A monopolist adapts price discrimination when the elasticity of demand of different consumers or different. Consumers – inelastic changed more
- ▶ **Public Utility Pricing:** Monopoly – railway, water supply.
 - Price discrimination according to elasticity
- **Joint Supply:** Wool and mutton.
- **Super market:** Slightly less price for goods with elastic demand

- Use of machines: If elastic demand may generate employment more capacity can be utilized, when inelastic demand – may be reverse case
- Factor pricing: The factor having price inelastic demand can obtain a higher price than those with elastic demand workers producing products having inelastic demand can easily can their wages raised.

● International Trade:

- a) A country benefit: Exports of products as have price inelastic demand for a rise in price.
- b) The demand for imports should be inelastic for a fall in price and elastic for a rise in price.

c) Deciding upon devalue a country's currency or not – price elasticity of demand. If demand is inelastic, devaluation would fail to achieve its objective.

Shifting of Tax Burden: If demand is elastic he will have to bear the tax burden himself, otherwise demand for his goods will go down.

Taxation Policy: Govt. can easily raise tax revenue by taxing commodities which are price inelastic.

Income & Demand

Basic demand determinants- useful in planning sales, allocating territories etc

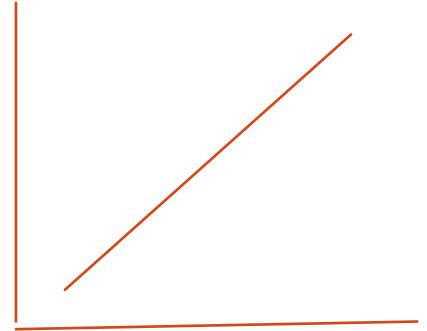
Important aspects:

Consumption function : refers to the relationship of Total expenditure on consumption to income.

- The long-run relation of consumption to income is somewhat Stable. Consumption is regularly about 85 to 90 % of the income.
- In Short -run, the consumption function recorded great instability.
- During periods of economic prosperity expenditure on consumption tends to increase as a % of income on the other hand, in periods of depression it absolutely but the expenditure on consumption increases as a % of income.
- In under developed countries like India where people live below the poverty line the propensity to consume is very high. Any increase in income of the people will be spent on consumption goods.

But still some limitations are there as some other factors also affect the consumption.

Product consumption (fn)- relationship between *total income* and *sales of particular products*.



personal consumption expenditure

Disposable personal income

- Differences in Regional income - diff. in purchasing power in diff. region.
- find out coefficient income sensitivity.
ratio of % change in expenditure (in money terms to % changes in income)
- Income expectation and demand :
applicable to consumer durable generally

Income Elasticity of demand:

The degrees of responsiveness of quantities demanded to a given change in income

$$\begin{aligned} E_y &= \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}} \\ &= \frac{\frac{\text{change in quantity demanded}}{\text{initial quantity demanded}} \times 100\%}{\frac{\text{change in income}}{\text{initial income}} \times 100\%} \\ &= \frac{\frac{Q_2 - Q_1}{Q_1}}{\frac{Y_2 - Y_1}{Y_1}} \\ &= \frac{\Delta Q}{\Delta Y} \times \frac{Y_1}{Q_1} \end{aligned}$$

$y_1 = 1000$ (Rs)

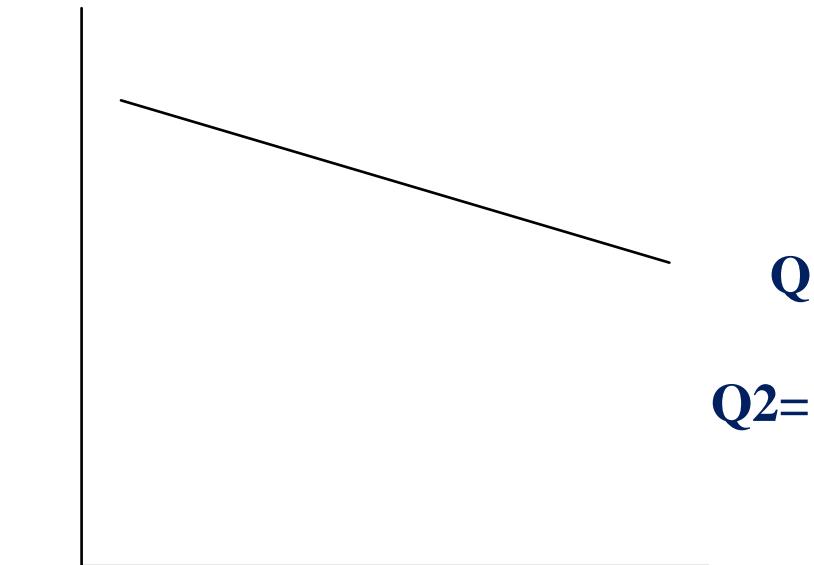
$y_2 = 1100$

sugar

sugar

$e_y = 1.99$

Income



Quantity Demanded

So we can say, the demand for sugar is quite income elastic.

- Zero income elastic (salt)
- Negative income elasticity (inferior good)
- Positive income elasticity (superior good)

PRICE OF RELATED GOODS AND DEMAND

Substitutes and Complements

Cross Elasticity of DEMAND

The proportionate change in the quantity demanded of a particular commodity in response to a change in the price of another related commodity.

% change in quantity demanded (good A)

% change in price (good B)

$$e_c = \frac{Qx2 - Qx1}{Qx2 + Qx1}$$

$$Pz2 - Pz1 / Pz2 + Pz1$$

If cross elasticity - Positive (+ve) - substitutes goods

If cross elasticity- Negative (-ve) - Complements goods

Cross Elasticity of Prices:

$$Px \cdot E_{py} = \frac{P_y2 - P_y1}{P_y2 + P_y1}$$

$$\frac{P_x2 - P_x1}{P_x2 + P_x1}$$

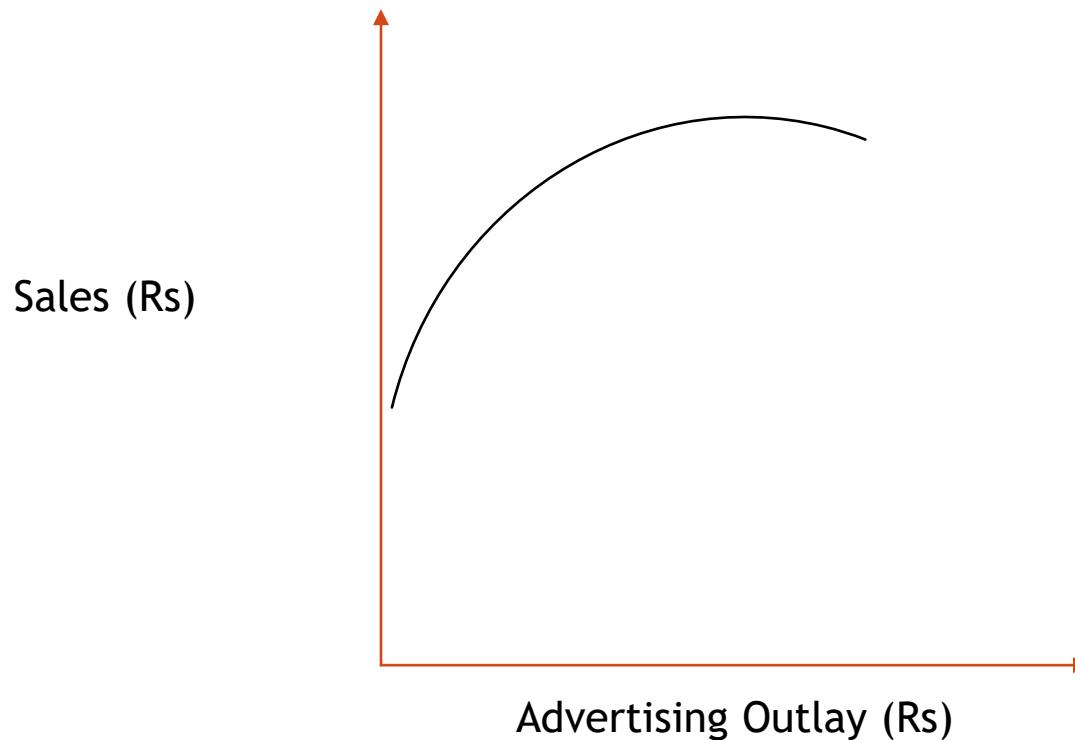
- For substitutes C.E. of price is positive
- For complements C.E of price is negative
- C.E. should range from +1 (perfect substitutes) to -1 (perfect complements) Theoretically, but in reality measure may go beyond these due to error in data and to various other extraneous factors.

ADVERTISING & DEMAND

The important fn. of advertising in context of demand

- (i) to shift the demand curve to the right
- (ii) to reduce the elasticity of demand.

however, adv. has a cost



The salient features of the advertising - sales relationships are :

1. Certain amount of sales is possible even without any adv.
2. Other things i.e. price, quality, channels of distribution and similar factors affecting the sales remaining the same, there is a direct relation. between the extent of advertisement and the volume of sales. This the increase in the expenditure on advertising is likely to lead to an increase in sales.
3. Up to a point an increase in 'advertisement will lead to a more than proportionate increase in sales. But beyond this point an increase in advertisement will lead to a less than proportionate Increase in sales till the saturation point is reached after which there will be no increase in sales

Advertising elasticity of Demand : (promotional elasticity)

$$ea = \frac{\text{Proportionate change in Sales}}{\text{Proportionate change in Adv. Expenditure}}$$

Or

$$ea = \frac{Q_2 - Q_1}{Q_2 + Q_1} / \frac{A_2 - A_1}{A_2 + A_1}$$

Factors affecting Advertising elasticity of Demand :

1. The stage of the product's market development
2. The extent to which competitors react to the adv.
3. The quality and quantity of the co's adv. In past and present relation to that of competitors
4. The influence non adv. Determinants of demand price and income
5. The time interval that elapses between adv. Expenditure and response of sales to the expenditure, which is difficult to predict
6. The delayed effect co's past adv. And the extent to which it affects current and future sales.

Determining Advertisement Outlays:

- 1.% of sales approach : fix % of past, present and expected sales on ad Outlays.
2. All you can afford approach of profit or cash funds more profitab more adv.
- 3 Return on Investment approach
4. competitive parity Approach what other firms are spending on adv. industry
5. objective and Task approach: define objective - Target outline task media - determine cost and measure-monitor

Economic Implications of Advertisement:

- **Informing consumer - Broadening Market**
- **Lowering selling costs (low cost per contact -advantage of adv.)**
- **Encouraging competition**
- **Waste of resources (increases prices –cost to consumer) & Oligopoly and Market concentration**

Demand Distinction

- Producer's and consumers goods
- Durable and non-durable goods
- Derived demand and autonomous demand
- Industry demand and company demand
- Short run demand and long run demand
- Short term demand fluctuation and long term trend
- Total market and market segment

Demand forecasting : A forecast is a prediction or estimation of a future situation under given condition.

- **Passive forecasts**: where Prediction about future is based on the assumption that the firm does not change the course of its action –
- **Active forecasts**: where pre casting is done under the condition of *likely future changes in the actions by the firm*.

Purpose of forecasting demand:

- **in short run forecast** seasonal patterns are of price importance - useful for suitable sales policy and proper scheduling of out put in order to avoid over-stocking or costly delays in meeting the orders, - necessary modification in advertising and sales techniques.
- **long run forecasts** are helpful in proper capital planning - deciding upon prod. capacity, man power planning etc.

Demand forecasting :

May be undertaken at three different level

- 1. Macro level - business conditions over the whole economy measured by an appropriate index of industrial prod" national income or ' expenditure**
- 2. Industry level - prepared by different trade association**
- 3. Firm level – Companies**

Steps in Demand Forecasting:

- Identification of objective
- Determining the nature of goods under consideration
- Selecting a proper method of forecasting
- Interpretation of results.

Methods of forecasting

1.Expert opinion method

2. Delphi Method : It consists of an attempt to arrive at a consensus in an uncertain area by questioning a group of experts repeatedly until the responses appear converge along a single line on the issue causing disagreement are clearly defined. The participants (experts) are supplied the responses to previous questions from others in the group by a coordinator or leader. even including reasons.

3. Survey of Buyers Intention useful for short run

4.collective opinion (sales force polling): restricted to short run only

5. Analysis of Time series and Trend projections :

Past sales data with time are arranged in chronological from yield 'time series & trend line can be fitted through a series either by means of

Statistical method such as least square or visually by judgement challenges at turning points, or at break down of time series.

Four sets of factor has to be seen:

Trend(t), seasonal variation (s), Cyclical fluctuations (c) and irregular forces (I).

Treat the original time series data (o) by Expressing $o=TSCI$

So for eliminating effects of these all four usual practice.

Usual practice is first calculate trend from usual data (D).

Then trend values are eliminated (TSCI / T). Then calculate seasonal index, used seasonal effect (SCI / S)

Linear Trend:

$$\text{Sales} = a + b T$$

$$S = a + \sum T$$

$$LS = Na + b \sum T$$

$$\sum ST = a \sum T + b \sum T^2$$

Find out a and b, So:

$S = () + () T$ and we can get value of S for any further year.

Non linear trends:

Polynomial trends: $S = a - bT + cT^2$

$$S = a - bT + cT^2 - dT^3$$

Exponential trend: $S = ae^{bt}$

$$\log S = \log a + b \log T$$

Double Log trend: $S = aT^b$

$$\log S = \log a + b \log T$$

Smoothing Method

(i) Moving Average (MA)

$$\text{first value of MA } (\bar{Y}_1) = \frac{1}{n} (Y_1 + Y_2 + \dots + Y_n)$$

$$\text{second value } (\bar{Y}_2) = \frac{1}{n} (Y_2 + Y_3 + \dots + Y_{n+1})$$

(ii) Exponential Smoothing :

$$\text{Current smoothed Value} = w \cdot \left(\begin{array}{c} \text{current observed} \\ \text{Value} \end{array} \right) + (1-w) \times \left(\begin{array}{c} \text{Previous} \\ \text{smoothed} \\ \text{Value} \end{array} \right)$$

$$S_t = W Y_t + (1 - W) S_{t-1}$$

7. Use of Economic Indicator Method

1. Construction contracts sanctioned for the demand of building work
2. Personal income for the demand of consumer goods
3. Automobile registration for the demand of car accessories
4. Agricultural income for the demand of fertilizer

Year	Farm Income Index (X)	Sales of Tractors (Y)	X 1	Y 1	X 1 Y1	X 1 ^2
1	100	110	10	11		
2	110	130	15	13		
3						
4						
5						
n = 5			$\Sigma X_1 =$	$\Sigma Y_1 =$	$\Sigma X_1 \cdot \Sigma Y_1$	

$$\sum Y_1 = n a + b \sum X_1$$

$$\sum X_1 Y_1 = a \sum X_1 + b \sum X_1 ^2$$

$$Y = n () + () X$$

8. Controlled experiments

9. Judgemental Approach

Financial Management

Goals of Financial Management

- Wealth Maximisation
 - Maximisation of Profit- 
 - Maximisation of Earning per share- 
 - Maximisation of return on equity- 

Other concerns

- High rate of growth
- Substantial market share
- Product and technological leadership
- Employee welfare
- Customer Satisfaction
- Support education and research
- Improve community life and other societal problems

Shareholder Orientation in India

- Foreign Exposure
- Greater dependence on Capital Market
- Growing importance of Institutional investors
- Abolition of wealth tax on financial assets

Key Activities of Financial Management

- Financial Analysis, planning and control
 - Assessing the financial performance and condition of the firm
 - Forecasting and planning the financial future of the firm
 - Estimating financing needs of the firm
 - Instituting appropriate system of control

LIABILITIES	Amount	ASSETS	Amount
Capital	XX	Fixed Assets-Land, Bldg,	XX
Loan taken	XX	Current Assets	
Current Liabilities		•Cash / Bank B/s	XX
•Outstanding Expenses	XX	•Accounts Receivable (Debtors)	XX
•Bank Overdraft	XX	•Bills Receivable)	XX
•Accounts Payable (Creditors)	XX	•Inventories (Stock)	XX
	XYZ		XYZ

Horizontal Form of Balance Sheet

- Management of Firm's asset structure
 - Determining the capital budget
 - Managing the liquid resources
 - Establishing the credit policy
 - Controlling the level of inventories

- Management of firm's financial structure
 - Establishing the debt-equity ratio/financial leverage
 - Determining the dividend policy
 - Choosing the specific instruments of financing
 - Negotiating and developing relationships with various suppliers of capital

Organisation of finance function

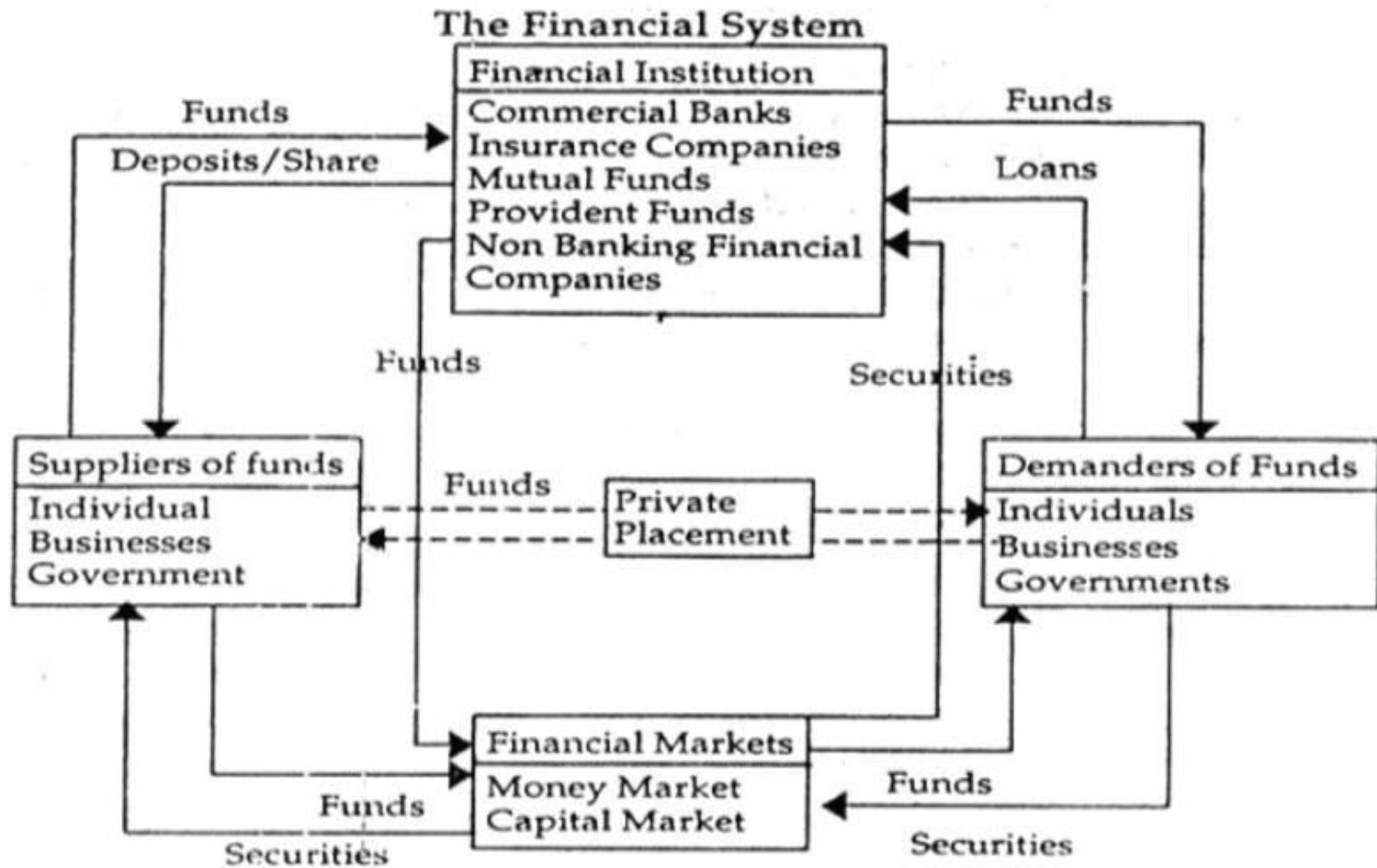


Relationship of finance to economics

- Macro economic
- Micro economic

Relationship to accounting

- Score keeping vs value maximising
- Accrual method vs cash flow method
- Certainty vs uncertainty



Financial System – A Pictorial Representation

Functions of Financial system

- Payment system-for the exchange of goods and services
- Pooling of funds-for undertaking large scale enterprises
- Transfer of resources
- Risk management
- Coordinating decentralized decision making
- Dealing with information asymmetry

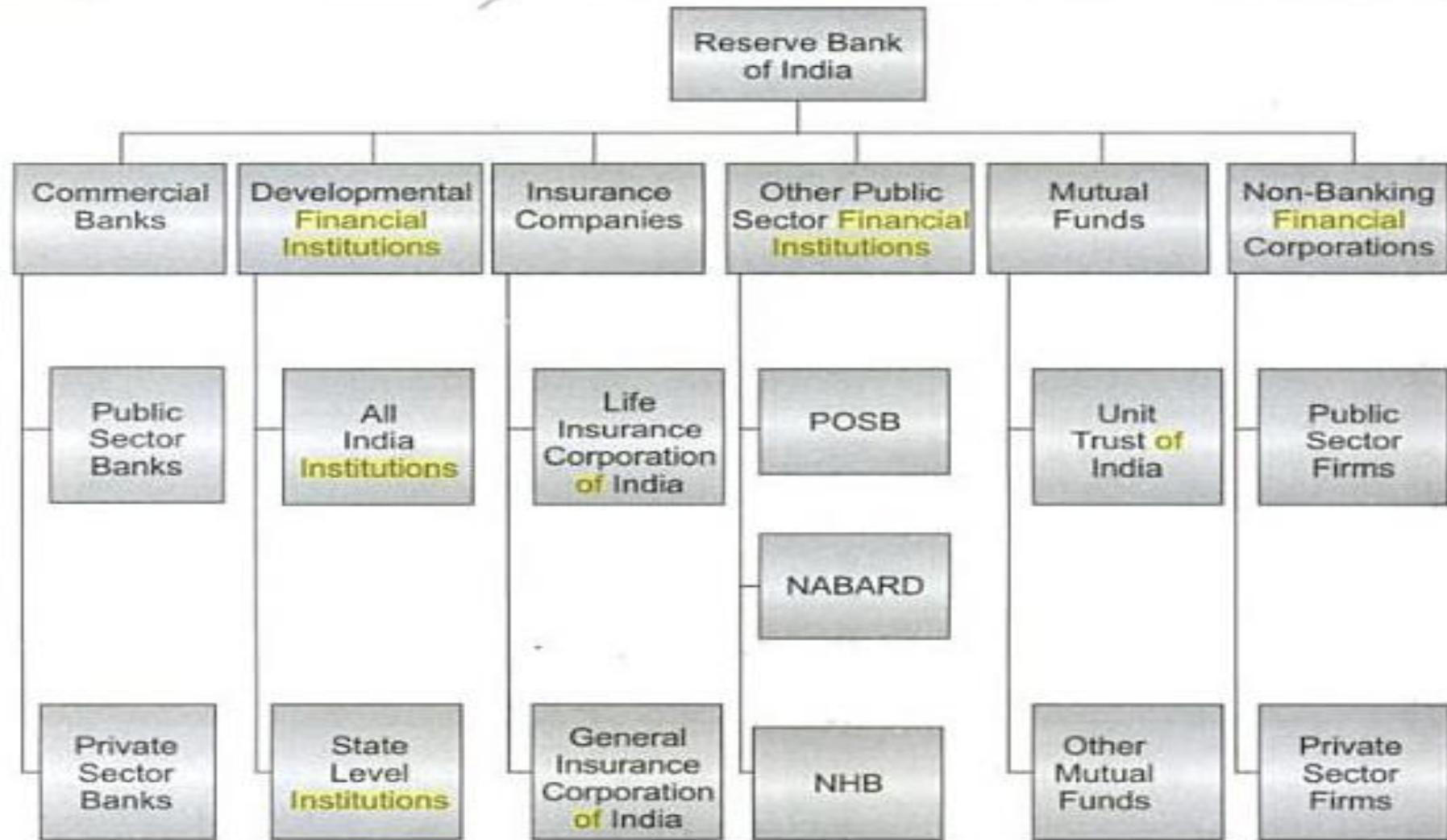
Financial Instruments

- Coins, currency notes, demand deposits, corporate debentures, gilt-edged securities, equity shares, futures and options
- Financial assets/ financial liabilities
- FA represents claim against future income and wealth of others.
- FL represent promises to pay some proportion of prospective income and wealth to others

FA & FL

- Money-
 - issued by RBI & Ministry of finance
- Demand deposit-
 - promise to repay given sum as and when demanded by the holder.
Interest Y/N
- Short term debt-
 - promise to repay given sum with interest within period of 1 year
- Intermediate term debt-
 - promise to repay given sum with interest within period that exceeds 1 year but is less than 5 years
- Long term debt-
 - stream of interest over long period of time and then repay in lumpsum /installment
- Equity stocks

Financial Institutions



Financial Markets

- Money market
- Capital market
 - Primary market
 - Public issue
 - Right issue
 - Private placement
 - Secondary market
- Government Securities market

Marketing Management

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Core Concepts of Marketing

- **Needs, Wants and Demands**
- **Product**
- **Value and Satisfaction**
- **Exchange and Transaction**
- **Relationship and Networks**
- **Market**
- **Marketers and Prospects**
- **Competition**
- **Marketing Environment**
- **Supply Chain Management**

Segmentation, Targeting and Positioning

Bases for Segmenting Consumer Markets:

- **Geographic:** Region, City, Rural and Semi-urban areas
- **Demographic:** Age, Family size, Gender, Income, Occupation, Education, Socio-Economic Classification (SEC)
- **Psychographic:** Lifestyle, Personality
- **Behavioral:** Occasions, Benefits, User status, Usage rate, Loyalty status, Readiness stage, Attitude towards product

Geographic region	Pacific Mountain, West North Central, West South Central, East North Central, East South Central, South Atlantic, Middle Atlantic, New England
City or metro size	Under 5,000; 5,000–20,000; 20,000–50,000; 50,000–100,000; 100,000–250,000; 250,000–500,000; 500,000,000; 1,000,000–4,000,000; 4,000,000+
Density	Urban, suburban, rural
Climate	Northern, southern
Demographic age	Under 6, 6–11, 12–17, 18–34, 35–49, 50–64, 64+
Family size	1–2, 3–4, 5+
Family life cycle	Young, single; young, married, no children; young, married, youngest child under 6; young; married, your child 6 or older; older, married, with children; older, married, no children under 18; older, single; other
Gender	Male, female
Income	Under \$10,000; \$10,000–\$15,000; \$15,000–\$20,000; \$20,000–\$30,000; \$30,000–\$50,000; \$50,000–\$100,000+
Occupation	Professional and technical; managers, officials, and proprietors; clerical sales; craftspeople; forepersons; operatives; farmers; retired; students; homemakers; unemployed
Education	Grade school or less; some high school; high school graduate; some college; college graduate; post college
Religion	Catholic, Protestant, Jewish, Muslim, Hindu, other
Race	White, Black, Asian, Hispanic, Other
Generation	Silent Generation, Baby Boomers, Gen X, Millennials (Gen Y)
Nationality	North American, Latin American, British, French, German, Italian, Chinese, Indian, Japanese
Social class	Lower lowers, upper lowers, working class, middle class, upper middles, lower uppers, upper uppers
Psychographic lifestyle	Culture-oriented, sports-oriented, outdoor-oriented
Personality	Compulsive, gregarious, authoritarian, ambitious
Behavioral occasions	Regular occasion, special occasion
Benefits	Quality, service, economy, speed
User status	Nonuser, ex-user, potential user, first-time user, regular user
Usage rate	Light user, medium user, heavy user
Loyalty status	None, medium, strong, absolute
Readiness stage	Unaware, aware, informed interested, desirous, intending to buy
Attitude toward product	Enthusiastic, positive, indifferent, negative, hostile

Bases for Segmenting Business market:

Industrial customers tend to be fewer in number and purchase larger quantities. Many of the consumer market segmentation variables can be applied to industrial markets. Industrial markets might be segmented on characteristics such as:

- 1) Location
- 2) Company type
- 3) Behavioral characteristics

Demographic

1. *Industry:* Which industries should we serve?
 2. *Company size:* What size companies should we serve?
 3. *Location:* What geographical areas should we serve?
-

Operating Variables

4. *Technology:* What customer technologies should we focus on?
 5. *User or nonuser status:* Should we serve heavy users, medium users, light users, or nonusers?
 6. *Customer capabilities:* Should we serve customers needing many or few services?
-

Purchasing Approaches

7. *Purchasing-function organization:* Should we serve companies with a highly centralized or decentralized purchasing organization?
 8. *Power structure:* Should we serve companies that are engineering dominated, financially dominated, and so on?
 9. *Nature of existing relationship:* Should we serve companies with which we have strong relationships or simply go after the most desirable companies?
 10. *General purchasing policies:* Should we serve companies that prefer leasing? Service contract? Systems purchases? Sealed bidding?
 11. *Purchasing criteria:* Should we serve companies that are seeking quality? Service? Price?
-

Situational Factors

12. *Urgency:* Should we serve companies that need quick and sudden delivery or service?
 13. *Specific application:* Should we focus on a certain application of our product rather than all applications?
 14. *Size or order:* Should we focus on large or small orders?
-

Personal Characteristics

15. *Buyer-seller similarity:* Should we serve companies whose people and values are similar to ours?
 16. *Attitude toward risk:* Should we serve risk-taking or risk-avoiding customers?
 17. *Loyalty:* Should we serve companies that show high loyalty to their suppliers?
-

Targeting:

Target Marketing involves breaking a market into segments and then concentrating your marketing efforts on one or a few key segments. Target marketing can be the key to a small business's success.

	P1	P2	P3
M1			
M2			
M3			

Target Market strategies:

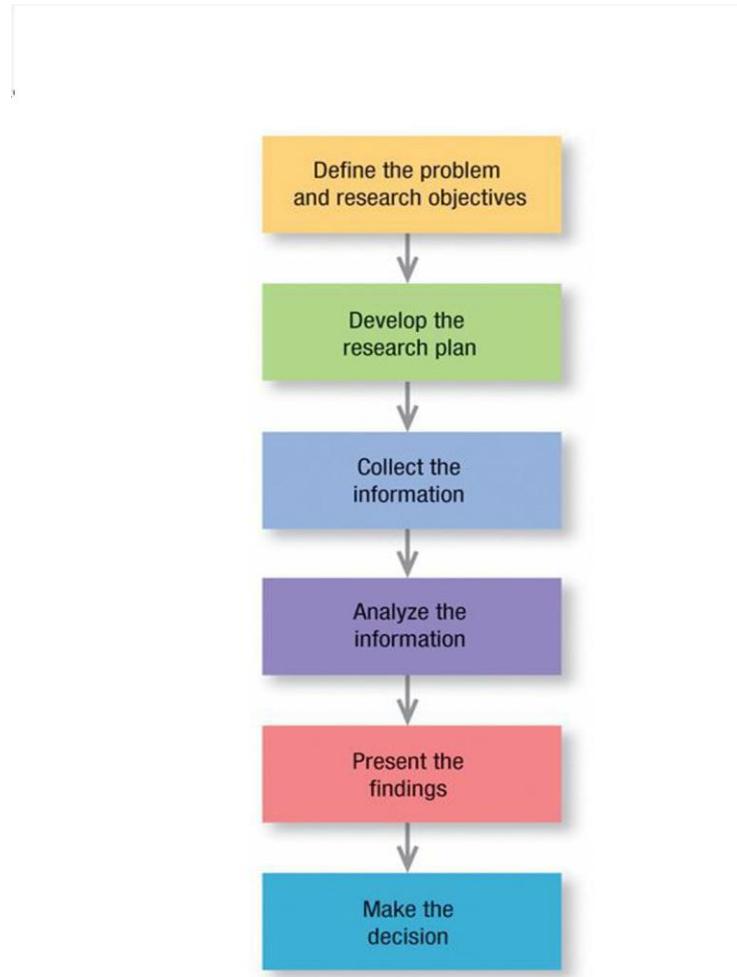
- Single segment concentrated strategy
- Selective specialization
- Product specialization
- Market specialization
- Full market coverage

Positioning:

The position of a product is the sum of those attributes normally ascribed to it by the consumers – its standing, its quality, the type of people who use it, its strengths, its weaknesses, any other unusual or memorable characteristics it may possess, its price and the value it represents.

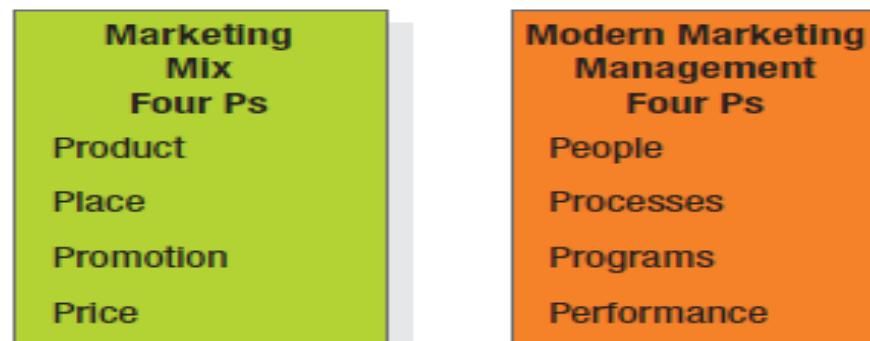
-Perception

Marketing Research



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Four Ps



Source: Philip Kotler et al, Marketing Management, 14th Edition, Page No. 23

Reference: Marketing Management by Philip Kotler
et al. any latest edition.

Preferably - South Asian edition

Thank You

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Nature Of Management

Major Topics

- Definitions of Management**
 - Features of Management**
 - Nature of Management**
 - Management is Science or Arts**
 - Management and Administration**
 - Applying Management Theory in Practice**
-

Definitions of Management

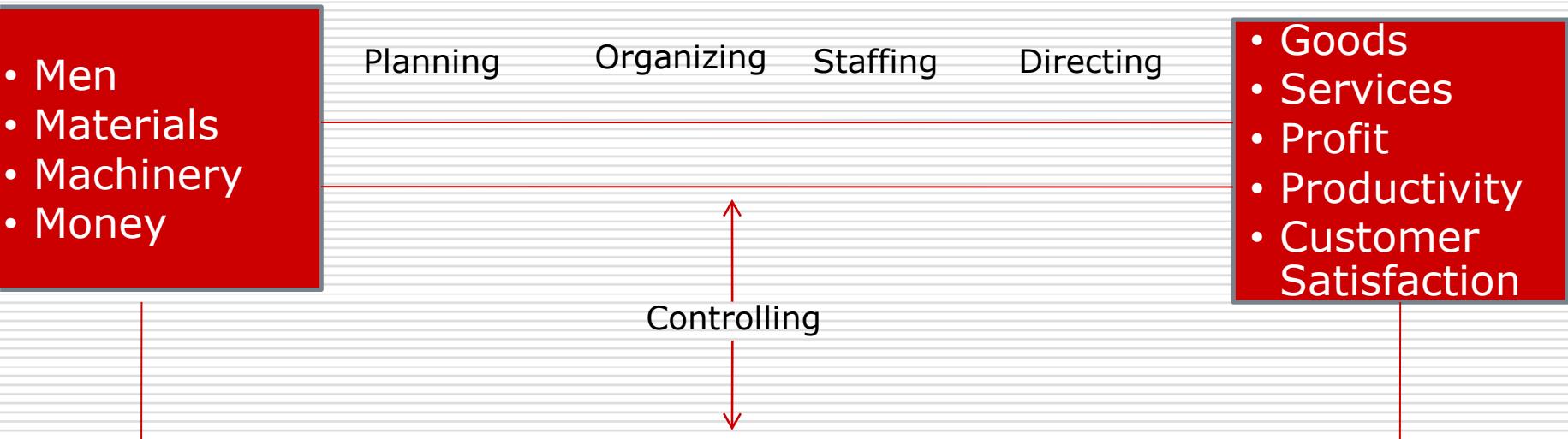
- In the present context, “managing” has become one of the most important areas of Human Activities . . .
 - Attention of Academicians and Professionals
 - Growing importance of Management
 - Greater expectations of people
 - In order to manage all well – People have been trying to evolve some methods and techniques
 - Such attempts have given a birth to management as a separate discipline.
 - Management as one of the most respected disciplines.
-

Definitions of Management...Continue

- However precise definition of management is difficult
—because of bringing characteristics of all and its non-standardized use of term of management.
- Being a new discipline it has drawn management concepts and principles from different disciplines like —economics, sociology, psychology, anthropology, history, statistics, and so on.
- Ex: Economist see management as factors of production
- Ex: Sociologist see management as a class or group of persons
- Ex: Practitioners of management treated as a process.

Definitions of Management...Continue

- Management as process – practitioners view is most prevalent.



Definitions of Management...Continue

- **Terry** has observed “the word managing is probably more descriptive and precise term than management ”
 - Management is not people, it is an activity like walking, reading, swimming or running. People who perform management can be designated as managers, members of management, or exclusive leaders.
 - Thus, management can be studied as a process.
-

Definitions of Management...Continue

- In studying management as a process, various managerial activities can be taken as basis for defining management.
- Thus, management is what a manager does. However, this definition, though simple, suffers from two serious limitations.
- **First**, there is a problem in identifying the people in the organization who can be called as managers because there is no uniformity in the titles given to the people.
- Ex: People at top level may be called as president, chief executive officer, managing director, etc...

Definitions of Management...Continue

- People at middle level may be called as executives or accountants.
- People at lower level termed as supervisors.
- Therefore, it becomes difficult to identify who is a manager and who is not; whose activities should be treated as managerial and whose activities as non-managerial.
- Thus, what should be studied is not clear.
- **Second**, even if the problem of identifying people as manager is resolved, the problem of identifying managerial activities remains because people known as managers may perform different kinds of activities some of which may not really be managerial.

Definitions of Management...Continue

- Therefore, unless some yardsticks are prescribed to distinguish between managerial and non managerial activities, managerial activities can not be identified.
- Total activities of an organization can be divided into two groups: Operational and managerial.
- Those activities which are of operative in nature through which actual work is accomplished such as handling machine by worker, putting materials in godown, etc... are called as **Operational activities**.
- As against this, some activities are performed to get things done like a supervisor instructing a worker to do a particular job, or marketing manager instructing his salesman to contact new customer and sell products, etc... are different than first group are managerial activities.

Definitions of Management...Continue

- Thus, management can be defined as the process of **getting things done by others.**
- Management is invariably defined as the process of **"getting things done through the efforts of others".**

OR

- **"getting from what we are to where we want to be with the least expenditure of time, money, and effort"**

OR

- **"Coordinating individual and group efforts towards superordinate goals"**
- Though these definitions of management as process use different statements, all of them convey the same set of meaning in final analysis.

Definitions of Management...Continue

- **Koontz** defines management in a very simple form
“Management is the art of getting things done through and with the people in formally organized group”

 - **McFarland** defines management in more elaborate form. According to him, **“Management is defined for conceptual, theoretical and analytical purposes as that process by which managers create, direct, maintain, and operate purposive organization through systematic, coordinated co-operative human effort”**
-

Features of Management

- In light of discussed above all definitions and discussions, following characteristics of management as process can be identified.

- 1. Organized Activities:**
 - 2. Existence of Objectives:**
 - 3. Relationship among Resources:**
 - 4. Working with and through People:**
 - 5. Decision Making:**
-

Nature of Management

- The study and application of management techniques in managing the affairs of the organization have changed its nature over the period of time. The nature of management can be described as follows:

1. Multidisciplinary:

- It draws the knowledge from various disciplines
- It integrates the ideas and concepts taken from different disciplines and presents newer concepts which can put into practice for managing the organization.
- In fact, Integration of knowledge of various discipline is the major contribution of Management and this integrated discipline is known as management.
- Therefore, the contribution on the field can be expected from any disciplines which deals with some aspects of human beings.

Nature of Management

2. Dynamic Nature of Principles:

- Principle is a fundamental truth which establishes cause and effect relationships of a function.
- Based on integration and supported by practical evidences, management has framed certain principles.
- However, these principles are flexible in nature and change with changes in the environment in which an organization exists.
- Because of the continuous development in the field, many principles are being changed by new principles.
- Continuous researches are being carried on to establish principles in changing society and no principles can be regarded as a final truth.
- In fact, there is nothing permanent in the landslide of management.

Nature of Management

3. Relative, Not Absolute Principles:

- Management principles are relative, not absolute, and they should be applied according to the need of the organizations.
 - Each organization is different than others because of time, place, socio-cultural factors, etc...
 - However, individual working within the same organizations may also differ.
 - Particular management principle has different strengths in different conditions.
 - Therefore, principles of management should be applied in the light of prevailing conditions.
-

Nature of Management

4. Management : Science or Arts

- There is controversy whether management is science or Art**
 - The controversy with regards to the nature of management, as to whether it is a science or an art, is very old.
 - Specification of exact nature of management as science or art or both is necessary to specify the process of learning of management.
 - Learning in science basically involves the assimilation of principles while learning of art involves of art involves its continuous practice.
-

Nature of Management

- Earlier captains of industry and managers have used intuition, hunches, commonsense, and experience in managing business.
- They were not trained managers, although they were brilliant and had developed commonsense through which they have managed well.
- Commonsense and Science differ in the following ways:
 - CS is vague as compared to scientific knowledge
 - Inconsistency often appears in CS whereas logical consistency is the basic of science.
 - Science systematically seeks to explains the events with which it deals, CS ignores the need for explanation.
 - Scientific methods conclude based on critical evaluation of experimental analysis, CS methods fails to test conclusion.

Nature of Management

- Science is based on logical consistency, systematic explanation, critical evaluation, and experimental analysis.
 - The science is systemized body of knowledge. The process of scientific theory construction and confirmation can be viewed as involving the following steps:
 - The formulation of problem
 - The construction of theory to answer to the problem
 - The deduction of specific hypothesis from the theory
 - The testing of hypothesis
 - The devising of actual situation to test theorem
 - The actual testing
-

Nature of Management

Management as Science:

1. Management may be viewed as science in terms of its structures, goals, and its methods.
2. One of the important rules of science is that concepts have to be defined clearly in terms of the procedure involved in their measurement.
3. In science, observations must be controlled so that causation may be imputed correctly. (by holding constant)
4. Theories in science are in terms that permit empirical confirmation. Scientific statements are testable and the tests are capable of repetition with same results.

Nature of Management

- The various factors analyzed above suggest that management is not a pure science but it can be simply called “Inexact Science” or “Pseudo Science”.
 - **Management as Art**
 - Management can be regarded as an art also.
 - The meaning of art is related with the bringing of a desired result through the application of skills.
 - Where as under science, one learns “why” phenomenon and under arts, one learns the “how” of it.
 - Art is thus understanding of how particular work can be accomplished.
 - That is, art has to do with applying of knowledge or science or of expertness in performance.
-

Nature of Management

- This is important in management in many instances much creativity apply in managerial effort.
- **Ex: Doctor**
- **EX: Management Student**
- Management is an art can be seen from the following facts:
 1. The process of management does involve the use of know-how and skills like other art such as music, painting, etc...
 2. The process of management is directed to achieve certain concrete results as other field of art also.
 3. Management is creative like any other art.
 4. Management is personalized meaning thereby that there is no 'one best way of managing'.

Nature of Management

- **Management: Both Science and Art**
- Thus, to be a successful manager, a person requires the knowledge of management principles and also the skills of how the knowledge can be utilized.
- Absence of either will result inefficiency.

Science	Arts
Advances of Knowledge	Advances by Practice
Proves	Feels
Predicts	Guesses
Defines	Describes
Measures	Opines
Impresses	Expresses

Nature of Management

- It can be concluded that management uses science and art both in managing an organization.
 - A balance between two is needed. Neither should be overweighed nor slighted.
 - Therefore, the **old** saying that "**Knowledge is power**" is partly true.
 - The **correct** saying should be "**Applied knowledge is power.**"
 - This is particularly true for management phenomenon which is a situational phenomenon.
-

Nature of Management

5. Management as Profession

- The characteristics if Profession
 - 1. Existence of Knowledge**
 - 2. Formal method of Acquisition of Knowledge**
 - 3. Professional Association**
 - 4. Ethical codes**
 - 5. Service Motives**
 - Thus, based on discussion we can conclude that above all characteristics are found in management. Hence, Management can be regarded as Profession.
-

Nature of Management

6. Universality of Management

- However, management principles are not universally applicable but are to be modified as according to the needs of organization.
 - **Arguments against Universality**
 - **Arguments For Universality**
-

Nature of Management

6. Universality of Management

Arguments against Universality

1. Management is culture bound

- Individualism & Collectivism
- Power Distance
- Uncertainty Avoidance
- Masculinity
- Time Orientation

2. Objective of an enterprise

3. Differences in Philosophies

Nature of Management

6. Universality of Management

□ Arguments for Universality

- 1.** Management as process
 - 2.** Distinction between management fundamentals and Techniques
 - 3.** Distinction between management fundamentals and Practices
-

Functions of Management

- The general approach of studying management is to treat management as a process. Management as process may involve a number of activities or elements.
- Management process suggest that all the managers in the organization perform certain functions to get things done by others.
- Management functions varies from author to author.
- **Henry Fayol**
 - Planning, Organizing, Commanding, Coordinating
- **Gullick & Urwick**
 - POSDCORB (Planning, Organizing, Staffing, Directing, Coordinating, Reporting, and Budgeting)

Functions of Management

- **Davis**
 - Planning, Organizing, and Controlling
- **Brech**
 - Planning, Organizing, Motivating, Coordinating, and Controlling)
- Various functions of management as suggested by various authors taken into account, the list is:

Planning	Organizing	Commanding
Coordinating	Controlling	Investigation
Communicating	Formulating	Staffing
Directing	Leading	Motivating
Representing	Decision Making	Activating
Evaluating	Administrating	and so on..... List continue

Functions of Management

- The list is very long. However this list can be shorten by combining some functions into one major function.
 - **Directing** may include leading, motivating, communicating, commanding, activating into one function.
 - Thus, Managerial functions may broadly be grouped into **planning, organizing, staffing, directing, and controlling**.
-

Functions of Management

1. Planning

- Determination of future courses of actions to achieve desired result
 - What one wants to achieve?
 - When to achieve?
 - How to achieve?
 - Determination of Objectives
 - Setting rules and procedures
 - Determining Project
 - Setting policies and Strategies
 - Budgeting
-

Functions of Management

2. Organizing

- Dividing work into convenient tasks or duties
 - Grouping of such duties in the form of positions
 - Grouping of various positions into Departments and Sections
 - Delegating authority to each position. So, that work is carried out as planned
 - It contributes to the efficiency of the organization by ensuring that all necessary activities will be performed and objectives are achieved.
-

Functions of Management

3. Staffing

- Manning various positions created by organizing process
 - Preparing inventory of personnel available and Identifying the gap between manpower required and available.
 - Identifying sources of recruitment, selecting people, training & developing them, fixing financial compensation, apprising them periodically, etc...
 - Performed by individual manager Vs. Personnel department
 - Ex: Performance appraisal system
-

Functions of Management

4. Directing

- People must know, what they are expected to do in the organization.
 - Superior has to communicate to Subordinate about expected behavior.
 - Continuous responsibility of guiding & motivating them to work with zeal & enthusiasm.
 - Thus it includes communicating, motivating and leading.
-

Functions of Management

5. Controlling

- Identifications of actual results
 - Comparisons of actual Vs. expected results by planning process
 - Identifying deviations, if any.
 - Taking corrective actions, so that actual match with expected results.
-

Nature of Management Functions

- 1.** Management functions are universal.
 - 2.** Management functions have iterative quality
 - 3.** Management process suggest a sequential arrangement of functions.
 - 4.** Relative importance of management functions can be identified in the context of management level.
-

**Development
of
Management Thought
by
Management Guru**

Contribution of Frederick Winslow Taylor

Taylor and Scientific Management

- Frederick Winslow Taylor and other contributors notably Frank Gilbreth, Lillian Gilbreth, and Henry Gantt, investigated the effective use of human beings in industrial organizations, particularly at the shop floor levels.

 - Taylor has defined the basic problem of managing as the art of "**Knowing exactly what you want men to do and then see in that they do it in the best and cheapest way**"
-

Taylor and Scientific Management

- Since Taylor has put the problem of managing on a scientific way, he is often known as "**Father of Scientific Management**" and his contributions as the **principles of Scientific Management**.
- **Taylor** joined Midvale Steel company in U.S.A. as a worker and later on became supervisor. During this period, he continued his studies and completed his ME. Subsequently he joined Bethlehem Steel company. At both places he carried out some experiments, how to increase human efficiency.
- Even after his retirement, he continued to develop scientific management. On the basis of his experiments many papers and book published and his all contributions compiled in a book "**Scientific Management**".

Taylor and Scientific Management

- Taylor's work can be described in two major parts:

1. Main Features of Scientific Management

2. Principles of Scientific Management

Taylor and Scientific Management

Main Features of Scientific Management

1. Separations of Planning and Doing

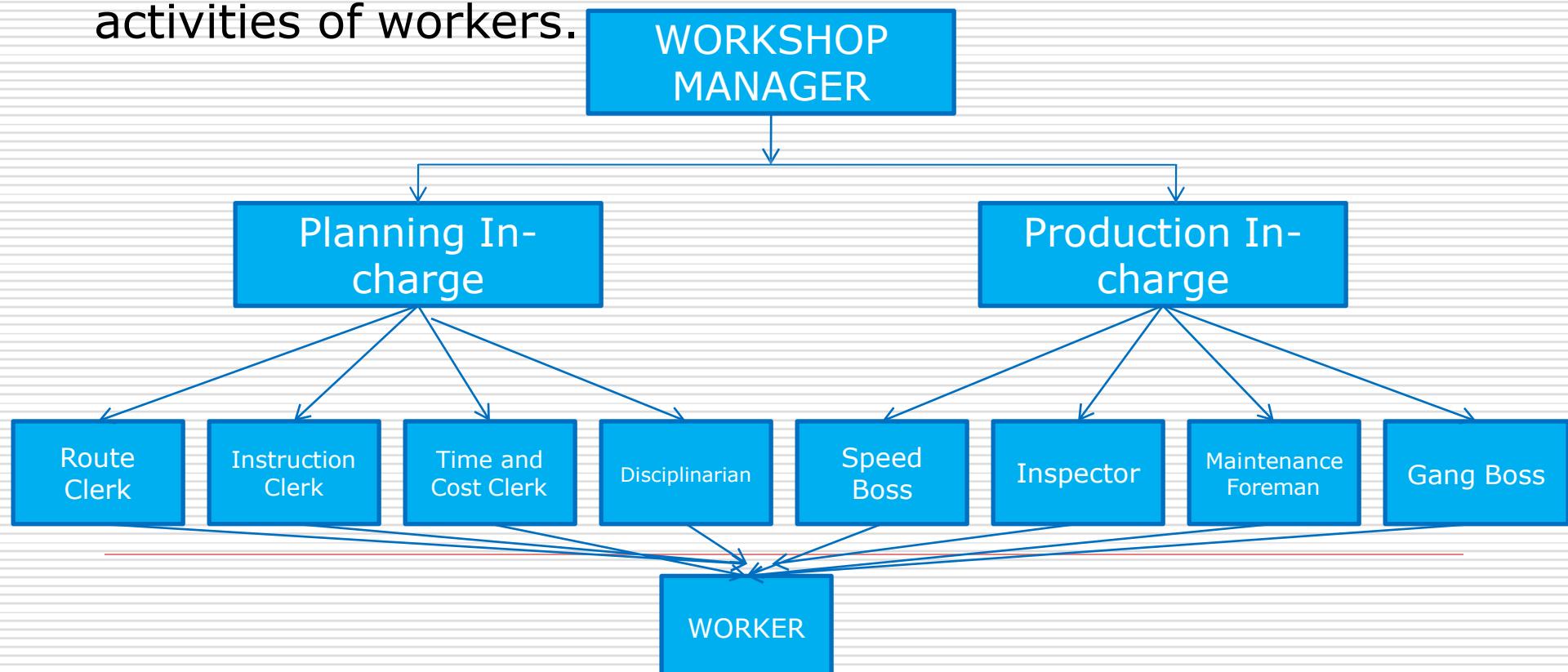
- The separation of planning aspects from actual doing of work.
 - Before this concept, Worker used to plan about how he had to work and what instruments were necessary for that.
 - The worker was put under supervision of a supervisor commonly known as Gang Boss.
 - The supervisor's job was merely to see how the workers were performing. This was creating a lot of problems.
 - Hence, he emphasized planning should be left to supervisor and the worker should emphasize only operational work.
-

Taylor and Scientific Management

□ Main Features of Scientific Management

2. Functional Foremanship

- In this system eight (8) persons are involved to direct the activities of workers.



Taylor and Scientific Management

□ Main Features of Scientific Management

3. Job Analysis

- It is undertaken to find out one best way of doing the thing.**
 - Time Study**
 - Motion Study**
 - Fatigue Study**
 - Time – Motion – Fatigue Study**
-

Taylor and Scientific Management

Main Features of Scientific Management

4. Standardization

- Instruments and tools
 - Period of works
 - Amount of work
 - Working conditions
 - Cost of productions, etc...

 - These things should be fixed in advance on the basis of job analysis and various elements of costs that go in performing a work.
-

Taylor and Scientific Management

□ Main Features of Scientific Management

5. Scientific Selection and Training of Worker

- Workers education**
 - Work Experience**
 - Aptitude Test**
 - Physical Strength**
 - Technical Skill and Knowledge**

 - Apart from selection, proper emphasis should be given on the training of workers which makes them more efficient and effective.**
-

Taylor and Scientific Management

□ Main Features of Scientific Management

6. Financial Incentive

□ Differential Piece Rate System

□ Taylor has suggested that wages should be based on individual performance and not on the position which he occupies.

Taylor and Scientific Management

□ Main Features of Scientific Management

7. Economy

- Scientific management not only focuses on technical and scientific aspects but also adequate consideration should be given to economy and profit.**

 - Resources should be more productive and eliminate unnecessary wastages.**
-

Taylor and Scientific Management

□ Main Features of Scientific Management

8. Mental Revolution

- Mutual co-operations between management and workers.**
 - Shift must taken place from Conflict to Co-operations.**
 - In the absence of this, no principles of scientific management can be applied.**
-

Taylor and Scientific Management

Principles of Scientific Management

1. Replacing Rule of Thumb with Science

- Organized knowledge should be applied which replace rule of thumb.
 - Scientific method denotes precisions in determining any aspects of work, rule of thumb emphasis on estimation.
 - Various aspects of work like –
 - Differential piece rate system
 - Day's fair work
 - Amount of work, etc...
 - These should not be based on estimation.
-

Taylor and Scientific Management

□ Principles of Scientific Management

2. Harmony in Group Action

- Harmony in group action rather than discord (Conflict)**
 - Mutual give and take situation and proper understanding**
-

Taylor and Scientific Management

Principles of Scientific Management

3. Co-operations

- Mutual confidence, co-operations & Goodwill
 - Co-operations between Management and Workers
 - It can be developed through mutual understanding and a change in thinking
 - Substitution of war for peace, healthy & brotherly co-operations, becoming friends instead of enemies.
-

Taylor and Scientific Management

□ Principles of Scientific Management

4. Maximum Output

- Continues increases in production and productivity must be focused**
 - It is worse crime to restrict production**
 - He decried quarrel over production but welcomed quarrel over distribution**
-

Taylor and Scientific Management

□ Principles of Scientific Management

5. Development of Worker

- All workers should be developed to the fullest level**
 - Scientific Selection**
 - Providing training at Work-place**
 - Training may be through non scientific methods.**
-

Taylor and Scientific Management

- The principles of management were more concerned with problem at the operating or shop floor levels and did not emphasize on management of the organization from manager's point of view.
- Therefore, it was more relevant from engineering point of view rather than management point of view.
- As such, the scientific management is more relevant to mechanism and automation – technical aspect of efficiency – than the broader aspects of management of an organization.

Contribution of Henry Fayol

Contribution of Henry Fayol

- Perhaps, the real father of modern management theory is the French industrialist **Henry Fayol**.
 - His contributions are generally termed as operational management or Administrative management.
 - Fayol looked at the problem of managing organization from the top management point of view.
 - He has used the term “Administration” instead of “Management” emphasizing that there is unity of science of administration.
-

Contribution of Henry Fayol

- He has emphasized that principles of management is a universal phenomenon.
- However, he has also emphasized that principles of management are flexible and not absolute and are usable regardless of changing and special conditions.
- Fayol found that activities of an industrial organization could be divided into six groups:

- 1. Technical**
 - 2. Commercial**
 - 3. Financial**
 - 4. Security**
 - 5. Accounting**
 - 6. Managerial**
-

Contribution of Henry Fayol

- Fayol has divided his approach of studying management into three parts:

1. Managerial Qualities

2. General Principles of Management

3. Elements of Management

Contribution of Henry Fayol

1. Managerial Qualities

- According to him, there are six types of qualities that a manager requires.

 - Physical (health, Vigor (Energy), and Address)
 - Mental (ability to understand or learn, judgment)
 - Moral (firmness, initiative, loyalty, tactful)
 - Educational
 - Technical (Particular to the function being performed)
 - Experience (Arising from the work)
-

Contribution of Henry Fayol

2. General Principles of Management

- Management principle is a fundamental truth and establishes cause-effect relationship.
 - Management elements denotes the function performed by a manager.
 - He has emphasized on two things:
 1. The list of principles is not exhaustive (complete) but suggestive and has discussed only those principles which he followed on most occasions.
 2. Principles of management are not rigid, but flexible.
-

Contribution of Henry Fayol

1. Division of Work

- To take the advantage of specialization
 - Work on the same part
 - i.e. manager concerned with same matters (Demand forecasting)
 - Acquire an ability, sureness, accuracy which increases their output.
 - Each change of work bring training & adoption which reduces output.
 - At all level of organization
-

Contribution of Henry Fayol

2. Authority and Responsibility

- Official authority derives from the manager position
 - Personal authority is derived from personal qualities such as intelligence, experience, morality, etc...
 - Responsibility arrives out of assignment of activity
 - There should be parity of authority & responsibility
-

Contribution of Henry Fayol

3. Discipline

- Discipline is obedience behaviors and outward mark of respect shown by employees.
 - Self imposed discipline springs from the within the individual.
 - Command discipline stems from a recognized authority to secure compliance with desired action, which is expressed by established customs, rules, and regulations.
 - Command discipline is in form of remunerations, warnings, suspensions, and dismissals, etc...
-

Contribution of Henry Fayol

4. Unity of Command

- A person should get order and instructions from only one supervisor.
 - Less number of problem in conflicts in instructions and greater is the feeling of personal responsibilities for results.
 - Contrary to Taylor's Functional Foremanship
-

Contribution of Henry Fayol

5. Unity of Direction

- Each group of activities with the same objectives must have one head and one plan.

 - Unity of direction concerned with functioning of organization
-

Contribution of Henry Fayol

6. Subordination of Individual interest to General Interest

- Common Interest is above individual interest
 - Individual interest must be subordinate to general interest when there is conflict between two.
 - Ambition, laziness, weakness, etc... tend to reduce the importance of general interest.
 - Continuous vigilance (watchfulness for danger) and supervision is desired.
-

Contribution of Henry Fayol

7. Remuneration of Personnel

- It must be fair & Provide maximum satisfaction to employee & Employers
 - He did not favor profit-sharing plan for worker but advocated it for managers
 - Non-financial benefits must be given.
-

Contribution of Henry Fayol

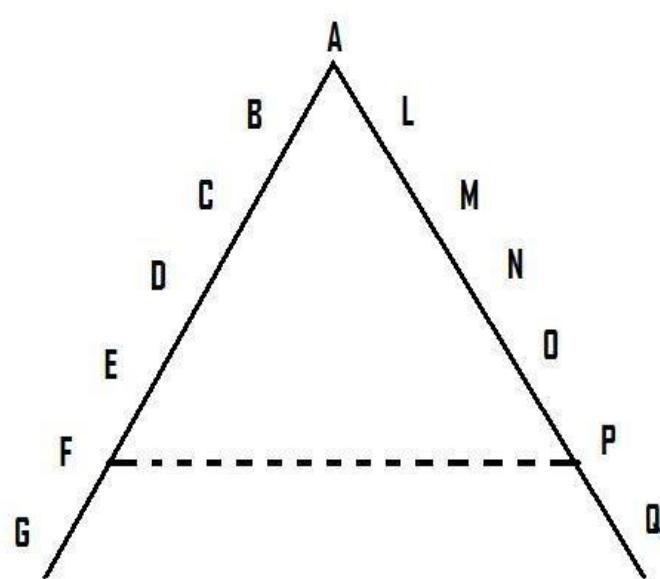
8. Centralisation

- Subordinates role increases in decentralisation and vice versa
- In small firm, centralisation is the natural, but in large scale firm, series of intermediaries require
- Share of authority & Initiative left to intermediaries depend on the personal character of manager, his moral, the reliability of subordinate, and also conditions of the business.
- Degree of centralisation and decentralisation is desirable, it may very constantly.

Contribution of Henry Fayol

9. Scalar Chain

- Communication going up or down, must flow through each position, in the line of authority.
- Short circuited only in special circumstances.
- For that Fayol, suggested “**Gang Plank**”



Contribution of Henry Fayol

10. Order

- Arrangements of things and people
 - Material Order
 - Social order (Right man at Right Place)
 - Balance between requirements and resources
-

Contribution of Henry Fayol

11. Equity

- Combination of justice and kindness.
 - Equity in treatment & behaviour is liked by everyone and it brings loyalty .
 - Good sense, knowledge, and experience
-

Contribution of Henry Fayol

12. Stability of Tenure

- No employee should remove in short time
 - Reasonable security of job
 - Avoid unnecessary tenure
-

Contribution of Henry Fayol

13. Initiative

- Within the limits of authority & responsibility, manager should encourage their employee for taking initiative.

 - Thinking out & Execution of plan

 - It increases Zeal and Energy
-

Contribution of Henry Fayol

14. Esprit de Corps

- Union is the real strength

 - Establishing the team work
-

Contribution of Henry Fayol

3. Elements of Management

- He enlisted certain elements of management as follows:
 - Planning
 - Organizing
 - Commanding
 - Coordinating
 - Controlling
-

Management and Administration

Introduction

- There is often a terminological conflict between management and administration.
- Some authors suggest that there is no fundamental difference between the two exists; it exists only in terms of usage in different walks of life.
- Other author suggests that there is difference between these two term because both of them represent different activities.
- Therefore, it is desirable to resolve terminological conflict between management and administration.

Introduction

- At the initial level of development of management thought, no distinction between these two was made and both terms were used interchangeably.
- In 1923, the terminological conflict between the two was raised by **Oliver Sheldon** when he emphasized administration as decision making function and management as execution function. After that a lot of controversies arises between these two. It covers broadly as follows:
 1. Administration is above management
 2. Administration is a part of management
 3. Administration and management are the same

1. Administration is above management

- The general view is that Administration relates to policy formulation and management relates to policy execution and these two activities are not same.

 - According to William Spriggin “**Administration**” is that phase of a business enterprise that concerns itself with the policies necessary to be followed in achieving those objectives. **Management**, on the other hand, is an executive function which is primarily concerned with carrying out broad policies laid down by the administration”.
-

1. Administration is above management

- The basic approach of these authors is that administration determines the basic framework of the organization within which managerial functions are taken.
 - However, such early authors on management appear to be influenced by the fact that administrative process in non business activity was well developed as compared to management.
 - Therefore, they could perceive the functions of management as studies to lower levels only.
-

2. Administration is a part of management

- This approach holds view that management is a comprehensive term and administration is its part.
 - According to Brech, Management as “a social process entailing responsibility for the effective and economical planning and the regulation of the operation of an enterprise, in the fulfillment of given purpose or task”.
 - Administration as “that part of management by which it is laid down and communicated and the process of activities regulated and checked against plan”.
-

2. Administration is a part of management

- If this view is accepted, administration becomes a subordinate function of to overall management function.
 - It deals with day-to-day executive routine work is a part of management.
 - Hence, **Administration is a part of management.**
-

3. Management and Administration are same

- The most practical approach
 - Both follows the P, O, S, D, C, Co, and general principles for completing tasks.
 - The distinction exists between both is in only origin of the terms.
 - Administration: Government Structure (Non Business)
 - Management: Business Structure (Business)
-

CENTRALIZATION AND DECENTRALIZATION OF AUTHORITY

Introduction

- Centralization:** Concentration of Authority
 - Decentralization:** Dispersion of Authority

 - “Centralization is the systematic and consistent reservation of authority at central point within an organization.”
 - “Decentralization applies to the systematic delegation of authority in an organization”
-

Introduction

□ Factors determining Degree of Decentralization:

- 1.** Size of the organization
 - 2.** History of the organization
 - 3.** Management Philosophy
 - 4.** Availability of Managers
 - 5.** Patterns of Planning
 - 6.** Control Techniques
 - 7.** Decentralized activities
 - 8.** Rate of change in the organization
 - 9.** Environment Influences
-

Introduction

□ Rationale for Centralization:

- Opportunity for Personal Leadership
 - Integration of Efforts
 - Quick Decision
 - It makes communication and control easier in the organization
 - It helps in reducing wastages of efforts by avoiding duplication
 - Uniformity in actions
-

Introduction

□ Rationale for Decentralization:

- It reduces burden of top management, they spend more time in strategic management
 - It facilitates growth and expansion
 - It is a good philosophy to motivate managers
 - Encourages development of managers by providing opportunities to their shoulder more responsibility
 - More result oriented approach
-



MODULE 2

Major Topics

- Nature and Purpose of Planning**
 - Steps in Planning**
 - Forms of Planning**
 - Types of Plan**
-

NATURE AND PURPOSE OF PLANNING

Nature of Planning

- Introduction**
 - Planning is the beginning of the process of management. Because, planning set all other functions into action, it can be seen as the most basic function of management.
 - Planning is an intellectual process which require a manager to think before acting. It is thinking in advance.
-

Nature of Planning

- It is by planning that managers of organizations decide:-
 - What is to be done?
 - When it is to be done?
 - How it is to be done? And
 - Who has to do it?
 - Thus, decision making is an integral part of planning.
 - It is defined as the process of choosing among alternatives. Obviously, decision-making will occur at many points in the planning process.
-

Nature of Planning

- Planning is a continuous process manager should constantly watch the progress of the plans. He must constantly monitor the conditions, both within and outside the organizations to determine if changes are required in his plans.
 - Plan must be flexible, by flexibility of plan is meant is ability to change direction to adapt to changing situations without undue cost.
 - It is simple common sense that a plan must provide as many as contingencies as possible.
-

Nature of Planning

- It needs to possess a built in flexibility in at least five major areas: Technology, Market, Finance, Personnel, and Organization.
 - Flexibility is possible only within limits. It is almost invariably true that it involves extra cost. Sometimes it may be so expensive that its benefits may not be worth against the cost.
 - Planning is all-pervasive function. Planning is important to all managers regardless of their level in the organization.
-

Nature of Planning

- **One major difference** concerned the time period covered. Top level managers are generally concerned with their longer-time period (six months to five years or later). Lower level managers are more concerned with planning activities for the day, week, or the month.

 - **Second,** major difference concerned the time spent on planning. Top level managers spent more time in planning whereas lower level managers spent less time in planning.
-

Purpose of Planning

- The planning done by managers is aimed at **achieving the organizational goals.**
 - The planning helps people in **concentrating their efforts** on the most important jobs rather than wasting time on the lesser important work.
 - The purpose of planning is also to **minimize the cost** of performance and **eliminate unproductive** efforts.
 - It also helps the management in adopting and **adjusting** according to the **changes** that take place in the environment.
-

Purpose of Planning

- Planning also provides a **basis for teamwork** as when the goals are properly defined assignments can be fixed and all the members can start contributing in the achievement of these objectives.

 - Planning gives a sense of **direction** and ensured that efforts are being put to useful purpose instead of being wasted.

 - Planning also facilitate **control** because without planning there will be nothing to control.
-

STEPS IN PLANNING

STEPS IN PLANNING

- Steps in planning includes**
 - 1. Establishing verifiable Goals or Set Goals to be achieved**
 - 2. Establishing planning premises**
 1. Internal and External Premises
 2. Tangible and Intangible Premises
 3. Controllable and Non-controllable Premises
 - 3. Deciding the Planning Period**
 - 4. Finding Alternative Courses of Action**
 - 5. Evaluating and Selecting Courses of Action**
 - 6. Developing Derivative Plans**
 - 7. Measuring and Controlling the Progress**

1. Establishing verifiable Goals or Set Goals to be achieved

- Top Management usually set the Goal for the organization.
- The first step in planning is to determine the enterprises objectives
- Various types of objectives
 - i.e. Desired sales volume, Growth rate, Development of New Product or Service
- Type of Goal selected depend on factors like-
 - Basic Mission of the organization
 - Values that management holds
 - Actual & Potential abilities of the organization

2. Establishing Planning Premises

- Planning premises means “the conditions under which planning activities will be undertaken”
 - “Certain assumption about future” – on that basis plan will be ultimately formulated.
 - Planning premises are vital to success of planning as they supply pertinent facts and information.
 - Planning premises can be variously classified as under:-
-

2. Establishing Planning Premises

1. Internal Premises

- Policies & Programs of the organization
- Capital Investment in plant & Equipment
- Competence of Management
- Skills of the labor force
- Resources & Abilities of organizations
- Sales Forecasts
- Beliefs, behaviour & values

2. External Premises

- General Business & Economic Environment
- Technological Changes
- Government Policies & Regulations
- Political Stability
- Population Growth
- Sociological factors
- Demand for Industry's product

2. Establishing Planning Premises

1. Tangible Premises

- Population Growth
- Industry Demand
- Capital & Resource

2. Intangible Premises

- Political Stability
- Sociological Factor
- Business & Economic Environment

1. Controllable Premises

- Company's Policies
- Competence of Management
- Skills of labor force
- Availability of Resources

2. Non-controllable Premises

- Strikes, wars, Natural calamities
- Emergency
- Legislation, etc...

3. Deciding the Planning Period

- Companies generally base their period on a future that can reasonably be anticipated.
 - Other factors which influence the choice of a period are as follows:-
 - Lead time in development and commercialization of new product
 - Time required to recover capital investment or The pay back
 - Length of commitments already made
-

4. Finding Alternative Courses of Action

- Based on organization objectives and planning premises, various alternatives suggest that a particular objective can be achieved through various actions.
 - i.e. Objectives to grow further may be achieved by-
 - Expanding the business in same field
 - Diversification
 - Joining Hands (M&A)
 - Taking over other organizations
-

5. Evaluating and Selecting Alternative Course of Action

- Evaluate alternative Course of Action
 - Evaluate in lights of Premises and Goals
 - Evaluate in terms of available resources and constraints
 - Evaluate from benefits Vs. Risk
-

6. Developing Derivative Plans

- Goals must be translated into day-to-day operations
 - Middle & lower level managers must draw up the appropriate plans, programmes and budgets for their sub-units.
 - These are called “Derivative Plans”
 - Selecting Goals for their Sub-units.
-

7. Measuring & Controlling the Progress

- It measures the progress of the plan which is executed or implemented
 - Hence, it's critical part of for any plan.
 - They can compare with actual result Vs. Planned result and take necessary remedial actions.
 - Changes can be made or accommodate in plan.
-

FORMS OF PLANNING

FORMS OF PLANNING

- However, one useful way of classifying them is to distinguish between strategic and tactical planning.
- **Strategic Planning**
- It decides the major goals and policies of organization and also allocation of resources to achieve these goals.
- It's done at higher (top) level management.
- It is for long term period.
- It is generally based on long-term forecasts about technology, political environment, etc... and is more uncertain.
- It is in less detailed because it does not involve day-to-day operations of the organization.

FORMS OF PLANNING

- Tactical Planning**
 - It decides the detailed use of resources for achieving each goal.
 - It is done at lower levels of management.
 - It is for short term period.
 - It is based on the past performance of the organization and is more certain.
 - It is more detailed because it involves with day-to-day operations of the organizations.
-

TYPES OF PLANS

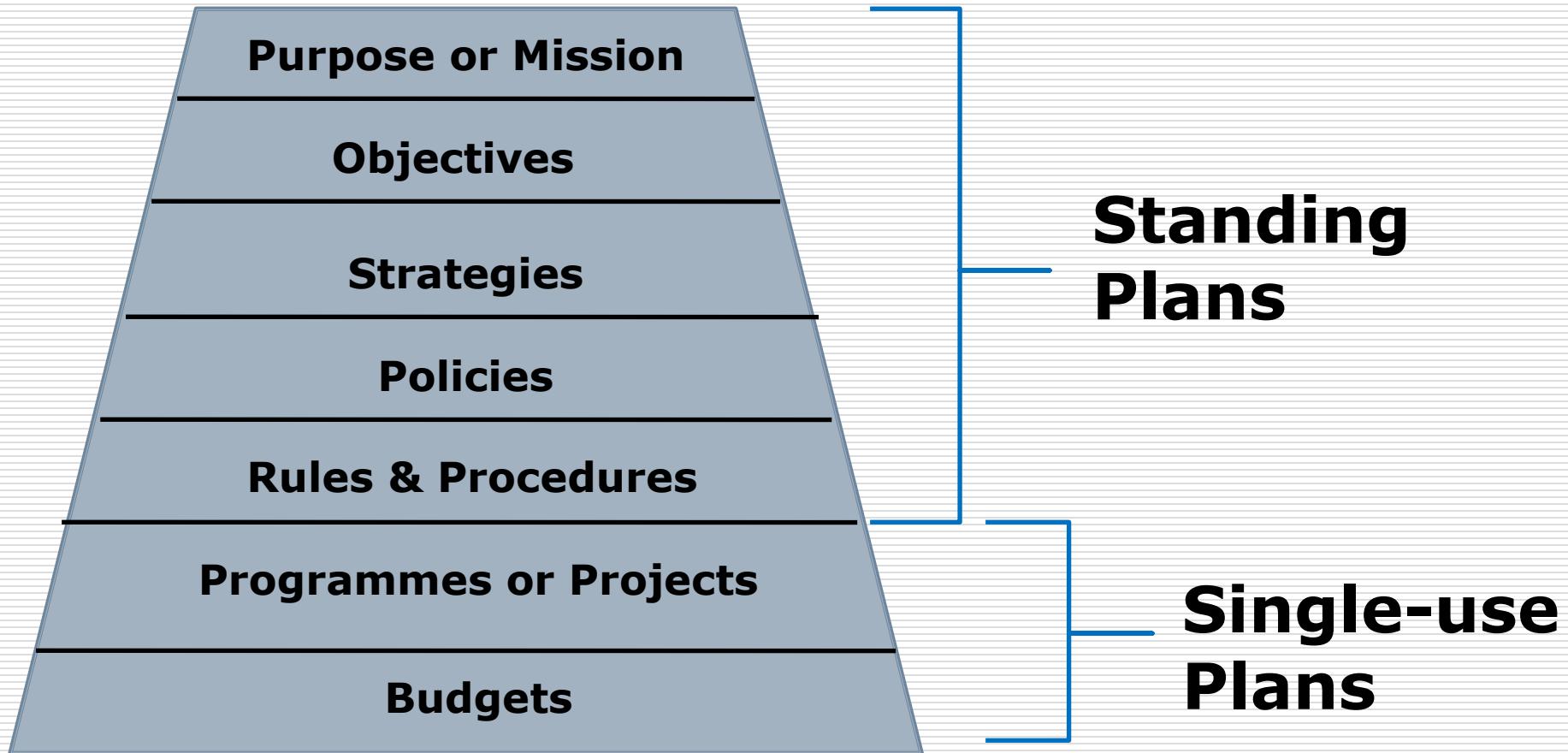
TYPES OF PLANS

- A plan is a commitment to a particular courses of action believed necessary to achieve specific result.
 - There are two-types of plans:
 - 1. Single-use plans**
 - 2. Standing plans**
 - The basic difference between standing plan and single-use plan, thus, lies in their use over a period of time.
 - Standing plans are used over a period of time and single-use plans are used for only specific period.
-

TYPES OF PLANS

- Single-use plans, as their name suggests, are developed to achieve a specific end; when the end is reached, the plan is dissolved.
- Budgets, targets, Quotas, are single-use plans because once these are achieved, these are to be formulated again.
- Standing plan, on the other hand are designed for situation long-time period.
- Mission, objectives, strategies, policies, rules & procedures are planned for long-period of time in an organizations.

TYPES OF PLANS



OBJECTIVES

Objectives

- Objectives are the end results which organizations want to achieve.
 - Goals and objectives are interchangeably used.
 - According to McFarland – “Objectives are goals, aims, or purpose that organizations wish over varying periods of time”
 - According to Terry and Franklin – “A managerial objective is the intended goal that prescribes definite scope and suggest direction to the planning efforts of a manager”
-

Features of objectives

- Each organization, or group of individuals, has some objectives.
 - Objectives may be broad or they may be specifically mentioned.
 - Objectives may be clearly defined, which may provide clear directions.
 - Organizational objectives have social sanction.
 - An organizational may have multiple objectives.
 - An organizational objectives may be changed.
-

Guideline for Objective Setting

- Objectives must be clearly specified
 - It must taken into account all factors affecting their achievement
 - It should be consistent with mission of the organization
 - It should be rational, realistic, rather than idealistic
 - It must be achievable
 - It must yield specific result when achieved
 - It must be desirable for those who are responsible for the achievement
 - It must be consistent over a period of time
 - They must be periodically reviewed
-

Management By Objectives (MBO)

- Management by objective (MBO) or Management by Result (MBR), has drawn considerable attention of both academicians as well as practitioners because of two reasons.
 - First, It focuses sharply on the objectives or results which a manager is expected to achieve within a specified period.
 - Second, It emphasizes participative management, an approach provides high motivation to individuals in an organization.
-

Management By Objectives (MBO)

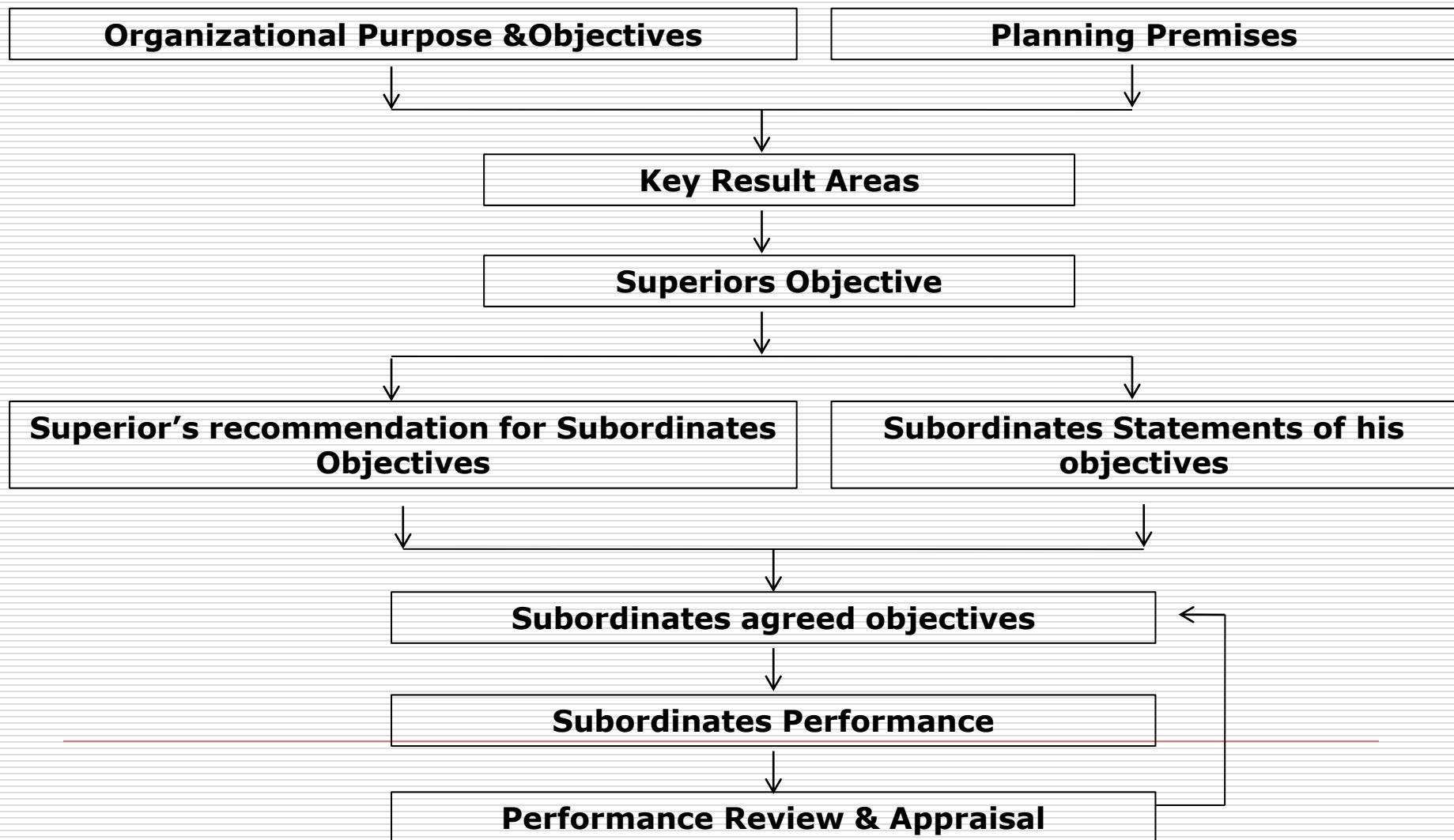
- The term MBO was coined by Peter Drucker in 1954 when he emphasized the concept of Management by Objective.

 - “MBO is a comprehensive managerial system that integrates many key managerial activities in a systematic manner, consciously directed towards the effective and efficient achievement of organizational objectives.”
-

Features of MBO

- MBO is an approach and philosophy to management and not merely a technique.
- As an approach to management, with objective orientation as its essence, MBO is bound to have some relationship with every management technique.
- The basic emphasis of MBO is on objectives.
- The MBO is characterized by the participation of concerned managers in objective setting and performance reviews.
- Periodic review of performance is an important feature of MBO.
- Objectives in MBO provide guidelines for appropriate system and procedures.

Process of MBO



Process of MBO

1. Setting of organizational purpose and objectives

- It must ask certain question as, **Why does the organization exist?**
- What should be our business?**
- It provides guidelines for the statement of purpose.
- Thus, an interaction with external factors, then determines the long term strategic objectives like-
 - Whether to achieve growth through expansion of business in same line or diversify.
 - What should be vertical integrations in our business?
- Objectives start from top level management and reach to bottom level.

Process of MBO

2. Key Result Area

- Organizational objectives and planning premises together provide the basis for the identification of Key Result Area(KRA).
 - KRA also indicate present state of an organizations health and top management perspectives for the future.
 - Examples of KRA's to most of business organizations are- Profitability, market standing, innovation, productivity, worker performance, financial and physical resources, manager performance, and public responsibility.
-

Process of MBO

3. Setting Subordinate Objective

- Each individual manager must know what he is expected to achieve.
 - Superior and subordinate seat together for objective setting process.
 - Superior state the objectives to subordinate.
 - There may be wide gap between recommended objectives by superior and suggested objectives by subordinate.
 - Mutual negotiation happens between both of them.
-

Process of MBO

4. Matching resources with Objectives.

- Resource availability becomes important aspects of objective setting because it is the proper application of resources which ensures objective achievement.

5. Appraisal

- It checks whether the subordinate is achieving his objectives or not.
- If not, what are problems and how these problems can be overcome.
- Appraisal must be undertaken as an on-going process.

Process of MBO

6. Recycling

- It is used as an input for recycling objectives and other actions.
- Objectives are neither set at the top and communicated to the bottom nor are they set at the bottom and go up.
- Objective setting is a joint process through interaction between superior and subordinate.



Benefits of MBO

□ Better Management

- Resources are put in such manner that they result into better performance.
- Better management by clarity in objectives, role clarity, periodic feedback of performance, participation by managers in the management process, realisation that there is always scope for improvement, etc...

□ Clarity in Organizational action

- It provides Key Result Area(KRA) where organizational efforts are required
-

Benefits of MBO

□ Personal Satisfaction

- This is because of two closely related phenomena:
 - (1) Participation in objective setting
 - (2) Rational performance appraisal.

□ Basis for Organizational Change

- MBO stimulates the changes, and provides a framework and guidelines for planned change, enabling management to initiate, plan, direct and control the direction and speed of change.
-

Limitations of MBO

Time and Cost

- It is not as simple as it looks to be.
- It requires large amount of scarce resources like time of senior managers
- It is something over and above some normal work
- It also generates grater paper work as so many forms are need to be filled by both.
- It creates only in the initial phase of MBO and organization over a period of time it may be disappear.

Failure to teach MBO philosophy

- Managers fail to understand and appreciate the new approach by creating doubt in their mind like -
 - What purpose it served by MBO?
 - How the performance is to be appraised?
 - How organization will benefit?

Limitations of MBO

□ Problems in objective setting

- It requires objective must be set out in verifiable terms, against which performance can be measured.
- It is again difficult to set in at least some of the area like innovation, technology, etc...

□ Emphasis on short term objectives

- It is very well suitable and dealt with short term objective its preciseness around for a year or even less.
 - It is danger to emphasis on short term objectives at the cost of long term objectives.
-

Limitations of MBO

□ Inflexibility

- In a dynamic environment, particularly objectives may not be valid forever. In the context of revised objectives, changed premises or modifies policies, it is useless to follow old objectives.
- However, many managers often hesitate to change objectives during a period of time. Thus, inflexibility can really cause harm to the organization.

□ Frustration

- It may be because of two reasons:
 1. As lack of experiences, many organization could not implement MBO properly.
 2. Introduction to MBO tends to arouse high expectations for rapid change particularly among young junior managers in terms of organizations growth, profitability and in themselves in their career advancement. If rate of changes is slower than expected due to any reason, managers begin to feel frustration.

Decision Making

Decision

- The word 'decision' has been derived from the Latin word 'decidere' which means a cutting away or cutting off.
 - Thus, decision involves a cut of alternatives between those that are desirable and those that are not desirable.
 - The decision is a kind of choice of a desirable alternative.
-

Decision

- Decision**
 - According to Lopez –
 - “A decision represents a judgment; a final resolution of a conflict of needs, means, or goals; and a commitment to action made in face of uncertainty, complexity, and even irrationality”
-

Features of Decision Making

- Decision making implies that there are various alternatives and the most desirable alternative is chosen to solve the problem or to arrive at expected result.
 - Existence of alternatives suggests that the decision maker has freedom to choose alternative.
 - Decision may not be completely rational but may be judgmental and emotional in which personal preferences and values of the decision maker play significant role.
 - Decision making, like any other management process, is goal oriented.
-

Types of Decisions

- There are different types of decisions which are made by managers in organizations and for each type of decisions.
- There are different ways in which organizational decisions may be classified.
- Herbert Simon has grouped organizational decisions into two categories based on the decision factors which are taken into considerations.
 - **Programmed Decisions**
 - **Non-programmed Decisions**
- Organizational decisions are classified as-
 - **Strategic Decisions**
 - **Tactical or Operational Decisions**

Types of Decisions

- Programmed Decisions**
 - They are routine and repetitive and are made within the framework of organizational policies and rules.
 - These policies and rules are established well in advance to solve recurring (frequent) problem.
 - Ex: Promotion of an employee
 - These decisions are comparatively easy to make as these are relate to the problems which are solved by considering internal organizational factors.
 - These are made by personnel at lower levels in the organizations.
-

Types of Decisions

- Non-programmed Decisions**
- They are relevant for solving unique/unusual problems.
- In which alternatives can not be determined well in advance.
- The situation is not well structured and the outcomes of various alternatives cannot be arranged in advance.
- Ex: Organization wants to take actions for growth
- They are non-recurring and, therefore, readymade solutions are not available.
- These decisions are of high importance because of their long term impact, they are made by top level managers.

Types of Decisions

- Strategic Decisions**

- The concept is based on strategy.

- “Strategic decision is a major choice of actions concerning allocation of resources and contribution to the achievement of organizational objectives”

- Tactical decisions**

- Tactical or operational decisions are derived out of strategic decisions.

- It relates to day-to-day working of the organization and is made in context of well set policies and procedures.

Types of Decisions

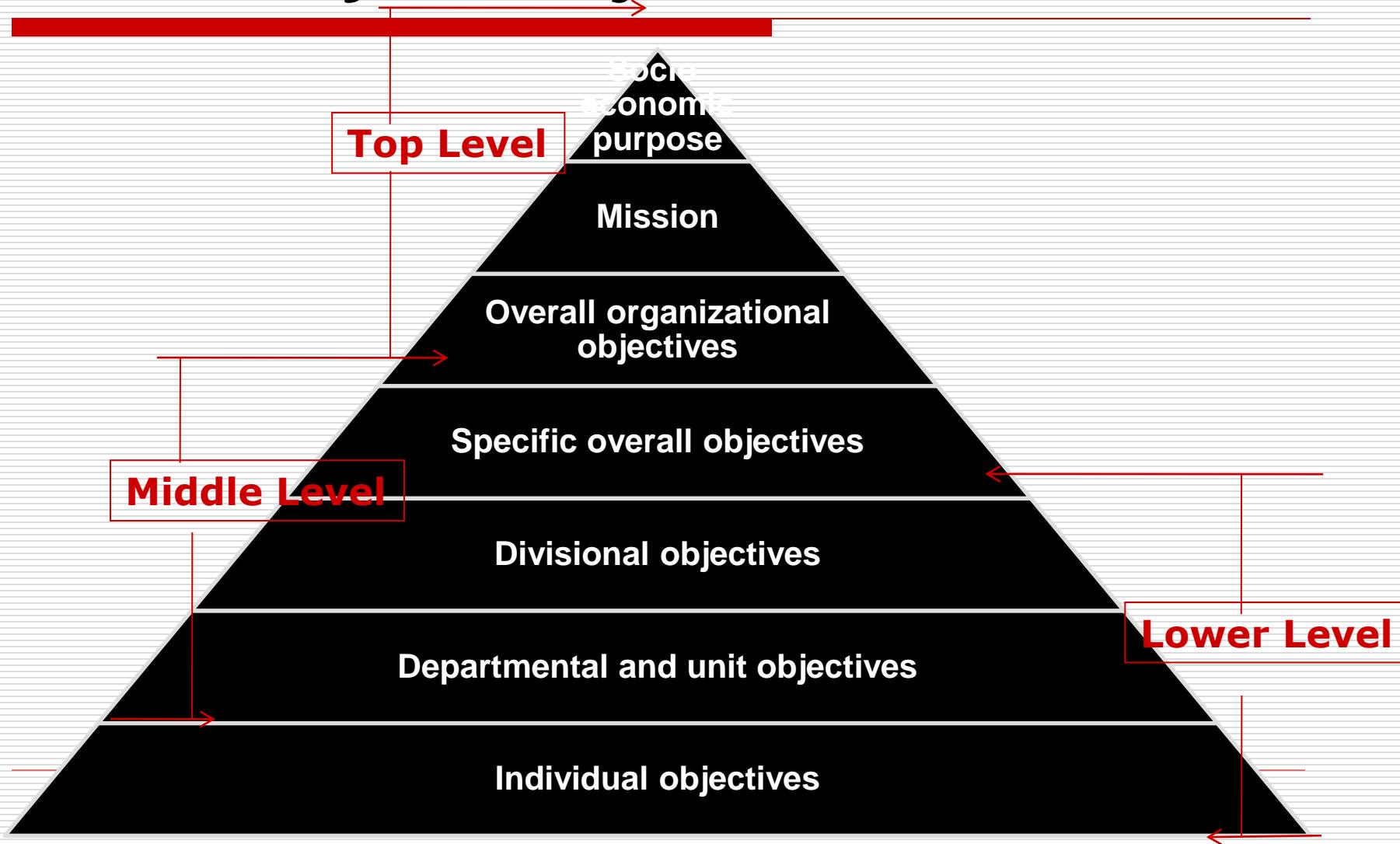
1. Strategic Premises

- It is a major decision which affects the major part of the organization
- It directly contributes in achievement of organizational objectives
- Three elements:
 - A course of actions or plan
 - A desired result or objective
 - A commitment
- They are non-programmed decision

2. Tactical Premises

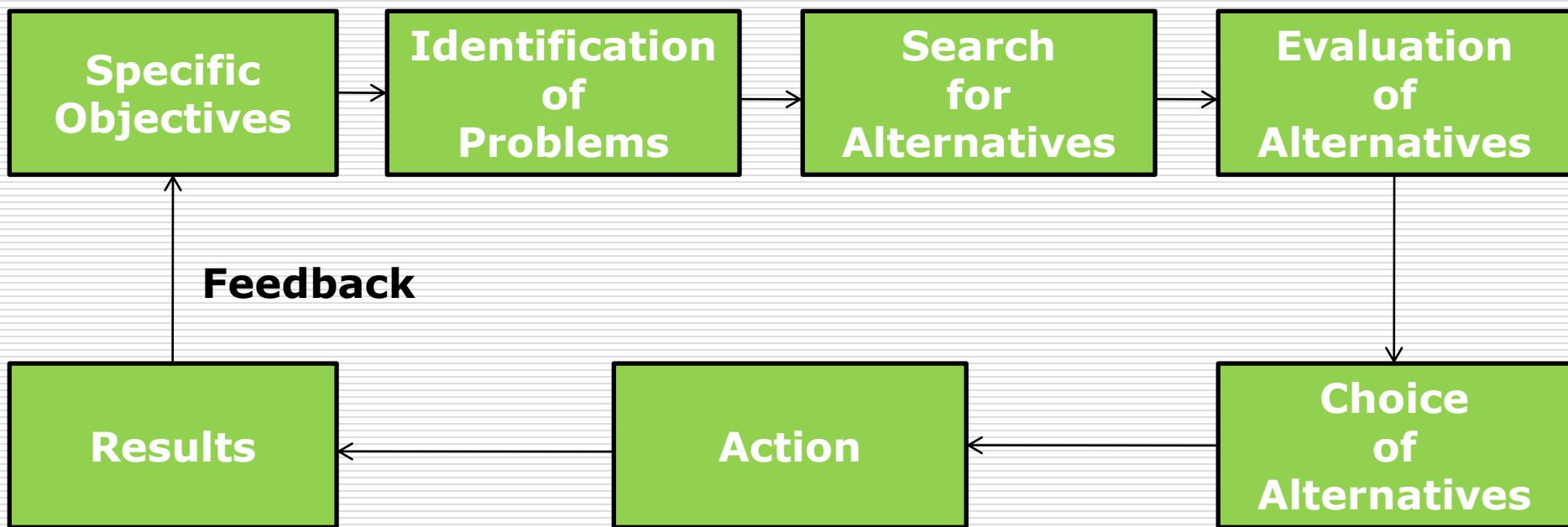
- The outcome affects narrow part of the organization
- Its relates to day-to-day operations and taken frequently
- The authority for making decisions can be delegated to bottom level managers
- They are mostly programmed decision.

Hierarchy of Objective



Decision Making Process

- Decision making process depicted in following figure:



Decision Making Process

1. Specific Objectives

- The need for decision making arises in order to achieve certain objectives.
 - Every action of human being is goal directed.
 - Decision making is also an action, hence, objectives are need to be referred.
 - However, objective setting is an outcome of earlier decisions, this may not be truly first step but it provides framework for the decision.
-

Decision Making Process

2. Problem Identification

- Identification of problem is the real beginning of decision making process.
- A problem can be identified much clearly, if managers go through diagnosis and analysis of the problem.

a. Diagnosis

- The term has derived from medical science where it is used as the process of identifying diseases from its sign and symptoms.
- A symptom is a condition or set of conditions that indicates the existence of problem.
- Ex: If an organization has high turnover ratio of its employee, it indicates something is wrong.
- The symptom of ("security of job") of high turnover may provide a real problem to the manager.

Decision Making Process

2. Problem Identification

a. Diagnosis

- Diagnosing the real problem implies the gap between what is and what ought to be, identifying the reasons or gap, and understanding the problem.

b. Analysis

- The analysis of the problem requires to find out-
 - Who would make decision?
 - What information would be needed?
 - Where the information is available?
- It provides revealing circumstances that help to gain insight of the problem.
- This step helps in knowing “What is needed” and “Where the alternatives for doing the thing”.

Decision Making Process

3. Search for Alternatives

- A problems can be solved in several ways, however, all the ways can not be equally satisfying.
 - If there is only one way of solving a problem, no question of decision arises.
 - Therefore, the decision makers has to find out more alternatives through which same problem can be solved.
 - It is not possible to consider all alternatives because of limitations of the decision maker or information related to all alternatives may not available.
-

Decision Making Process

3. Search for Alternatives

- Therefore, while generating alternatives, concept of limiting factor must be considered.
 - A decision maker can make use of several sources for generating of alternatives:
 - Past experiences
 - Practices followed by others
 - Using creative techniques, etc...
-

Decision Making Process

4. Evaluation of Alternatives

- However, all alternatives available for the decision making will not be undertaken for detailed evaluation because of limitations of manager in evaluation of alternative.
 - In narrow down the list of alternatives two approach can be useful:
 - **Constraints on alternatives** (i.e. list of criteria must match in alternative)
 - **Grouping of alternatives of similar nature** (i.e. producing outside the company and producing on contract basis can be grouped together)
-

Decision Making Process

4. Evaluation of Alternatives

- After narrowed list of alternatives, each one is evaluated in the lights of contribution of them in achieving of objectives.
 - Tangible factors like -
 - Cost (investment required), benefits (output to be received)
 - Intangible factors like -
 - Qualitative factors like ecological balance, etc...
 - In evaluating alternatives, both of these factors taken into consideration.
-

Decision Making Process

5. Choice of Alternatives

- Choice aspects of decision making is related to deciding the most acceptable alternatives which fits with the organizational objectives.
- Thus, it is not necessary that chosen alternative is the best one alternative.
- In choosing an alternative, the decision maker can go through three approaches:

1. Experience

2. Experimentations

3. Research and Analysis

Decision Making Process

6. Action

- Once alternative is selected, it is put into action.
 - By implementation of alternative, manager can come to know whether objectives are achieved or not by choosing an alternative.
 - Implementation requires, the communication to subordinates, getting acceptance of subordinates, getting their support in putting decision into action.
 - The effectiveness of action is important, because right decision may fail to achieve desired result if action (right implementation) is failed.
-

Decision Making Process

7. Results

- It decision put into action, it brings certain results.
- These results must be corresponding to objectives, hence, it must be compared with those objectives.
- It indicated whether proper implementation has taken place or not.
- Manager can take necessary follow-up actions in the light of feedback received from results.
- If there is any deviation between results and objectives, this should be analyzed and modified as need arises.
- Hence, its continuous or on-going process.

Operation Management

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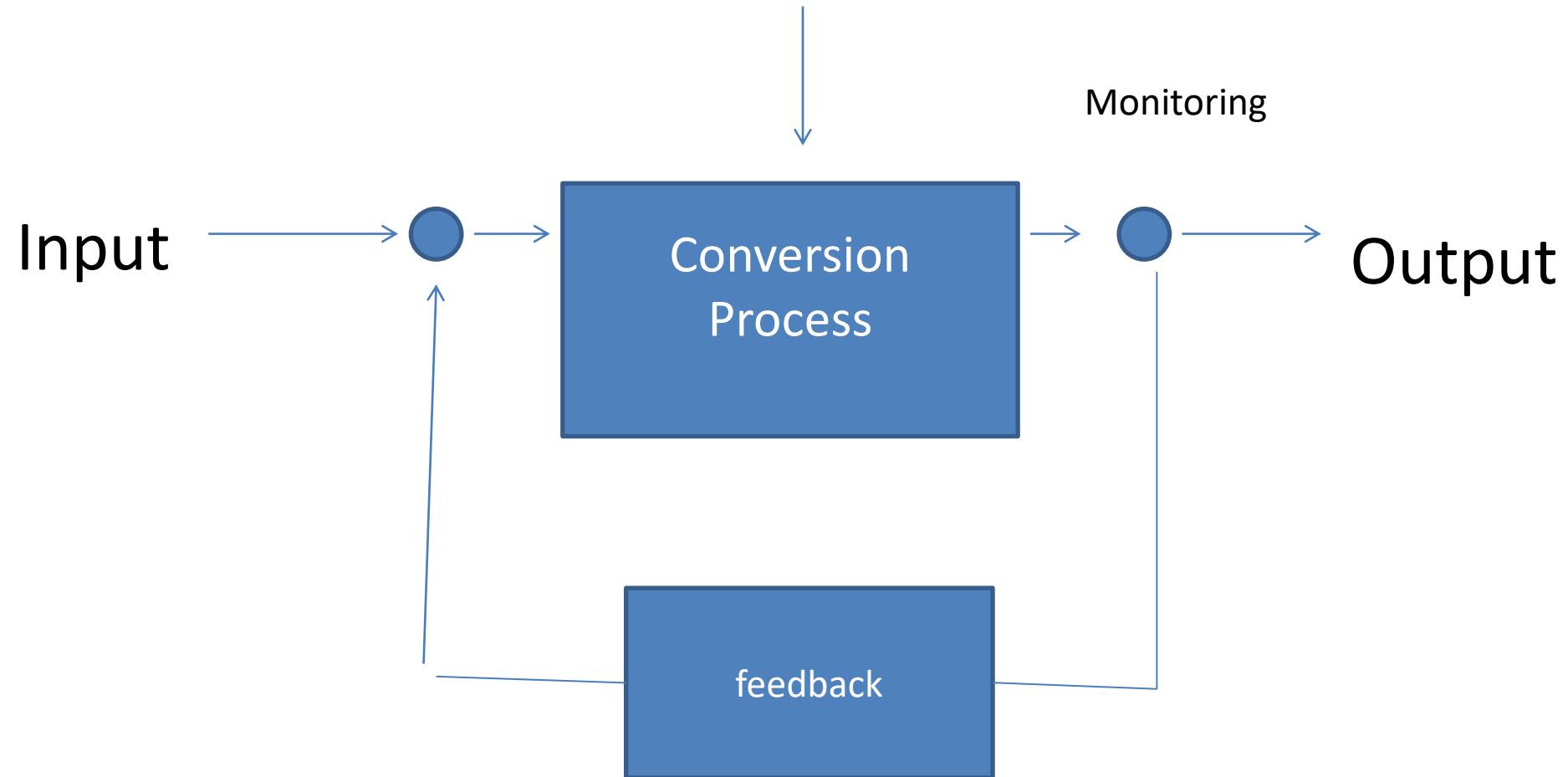
Introduction

- The management of the conversion processes which transforms inputs such as raw material, labour etc. into outputs in the form of finished goods and services is termed as Operations Management (OM).
- OM is the business function that is responsible for managing and coordinating the resources required to produce a company's products and services.
- The role of OM is to transform organizational inputs into company's products or services outputs. OM is responsible for a wide range of decisions, ranging from strategic to tactical.

System concept

- A system is an arrangement of components designed to achieve a particular objective (or objectives) according to plan.
- The components may be either physical or conceptual or both, but they all share a unique relationship with each other and with the overall objective of the system.
- A systems approach to operations management problems places strong emphasis upon the integrative nature of management responsibilities, recognizing both the interdependence and the hierarchical nature of subsystems.

Random Fluctuation



Inputs	Transformation	Outputs
Energy, Raw vegetables	Cleaning	Clean vegetables
Energy, Metal sheets	Cutting/Rolling/Welding	Cans
Energy, Vegetables	Cutting/Chopping	Cut vegetables
Energy, Water, Vegetables	Cooking	Boiled vegetables
Energy, Cans, Boiled vegetables	Placing	Can food

Types of production systems

- **Mass production(Continuous and Assembly line)**
- **Batch production**
- **Job shop**

Plant location

- Plant location means the establishment of an industry at a particular place.
- The location of the plant can have a critical influence on the profitability of a project, and the scope for future expansion.
- It is challenging to set down rules whereby the problem of facilities location can be programmed but there are a number of factors which should be considered when selecting a suitable site.
- The essential purpose of location investigation is to maximize the profits by minimizing the total cost of production linked with the production process.

Critical Success Factors of Location Decisions:

A. Country Decision

- Political risks, government rules, attitudes, incentives
- Cultural and economic issues
- Location of markets
- Labor talent, attitudes, productivity, costs
- Availability of supplies, communications, energy
- Exchange rates and currency risks

B. Region/ Community Decision

- Attractiveness of region
- Corporate desires
- Costs and availability of utilities
- Environmental regulations
- Government incentives and fiscal policies
- Labor availability, costs, attitudes towards unions
- Land/construction costs
- Proximity to raw materials and customers

C. Site Decision

- Site size and cost
- Air, rail, highway, and waterway systems
- Zoning restrictions
- Proximity of services/ supplies needed
- Environmental impact issues

Plant location strategy

- Minimum handling of material
- Minimum damage and spoilage of materials
- Reduced congestion of materials, machinery and man
- Flexibility with regards to changing production conditions

Plant layout

- It is the physical preparation of equipment and facilities within a plant. Optimizing the layout of a plant can improve productivity, safety and quality of products. The basic objective is to ensure a smooth flow of work, material, people and information. It must facilitate the production process, minimize material handling time and cost.
- A perfect plant layout must emphasize on –
 - Minimizing the operational cost and maximizing the productivity of the manufacturing unit
 - Allow flexibility of operations
 - Ease of production flow
 - Economic use of the building
 - Promote effective utilization of manpower
 - Provide for employees' convenience
 - Safety & comfort at work and maximum exposure to natural light

Basic objectives of plant layout

A plant layout must achieve the following objectives:

- Enhance productivity
- Maximize production capacity
- Avoid delays in production activities
- Efficient utilization of available floor space
- Minimize material handling costs
- Enhance labour efficiency
- Improve employee morale
- Ensure ease of supervision & control
- Allow optimum utilization of machinery & equipment
- Provide for flexibility in production volume
- Help easy maintenance
- Support employee health & safety
- Minimize hazards to employees
- Mitigate accident risks

Inputs to the Plant layout decision

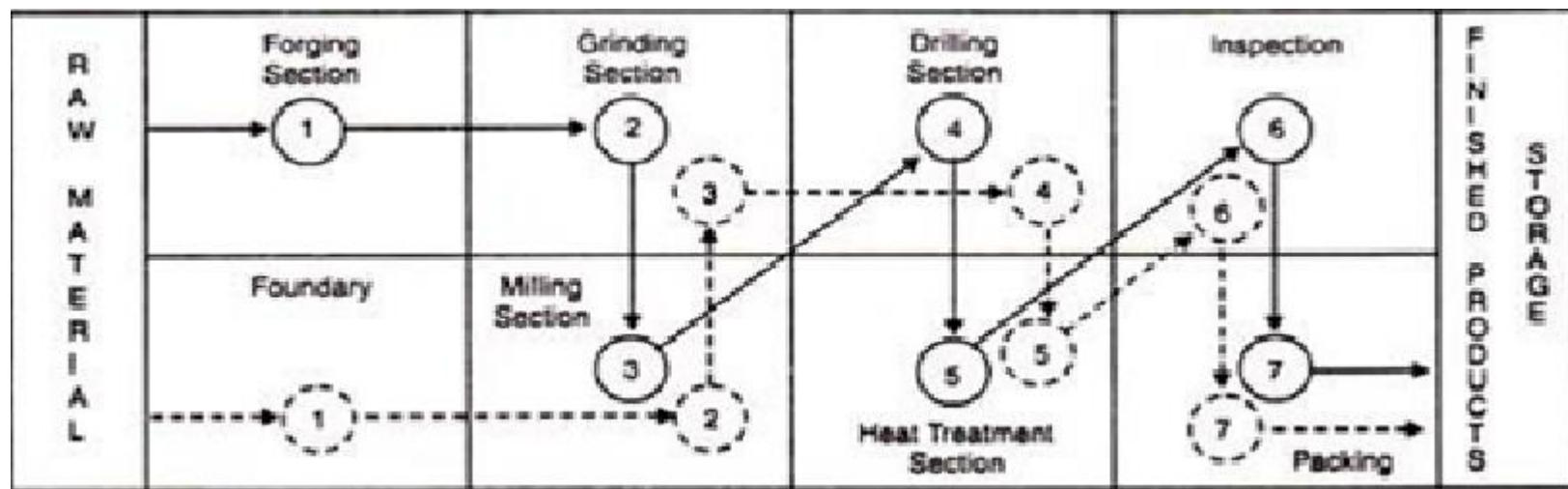
- Specification of objectives of the system in terms of output and flexibility
- Estimation of product or service demand on the system
- Processing requirements in terms of number of operations and amount of flow between departments and work centres
- Space requirements for the elements in the layout
- Space availability within the facility itself

Advantages of a good layout:

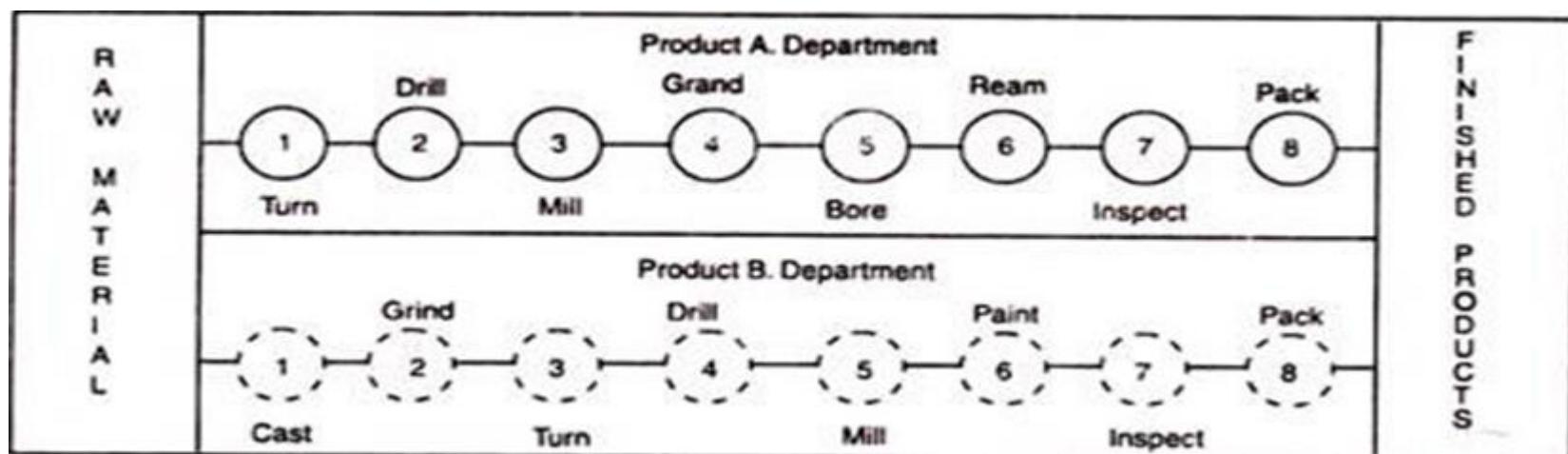
- The overall process time and cost will be minimized by reducing unnecessary handling and movement.
- Supervision and control will be simplified by the elimination of ‘hidden corners’
- Changes in the programmers will be most readily accommodated.
- Total output from a given facility will be as high as possible by making the maximum effective use of available space and resources.
- A feeling of unity among employees will be encouraged by avoiding unnecessary segregation.
- Quality of the products or service will be sustained by safer and more effective methods of operation.

Types of Plant layout:

Process layout or Functional layout - Process layout is applicable where similar equipment, machinery & task tools are grouped together, also known as a functional layout useful for low volume & high variety production jobs.



Product layout or Line layout - Product layouts are used to achieve a smooth and rapid flow of large volumes of products or customers through a system. They achieve a high degree of labour and equipment utilization.



- **Fixed position layout** – In this layout the material / job remains in a fixed position, but machinery, tools, workmen etc. are brought to the material – Project layout.
- **Cellular layout** – It is a type of layout in which machines are grouped into what is referred to as a cell. It provides faster processing time, less material handling, less work-in-process inventory, and reduced setup time.
- **Combination layout** - Sometimes, every manufacturing unit requires a customized plant layout wherein a combination of plant layout types may be employed which is known as a combination layout. A company may opt to prepare a combination layout in order avail the benefits from one or more plant layout type.

Material handling

- The primary objective of using a Material Handling System is to confirm that the material in the right amount is safely delivered to the chosen destination at the right time and at minimum cost.
- The Material Handling System is properly designed not only to ensure the minimum cost and compatibility with other manufacturing equipment but also to meet safety concerns.
- Material Handling simply means loading, moving and unloading of material.
- Material Handling is defined by the Materials Handling Institute (MHI), as the movement, storage, control, and protection of materials and products throughout the process of their manufacture, distribution, consumption, and disposal.
- The five commonly recognized aspects of Material Handling are motion, time, place, quantity, space.

Classification of Material Handling:

- Holding, feeding, metering
- Transferring, positioning
- Lifting, hoisting, elevating
- Dragging, pulling, pushing
- Loading, carrying, excavating
- Conveyor moving and handling
- Automatic guided vehicle transporting
- Robot manipulating
- Identifying, sorting, controlling
- Storing, warehousing
- Order picking, packing
- Loading, shipping

Importance of Materials Handling:

- By ensuring the right quantity of materials delivered at the right place at the right time most economically, it improves efficiency of a production system.
- Indirect labour cost is cut down.
- During storage and movement reduces damage of materials.
- Maximize space utilization by proper storage of materials and thereby reduce storage and handling cost.
- Proper materials handling minimises accident.
- By improving materials handling overall cost reduces.
- Improve customer services by supplying materials in a manner convenient for handlings.
- Increase efficiency and sale ability of plant and equipment with integral materials handling features.

Principles of Material Handlings:

- **Planning principle** - A plan is a recommended sequence of action that is defined in advance of implementation. In its simplest form a material handing plan defines the material (what) and the moves (when and where); together they define the method (how and who).
- **Standardization principle** - Standardization means less variety and customization in the methods and equipment employed.
- **Work principle** - The measure of work is material handling flow (volume, weight or count per unit of time) multiplied by the distance moved.
- **Orientation principle** - Study the system relationships carefully prior to initial planning in order to classify current approaches and problems, physical and economic constraints, and to establish future necessities and objectives.
- **Unit load principle** - Handle product in as large a unit load as practical.

- **Ergonomic Principle** - Recognize human capabilities and boundaries.
- **Space utilization principle** - Space in material handling is three dimensional and therefore is counted as cubic space.
- **System flow principle** - Integrate data flow with the physical material flow in handling and storage.
- **Automation Principle** - All items expected to be handled automatically must have features that accommodate mechanized and automated handling.
- **Ecology principle** - Minimize adverse effects on the environment when selecting MH equipment and procedures.
- **Life Cycle Cost Principle** - Life cycle costs include all cash flows that will occur between the time the first rupee is spent to plan or procure a new piece of equipment, or to put in place a new method, until that method and/or equipment is totally replaced.

Factors to be Considered while Selecting a Material Handling Equipment:

- Material to be moved
- Plant buildings and layout
- Type of production machines
- Type of material flow pattern
- Type of production
- Cost of material handling equipment
- Handling cost
- Life of equipment
- Amount of care and maintenance required for the material handling equipment

Equipment of Material Handling:

- Industrial trucks include hand trucks such as two-wheeled, four-wheeled, hand lift, and forklift and powered trucks such as forklift, tractor-trailer trains, industrial crane trucks, and side loaders
- Conveyors such as belt, chute, roller, wheel, slat, chain, bucket, trolley, tow, screw, vibrating, and pneumatic
- Monorails, hoists, and cranes such as bridge, gantry, tower, and stacker
- Automated guided vehicle systems such as unit load carriers, towing, pallet trucks, fork trucks, and assembly line
- Automated storage and retrieval systems (AS/RS) such as unit load, mini-load, person-on-board, deep lane, and storage carousel systems

Inventory management

Meaning of Inventories:

Inventory consists of items which are finished and held in sales or are in the process of production or the items which are kept as raw material.

- a) **Raw materials** are those basic fabricated materials which are yet to go through any conversion.
- b) **Finish parts** which may either be bought-out-parts (produced by suppliers) or piece parts (made in own company).
- c) **Work-in-process Inventories**: these items are partially completed state. These items are can be found on the conveyers, trucks, pallets, in and around the machines and in store section waiting for assemble.
- d) **Finish Goods** are the products or goods which are ready to be shipped.
- e) **Tools** comprises standard and hand tools.
- f) **Supplies** are materials in running the plant or in making companies product but do not go into the product.
- g) **Machinery spares** include consumable spares and replacement spares

Major Reasons for Keeping the Inventories:

- a) To economies on buying or manufacturing cost
- b) To keep pace with changing market conditions
- c) To satisfy demand during period of replenishment
- d) To take care contingencies (i.e. prevent stock-outs)
- e) To stabilize production
- f) To prevent loss of sale
- g) To satisfy other business constraints

Objectives of Scientific Inventory Control System:

- a) Continuity of productive operations
- b) Effective use of capital
- c) Reduction of administrative workload
- d) Service of customers
- e) Economy in purchasing
- f) Reduction of risk in loss
- g) Practical system
- h) Administrative simplicity

Classifications of Inventory :

- **ABC analysis:**
ABC analysis work on a very important principle “vital few : trivial many”. Statistical data reveals that only a few items account for the maximum annual expenditure on materials. These few items called ‘A’ items, therefore, hold the key to business. The other items, known as ‘B’ and ‘C’ items, are numerous in number but their contribution is less significant.
- **HML analysis:**
HML analysis is similar to ABC analysis except for the difference that instead of usage value, price criteria is used. The items under this are categorized into three types such as high, medium and low. The cut off lines of the items are fixed by the management.
- **VED analysis:**
VED analysis categorizes the items according to their criticality. The items are classified as vital, essential and desirable. Vital category includes those items, which are very essential to running the production. Essential group includes items which have high stock out costs. And desirable group comprises of items which do not cause any immediate loss of production.
- **SDE analysis:**
SDE analysis classifies the items in to three groups called scarce, difficult and easy. Scarce group consist of items which are in short supply imported or canalized through government agencies. Difficult group consist of items which are available indigenously but are not easy procure. Easy group consist of items which are readily available.

- **G-NG-LF analysis/GOLF analysis:**
The analysis classifies items into four groups namely G-NG-L and F. G group covers items procured from Government suppliers such as the STC, the MMTC and the public sector undertakings. NG group comprises of items procured from non-government suppliers. L group consist items bought from “local suppliers”. F group contains items which are purchased from foreign suppliers.
- **S-OS analysis:**
S-OS analysis is based on seasonality of the items and it classifies the items into two groups S (seasonal) and OS (i.e. off seasonal). The analysis identifies items which are available only limited period, available through the year.
- **F-S-N analysis:**
F-S-N analysis is based on consumption figures of items. The items are classified in to three categories. F fast moving items, requires to be viewed regularly. S low moving items, these items having higher stock than their rate of consumption. N non-moving, the items which are not being consumed.
- **X-Y-Z analysis:**
X-Y-Z analysis is based on value of the stocks on hand. The items whose inventory values are high are called X items while those whose inventory values are low are called Z items. And Y items are those which have moderate inventory stocks.

Purchasing and store system

- **Purchasing:**

Purchasing may be defined as that function of a business undertaking which is responsible for the procurement of materials, tools, implements, machinery and service required to produce certain goods and services.

- **Procurement:**

Procurement means acquisition of materials by any method whatsoever and is a part of Material Management.

- **Objectives of Purchasing Department:**

- To procure right material
- To procure material in right quantities
- To procure materials in right quality
- To procure material from right and reliable source or vendor
- To procure material economically, i.e. at right or reasonable price
- To receive and deliver materials at right place and at right time

Principles of Scientific Purchasing:

There are six R's wise or scientific purchasing.
These are

- Right Quality
- Right Quantity
- Right Price
- Right Time of Delivery
- Right Price of Delivery
- Right Source of Supply

Methods of Purchasing:

- a) Purchasing by requirement-undertaking Purchase only when necessary
- b) Purchasing for specified future period- goods regularly used by the organizations but in small quantity
- c) Purchasing from the favourable market- using the correct forecast of market conditions
- d) Speculative purchasing- Purchase is made in speculation of rise in prices
- e) Contract purchasing- Buying goods under forward buying contracts
- f) Purchasing small items in group- Purchase various items in small quantities
- g) Scheduled purchasing- estimate of purchasing being made in the future in accordance with production schedules for future period

Standard Purchase Procedure for a Large Scale Organization:

- a) Recognition of the need
- b) Selection of source of supply
- c) Inviting quotations
- d) Processing the quotations
- e) Placing the order and follow up
- f) Receipt and inspection
- g) Approval of Payment

Thank You

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Introduction to Personnel Management

Definitions of Personnel Management

- “Manpower management effectively describes the processes of planning and application, development, and utilization of human resources in employment.”
- Dale Yoder, *Personnel Management and Industry*
- “Personnel Administration is a method of developing the potentialities of employees so that they get maximum satisfaction out of their work and give their best efforts to the company.”
- Pigors and Myres, *Personnel Administration*
- “The personnel function is concerned with the procurement, development, control, and maintenance of the personnel of an organisation for the purpose of utilising their potentialities towards the accomplishment of that organisation’s major goals or objectives. Personnel management is the planning, organising, directing, and controlling of those operative functions”
- Edwin B. Flippo, *Principles of Personnel Management*

Characteristics of Personnel Management

- It is a specialised branch of management and hence all the principles of management (as well as functions of management) are applicable to personnel management.
- It is concerned with human resources. It advocates the ways to get best managing the scarcely available human resources effectively and efficiently.
- It is concerned with relationship between employer and employee; between employee; and among employees. By the term employee we mean to include both blue-collar as well as white-collar workers.
- It concentrates on the development of individual and group in an organization for achieving better results.
- It focuses on employment planning.
- It gives adequate direction to the developmental activities—of lower-level workers as well as executives.

Functions of Personnel Management

- Basic managerial functions- planning, organizing, motivating and controlling- are performed by all managers including personnel managers and are performed by all of them. This indicates that general management and personnel management are one and the same.
- **Planning** – Pertains to the steps taken in determining a course of action.
- **Organisation**- The personnel manager must establish an organization to carry out his function, therefore, calls for grouping of personnel activities.
- **Motivation** – It involved guiding and supervising the personnel.
- **Control** – It involves measuring performance, correcting negative deviations and accomplishment of plans.

Detailed List of Operative Functions of a Personnel Manager

A. Procurement

1. Determination of Manpower Needs

- (i) To analyse each job to determine the nature of the work; the quality necessity; nature and amount of training required; the amount of necessary; etc.
- (ii) To derive from the job analysis job specifications containing in combination the most pertinent points relating to the position and the worker, employment interviews to facilitate the work of selection and placement.
- (iii) To determine the manpower needs of the organization.

2. Recruitment and Selection

- (i) To develop different sources of supply of applicants for different categories of employees.
- (ii) To design a standard requisition blank for use by operating departments requesting personnel.
- (iii) To design an application blank for each category of employees.
- (iv) To interview applicants by a trained interviewer.
- (v) To introduce (after a careful study) a testing programme to supplement the interview.
- (vi) To thoroughly investigate and medically examine successful applicants before employment.

3. Placement

- (i) To assign employees to jobs for which they appear best qualified on the basis of their skills and techniques.
 - (ii) To introduce a uniform procedure for introducing new employees to the company and its respective department.
1. Copy of rules and regulations is to be given to each employee, supplemented by a discussion about the company, its products, etc.
 2. To introduce a uniform procedure for introducing new employees to the company and its respective departments.
 1. Copy of rules and regulations is to be given to each employee, supplemented by a discussion about the company, its products, etc.
 2. Department head is to designate a fellow employee to escort newcomer for a few days and to act as his “sponsor”.

B. DEVELOPMENT

1. Training and Education

- (i) To develop pre-job and service training programmes for operatives.
- (ii) To develop programmes for the training of understudies – Junior executives.
- (iii) To develop programmes of lectures and classes for clerical personnel.
- (iv) To organise supervisory training programmes with emphasis on techniques problems of human relationships.
- (v) To develop company library to include books, pamphlets, magazines, etc. on classes of personnel.

2. Suggestions System

- (i) To organise a suggestions system which attracts, offers rewards commensurate of suggestions, and in general serves as a clearing house for ideas. (Suggestions improvement of methods, machinery, processes, employee relations, etc.)
- (ii) To tie the suggestions system to the supervisory training programme and to supervisory personnel through that medium.

3. Communication

- (i) To compile and publish in tentative form an employee hand book subject to revision from time to time containing details of company history and a clear and concise outline of company policies with respect to such items as “employment”, “security plans”, “vacation”, etc.
- (ii) To develop a company organisation chart showing the relationship of the different divisions to each other and the lines of responsibility and authority.
- (iii) To develop a detailed personnel department organisation chart.

4. Performance Appraisal and Promotion

- (i) To arrange for annual or semi-annual appraisals of all personnel
- (ii) To devise appropriate appraisal forms for each class of employees
- (iii) To work out promotional charts with lines of advertisement clearly marked
- (iv) To develop a promotion policy based on periodic reviews of employees' performance

C. Compensation (Wages and Incentives)

- (i) To grade jobs in relationship to each other, to some established base or to similar plants with frequent examination of results.
- (ii) To formulate wage scales for each job classification.
- (iii) To consider payment of bonus to supervisory personnel.
- (iv) To consider effective means of stimulating and rewarding executives.
- (v) To provide for stability of employment, so far as possible, through careful scheduling of operations and financial planning.

D. Integration

1. DISCIPLINE AND GRIEVANCES

- (i) To provide for uniformity in disciplinary action for similar infractions.
- (ii) To render special assistance on problem cases referred to personnel.
- (iii) To establish an efficient mechanism for the adjustment of individual disputes.

2. DISCHARGES, “QUITS”, LAYOFFS, RE-HIRINGS

- (i) To establish leaving or “Exit” interview as standard practice to determine real facts leading to involuntary termination.
- (ii) To determine relative weight of factors in deciding on layoffs.
- (iii) To determine policy with respect to re-hiring.

3. LABOUR-MANAGEMENT RELATIONS

- (i) To establish a realistic, positive and clear-cut philosophy of labour relations.
- (ii) To analyse thoroughly the existing labour agreement with measures precise as possible of its costs, both actual and potential.

4. RELATIONS WITH INDUSTRIAL COMMUNITY

To establish good relations with government agencies, citizens organisations, newspapers, industrial individuals and educational institutions.

E. Maintenance (Health, Safety and Security)

- (i) To provide for adequate facilities in respect of legal advice, canteens, first-aid, etc.
- (ii) To introduce effective rest pauses.
- (iii) To educate employees in safety and health.
- (iv) To provide for sickness, disability, accident and retirement benefits, insurance and other schemes.

F. Records, Audits and Research

- (i) To develop a good system of record keeping.
- (ii) To formulate a checklist for carrying out annual personnel audit.
- (iii) To carry out research on various subjects of interest to the organisation.
- (iv) To make contacts with professional management organisations worldwide as source of research material.

Recruitment

Recruitment is a process of identifying, screening, shortlisting potential resource for filling up the vacant positions in an organization. It is a core function of Human Resource Management.

Recruitment is the process of choosing the right person for the right position and at the right time. Recruitment also refers to attracting, selecting, and appointing potential candidates to meet the organization's resource requirements.

The hiring of the candidates can be done internally from within the organization, or from external sources. And the process should be completed within a time constraint and it should be cost effective.

Importance of Recruitment

Recruitment is one of the most fundamental components of the HR team. If the recruitment process is efficient, it can bring many benefits to the organization.

- The organization gets happier and more satisfied employees.
- Attrition rate reduces.
- It builds a good workplace environment through positive employee relationships.
- It results in overall growth of the organization.

Factors that influence the recruitment process.

Internal Factors Organizations have control over internal factors that affect their recruitment function.

The internal factors are:

- Size of organization
- Recruiting policy
- Image of organization
- Image of job

External factors are those that cannot be controlled by an organization. Factors that affect the recruitment process include the following:

- ▶ Demographic factors – Demographic factors are related to potential employees such as their age, religion, literacy level, gender, economic status, etc.
- ▶ Labor market – Labor market controls the demand and supply of labor. For example, if the supply of people having a specific skill is less than the demand, the hiring will need more efforts. On the other hand, if the demand is less than the supply, the hiring will be relatively easier.
- ▶ Unemployment rate – If the unemployment rate is high in a specific area, recruiting resources will be simple and easier, as the number of applicants will be high. In contrast, if the unemployment rate is low, then recruiting tends to be difficult due to the less number of resources.

Labor laws – Labor laws reflect the social and political environment which are created by the central and state governments. These laws regulate compensation, working environment, safety and health regulations for different types of employments. As the government changes, the laws will also change.

Legal considerations – Job reservations for different castes such as SC, ST, OBC etc. are best examples of legal considerations. These considerations, made by the government, will have a positive or negative impact on the recruitment process of the organizations.

Competitors – When organizations in the same industry are competing for the same qualified resources, there is a need to analyze the competition and offer resources packages that are best in terms of industry standards.

RECRUITMENT PROC

Recruitment Planning

Strategy Development

Searching

Screening

Evaluation & Control

1. Recruitment planning is the first step of the recruitment process, where positions are analyzed and described. It includes job specifications and experience, qualifications and skills required for the job, etc.
2. Recruitment strategy is the second step of the recruitment process. Strategy is prepared for hiring the resources. After completing the preparation of descriptions and job specifications, the next step is to decide which methods to adopt for recruiting the potential candidates for the organization.
3. Searching is the process of recruitment where the resources are sourced upon the requirement of the job. After the recruitment strategy is finalized, searching of candidates will be initialized.
4. Screening starts after completion of the process of sourcing the candidates. Screening is the process of filtering the applications of the candidates for the selection process.
5. Evaluation and control is the last stage in the process of recruitment. In this stage, the effectiveness and the validity of the process and methods are evaluated. Recruitment is a costly process, hence it is important that the performance of the recruitment process is thoroughly evaluated.

Sources of Recruitment

Internal
Source

External
Source

Definition of Internal Recruiting

- Any method of identifying and attracting job seekers from within an organization can be considered **recruiting**. There are many different mechanisms, formal and some informal, that can be used to identify quality internal candidates. Internal recruiting has some distinct benefits over recruiting from outside the organization, but it also has its critics. In the end, each organization's hiring manager should consider their needs and develop a recruitment plan that they believe will produce the best candidates for their needs.

1. Transfers:

Transfer involves shifting of persons from present jobs to other similar jobs. These do not involve any change in responsibility or prestige. The numbers of persons increase with transfers.

2. Promotions:

Promotions refer to shifting of persons to positions of better prestige, higher responsibilities and more authority. Higher positions falling vacant may be filled up by persons in the organisation. A promotion does not increase the total number of persons in the organisation.

A person going to get a higher position will vacate his present position. Promotion will motivate employees to improve their performance so that they can also get promotion.

3. Present Employees:

The present employees of a concern are informed of vacant positions. The employees recommend their persons intimately known to them. Management is looking out prospective candidates.

The persons recommended by the employees are generally suitable for the jobs because they know the requirements of various positions. The existing employees take full responsibility of those recommended by them and also ensure of their proper behaviour and performance.

Advantages of Internal recruitment Sources:

1. Improves morale:

When an employee from inside the organisation gets promoted to a higher post, it helps in increasing the morale of all employees. Generally every employee expects promotion to a higher post because it carries more status and pay (if he fulfills the requirements).

2. No Error in Selection:

When an employee is selected from inside, there is less possibility of errors in selection since every organization maintains complete record of its employees and selects them in a better manner.

3. Promotes Loyalty:

It promotes loyalty among the employees as they on account of chances of advancement.

4. No Hasty Decision:

The chances of hasty decisions are completely eliminated as the existing employees are well tried and can be relied upon.

5. Economy in Training Costs:

The existing employees are fully aware of the procedures and policies of the organisation. These employees require little training and it brings down the training costs.

Disadvantages of Internal recruitment

Sources:

- (i) It discourages capable persons from outside concern.
- (ii) It is possible that the requisite number possessing qualifications for the vacant posts available in the organisation.
- (iii) For posts requiring innovations and creative talents the method of recruitment cannot be followed.
- (iv) If only seniority is the criterion for promotion person filling the vacant post may not be really capable.

External sources of recruitment

**External
Recruitment**

Media Advertisers

Employment Exch

Factory Gate Recru

Casual Callers

Campus Placem

Labor Contracte

Walk-Ins

E-Recruiting

Management Cons

1.Advertisements

To find the skilled and more efficient manpower giving advertisement position is the better way. Advertisements help in attracting the right maximizing brand image. Advertisements may be given in print media or gives better results and it is cheaper than approaching third parties.

2.Job portals

With the growing technology and internet usage, job portals are playing finding right candidates for right jobs. Job portals can inform up to date candidates and offer attractive benefits and packages to the employees. Techniques used by the job portals highly reduce the efforts in finding the right candidates.

3.Company's websites

With the increase in business operations and globalization, the need for finding the right candidates is also increasing day by day. To face a severe competition and to reduce the cost in the long run, many companies are setting up their own websites for finding candidates with competitive skills.

4.Social networking sites

Communicating about vacant positions of the organization through social networking sites help in motivation and attracting the highly skilled and more efficient candidates for the jobs.

5.Placement agencies

Approaching placement agencies reduces the time and efforts to find the suitable candidates from the pool of skilled candidates. They use various tools and techniques to collect resumes and they send it to the companies for further processing. The main method used by placement agencies is commission basis on hiring the candidates.

6.Job fairs and walk in interviews

Walk in interviews and job fairs are declared and conducted by companies to find suitable candidates. Following this method highly reduces efforts in finding most suitable resources for the bulk requirement.

7.Campus interviews

This is an easy and economical method helps in finding eligible candidates for the vacant posts. This method organization can find energetic and more competitive candidates for the vacant vacancies, this method is beneficial for both the candidates and companies.

Advantages of External Recruitment Process:

In an external recruitment process, the company posts a job and invites candidates suitable for the job outside the company.

1. Increased chances:

In this increased chance, the company receives a variety and number of candidates with knowledge and ability to handle that job.

2. Fresher skill and input:

When a company goes with an external recruitment method, there is a quick process of finding and identifying a fresher candidate who is capable of **delivering inputs** for the betterment of the company.

3. Qualified candidates:

Nowadays, when a company posts an advertisement in social media or any other common thing they look for is a **well experienced and qualified candidate**.

4. Better competition:

In the external recruitment process, there will be a chance of facing better competition in terms of hiring new talent.

Disadvantages of External Recruitment Process:

1. A limited understanding of the company:

When a candidate is selected from an external recruitment process, there the candidate might have **less chance of understanding the environment of the company**.

2. Higher risk:

There is a possibility that the candidate selected for the post is **not interested in the position offered** and he/she can take advantage of their position in the organization.

3. Time-consuming:

The main disadvantages of external recruitment are that it is **time-consuming** as the companies post an advertisement for their company recruitment drive.

4. High costs:

As most part of the external recruitment process mainly deals with completing the formalities, then the company needs to come up with a pay scale for that candidate based on his/her skill and ability.

5. Internal disputes with existing employees:

When a company considers a fresh candidate for the higher post among the existing candidates, then there is a higher possibility that the company existing employees will show some sort of **internal dispute among the officials of the company**.

SELECTION



SELECTION

Selection has been regarded as the most important HR department. It ensures the organization that number, right kind of people at the right place and time.

Definition:

“It is the process of differentiating applicants in order to identify (and hire) those with likelihood of success.”

In simple words.....

It is the functions performed by the management to select the right employees at the right time after identifying sources of human resources, searching for prospective employees and stimulating them to apply for jobs in an organization .

The objective of the selection decision is to choose the individual who can most successfully perform the job from the pool of qualified candidates.

Selection Process

Blank Application Form

Preliminary Interview

Employee Test

Employee Interview

Reference Check

Medical Examination

Induction

BLANK APPLICATION

It is a structured interview in which questions are standard and consist basic details of the candidates. **Such as:**

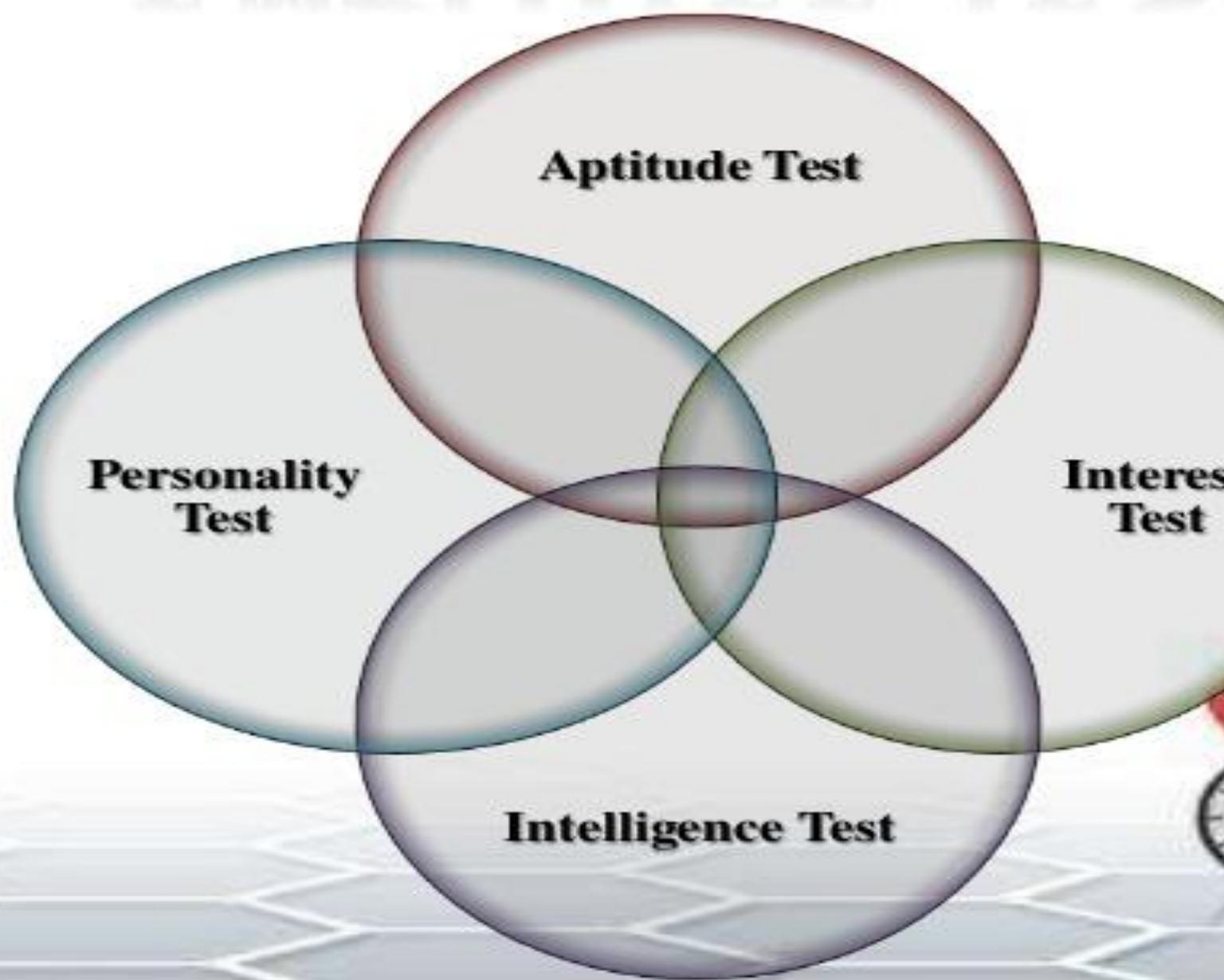
1. Age and gender
2. Marital Status
3. Height and weight
4. Education details
5. Languages
6. Details of previous job
7. Average earnings
8. Reason for quitting previous job
9. Hobbies
10. Salary expectations

PRELIMINARY INTERVIEW

On the basis of application blank, candidates are selected for the first interview. It is necessary because a large no of candidates apply for a single post.

Interviewer asked general questions about the appearance of the candidate.

EMPLOYEE TEST



EMPLOYMENT INTERVIEW

Selected candidates call for the final interview in which interviewer asked many type of questions to judge the candidate for that job.

It consists of interaction between interviewer and applicant.

There are different types of interviews:

- a. One to one interview
- b. Panel Interview
- c. Structured Interview
- d. Unstructured Interview
- e. Stressed interview
- f. Behavioral description Interview
- g. Telephonic Interview
- h. Situational Interview

MEDICAL EXAMINA

- It is required to eliminating candidates to suffer from the health problems which might affect his attitude in the work place.
- In the government and semi government organizations getting medically examined is a must before taking up duty or at the time of duty.

INDUCTION

After selecting the candidate, INDUCTION is provided to the candidate.

The major objectives of INDUCTION are:

- a. Familiarizing the new employee with this new surroundings, company policy, rules and regulations, structure etc.**
- b. Integrating his personal goals with organizational goals.**



Training

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Training, Education and Development

- The term '**training**', '**education**', '**development**' are closely related but their meanings have important distinctions.
- **Training** is the act of increasing the knowledge and skill of an employee for doing a particular job. It is concerned with imparting specific skills for particular purposes.
- **Education** is concerned with increasing general knowledge and understanding of the employee's total environment.

Following are some important distinctions between training and education:

- The content and scope of training is always specific, narrow and job-related; the content and scope of education is always broad and general.
- Training is always applied and practical; education is usually pure and theoretical.
- Training is mostly of short duration; education is long duration.
- Training gives quick and apparent results; the results of education are not so quick and apparent

The term development is broad one. It includes both training and education. Its aim is to improve overall personality of an individual. The term is mostly used in the context of executives only.

Following are some important distinctions between training and development:

- Training is meant for operatives. Development is meant for executives.
- The aim of training is to develop some specific skill in an individual. The aim of development is to develop the total personality of the individual.
- Training is one-shot affair. Development is a continuous process.
- The initiative for training comes from management. The initiative for development comes from the individual himself. To put it differently training is mostly the result of some outside motivation. Development is the result of internal motivation.
- Training is mostly a preparation to meet an individual's present needs. It can thus be seen as reactive process. Development is a preparation to meet his future needs. It is thus largely a proactive process.

Need and Objectives

The major objectives of training are as follows :

- (1) To train the employee in the company culture pattern.
- (2) To train the employee to increase his quantity and quality of output. This may involve improvement in work methods or skills.
- (3) To train the employee for promotion to higher jobs.
- (4) To train the employee to avoid social mistakes .
- (5) To train the employee toward better job adjustment and high morale.
- (6) To reduce supervision, wastage and accidents . Development of effective work habits and methods of work should contribute toward a reduction in the accident rate, less supervision and wastage of material.

Determining Training Needs

In order to determine the training needs of an organization the personnel manager should seek information on the following points :

(a) Whether training is needed ?

(b) Where training is needed ?

(c) Which training is needed ?

Training methods for operatives

(1) Training on the job

- Job Rotation
- Internship Training
- Apprenticeship
- Vestibule school

(2) General Education Programs

(3) Simulators and Training Aids

Management Development Methods

- A. Methods which aim at improving the decision-making skills of executives ;**

- B. Methods which aim at improving the inter-personal skills of executives ; and**

- C. Methods which aim at improving the executive's knowledge.**

A. Methods Which Aim at Improving the Decision-making Skills of Executives

- (1) Case Study Method**
- (2) Incident Method**
- (3) In-basket Method**
- (4) Management Games**

B. Method Which Aim at Improving the Interpersonal Skills of Executives

- (1)Sensitivity Training(or laboratory training)**
- (2)Role Playing**
- (3)Transactional Analysis**

C. Methods which aim at improving the executive's knowledge

(1)Conferences

(2)Autonomy training

Thank You

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Types of Business Organizations

Introduction

- Business organization refers to all legal and mandatory arrangements required to conduct a business.
 - It also refers to all those steps that need to be undertaken for establishing relationship between men, material, and machine to carry business efficiently with the intention of earning profit.
 - The arrangement which follows this process of organizing is called a business undertaking or organization.
-

Introduction

- **Characteristics of Business organization:**

- Ownership
- Lawful Business
- Separate Entity and Management
- Risk

- **Forms of Business Organization:**

- Sole Proprietorship
 - Partnership
 - Joint Stock Company
 - Co-Operative Society
 - Joint Hindu Family Business
 - Government Company (Public Corporations)
-

1. Sole Proprietorship

- When the ownership and management of business are in control of one individual, it is known as sole proprietorship.
 - The shops and the stores that you see in your locality – the grocery store, the vegetable shop, the chemist shop, etc... all come under sole proprietorship.
 - The volume of activities of such a business unit may be quite large.
 - However, since it is managed and owned by single individual, often the size of business remain small.
-

1. Sole Proprietorship

□ Characteristics:

- Ownership**
 - Management**
 - Source of Capital**
 - Legal Status**
 - Liability**
 - Stability**
 - Legal Formalities**
-

1. Sole Proprietorship

□ Advantages:

- Easy Formation**
 - Better Control**
 - Prompt Decision Making**
 - Flexibility in operations**
 - Retention of Business secrets**
 - Direct Motivation**
 - Personal attention to consumer needs**
 - Creation of employment**
-

1. Sole Proprietorship

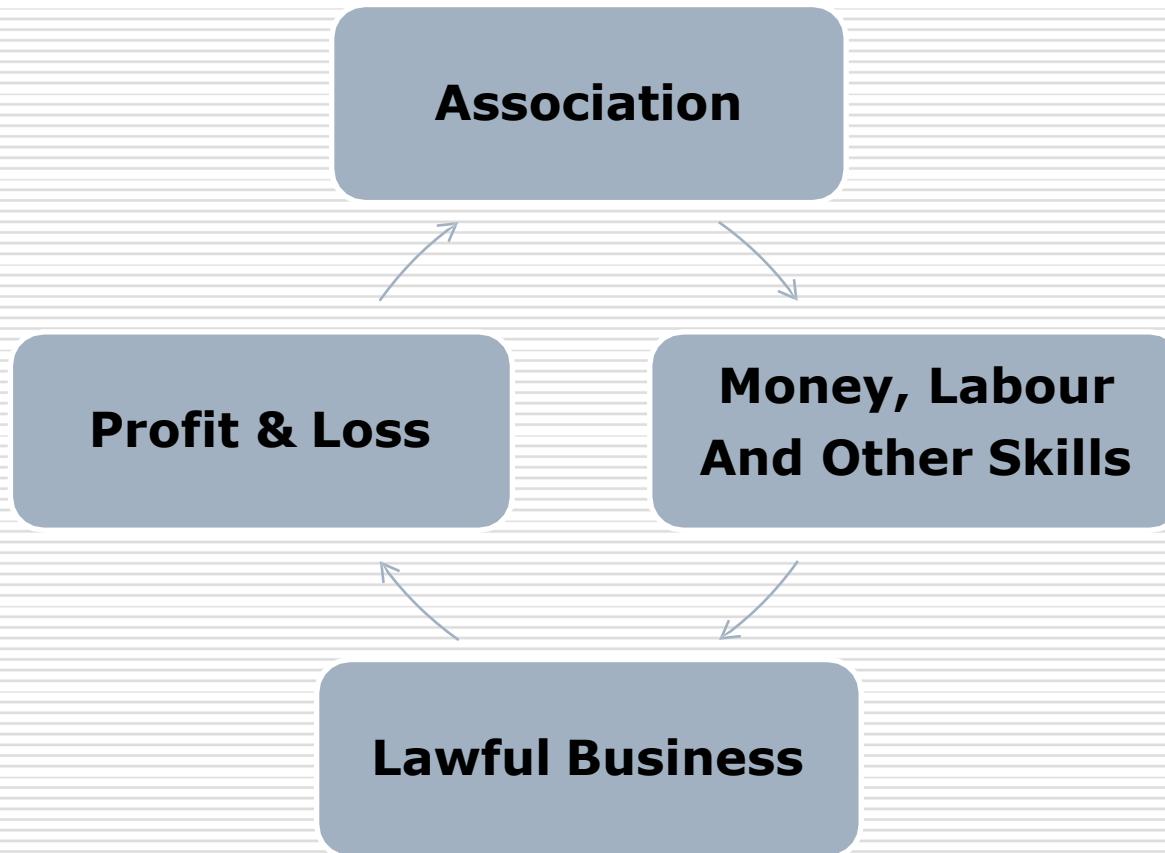
□ Disadvantages:

- Unlimited Liability**
 - Limited Financial Resources**
 - Limited Capacity of Individual**
 - Uncertainty of Duration**
-

2. Partnership

- A Partnership form of organization is one where two or more persons are associated to run a business with a view to earn profit.
 - Persons from similar background or different ability or skills, may join together to carry a business.
 - Each member of such a group is individually known as 'Partner' and collectively the members are known as 'partnership firm'.
 - These firms are governed by the Indian Partnership Act, 1932.
-

PARTNERSHIP



2. Partnership

□ Characteristics:

- Number of Partners**
 - Contractual Relationship(written /oral)**
 - Competence of Partners(synergy)**
 - Sharing of Profit and Loss**
 - Unlimited Liability(private property)**
 - Transfer of Interest**
 - Legal Status**
 - Voluntary Registration**
-

Types of Partners

- General Partners
 - Active Partners
 - Sleeping/Silent Partners
 - Nominal Partners
 - Secret Partners
 - Minor Partners(limited liability)
-

2. Partnership

□ Advantages:

- Easy Formulation
 - Larger Resources
 - Flexibility in Operations
 - Better Management
 - Sharing of Risk
 - Protection of Minority Interest
 - Better Public Relation
-

2. Partnership

□ Disadvantages:

- Dissolution of organisation
 - Unlimited Liability
 - Lack of Harmony
 - Limited Capital
-

3. Joint Stock Company

- A joint stock company form of business organization is a voluntary association of persons to carry on business.
 - It is given a legal status and is subject to certain legal regulations.
 - It is an association of persons who generally contribute money for some common purpose.
 - The proportion of capital to which each member is entitled is called his share, therefore members of joint stock company are known as shareholders and the capital of the company is known as share capital.
-

3. Joint Stock Company

- The total share capital is divided into a number of units known as 'shares'.
 - The companies are governed by the Indian Companies Act, 1956.
 - The act defines a company as an artificial person created by law, having a separate entity, with perpetual succession, and a common seal.
-

3. Joint Stock Company

□ Advantages:

- Limited Liability
 - Continuity of Existence
 - Benefits of Large Scale of Operations
 - Professional Management
 - Social Benefit
-

3. Joint Stock Company

□ Disadvantages:

- Formation is not easy
 - Control by a group
 - Speculation and Manipulation
 - Excessive government Control
 - Delay in policy decision
-

4. Co-Operative Society

- Any ten person can form a Co-Operative society.
 - It function under the Co-operative Societies Act , 1912 and other State Co-operative Societies Acts.
 - It is totally different than all other form of business discussed above in terms of its objective.
 - They are primarily formed to render service to its members.
 - Its also provides some services to the society. The main objective of Co-Operative Societies are:
 - Rendering the service rather than earning profit
 - Mutual help instead of competition
 - Self help in place of dependence
-

4. Co-Operative Society

- Few Co-Operative Societies are:
 - Consumer Co-operatives
 - Producer's Co-operatives
 - Marketing Co-operatives
 - Housing Co-operatives
 - Credit Co-operatives
 - Farming Co-operatives
-

4. Co-Operative Society

□ Characteristics:

- Voluntary Association**
 - Membership**
 - Body Corporate**
 - Service Motive**
 - Democratic Set up**
 - Sources of Finances**
-

4. Co-Operative Society

□ Advantages:

- Easy Formation
 - Limited Liability
 - Open Membership
 - State Assistance
 - Middlemen's profit Eliminated
 - Management
 - Winding up
-

4. Co-Operative Society

□ Disadvantages:

- Limited Capital
 - Problems in Management
 - Lack of Motivation
 - Lack of Co-Operation
 - Lack of Secrecy
 - Dependence on Government
-

5. Joint Hindu Family Business

- The JHF business is a form of business organization found only in India.
 - In this form of business, all the members of a Hindu undivided family own the business jointly.
 - The affairs of business are managed by the head of the family, who is known as the 'KARTA'.
 - A Joint Hindu Family business only the male members get a share in the business by virtue of there being part of the family.
 - The membership is limited up to three successive generations.
-

5. Joint Hindu Family Business

- Thus an individual, his son(s), and his grandson(s) become the members of a Joint Hindu Family by birth.
 - A daughter has no right to ask for a partition.
-

5. Joint Hindu Family Business

□ Characteristics:

- Legal Status**
 - Membership**
 - Profit Sharing**
 - Management**
 - Liability**
 - Fluctuating share**
 - Continuity**
-

5. Joint Hindu Family Business

□ Advantages:

- Assured share in profits
 - Freedom in Managing
 - Sharing of Knowledge and Experience
 - Unlimited liability of the KARTA only
 - Continued Existence
-

5. Joint Hindu Family Business

□ Disadvantages:

- Limited Capital
 - Lack of Motivation
 - Scope for misuse of power of the KARTA
 - Scope for conflict
 - Instability
-

Forms of Public Sector Organisations

- Departmental Organisation
 - Public Corporations
 - Government Companies
-

Departmental Organisation

□ Characteristics

- Financed out of Govt. budget
 - Revenue go to public exchequer
 - All the rules and regulations of govt. are applicable
 - Direct control of the concerned ministry
 - Employees are govt. servants
-

Advantages

- Easy to achieve political, economical and social objectives
 - Suitable for public utility services and defence industries
 - Due to govt. control, complete secrecy is possible
-

Disadvantages

- Bureaucratic control
 - No timely decisions
 - Rigidity in certain rules and regulations, difficult to bring major innovations and modifications
 - Lack of initiatives as promotions are on seniority based
-

Public Corporations

□ Advantages

- Better managed**
 - Quick decisions**
 - More flexibility**
 - No profit motive, public utilities at reasonable costs to people**
 - Experienced and capable directors thus efficiently managed**
-

Disadvantages

- Autonomy of corporations only on paper
 - Interference of political leaders and govt. officers
 - Possess monopoly

 - Examples
 - Indian railway, Delhi metro rail, Air India, Indian vaccine corporation, IRDA, Post office
-

6. Government Companies (Public Co-operations)

- A Government-owned corporations, State Owned company, State-owned entity, State enterprise, publicly owned corporations, government business enterprise, is a legal entity created by government to undertake commercial activities on behalf of an owner government.
 - In India a public enterprise incorporated under the Indian Companies Act, 1956, is called a government company.
 - These companies are owned and managed by central or state government.
-

6. Government Companies (Public Co-operations)

- According to Indian Companies Act, 1956, a government company means “any company in which not less than 51% of paid capital is held by the central or state government and partly by the central government and includes a company which is a subsidiary of a government company”.
-

6. Government Companies (Public Co-operations)

□ Characteristics:

- Formation**
 - Ownership**
 - Management**
 - Legal Status**
 - Employees**
 - Capital Collection**
 - Approval of Accounts**
 - Flexibility**
-

6. Government Companies (Public Co-operations)

□ Advantages:

- Formation is easy
 - Easy to incorporate changes
 - Enjoys Financial Autonomy
 - Development of Neglected areas by Private players
 - Healthy competition
-

6. Government Companies (Public Co-operations)

□ Disadvantages:

- Political Interference
 - They Take the assistance of Civil Servants and they are not experts
 - Slackness in Management
-

Transportation Models

- The transportation problem deals with the distribution of goods from several points of ss (sources) to a no. of pts. of demand (destination)
- Usually, we have a given capacity of goods at each source and a given requirements for the goods at each destinaⁿ
- It is used when firm is trying to decide where to locate a new facility.
- It is used before opening a new warehouse, factory or sales office.
- It attempts to minimize total transportⁿ & produⁿ costs for the entire system.

* Mathematical model of transportⁿ problem.

	D ₁	D ₂	D ₃	D ₄	Capacity(ss)
S ₁	19	30	50	10	7
S ₂	70	30	40	60	9
S ₃	40	08	70	20	18
D _d	05	08	07	14	34

Prodⁿ facilities \rightarrow S₁, S₂ & S₃ \rightarrow Per week capacities
 Warehouses \rightarrow D₁, D₂, D₃, D₄ \rightarrow II II requirements

19, 30 --- 20, 18 \rightarrow transportⁿ cost / unit
 from source to destinaⁿ.

Model formulation

Let x_{ij} = no. of units of product to be transported from factory i to warehouse j
 $i = 1, 2, 3$
 $j = 1, 2, 3, 4$.

\Rightarrow Transportation problem stated as an LP model as follows:

write down whole eqⁿ

$$\text{Min. } Z = 19x_{11} + 30x_{12} + 50x_{13} + \dots + 70x_{32} + 20x_{34}$$

subject to the constraints

$$\begin{aligned} x_{11} + x_{12} + x_{13} + x_{14} &= 7 \\ x_{21} + x_{22} + x_{23} + x_{24} &= 9 \\ x_{31} + x_{32} + x_{33} + x_{34} &= 18 \end{aligned} \quad \left. \begin{array}{l} \text{(Capacity available)} \\ \text{(Demand)} \end{array} \right.$$

$$\begin{aligned} x_{11} + x_{21} + x_{31} &= 5 \\ x_{12} + x_{22} + x_{32} &= 8 \\ x_{13} + x_{23} + x_{33} &= 7 \\ x_{14} + x_{24} + x_{34} &= 14 \end{aligned} \quad \left. \begin{array}{l} \text{(Demand)} \\ \text{(Demand)} \end{array} \right.$$

& $x_{ij} \geq 0$ for i & j .

* General Mathematical model of Transportation problem.

$$\text{Minimize (Total cost)} Z = \sum_{i=1}^m \sum_{j=1}^n c_{ij} x_{ij}$$

Subj. to the constraints

$$\sum_{j=1}^n x_{ij} = a_i \quad i = 1, 2, \dots, m \quad (\text{Supply constraints})$$

$$\sum_{i=1}^m x_{ij} = b_j, \quad j = 1, 2, \dots, n \quad (\text{all constraints})$$

$x_{ij} \geq 0$ for all $i \leq j$.

* Transportation Algorithm.

1 Step-1 → Formulate the problem and arrange the data in the matrix form

Step-2 → Obtain an initial basic feasible solⁿ

(i) North-West Corner Method

(ii) Least Cost Method

(iii) Vogel's Approximation (or Penalty) Method

⇒ Initial solⁿ must satisfy the following condⁿs.

(i) Solⁿ must be feasible i.e. it must satisfy all dd & ss constraints.

(ii) The no. of allocⁿ must be equal to $(m+n-1)$ ⇒ min no. of rows & columns resp.

⇒ Any solⁿ that satisfies the above condⁿs is called non-degenerate basic feasible solⁿ. otherwise degenerate solⁿ.

Step-3 → Test the initial solⁿ for optimality
Use MODI method.

Step-4 → Updating the solⁿ.

Repeat step 3 until an optimal solⁿ is obtained.

* Methods of finding initial solⁿ
J.K. Sharma (4th)

① North-West Corner Method (NWCM)

	D ₁	D ₂	D ₃	D ₄	S ₅
S ₁	19	30	50	10	7
S ₂	70	30	40	60	9
S ₃	40	8	70	20	18
D ₄	5	8	7	14	34

$$\text{Positive allocation} = m+n-1 = 3+4-1 = 6$$

$$\begin{aligned} \text{Total transportation cost} &= (5 \times 19) + (2 \times 30) + \\ &(6 \times 30) + (3 \times 40) + (4 \times 70) + (1 \times 20) \\ &= 1015 \text{ Rs} \end{aligned}$$

② Least-Cost Method (LCM)

	D ₁	D ₂	D ₃	D ₄	S ₅
S ₁	19	30	50	10	7 (2)
S ₂	70 (1)	30	40	60	9
S ₃	40 (3)	8 (1)	70	20	18 (3)
D ₄	5	8	7	14	34 (3)

$$\text{Positive allocation} = m+n-1 = 3+4-1 = 6$$

$$\begin{aligned} \text{Total transportation cost} &= (7 \times 10) + (2 \times 70) + (7 \times 40) + (3 \times 20) + (8 \times 8) \\ &\quad + (7 \times 20) \end{aligned}$$

$$= 700 + 140 + 280 + 120 + 64 + 140 = 814$$

③ Vogel's Approximation Method (VAM)

- VAM is a heuristic method & is preferred more than the other two methods described above.
- The advantage of this method is that it gives an initial solution which is nearer to an optimal soln. or is a the optimal soln. itself.

→ Steps :-

① Find the differences b/w the lowest & the second lowest costs for each row & each column. Write down the row penalties against the respective rows & the column penalties against the respective columns.

② Select the row & column with the largest penalty. In case of a tie, select the row/column that allows maximum allocn in the lowest cost cell in those columns/rows corresponding to the largest penalty.

③ Assign the maximum possible amt. to the cell with the lowest cost in the row/column selected in step-2.

④ Delete the row/column as the case may be (if it is exhausted or requirement is satisfied) & adjust marginal cost (a_i / b_j). This will give a new reduced matrix.

⑤ Repeat step-1 to step-3 until all requirements are satisfied.

This method gives an IBS.

	D ₁	D ₂	D ₃	D ₄	SS	Row Penalty		
S ₁	19 ③	30	50	10 ②	1/2	9	40	40
S ₂	70	30	40 ⑦	60 ②	9/2	10	20	20
S ₃	40 ⑧	8 ①	70 ④	20 ⑤	18/10 ⑥	12	20	50
dd.	5 21	8 22	7 10	14 10	34			
Column	21	-	10	10				
Penalty	-	-	10	10				
	-	-	10	50				

Positive allocation = [6] 95 20 280 120

Total transportation cost = $(5 \times 19) + (2 \times 10) + (7 \times 40) + (2 \times 60)$
 $+ (8 \times 8) + (10 \times 20)$
 $= 779$

Example - 2

(1) North-west corner Method. (2) Least-cost Method.

Sales			Depot					
	x	y	z	ss	x	y	z	ss
A	3 20	7 20	1	20	-A	3	7	1 20
B	2 15	9 15	12	30	B	2 30	9	12 30
C	10 50	2 50	5 50	50	C	10 30	2 15	5 30 100
dd	35	15	50	100	dd	35	15	50

Degenerate

475

Total transportation cost = $(20 \times 1) + (30 \times 2)$
 $+ (5 \times 10) + (15 \times 2) + (30 \times 5)$
 $= 310$

③ Vogel's Approximation Method (VAM)

	x	y	z	SS.	Row Penalty
A	3	7	1	20	2 2 6 +
	(3)		(1)	(15)	
B	2	9	12	30	7 - - -
	(2)			(30)	
C	10	2	5	50	3 3 3
		(2)	(5)	(35)	
dd	35/5	15	50	100	
	1	5	4		

Column Penalty - 7 5 4

Penalty - - 5 4

$$\begin{aligned}
 \text{Transportation Cost} &= (5 \times 3) + (15 \times 1) + (30 \times 2) + (15 \times 2) + (35 \times 5) \\
 &= 15 + 15 + 60 + 30 + 175 \\
 &= 295
 \end{aligned}$$

* MODI Method :-

- Example - 1

	D ₁	D ₂	D ₃	D ₄	SS.	U _i
S ₁	19	30	50	10	7	U ₁ = 10
	(5)		32	60	(2)	
S ₂	70	30	40	60	9	U ₂ = 60
		(1)	(-1)	(7)	(2)	
S ₃	40	8	70	20	18	U ₃ = 20
	11	(-4)	(8)	70	(10)	
dd	5	8	7	14	35	

$$Y_j: Y_1 = 9 \quad Y_2 = -12 \quad Y_3 = -20 \quad Y_4 = 0$$

$$C_{ij} = U_i + V_j \Rightarrow \text{assume } V_4 = 0$$

$$C_{14} = U_1 + V_4 \Rightarrow 10 = U_1 + 0 \Rightarrow U_1 = 10$$

$$C_{24} = U_2 + V_4 \Rightarrow 60 = U_2 + 0 \Rightarrow U_2 = 60$$

$$C_{34} = U_3 + V_4 \Rightarrow 20 = U_3 + 0 \Rightarrow U_3 \text{ Page No. 1}$$

$$C_{11} = U_1 + V_1 \Rightarrow 19 = 10 + V_1 \Rightarrow V_1 = 9$$

$$C_{23} = U_2 + V_3 \Rightarrow 40 = 60 + V_3 \Rightarrow V_3 = -20$$

$$C_{32} = U_3 + V_2 \Rightarrow 8 = 20 + V_2 \Rightarrow V_2 = -12$$

* Opportunity cost for unoccupied cell.

$$d_{ij} = C_{ij} - (U_i + V_j)$$

$$d_{12} = 30 - (10 - 12) = 32$$

$$d_{13} = 50 - (10 - 20) = 60$$

$$d_{21} = 70 - (60 + 9) = 1$$

$$d_{22} = 30 - (60 - 12) = -18$$

$$d_{31} = 40 - (20 + 9) = 11$$

$$d_{33} = 70 - (20 - 20) = 50$$

	D_1	D_2	D_3	D_4	SS	U_i
S_1	19	30	50	10	7	$U_1 = 10$
	(5)	+28	+48	(2)		
S_2	70	30	90	60	9	$U_2 = 42$
	+37	(2)	(7)	+18		
S_3	40	8	70	20	18	$U_3 = 20$
	+11	(6)	+52	(12)		
dd	5	8	7	14	34	
	$V_1 = 9$	$V_2 = -12$	$V_3 = -2$	$V_4 = 0$		

Example - 2

	x	y	z	SS	U_i
A	3	7	15	20	$U_1 = 3$
	(3)	+9	(15)		
B	2	9	12		
	(2)	+2	+8	(30)	$U_2 = 2$
C	10	2	5		
	+3	(15)	(35)	50	$U_3 = 4$
dd	35	15	50		
	$V_1 = 0$	$V_2 = -2$	$V_3 = -2$		

Assume $V_1 = 0$

$$C_{11} = U_1 + V_1 \Rightarrow 3 = U_1$$

$$C_{21} = U_2 + V_1 \Rightarrow 2 = U_2$$

$$C_{13} = U_1 + V_3 \Rightarrow 1 = 3 + V_3 \Rightarrow V_3 = -2$$

$$C_{33} = U_3 + V_3 \Rightarrow 5 = U_3 + 2 \Rightarrow U_3 = 7$$

$$C_{32} = U_3 + V_2 \Rightarrow 2 = 7 + V_2 \Rightarrow V_2 = -5$$

Example - 3 Unbalanced SS & DD.

J.K. Sharma (4th) (Pg - 285)

four factories	A	B	C	D
Prod ⁿ cost / variable cost	2	3	1	5
Prod ⁿ capacities	50	40	30	50
four stores	I	II	III	IV
dd.	25	35	105	20

Note :- Here my fix-cost might be given - but one has to ignore it

stores

	I	II	III	IV	SS
A	$2+2=4$	$4+2=6$	$6+2=8$	$11+2=13$	50
B	$10+3=13$	$8+3=11$	$7+3=10$	$5+3=8$	70
C	$13+1=14$	$3+1=4$	$9+1=10$	$12+1=13$	30
D	$4+5=9$	$6+5=11$	$8+5=13$	$3+5=8$	50
dd.	25	35	105	20	185 200

①

$$(0.8x_1) + (0.5x_2) + (0.5x_3) + (2x_4) + (2x_5) \text{ after 1st step}$$

$$(21 \cdot 0.8 + 16 \cdot 0.5 + 10 \cdot 0.5 + 2 \cdot 2 + 2 \cdot 2) +$$

$$25 + 35 + 105 + 20 + 185 = 280$$

	I	II	III	IV	Dummy	SS	Row Min
A	4	6	8	13	0	50 /25	42
B	13	11	10	8	0	70	8 & 22
C	14	9	10	13	0	30	16 -
D	9	11	13	8	0	50 /15	8 1 13
dd.	25	35/5	105	20	15	200	
S	2	0	0	0	-		
S	2	0	0	-			
Column SS	0	2	0	-			
Penalty	-	0	2	0	-		
-	-	0	2	-	-		
-	-	0	2	-	-		

$$V_1 = 4 \quad V_2 = 6 \quad V_3 = 8 \quad V_4 = 3 \quad V_5 = -5$$

Assume $U_1 = 0$

$$C_{11} = U_1 + V_1 \Rightarrow V_1 = 4$$

$$C_{12} = U_1 + V_2 \Rightarrow V_2 = 6$$

$$C_{13} = U_1 + V_3 \Rightarrow V_3 = 8$$

$$C_{23} = U_2 + V_3 \Rightarrow 10 = U_2 + 8 \Rightarrow U_2 = 2$$

$$C_{32} = U_3 + V_2 \Rightarrow 4 = U_3 + 6 \Rightarrow U_3 = -2$$

$$C_{43} = U_4 + V_3 \Rightarrow 13 = U_4 + 8 \Rightarrow U_4 = 5$$

$$C_{44} = U_4 + V_4 \Rightarrow 8 = 5 + V_4 \Rightarrow V_4 = 3$$

$$C_{45} = U_4 + V_5 \Rightarrow 0 = 5 + V_5 \Rightarrow V_5 = -5$$

$$\begin{aligned} \text{Total cost} &= (4 \times 25) + (6 \times 5) + (8 \times 20) + (10 \times 70) + (4 \times 30) \\ &\quad + (13 \times 15) + (8 \times 20) + (0 \times 15) \\ &= 100 + 30 + 160 + 700 + 120 + 195 + 160 + 0 \\ &= 1465 \end{aligned}$$

Maximizing Transport Problem

$U_1 = 0 \quad U_2 = 0$

Example :- J.K. Sharma (4th) (Pg - 297)

- 1. $U_1 = 2, U_2 = 0$. has four mfg plants & five warehouses
- Relevant data is given in the following
- $U_3 = 2, U_4 = 0$ - 2 tables.

$U_4 = 5, U_5 = T$ term

	Plant			
	1	2	3	4
Mfg. cost (Rs) per unit	12	10	8	17
R.M. cost (Rs) per unit	8	7	7	5
Capacity per unit	100	200	120	80

Warehouse	Transport cost (Rs)/unit				SP.	Ad./unit(Rs)
	1	2	3	4		
A	4	7	4	3	30	80
B	8	9	7	8	32	120
C	2	7	6	10	28	150
D	10	7	5	8	34	70
E	2	5	8	9	30	90

(a) Formulate this problem as a transport problem in order to maximize profit.

(b) Find the soln. using VAM method.

(c) Test for optimality and find the optimal soln.

Ans: Profit = Sales price - Prodⁿ cost - R M cost - TC.

	1	2	3	4	Dummy	dd.
A	6	6	11	15	0	80
B	4	6	10	12	13	0
C	6	4	7	6	0	150
D	4	10	14	14	0	70
E	8	8	7	9	0	190
SS.	100	200	120	80	10	510.

- As the highest profit value is 15, by subtracting all cell values including itself from it, the new values that are obtained are shown below. Now the problem becomes cost minimizing "transports" problem.

	1	2	3	4	D	dd.	Row Penalty	u_i
A	9	9	4	0	5	80	4 - - -	$u_1 = 4$
B	11	9	5	3	15	120	2 4 4 2 2	$u_2 = 9$
C	9	11	8	9	15	150	1 1 3 2 2	$u_3 = 11$
D	11	5	1	1	15	70	0 0 - - -	$u_4 = 5$
E	7	7	8	6	15	90	1 1 1 0 -	$u_5 = 7$
SS.	100	200	120	80	10	510.		

Col. Penalty $\{ -2 \ 0 \ -4 \ -4 \ -4 \}$

$$Y_j \quad Y_1 = -2 \quad Y_2 = 0 \quad Y_3 = -4 \quad Y_4 = -4 \quad Y_5 = 4$$

Assume $V_2 = 0$

$$C_{22} = u_2 + v_2 \Rightarrow 9 = u_2 + 0 \Rightarrow u_2 = 9$$

$$C_{32} = u_3 + v_2 \Rightarrow u_3 = 11$$

$$C_{52} = u_5 + v_2 \Rightarrow u_5 = 7$$

$$C_{31} = u_3 + v_1 \Rightarrow 9 = 11 + v_1 \Rightarrow v_1 = -2$$

$$C_{35} = u_3 + v_5 \Rightarrow 15 = 11 + v_5 \Rightarrow v_5 = 4$$

$$C_{23} = u_2 + v_3 \Rightarrow 5 = 9 + v_3 \Rightarrow v_3 = -4$$

$$C_{43} = u_4 + v_3 \Rightarrow 1 = u_4 + (-4) \Rightarrow u_4 = 5$$

For finding u_1 & v_4 , let us put Epsilon (ϵ) in cell B_4 first

$$C_{44} = u_4 + v_4 \Rightarrow 1 = 5 + v_4 \Rightarrow v_4 = -4$$

$$C_{14} = u_1 + v_4 \Rightarrow 0 = u_1 - 4 \Rightarrow u_1 = 4$$

$$\uparrow C_{24} = u_2 + v_4 \Rightarrow 3 = 9 + v_4 \Rightarrow v_4 = -6$$

$$C_{14} = u_1 + v_4 \Rightarrow 0 = u_1 - 6 \Rightarrow u_1 = 6 \quad \text{the coln. is optimal}$$

Here $B_4 = -2$ (\therefore) we need to shift ϵ to B_4 & by doing so.

$$\begin{aligned} \text{Total profit} &= (9 \times 70) + (5 \times 50) + (9 \times 100) + (11 \times 40) + (15 \times 10) \\ &\quad + (1 \times 70) + (7 \times 90) \\ &= 630 + 250 + 900 + 440 + 150 + 70 + 630 \\ &= 3070. \end{aligned}$$

Example of Trans-Shipment Problem [Nita Shah (DR) - pg. 233]

- 4 sources & 2 destinations $\rightarrow X \quad Y$

A B C D - 100, 200, 150 & 350 units $\quad 350 \quad 450$

Destinations

A B C D ~~E~~ Y

A 0 4 20 5 25 12

B 10 0 6 10 5 20

Source C 15 20 0 8 45 7

D 20 25 10 0 30 6

X 20 18 20 15 0 10

Y 10 25 30 23 4 0

Destination

	A	B	C	D	X	Y	SS	Row Penalty					
A	0	400	20	14	5	26	28	12	28	100+800	13	13	41=59
B	10	0	6	10	5	300	0	20	11	= 900	15	15	42=55
C	15	20	0	8	45	7	14	150	39	= 1000	38	-	43=31
D	20	25	10	0	30	6	7	14	150	= 950	24	24	44=30
X	20	18	60	15	0	10	800	300	300	= 1150	-	-	45=0
Y	10	28	30	23	4	0	800	800	800	- -	-	-	46=24
dd	800	800	800	800	350+800	450+800	= 1150	= 1250					
C.P.	--	--	--	--	2020	11							
	$y_1 = -25$	$y_2 = -5$	$y_3 = -3$	$y_4 = -30$	$y_5 = 0$	$y_6 = -24$							

Assume $y_5 = 0$

$$C_{15} = u_1 + v_5 \Rightarrow u_1 = 25$$

$$C_{25} = u_2 + v_5 \Rightarrow u_2 = 5$$

$$C_{45} = u_4 + v_5 \Rightarrow u_4 = 30$$

$$C_{55} = u_5 + v_5 \Rightarrow u_5 = 0$$

$$C_{11} = u_1 + v_1 \Rightarrow 0 = 25 + v_1 \Rightarrow v_1 = -25$$

$$C_{22} = u_2 + v_2 \Rightarrow 0 = 5 + v_2 \Rightarrow v_2 = -5$$

$$C_{46} = u_4 + v_6 \Rightarrow 6 = 30 + v_6 \Rightarrow v_6 = -24$$

$$C_{36} = u_3 + v_6 \Rightarrow 7 = u_3 - 24 \Rightarrow u_3 = 31$$

$$C_{33} = u_3 + v_3 \Rightarrow 0 = 31 + v_3 \Rightarrow v_3 = -31$$

$$C_{44} = u_4 + v_4 \Rightarrow 0 = 30 + v_4 \Rightarrow v_4 = -30$$

$$C_{66} = u_6 + v_6 \Rightarrow 0 = u_6 - 24 \Rightarrow u_6 = 24$$

Note: The allocation on main diagonal are to be ignored.

$$\text{Transport cost} = (100 \times 4) + (300 \times 5) + (7 \times 150) + (30 \times 50) + (6 \times 30)$$

$$= 6250$$

Example :- Determine optimal solⁿ for the following TP.

	$V_1 = -9$	$V_2 = -8$	$V_3 = 0$	SS	R.P.
u_1	30	27	14	60	13,-
$= u_1$	14	+25	+21	(60)	
u_2	18	17	25	50	1,1
$= u_2$	25	+2	(50)	0	
u_3	20	21	29	40	1,1
$= u_3$	29	(52)	(18)	(20)	
dd.	52	68	80	200	
C.P.	2,52	4,4	11,4	200.	

Assume $V_3 = 0$

$$C_{13} = u_1 + V_3 \Rightarrow u_1 = 14$$

$$C_{23} = u_3 + V_3 \Rightarrow u_3 = 29$$

$$C_{31} = u_3 + V_1 \Rightarrow 20 = 29 + V_1 \Rightarrow V_1 = -9$$

$$C_{32} = u_3 + V_2 \Rightarrow 21 = 29 + V_2 \Rightarrow V_2 = -8$$

$$C_{22} = u_2 + V_2 \Rightarrow 17 = u_2 - 8 \Rightarrow u_2 = 25$$

$$\text{Transport cost} = (60 \times 14) + (50 \times 17) + (52 \times 20) + (18 \times 21) + (20 \times 29)$$

$$= 3688$$

* Transshipment Problem

- Multi plant firm may find it necessary to send some goods from one plant to another in order to meet the substantial ↑ in the add in the second mkt.
- So, here second plant would act as both source & a. destinaⁿ.
- In short, TP. in which available commodity may be send through one/more sources/destinaⁿs before reaching its destinaⁿ, is termed as trans-shipment problem.

Assignment Problem.

- An assignment problem is a particular case of a transport problem where the sources are assigned and the destinations are tasks.
- Here the no. of origins is always equal to the no. of destinations.
- The problem of assignment arises because the resources that are available such as men, machines etc, have varying degrees of efficiency for performing different activities is also different. Therefore, the cost, profit or time for performing different activities is also different. Thus, the problem is : how to optimize the given objective.

Resources	Activities (Jobs)											Supply
Cworkers	J_1, J_2, \dots, J_n											1
w_1	$c_{11}, c_{12}, \dots, c_{1n}$											1
w_2	$c_{21}, c_{22}, \dots, c_{2n}$											1
w_n	$c_{n1}, c_{n2}, \dots, c_{nn}$											1
dd	1 1 1 ... 1											n

* Solution methods of AP

① Enumeration Methods

- To find an optimum assignment first all $n!$ arrangements are written & then their total costs are evaluated.
- Assignment with minimum cost is selected.
- It leads to computational problem of formidable size even when the value of n is moderate.

- Even for $n=10$, total no. of arrangements are $n! = 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 3628800$

(2) Simplex Method :-

- AP can be solved by this method after converting it into zero-one integer programming problem.

(3) Transportation Method :-

- Due to high degree of degeneracy, the computational method of TP become very inefficient.

(4) Hungarian Method :-

- Developed by H. Kuhn, based upon the work of two Hungarian mathematicians - D. Konig & J. Egervary.

\Rightarrow Assumption

- All C_{ij} 's of the starting cost matrix are non-negative integers.
- Assignment problem is of minimization case.

\Rightarrow Algorithm.

Step:-1 Subtract the minimum of each row from all the elements of respective rows.

Step:-2 Modify the resulting matrix by subtracting the minimum element of each column from all the elements of the column.

Step:-3 Draw the min. no. of horizontal and vertical

lines to suppress all the zeros. Let the no. of lines drawn be N .

- (i) If $N=n$ (n = no. of rows/columns), the optimal assignment can be made. Hence go to step 6.
- (ii) If $N < n$, go to step 4.

Step-4: Find the smallest uncovered element (that is not covered by the lines drawn). Subtract it from all uncovered entries. Add it to all entries on the intersection of the two lines.

Step-5 Repeat step 3 & step 4 until $N=n$.

Step-6 Find a row with exactly one 0 entry. Encircle it by \boxed{I} . Cancel that column and row showing that the zeroes in that column cannot be taken for further assignment. Continue this process until all rows are examined. Repeat it for columns also. This step is called zero assigning.

Step-7 Continue step 6 until

- (i) No unmarked zero is left.
- (ii) there lies more than one of the unmarked zeroes in the column/row.

In case (i), the procedure terminates. In case (ii), mark \boxed{I} one of the unmarked zeroes arbitrarily and cancel the remaining zeros in its row & column. Repeat the process until no unmarked zero is left in the matrix.

Step-8 Exactly one marked \boxed{I} zero in each row & column is obtained. This method is known as Flood's technique.

Example 1-1 3 applicants & 3 jobs.

Determine the assignment of applicants to jobs such that the total cost is minimized.

	J_1	J_2	J_3		J_1	J_2	J_3		J_1	J_2	J_3	
A	26	<u>23</u>	27		A	3	<u>0</u>	4	A	2	0	2
B	23	<u>22</u>	24		B	<u>1</u>	0	<u>2</u>	B	0	0	0
C	24	<u>20</u>	23		C	<u>4</u>	0	<u>3</u>	C	3	0	1

(3)	J_1	J_2	J_3	Here $N = 3 = n$.		J_1	J_2	J_3
A	1	0	1	$A J_2 + B J_1 + C J_3$	A	<u>1</u>	0	1
B	0	1	0	Total cost = $23 + 23 + 23$	B	0	1	0
C	2	0	0	= 69	C	2	0	0

Example 2 - Using the following cost matrix, determine
(a) optimal job assignment & (b) the cost of assignment

Machinist 1 2 3 4 5

					1	2	3	4	5
A	10	3	3	2	8	1	1	0	6
B	9	7	8	2	7	1	0	5	5
C	7	5	6	2	4	1	3	4	0
D	3	5	8	2	4	1	3	6	0
E	9	10	9	6	10	3	4	3	0

	1	2	3	4	5		1	2	3	4	5
A	-	0	0	<u>2</u>	6		A	-	0	0	4
B	4	2	3	0	3		B	6	4	5	0
C	<u>2</u>	0	1	0	0		C	4	2	3	0
D	0	2	5	9	2		D	-	2	5	0
E	-	1	0	0	2		E	2	3	2	0

	1	2	3	4	5	Total cost
A	7	0	0	2	6	$A-2 = 03$
B	4	2	3	0	3	$B-4 = 02$
C	2	0	1	0	0	$C-5 = 04$
D	0	2	5	2	2	$D-1 = 03$
E	0	1	0	0	2	$E-3 = 09 = 21$

Example-3. Minimize the processing time.

	O_1	O_2	O_3	O_4	O_5	$J_1 \rightarrow O_5$	8
J_1	10	12	15	12	8	$J_2 \rightarrow O_1$	7
J_2	7	16	14	14	11	$J_3 \rightarrow O_3$	7
J_3	13	14	7	9	9	$J_4 \rightarrow O_2$	10
J_4	12	10	11	13	10	$J_5 \rightarrow O_4$	11
J_5	8	13	15	11	15		43

* Problem with infeasible (Restricted) Assignment.

Example-4. Determine the optimal assignment.

	J_1	J_2	J_3	J_4		J_1	J_2	J_3	J_4
w_1	M	30	23	25	①	w_1	M-23	7	0
w_2	34	M	16	24		w_2	18	M-16	0
w_3	22	19	21	M		w_3	9	0	2
w_4	21	23	14	20		w_4	7	8	0

②

	J_1	J_2	J_3	J_4		J_1	J_2	J_3	J_4
w_1	M-26	7	4	0	③	w_1	M-26	7	0
w_2	11	M-20	0	2		w_2	15	M-16	0
w_3	0	0	6	M-21		w_3	0	0	2
w_4	0	4	0	0		w_4	4	8	0

Total cost

	J_1	J_2	J_3	J_4		
w_1	M-26	7	4	0	$w_1 \rightarrow J_4$	25
w_2	11	M-20	10	2	$w_2 \rightarrow J_3$	16
w_3	0	0	6	M-21	$w_3 \rightarrow J_2$	19
w_4	0	4	0	0	$w_4 \rightarrow J_1$	21
						81

* Example - 5 Unique vs. multiple optimal soln.

↓

Job (Cost in '00 Rs)

workers

	1	2	3	4	5		1	2	3	4	5
A-2 A	25	18	32	20	21	B-3	A	7	0	14	2
B-4 B	34	25	21	12	17	C-5	B	22	13	9	0
C-5 C	20	17	20	32	16	D-3	C	4	1	4	16
D-1 D	20	28	20	16	27	E-left-1	D	4	12	4	0
E-left-3	6	6	6	6	6		E	0	0	0	0

Here there are two optimal

soln.s.

	1	2	3	4	5
(1) A-2 - 18	2	8	0	10	2
B-4 - 12	12	8	13	5	0
C-5 - 16	16	0	1	0	16
D-1 - 20	20	0	12	0	11
E-left-3 - 66	66	E-left-1 - 66	0	0	4

* Unbalanced assignment problem

Example - 6 Jobs.

	J_1	J_2	J_3	J_4	J_5		J_1	J_2	J_3	J_4	J_5	J_6	
P ₁	27	23	22	24	27		P ₁	27	23	22	24	27	0
P ₂	28	27	21	26	24	1	P ₂	28	27	21	26	24	0
P ₃	28	26	24	25	28		P ₃	28	26	24	25	28	0
P ₄	27	25	21	24	24		P ₄	27	25	21	24	24	0
P ₅	25	20	23	28	26		P ₅	25	20	23	26	26	0
P ₆	26	21	21	24	27		P ₆	26	21	24	27	0	Page No. 4

	J_1	J_2	J_3	J_4	J_5	J_6		J_1	J_2	J_3	J_4	J_5	J_6	
P_1	2	3	1	0	3	0		P_1	1	2	1	0	3	0
P_2	3	7	0	2	0	0		P_2	2	6	0	2	0	0
P_3	3	6	3	1	4	0		P_3	2	5	3	1	4	0
P_4	2	5	0	0	0	0		P_4	1	4	0	0	0	0
P_5	0	0	2	2	2	0		P_5	0	0	3	3	3	1
P	1	1	0	0	3	0		P_6	0	0	0	0	3	0

Solt. 1.

Solt. 2.

Person Job cost

 P J Cost P_1 J_4 24 P_1 J_4 24 P_2 J_3 21 P_2 J_5 24 P_3 J_6 0 P_3 J_6 0 P_4 J_5 24 P_4 J_3 21 P_5 J_1 25 P_5 J_2 20 P_6 J_2 21 P_6 J_1 28

115

115

* Maximisation case in assignment problem.
 Example 8-7 Find out maximum profit

Profits resulting from

	A	B	C	D	E		A	B	C	D	E	
1	30	37	40	28	40		1	32	25	22	34	22
2	40	24	27	27	36		2	22	38	35	41	26
Jobs 3	40	32	33	30	35		3	22	30	29	32	27
4	25	38	40	36	36		4	37	24	22	26	26
5	29	62	41	34	39		5	33	10	21	28	33

	A	B	C	D	E
② → 1	10	3	0	12	0
2	0	16	13	19	4
3	0	8	7	10	5
4	15	2	0	4	4
5	33	0	21	28	23

	A	B	C	D	E
③ → 1	1	10	3	0	8
2	0	16	13	19	4
3	0	8	7	6	5
4	15	2	0	0	4
5	33	0	21	24	23

Job	Machine	Profit
1	C	40
2	E	36
3	A	40
4	D	36
5	B	62
[214]		

	A	B	C	D	E
1	14	3	0	8	0
2	0	12	9	11	0
3	0	4	3	2	1
4	19	2	0	0	4
5	37	0	21	24	23

* Travelling Salesman Problem

- TSP may be solved as an assignment problem, with two additional condition on the choice of assignment.

- ① how should a TS travel starting from his home city, visiting each city only once.
- ② Returning to his home city.
so that the total distance, time or cost covered is minimum.

Example - 8

(J.K. Sharma - 4th - 339)

A salesman must travel from city to city to maintain his accounts. This week he has to leave his home base & visit other cities & return home. The table shows the distances (in km) b/w the various cities. His home city is city A.

To city

	A	B	C	D	E		A	B	C	D	E
A	-	375	600	150	190		-	225	450	0	40
B	375	-	300	350	175		200	-	125	175	0
From city	C	600	300	-	350	500	^{Raw} _{Redm}	C	300	0	-
D	160	350	350	-	300		0	190	190	-	140
E	190	175	500	300	-		E	15	0	325	125

↓ column Red²

	A	B	C	D	E		A	B	C	D	F
A	-	240	325	0	40		-	225	325	0	40
B	200	-	0	175	0		200	-	0	175	0
C	285	0	-	(35)	185	←	C	300	0	-	50 200
D	0	205	.65	-	140		D	0	190	65	-
E	0	0	185	115	-		E	(15)	0	200	125

↓

	A	B	C	D	E		A	B	C	D	E
A	-	275	325	0	40		-	275	295	0	10
B	235	-	0	175	0		B	265	-	0	205
C	285	0	-	0	150	→	C	285	0	-	120
D	0	205	(30)	-	105		D	0	205	0	-
E	0	0	150	80	-		E	0	120	80	-

The route for the salesman is

A → D → C → B → E → A

$$= 150 + 350 + 300 + 175 + 190$$

$$= 1165 \text{ Km.}$$

Example-9 :- C.J.K. Sharma - 8th (338)

xyz Ice-Cream Company has a distribution depot in Greater Kailash Part-I for distributing ice-cream in South Delhi. There are four vendors located in different parts of South Delhi A, B, C & D, who have to be supplied ice-cream everyday.

Depot	A	B	C	D
Depot	-	3.5	3	4
A	3.5	-	4	2.5
B	3	4	-	4.5
C	4	2.5	4.5	-
D	2	3	3.5	4

Dep	A	B	C	D
Dep	-	1.5	1	2
A	1.5	-	1.5	0
B	0	1	-	1.5
C	1.5	0	2	-
D	0	1	1.5	2

↓

Dep	A	B	C	D
Dep	-	1.5	0	2
A	2	-	0.5	0
B	0	0.5	-	1
C	2	0	-	1.5
D	2	0.5	0	1.5

Dep	A	B	C	D
Dep	-	1.5	0	2
A	1.5	-	0.5	0
B	0	1	-	1.5
C	1.5	0	1	-
D	0	1	0.5	2

Sequence %: Depot → D → B → C → % Dep.

- This violates the condition of TSP.
- The 'next best' solution to the problem that also satisfies all conditions can be obtained by bringing next (non-zero) element, i.e. 0.5 into the solution.
- In above given solution 0.5 occurs at four different places.
- Therefore, consider all four different cases, one by one, until an acceptable solution is reached.

Dep	A	B	C	D
Dep	-	1.5	0	2
A	2	-	0.5	0
B	0	0.5	-	1
C	2	0	-	1.5
D	0	0.5	0	1.5

- If we consider $D \rightarrow A = 0.5$. then also the soln. is not possible because CCA gets cancelled & 0.5 is also not available in 4th row.

- If we consider $A \rightarrow B = 0.5$, then sequence
: Depot \rightarrow D \rightarrow Depot.
[Not possible]



Depot	A	B	C	D
Depot	-	1.5	0.5	2 [0]
A	1.5	-	[0.5]	0.5
B	[0]	0.5	-	1 [0]
C	2	[0]	1	- 1.5
D	[0]	0.5	0.5	1.5 -

Depot	A	B	C	D
Dep	-	1.5	[0]	0.5
A	1.5	-	0.5	0 [0.5]
B	[0]	0.5	- 1 [0]	0.5
C	2	[0]	1	- 1.5
D	[0]	0.5	0.5	1.5 -

- Similarly if we consider $A \rightarrow D = 0.5$ the also solution is not feasible.

→ Thus we look for the 'next best' solution by bringing the next (non-zero) element 1 along with 0.5 & 0 elements into the solution.

→ Here we'll start with $C \rightarrow B = 1$

Depot	A	B	C	D	Sequence of
Depot	-	1.5	0.5	2 [0]	Depot \rightarrow D \rightarrow A \rightarrow
A	1.5	-	0.5	[0]	Depot \leftarrow B \leftarrow C
B	[0]	0.5	-	0	= 2 + 3 + 2.5 + 4.5 + 3
C	2	0	[1]	- 1.5	= 15 km.
D	0	0.5	0	1.5 -	

Costs

OPPORTUNITY COST

- A firm's total cost of producing a given level of output is the opportunity cost of the owners
 - Everything they must give up in order to produce that amount of output
- Opportunity cost is the most fundamental cost concept.
 - The opportunity cost of doing or getting something is:
- what you could have done or gotten instead
- Example: Your opportunity cost for taking this class includes:
- Whatever else you could have bought with your tuition and fee money
 - plus
- the work, family participation, and recreation that you are not doing because you are here.

ACCOUNTING & ECONOMIC COSTS

- **Accounting cost** is the concept that goods or services cost what was paid for them.
- **Economic cost** is the amount required to keep a resource in its present use; the amount that it would be worth in its next best alternative use.
- Economists & Accountants calculate costs differently:
 - Economists are interested in studying how firms make production & pricing decisions. They include all costs.

Economic Costs = Explicit + Implicit Costs

- Accountants are responsible for keeping track of the money that flows into and out of firms. They focus on *explicit costs*.

Accounting Costs = Explicit Costs

Implicit and Explicit Costs

- Explicit Costs: Costs that involve an exchange of money
 - Explicit (involving actual payments)
 - Money actually paid out for the use of inputs
- ie: Rent, Wages, Licence, Materials
- Implicit Costs: Costs that don't involve an exchange of money
 - Implicit (no money changes hands)
 - The cost of inputs for which there is no direct money payment
- -ie: Wage that could have been earned working elsewhere

Costs Example

- Last year, John decided to open a box factory. Hugo built the factory for 200,000. Materials and wages required to make a box amount to 5 cents per box.
- Before starting production, John was offered a job at BoxMart that paid 4,000 a month.
- Classify John's costs (explicit, implicit, economic, accounting, and sunk)

Explicit Costs:
Factory (200K)
Production (5 cents/box + ongoing cost)

Implicit Costs:
Forgone Wage (4,000/month)

Accounting Costs=Explicit Costs
Economic Costs = Explicit+Implicit Costs

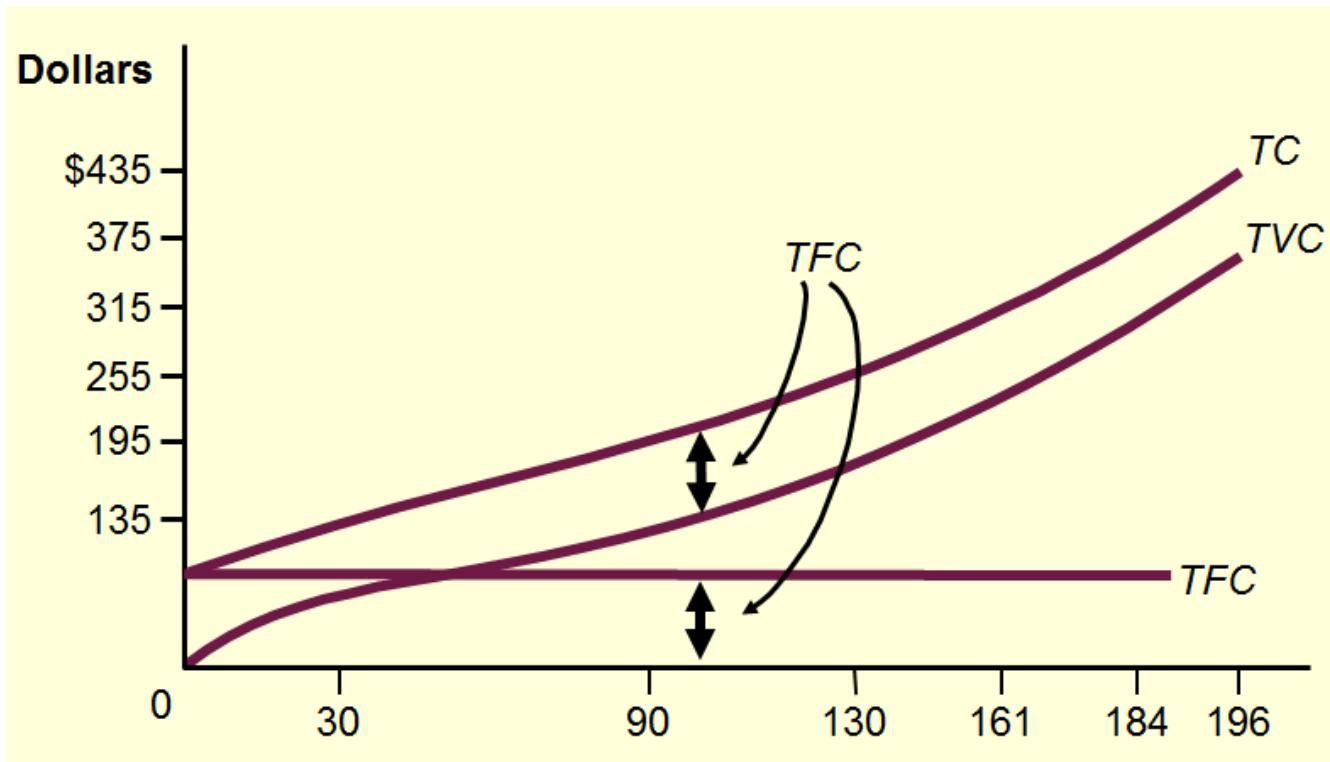
Sunk Costs= Factory (200K)

- Fixed costs
 - Costs of a firm's fixed inputs
- Variable costs
 - Costs of obtaining the firm's variable inputs

Types of total costs

- Total fixed costs
 - Cost of all inputs that are fixed in the short run
- Total variable costs
 - Cost of all variable inputs used in producing a particular level of output
- Total cost
 - Cost of all inputs—fixed and variable
 - $TC = TFC + TVC$

Total cost curves



Average Costs

- Average fixed cost (AFC)
 - Total fixed cost divided by the quantity of output produced

$$AFC = \frac{TFC}{Q}$$

- Average variable cost (TVC)
 - Total variable cost divided by the quantity of output produced

$$AVC = \frac{TVC}{Q}$$

- Average total cost (TC)
 - Total cost divided by the quantity of output produced

$$ATC = \frac{TC}{Q}$$

Marginal Cost

- Marginal Cost
 - Increase in total cost from producing one more unit or output
- Marginal cost is the change in total cost (ΔTC) divided by the change in output (ΔQ)

$$MC = \frac{\Delta TC}{\Delta Q}$$



What is a firm?

- **Firm** - an organization that converts inputs such as labor, materials, energy, and capital into outputs, the goods and services that it sells.
 - ◆ *Sole proprietorships* are firms owned and run by a single individual.
 - ◆ *Partnerships* are businesses jointly owned and controlled by two or more people.
 - ◆ *Corporations* are owned by *shareholders* in proportion to the numbers of shares of stock they hold.



What Owners Want?

- **Main assumption:** firm's owners try to maximize profit!
- **Profit (π)** - the difference between revenues, R , and costs, C :

$$\pi = R - C$$



What are the categories of inputs?

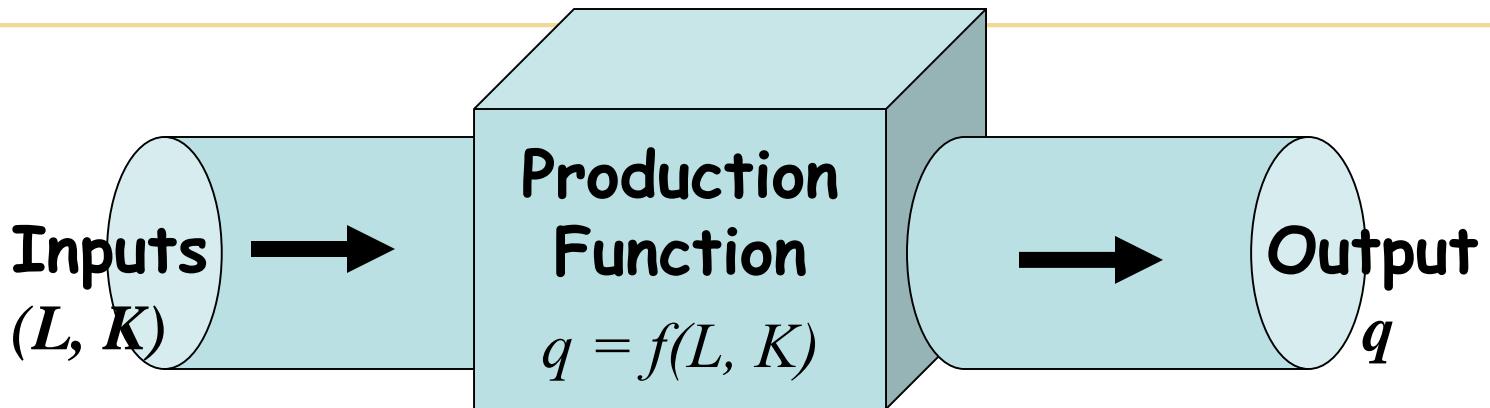
- **Capital (K)** - long-lived inputs.
 - ◆ land, buildings (factories, stores), and equipment (machines, trucks)
- **Labor (L)** - human services
 - ◆ managers, skilled workers (architects, economists, engineers, plumbers), and less-skilled workers (custodians, construction laborers, assembly-line workers)
- **Materials (M)** - raw goods (oil, water, wheat) and processed products (aluminum, plastic, paper, steel)



How firms combine the inputs?

- **Production function** - the relationship between the quantities of inputs used and the maximum quantity of output that can be produced, given current knowledge about technology and organization

Production Function



- **Formally,**

$$q = f(L, K)$$

- ◆ where q units of output are produced using L units of labor services and K units of capital (the number of conveyor belts).



Time and the Variability of Inputs

- **Short run** - a period of time so brief that at least one factor of production cannot be varied practically
 - ◆ **Fixed input** - a factor of production that cannot be varied practically in the short run.
 - ◆ **Variable input** - a factor of production whose quantity can be changed readily by the firm during the relevant time period
- **Long run** - a lengthy enough period of time that all inputs can be varied



Short-Run Production

- In the short run, the firm's production function is

$$q = f(L, \bar{K})$$

- ◆ where q is output, L is workers, and \bar{K} is the fixed number of units of capital.

Table 6.1 Total Product, Marginal Product, and Average Product of Labor with Fixed Capital

Capital, \bar{K}	Labor, L	Output, Total Product of Labor, Q	Marginal Product of Labor, $MP_L = \Delta Q / \Delta L$	Average Product of Labor, $AP_L = Q / L$
8	0	0		
8	1	5	5	5
8	2	18	13	9
8	3	36	18	12
8	4	56	20	14
8	5	75	19	15
8	6	90	15	15
8	7	98	8	14
8	8	104	6	13
8	9	108	4	12
8	10	110	2	11
8	11	110	0	10
<hr/>				
8	12	108	-2	9
8	13	104	-4	8



Marginal Product of Labor

- **Marginal product of labor (MP_L)** - the change in total output, Δq , resulting from using an extra unit of labor, ΔL , holding other factors constant:

$$MP_L = \frac{\Delta q}{\Delta L}$$



Average Product of Labor

- **Average product of labor (AP_L)** - the ratio of output, q , to the number of workers, L , used to produce that output:

$$AP_L = \frac{q}{L}$$



Total Product of Labor

- **Total product of labor-** the amount of output (or total product) that can be produced by a given amount of labor



Law of Diminishing Marginal Returns

If a firm keeps increasing an input, holding all other inputs and technology constant, the corresponding increases in output will become smaller eventually.

- ◆ That is, if only one input is increased, *the marginal product of that input will diminish eventually.*

Basic Approaches to Leadership

What Is Leadership?

Leadership

The ability to influence a group toward the achievement of goals.

Management

Use of authority inherent in designated formal rank to obtain compliance from organizational members.

Trait Theories

Traits Theories of Leadership

Theories that consider personality, social, physical, or intellectual traits to differentiate leaders from nonleaders.



Leadership Traits:

- Extraversion
- Openness
- Emotional Intelligence (qualified)

Innate Qualities acc to Trait Theories

- **Physical features**
- **Intelligence**
- **Emotional Stability**
- **Human relations**
- **Empathy**
- **Objectivity**
- **Motivating skills**
- **Technical skills**
- **Communication skills**
- **Social skills**

Trait Theories

Limitations:

- No universal traits found that predict leadership in all situations.
- Unclear evidence of the cause and effect of relationship of leadership and traits.
- Better predictor of the appearance of leadership than distinguishing effective and ineffective leaders.

Trait Approach

- **Traits (examples)**
 - Extraversion
 - Openness
- **Assumption: Leaders are born**
- **Goal: Select leaders**
- **Problems**
 - Traits do not generalize across situations
 - Better at predicting leader emergence than leader effectiveness

Leadership Styles

➤ **Based on Behavioral Approach**

- Power Orientation
- Leadership as a continuum
- Employee- Production Orientation
- Likert's management system
- Managerial Grid
- Tri-dimensional Grid

➤ **Based on Situational Approach**

- Fiedler's Contingency Model
- Cognitive Resource Theory
- Hersey and Blanchard's Situational Leadership Model
- Path Goal Theory

Power Orientation

➤ Autocratic Leadership

- Strict Autocrat
- Benevolent Autocrat
- Incompetent Autocrat

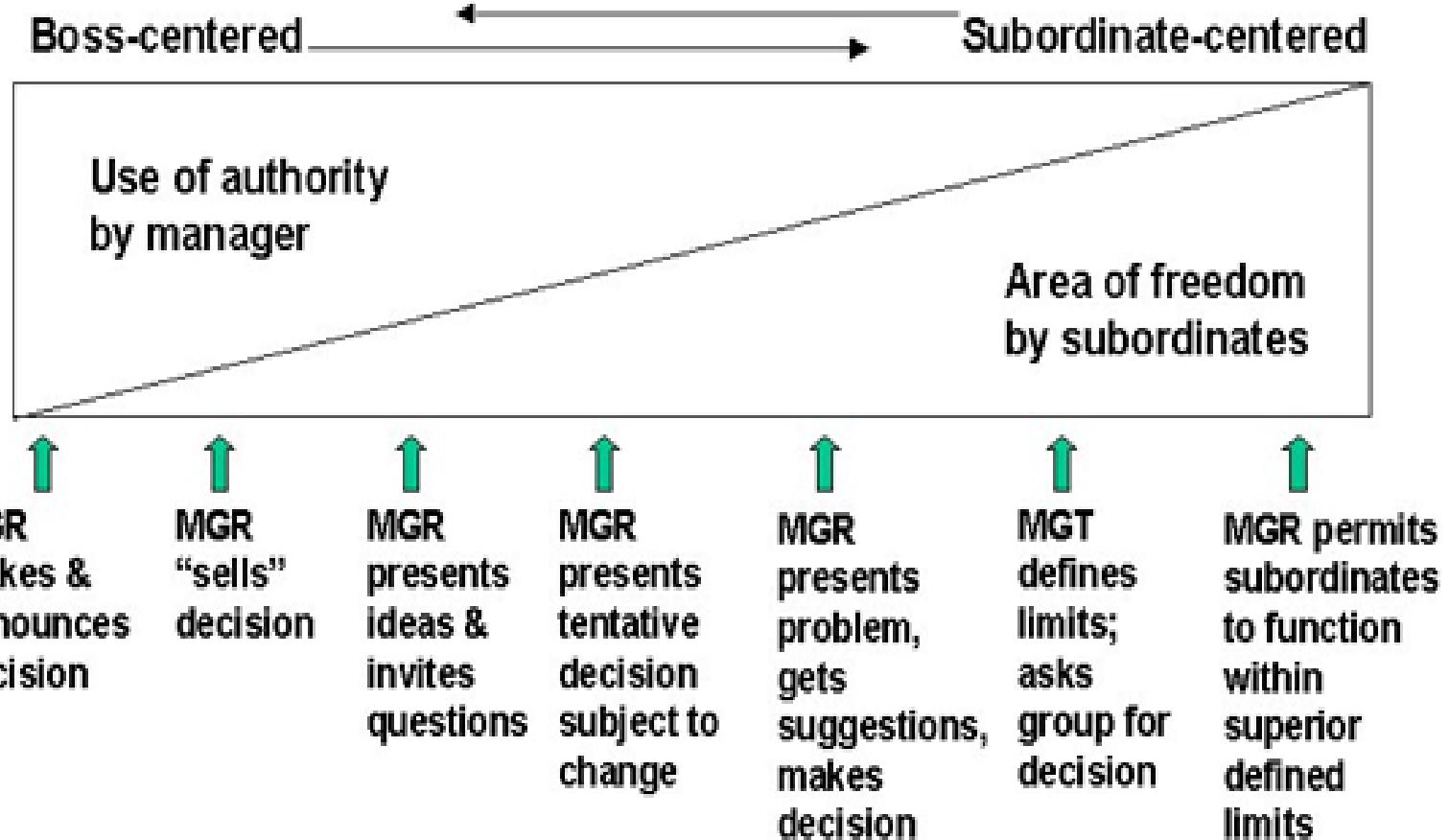
➤ Participative Leadership

- Also known as democratic/consultative/ideographic leadership
- Decentralizes his decision-making

➤ Free-rein Leadership

- Managers decides policy, programs and limitations for actions and the entire process is left on subordinates

Leadership as a continuum



Depends on

➤ **Forces in manager**

- Value system, confidence in his subordinates, his own leadership inclination, his feeling of security(trust)

➤ **Forces in subordinates**

- Need for independence, readiness to assume responsibility, level of tolerance for ambiguity, interest, understanding, knowledge, experience

➤ **Forces in situation**

- Type of org., group effectiveness, problem itself and pressure of time.

Rensis Likert's Management System

	Trust	Motivation	Interaction
System 1	no trust	fear, threats, and punishment	little interaction, always distrust
System 2	master/servant	rewards and punishment	little interaction, always caution
System 3	substantial but incomplete trust	rewards, punishment, some involvement	moderate interaction, some trust
System 4	complete trust	goals based on participation and improvements	extensive interaction. Friendly, high trust.



Initiating Structure

The extent to which a leader is likely to define and structure his or her role and those of subordinates in the search for goal attainment.

Consideration

The extent to which a leader is likely to have job relationships characterized by mutual trust, respect for subordinate's ideas, and regard for their feelings.

Low Consideration (High)

High consideration
and
low structure

High structure
and
high consideration

Low consideration
and
low structure

High structure
and
low consideration

(Low) Initiating Structure (High)

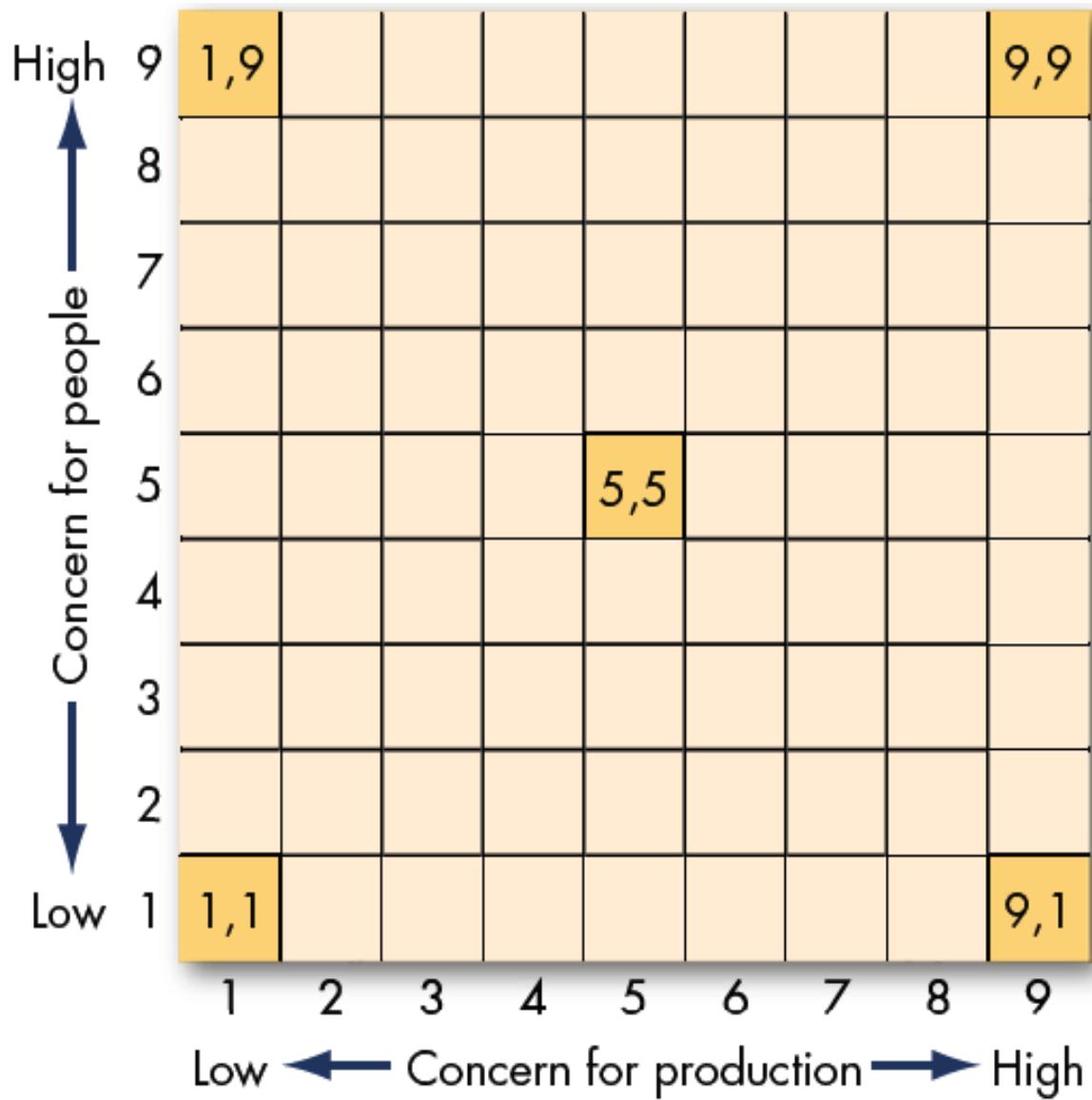
DIMENTIONS OF LEADER BEHAVIOR

Employee-Oriented Leader

Emphasizing interpersonal relations; taking a personal interest in the needs of employees and accepting individual differences among members.

Production-Oriented Leader

One who emphasizes technical or task aspects of the job.



The Managerial Grid

(Blake and Mouton)

A nine-by-nine matrix outlining 81 different leadership styles.

EXHIBIT 12-1

Managerial Grid (Blake & Mouton)

- Impoverished Management (1,1)– Low Results/Low People
 - This leader is mostly ineffective. He/she has neither a high regard for creating systems for getting the job done, nor for creating a work environment that is satisfying and motivating. The result is disorganization, dissatisfaction and disharmony.
- Country Club Management (1,9) – High People/Low Results
 - This style of leader is most concerned about the needs and feelings of members of his/her team. These people operate under the assumption that as long as team members are happy and secure then they will work hard. What tends to result is a work environment that is very relaxed and fun but where production suffers due to lack of direction and control.

- Authority-Compliance Management (9,1)– High Results/Low People
 - Also known as Authoritarian or "Produce or Perish" Leaders, people in this category believe that employees are simply a means to an end. Employee needs are always secondary to the need for efficient and productive workplaces. This type of leader is very autocratic, has strict work rules, policies, and procedures, and views punishment as the most effective means to motivate employees.
- Middle-of-the-Road Management – Medium Results/Medium People
 - This style seems to be a balance of the two competing concerns, and it may at first appear to be an ideal compromise. Therein lies the problem, though: When you compromise, you necessarily give away a bit of each concern, so that neither production nor people needs are fully met. Leaders who use this style settle for average performance and often believe that this is the most anyone can expect.

- Team Leadership – High Production/High People
 - According to the Blake Mouton model, this is the best managerial style. These leaders stress production needs and the needs of the people equally highly.

Behavioral Theories

Behavioral Theories of Leadership

Theories proposing that specific behaviors differentiate leaders from nonleaders.

- **Behavioral theory:**
Leadership behaviors can be taught.

Vs.

Trait theory:
Leaders are born, not made.

Behavioral Approach

- **Ohio State Studies/U. of Michigan**
 - Initiating Structure/Production Orientation
 - Consideration/Employee Orientation
- **Assumption: Leaders can be trained**
- **Goal: Develop leaders**
- **Problem: Effective behaviors do not generalize across situations**

Fiedler Model

- **Leader: Style is Fixed (Task oriented vs. Relationship oriented)**
- **Considers Situational Favorableness for Leader**
 - Leader-member relations
 - Task structure
 - Position power
- **Key Assumption**
 - Leader must fit situation; options to accomplish this:
 - Select leader to fit situation
 - Change situation to fit leader

Fiedler's Model: The Leader

Assumption: Leader's Style is Fixed & Can be Measured by the Least Preferred Co-Worker (LPC) and Assumed similarity (AS)

Least Preferred Co-Worker (LPC) Questionnaire

The way in which a leader will evaluate a co-worker that is not liked will indicate whether the leader is task- or relationship-oriented.(10, pleasant, friendly, accepting)

Fiedler's Model: Defining the Situation

Leader-Member Relations

The degree of confidence, trust, and respect subordinates have in their leader.

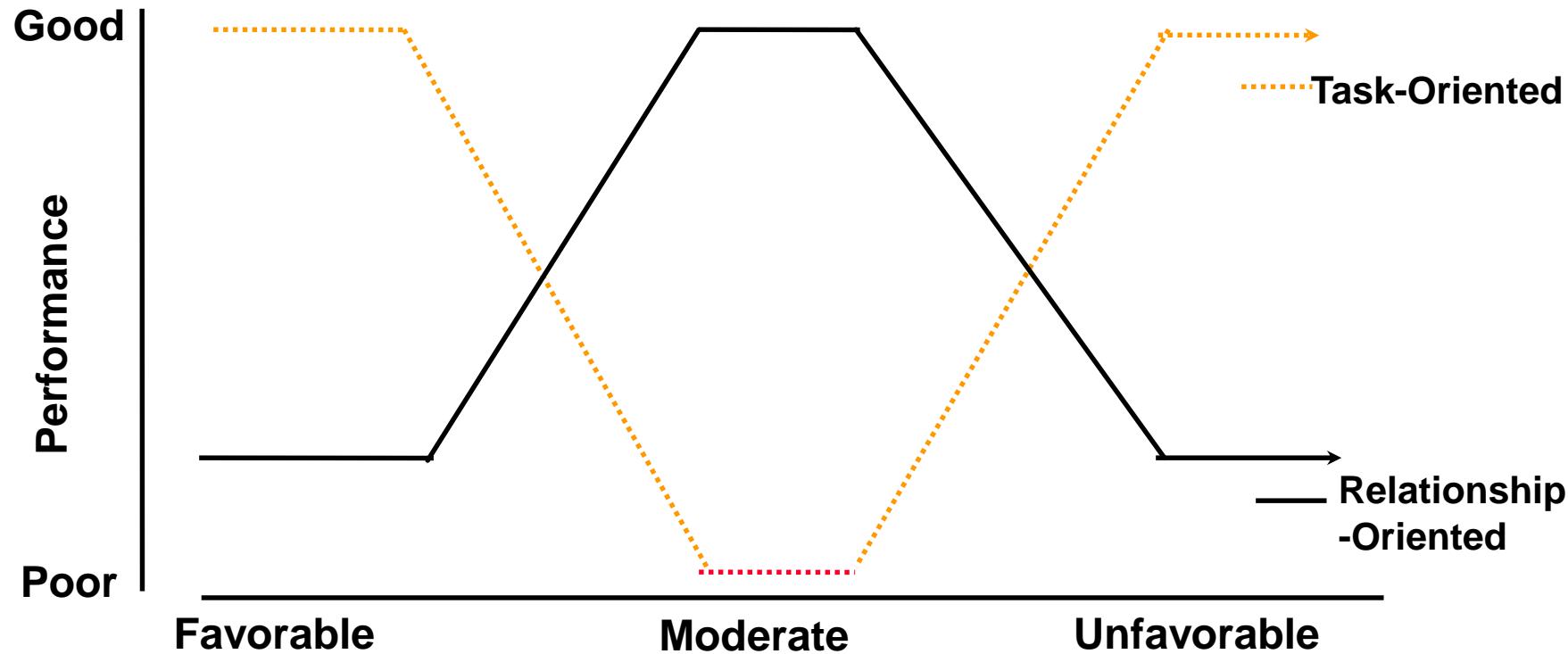
Task Structure

The degree to which the job assignments are proceduralized.

Position Power

Influence derived from one's formal structural position in the organization; includes power to hire, fire, discipline, promote, and give salary increases.

Findings of the Fiedler Model



Category	I	II	III	IV	V	VI	VII	VIII
Leader-Member Relations	Good	Good	Good	Good	Poor	Poor	Poor	Poor
Task Structure	High	High	Low	Low	High	High	Low	Low
Position Power	Strong	Weak	Strong	Weak	Strong	Weak	Strong	Weak

Contingency Approach: Hersey & Blanchard Situational Model

- **Considers Leader Behaviors (Task & Relationship)**
 - Assumes Leaders CAN change their behaviors
- **Considers *Followers* as the Situation**
 - Follower Task maturity (ability & experience)
 - Follower Psychological maturity (willingness to take responsibility)
- **Assumptions**
 - Leaders can and should change their style to fit their followers' degree of readiness (willingness and ability)
 - Therefore, it is possible to TRAIN leaders to better fit their style to their followers.

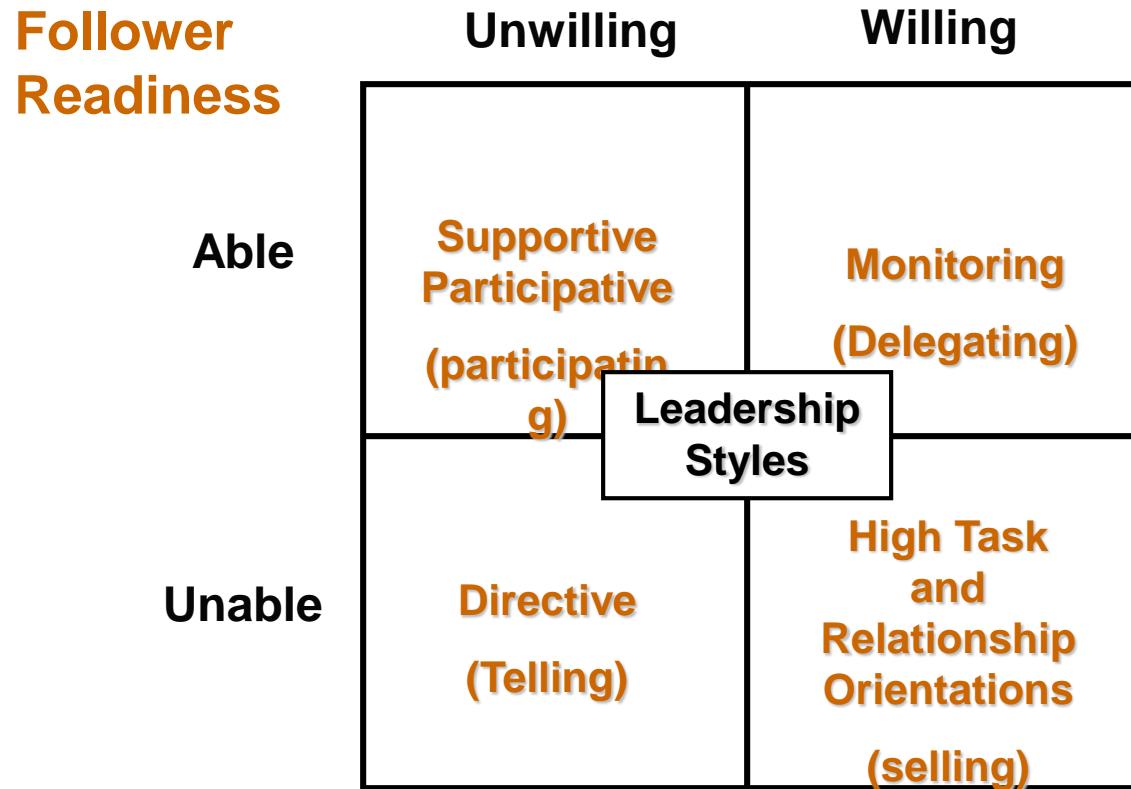
Hersey and Blanchard's Situational Leadership Theory

Situational Leadership Theory (SLT)

A contingency theory that focuses on followers' readiness; the **more** "ready" the followers (the more willing and able) the **less** the need for leader support and supervision.



Leadership Styles and Follower Readiness (Hersey and Blanchard)



Path-Goal Theory (Robert House & Others)

Premise

- Leader must help followers attaining goals and reduce roadblocks to success
- Leaders must change behaviors to fit the situation (environmental contingencies & subordinate contingencies)



The Path-Goal Theory

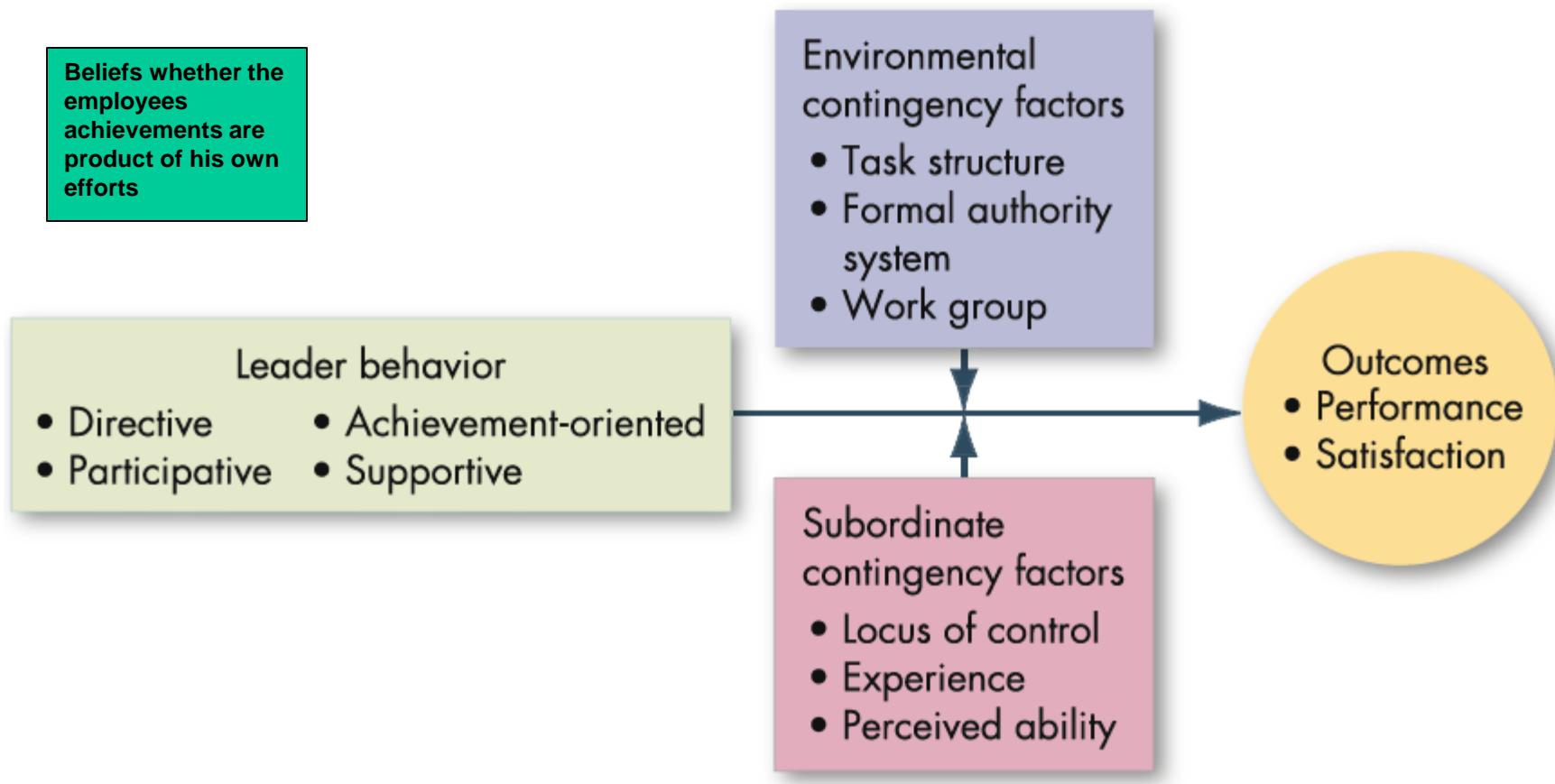


EXHIBIT 12-4

Lecture on “Linear Programming”

By

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Linear Programming

(An Optimization Technique)

General Optimization Problem Involves :

1. Decision Variables

2. Objective Criterion (Max/Min)

3. Constraints: (i) Equality (ii) Inequality

Linear Programming(LP) :

- It is one of the important “Optimization Techniques.”
- Most Versatile, powerful & useful technique.
- Developed in 1947 by George B. Dantzig during World War II to solve military problems, while working with ‘US Air Force’.

- The word **Linear** in LP indicates - relationship among variables both in objective function and constraints.
- **while Programming means** - Systematic Mathematical technique.
- General Linear Programming Problem (LPP) with n variables and m constraints can be stated as follows:

$$\text{Optimize}(Max.\text{or}Min.) Z = \sum_{j=1}^n c_j x_j \quad (1)$$

$$\sum_{j=1}^n a_{ij} x_j (\leq, =, \geq) b_i ; \quad i = 1, 2, \dots, m \quad (2)$$

$$x_j \geq 0; \quad j = 1, 2, \dots, n \quad (3)$$

Types of Variables

- **Decision Variables**

x_j are decision variables

- **Slack Variables**

$$\sum_{j=1}^n a_{ij}x_j \leq b_i \rightarrow \sum_{j=1}^n a_{ij}x_j + w_i = b_i; i = 1, 2, \dots, m$$

w_i are slack variables

- **Surplus Variables**

$$\sum_{j=1}^n a_{ij}x_j \geq b_i \rightarrow \sum_{j=1}^n a_{ij}x_j - s_i = b_i; i = 1, 2, \dots, m$$

s_i are surplus variables

- **Artificial Variables :**

Required for solution methodology

- Components of LPP :

*The three important components of LPP
are as follows:*

(a) Decision Variables

(b) Objective Function - Max. or Min.

(c) Constraints-limitations.

Assumptions of LP

- 1. Certainty:** c_j , a_{ij} , b_i are known & constants.
- 2. Divisibility:** Values of decision variable can be integer or fractional.
- 3. Additivity:** Total contribution = Sum of contribution of all variables
- 4. Linearity:** Relationship among variables both in objective function & constraints.

- **Formulation of LPP :**

Steps to be followed.

1. To decide (define) decision variables.
2. To formulate objective function.
3. To formulate constraints.

CASE - 1 Data for LP Formulation.

Factory: Two products P1 & P2

Profit/piece of P1 = Rs.3/-

Profit/piece of P2 = Rs.5/-

Time Constraint:

Time required/piece of P1 = 3 hrs.

Time required/piece of P2 = 2 hrs.

Max. time available = 18 hrs.

Material Constraint:

Max. Material available for P1 = 4 pieces.

Max. Material available for P2 = 6 pieces.

CASE - 1 Formulation of LPP :

Let decision variable x_1 = no of pieces of P1
 x_2 = no of pieces of P2

Max. $Z = 3x_1 + 5x_2$ Objective Equation

$$3x_1 + 2x_2 \leq 18 \quad -(I) \text{ Time Constraint}$$

$$x_1 \leq 4 \quad -(II) \text{ Material Constraint}$$

$$x_2 \leq 6 \quad -(III) \text{ Material Constraint}$$

$$x_1, x_2 \geq 0 \quad \text{Non-negativity Conditions}$$

CASE - 2

If Time Constraint is modified to:

Time available is not less than 18 hours.

Max. Z = 3x1 + 5x2 Objective Equation

$$3x_1 + 2x_2 \geq 18 \quad -(I) \text{ Time Constraint}$$

$$x_1 \leq 4 \quad -(II) \text{ Material Constraint}$$

$$x_2 \leq 6 \quad -(III) \text{ Material Constraint}$$

$$x_1, x_2 \geq 0 \quad \text{Non-negativity Conditions}$$

CASE - 3

If Time Constraint is modified to:

Time available is exactly 18 hours.

Max. Z = 3x1 + 5x2 Objective Equation

$$3x_1 + 2x_2 = 18 \quad -(I) \text{ Time Constraint}$$

$$x_1 \leq 4 \quad -(II) \text{ Material Constraint}$$

$$x_2 \leq 6 \quad -(III) \text{ Material Constraint}$$

$$x_1, x_2 \geq 0 \quad \text{Non-negativity Conditions}$$

Types of Solution

- 1. Feasible Solution:** Solution with values of decision variables(x_j) which satisfy all Constraints & Non-negativity condition.
- 2. Basic Solution:** For a set of m equations in n variables ($n>m$), basic solution is a solution obtained by setting $(n-m)$ variables equal to zero and solving for remaining m equations in m variables.

No. of possible Basic solutions = nCm

$$= n!/(m!(n-m)!)$$

- (i) Basic Variables :** Having values > 0 .
- (ii) Non-basic Variables :** Having values $= 0$.

3. Basic Feasible Solution : It is a Basic Solution which satisfies (3).

4. Non-degenerate/degenerate B.F.S

5. Optimal Basic Feasible Solution : It is a Basic Feasible Solution which optimizes objective function.

6. Unbounded Solution :

7. Infeasible Solution :

8. Unique/Alternative Optimal Solutions :

- **Methods to solve LPP :**

1. Graphical Method - for only two variables.
2. Simplex Method - Universal method.
3. Assignment Method - Special method.
4. Transportation Method - Special method.

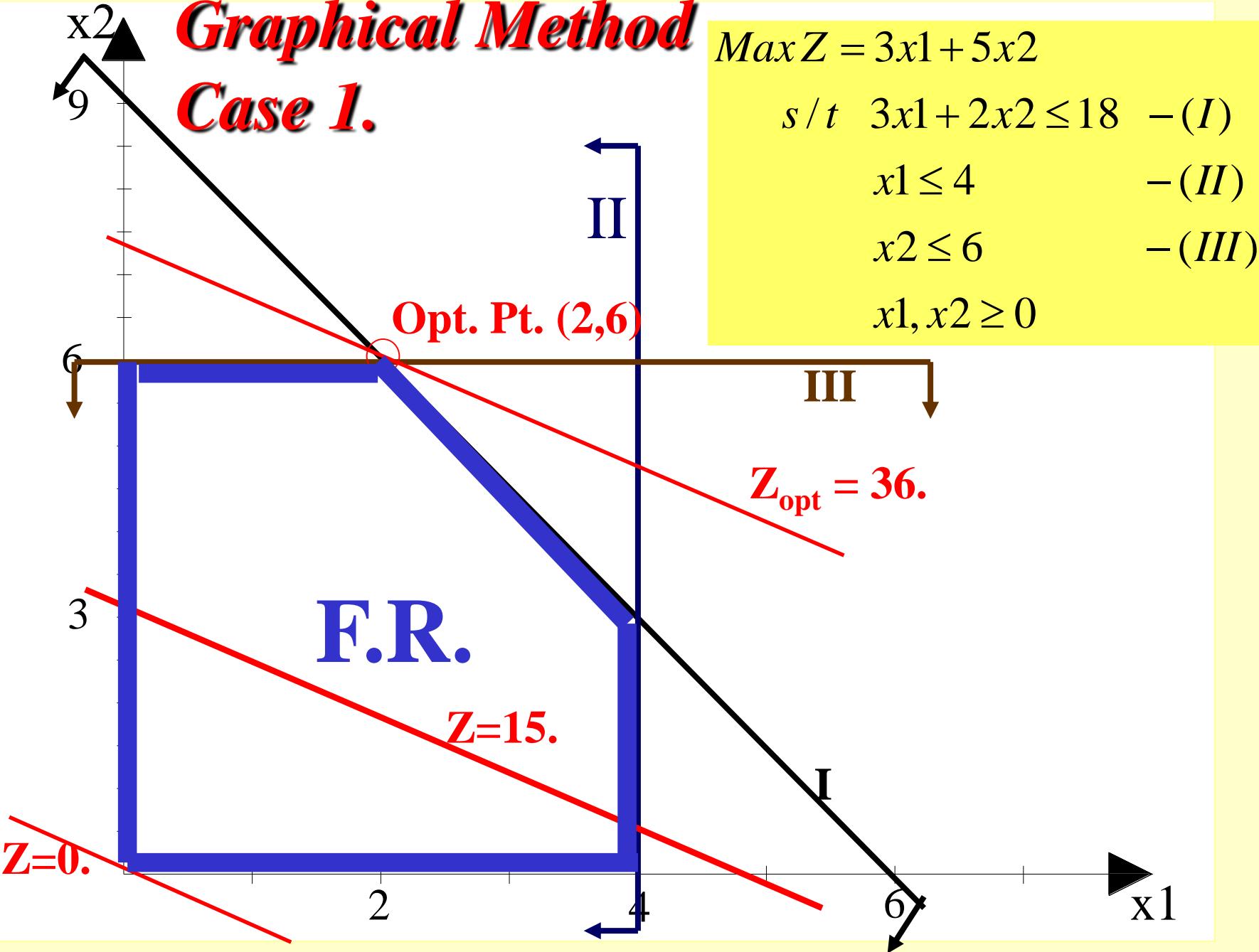
Note : Methods (2), (3) and (4) are iterative methods.

(1) Graphical Method

(for only two variables)

Graphical Method

Case 1.



x_2

Graphical Method

Case 2.

9

6

3

2

4

6

x_1

II

F.R.

Opt. Pt.
(4,6)

III
 $Z_{\text{opt}} = 42$

$Z=15.$

$$\text{Max } Z = 3x_1 + 5x_2$$

$$\text{s.t. } 3x_1 + 2x_2 \geq 18 \quad -(I)$$

$$x_1 \leq 4 \quad -(II)$$

$$x_2 \leq 6 \quad -(III)$$

$$x_1, x_2 \geq 0$$

x_2

Graphical Method

Case 3.

9

6

3

2

II

III

4

x_1

Opt. Pt.

F.L.

$Z=15.$

$$\text{Max } Z = 3x_1 + 5x_2$$

$$\text{s.t. } 3x_1 + 2x_2 = 18 \quad -(I)$$

$$x_1 \leq 4 \quad -(II)$$

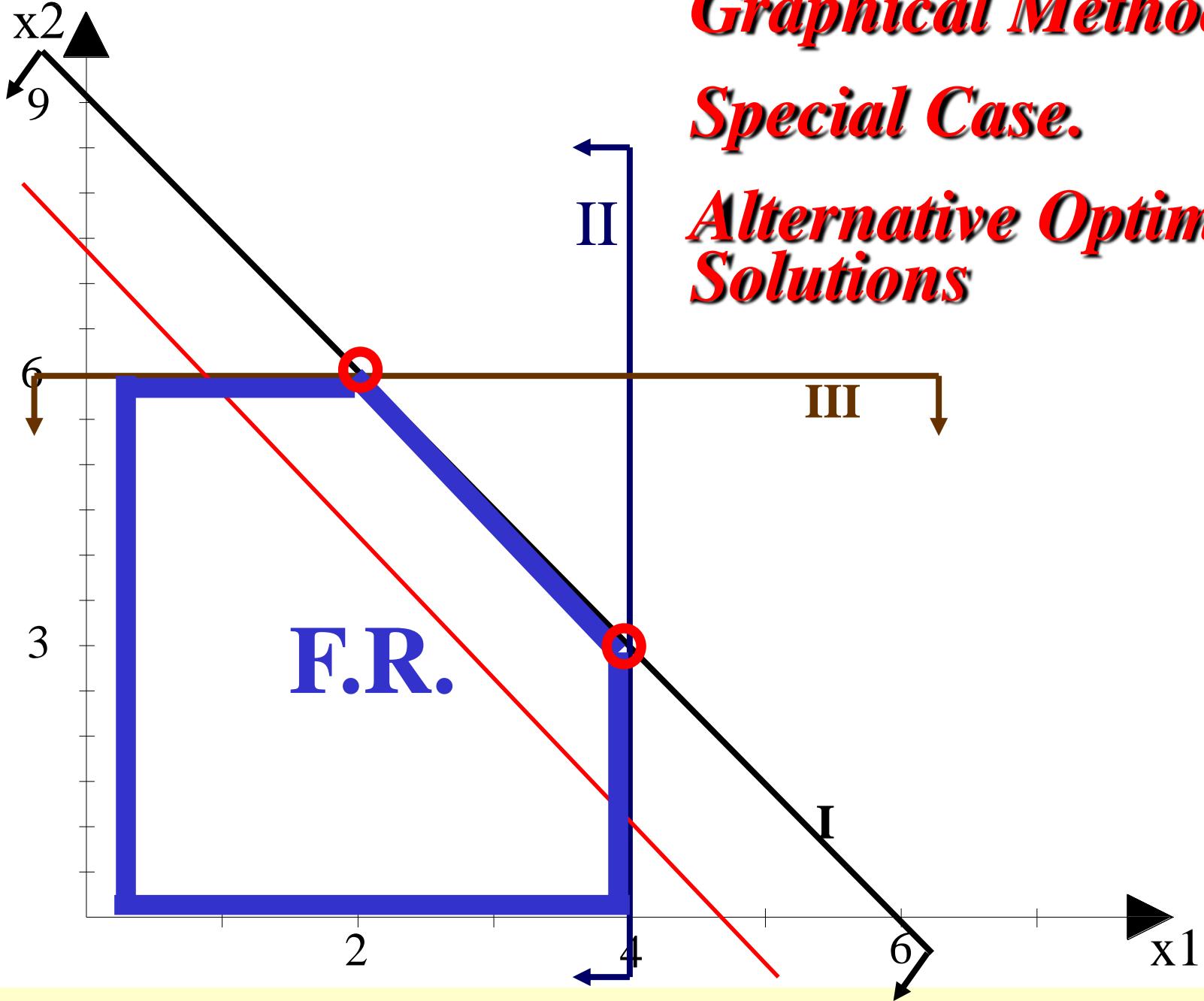
$$x_2 \leq 6 \quad -(III)$$

$$x_1, x_2 \geq 0$$

$Z_{\text{opt}} = 36$

I

Graphical Method
Special Case.
Alternative Optimal Solutions



Graphical Method

Special Case.

9

6

3

0

12

9

6

3

0

9

x₂

0

12

9

6

3

x₁

Opt. Pt.

(Min.)

Z line

F.R.
(Unbounded)

I

II

III

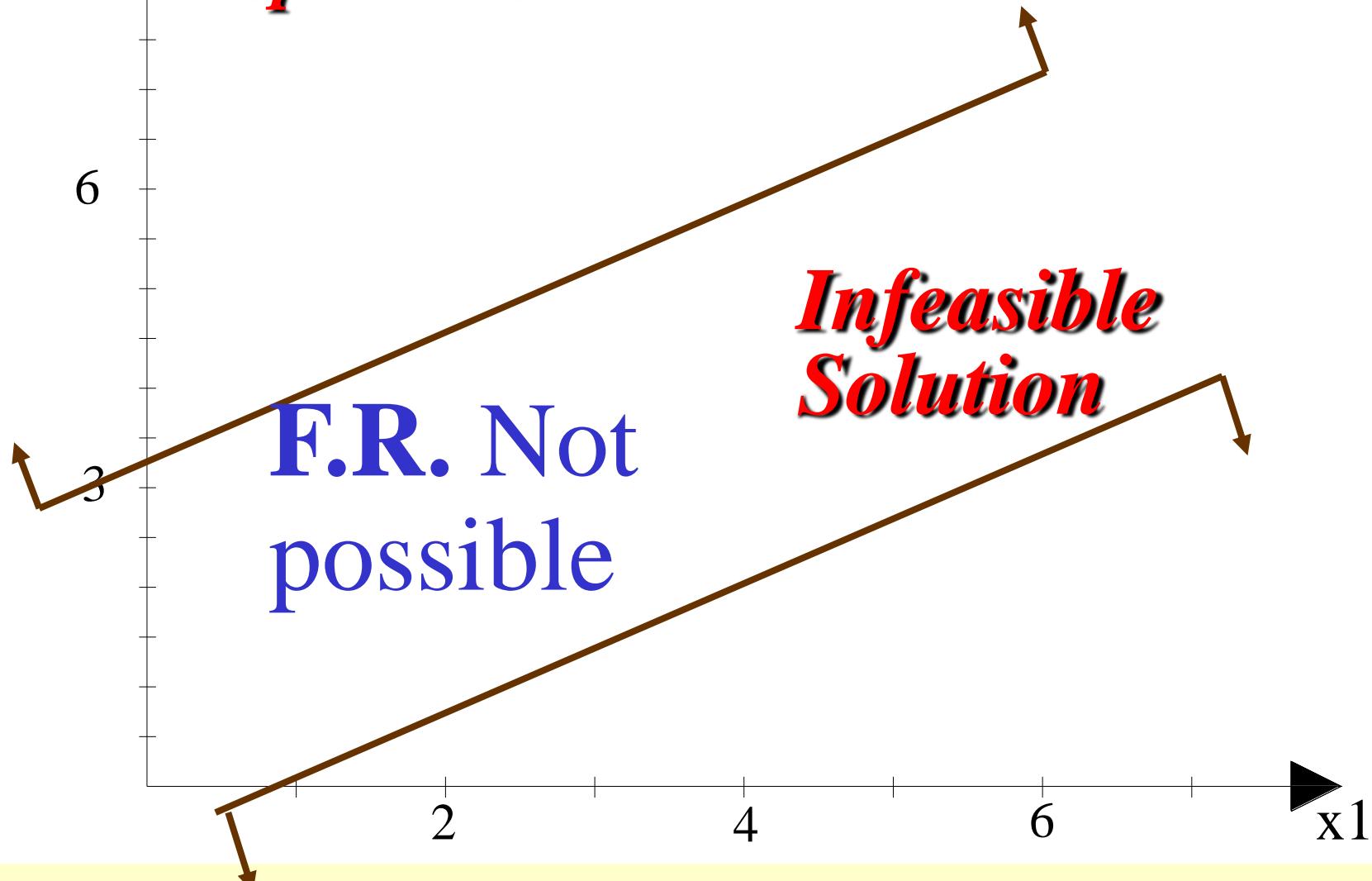
*Opt. Sol. (Max)
(Unbounded)*

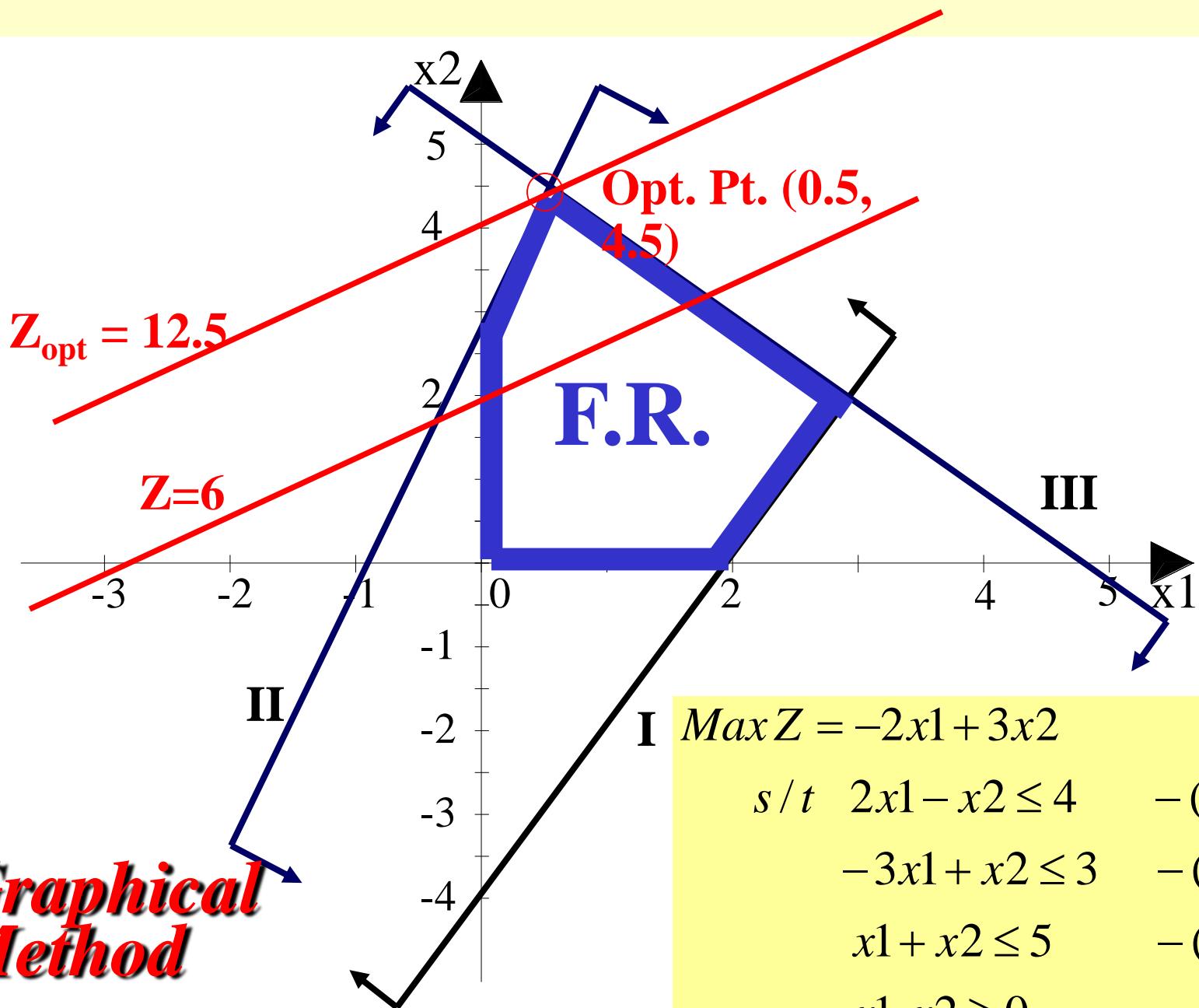
x₂

9

Graphical Method

Special Case.





**Graphical
Method**

Special Case.

$\text{Max } Z = -2x_1 + 3x_2$ s/t	$2x_1 - x_2 \leq 4$ -(I) $-3x_1 + x_2 \leq 3$ -(II) $x_1 + x_2 \leq 5$ -(III) $x_1, x_2 \geq 0$
---	--

- Graphical Method – to discuss typical constraints to identify regions of constraints.

Typical Case

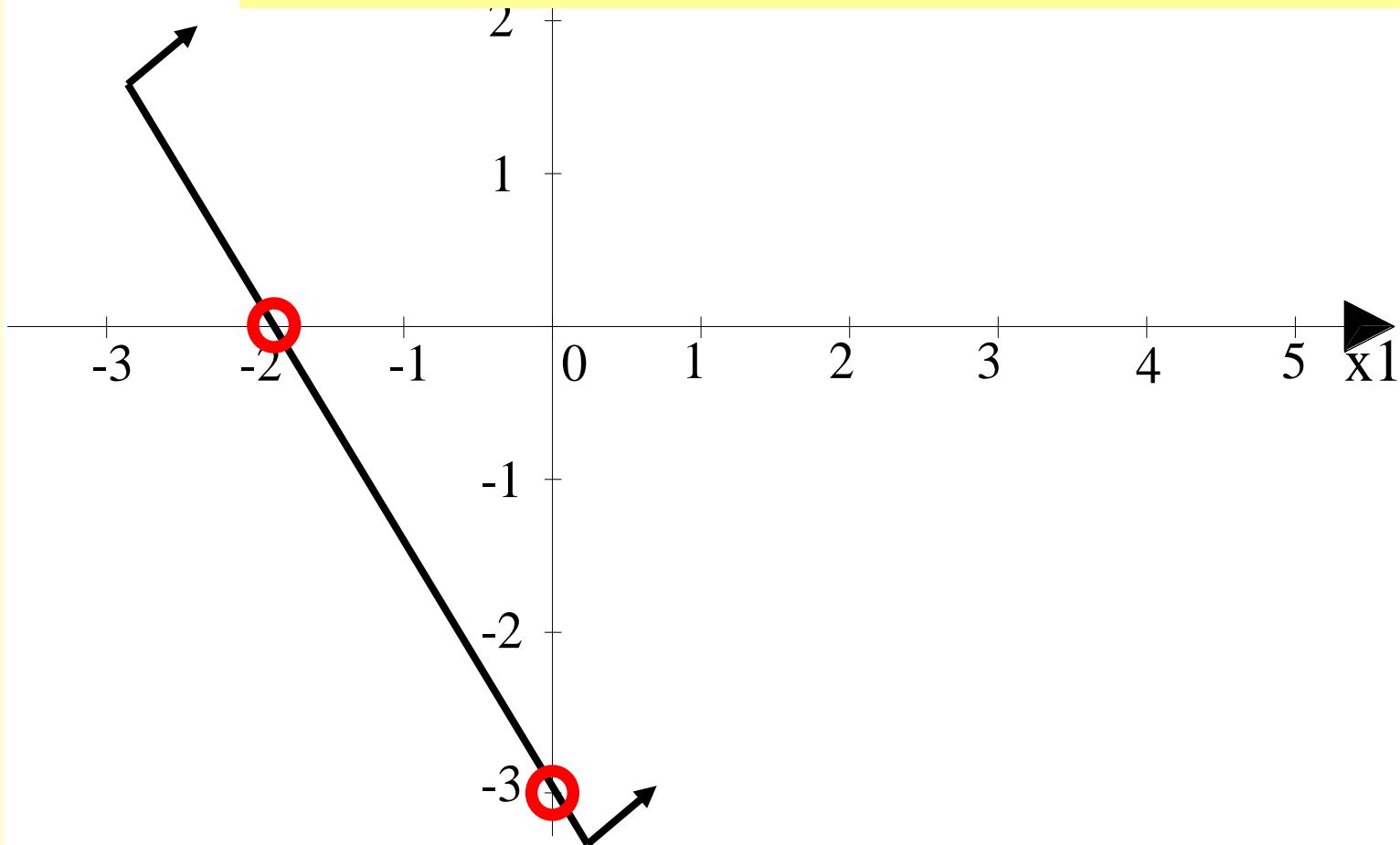
How to plot $\rightarrow 3x_1 + 2x_2 \geq -6$?

x₂ ↑

$$3x_1 + 2x_2 = -6$$

When $x_2 = 0 \rightarrow x_1 = -2 \therefore \text{Point}(-2, 0)$

When $x_1 = 0 \rightarrow x_2 = -3 \therefore \text{Point}(0, -3)$



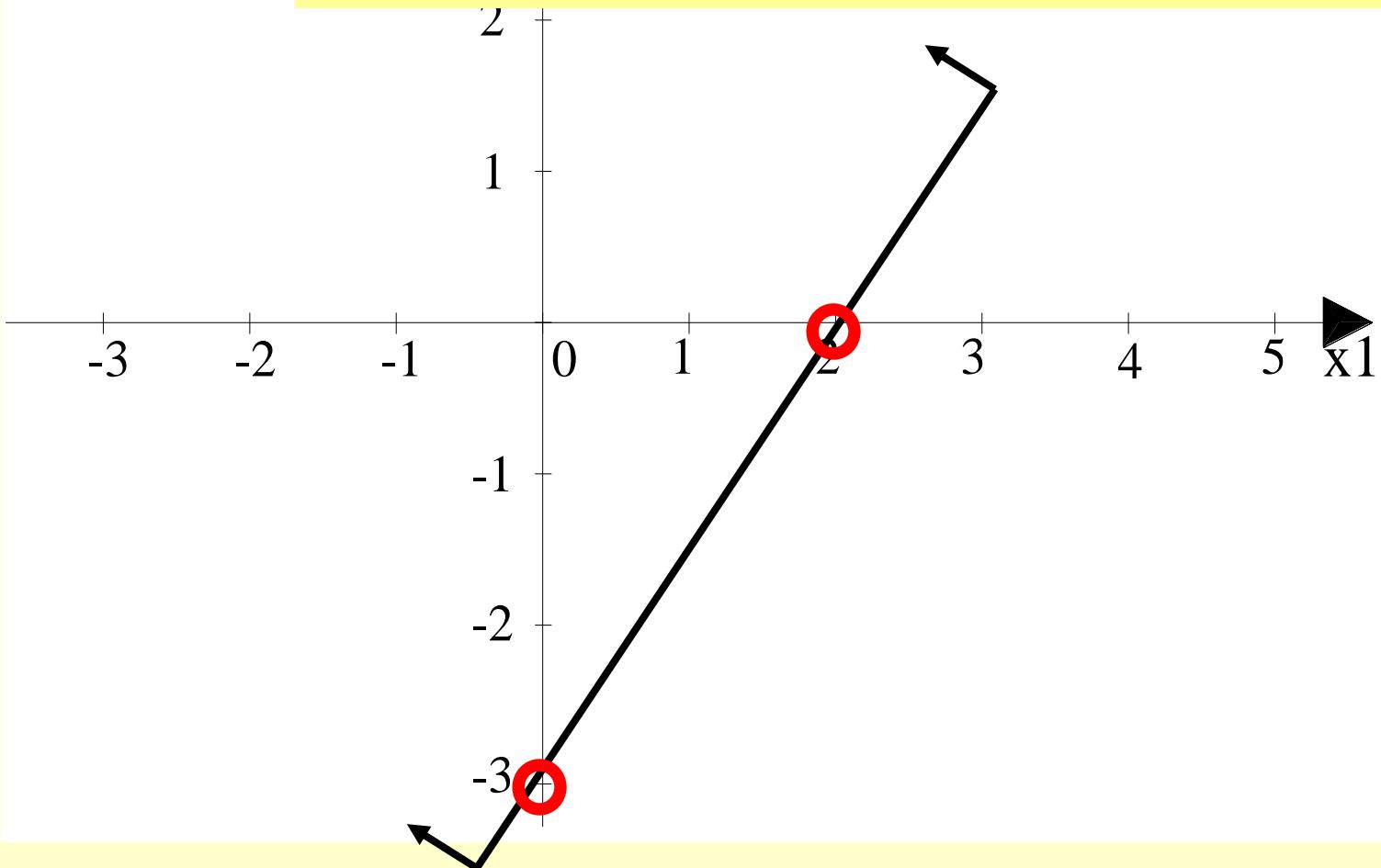
Typical Case

How to plot $\rightarrow 3x_1 - 2x_2 \leq 6$?

$$x_2 \uparrow \quad 3x_1 - 2x_2 = 6$$

When $x_2 = 0 \rightarrow x_1 = 2 \therefore \text{Point}(2,0)$

When $x_1 = 0 \rightarrow x_2 = -3 \therefore \text{Point}(0,-3)$



Typical Case

How to plot $\rightarrow x_1 + x_2 \geq 0$?

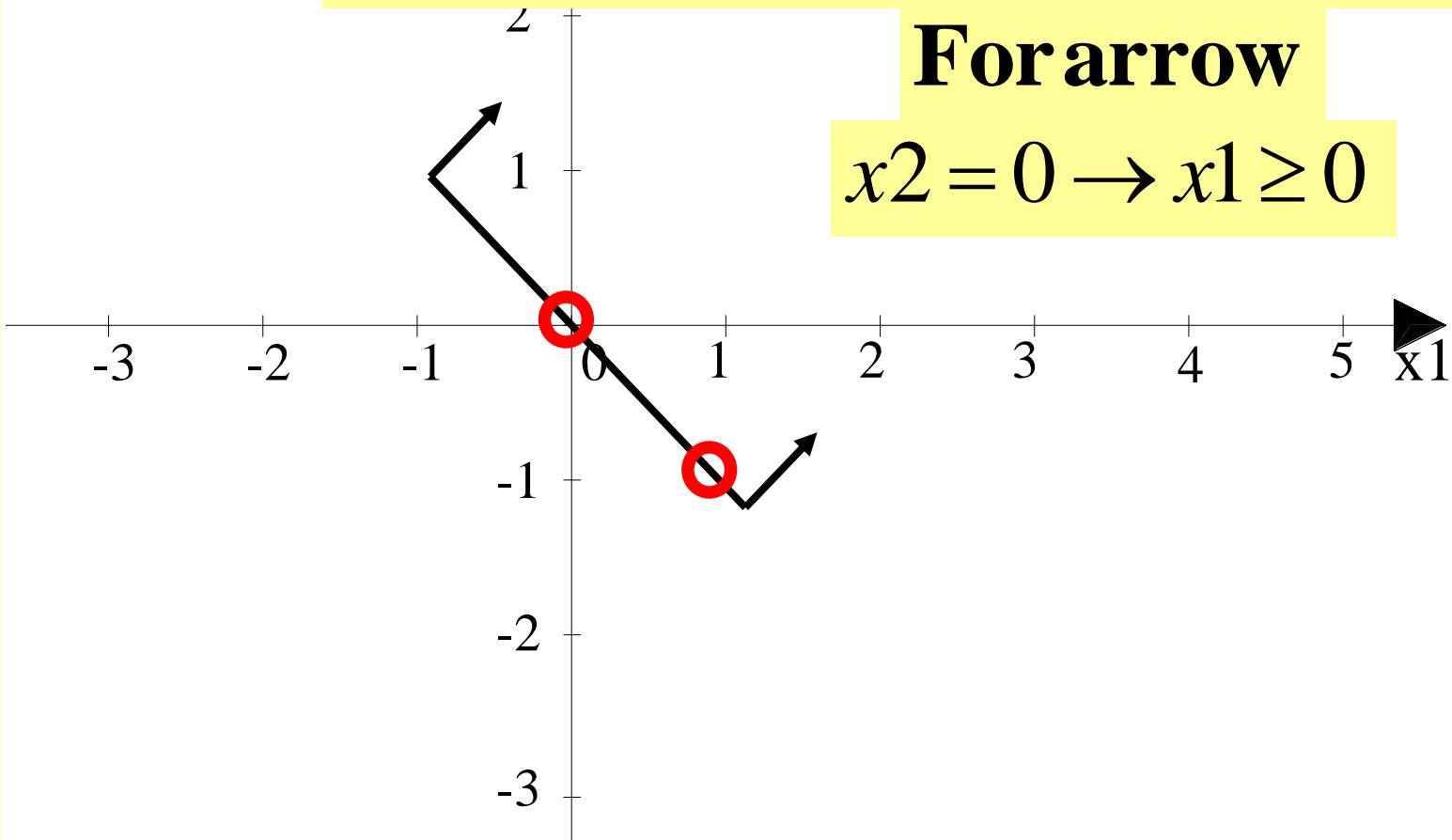
x_2

3

$$x_1 + x_2 = 0$$

$$x_1 = -x_2$$

When $x_1 = 1 \rightarrow x_2 = -1 \therefore Point(1, -1)$



Recapitulate

- What is LPP ?
- Types of variables.
- Components of LPP.
- Assumptions of LP.
- Formulation of LPP.
- Types of solutions.
- Graphical Method.
- Unique & Alternative Optimal Solution,
Unbounded FR, Infeasible solution.

(2) Simplex Method

(Universal method)

- Simplex Method to solve
- Max. Problem with
- All \leq constraints.

$$Max Z = 3x_1 + 5x_2$$

Simplex Method

$$s/t \quad 3x_1 + 2x_2 \leq 18 \quad -(I) \quad \text{Case 1.}$$

$$x_1 \leq 4 \quad -(II)$$

$$x_2 \leq 6 \quad -(III)$$

$$x_1, x_2 \geq 0$$

Standard Form:

$$Max Z = 3x_1 + 5x_2 + 0w_1 + 0w_2 + 0w_3$$

$$3x_1 + 2x_2 + w_1 + 0w_2 + 0w_3 = 18$$

$$x_1 + 0x_2 + 0w_1 + w_2 + 0w_3 = 4$$

$$0x_1 + x_2 + 0w_1 + 0w_2 + w_3 = 6$$

To prepare initial Tableau:

Tableau - I

			c_j	3	5	0	0	0
c_i	x_i	b_i		x_1	x_2	w_1	w_2	w_3
0	w_1	18		3	2	1	0	0
0	w_2	4		1	0	0	1	0
0	w_3	6		0	1	0	0	1
<hr/>			I_j	$Z = 0$	-3	-5	0	0

$$\bullet I_j = (Z_j - c_j) = (\sum a_{ij} \cdot c_i) - c_j$$

Interpretation of Tableau

Tableau - I

		c_j	3	5	0	0	0	
c_i	x_i	b_i	x_1	x_2	w_1	w_2	w_3	Ratio
0	w_1	18	3	2	1	0	0	$18/2 = 9$
0	w_2	4	1	0	0	1	0	$4/0 = \alpha$
0	w_3	6	0	1	0	0	1	$6/1 = 6$
I_j	Z = 0		-3	-5	0	0	0	

- Key Column \rightarrow Min I_j
- Key Row \rightarrow Min positive ratio.

How to get next tableau ?

- Leaving variable : w3
- Entering variable : x2
- Key no. = 1
- For old key row : New No.= Old No./key No.
- For other rows:

(Corresponding Key Row No.).

$$New\ No. = Old\ No. - \frac{(Corresponding\ Key\ Column\ No.)}{Key\ No.}$$

Tableau - I

			c_j	3	5	0	0	0	
c_i	x_i	b_i	x_1	x_2	w_1	w_2	w_3	Ratio	
0	w_1	18	3	2	1	0	0	$18/2 = 9$	
0	w_2	4	1	0	0	1	0	$4/0 = \alpha$	
0	w_3	6	0	1	0	0	1	$6/1 = 6$	
I_j	Z = 0		-3	-5	0	0	0		

- $18 \rightarrow 18 - (6*2)/1 = 6$

$(Corresponding\ Key\ Row\ No.).$
 $New\ No. = Old\ No. - \frac{(Corresponding\ Key\ Column\ No.)}{Key\ No.}$

- $I_{(w3)} = 0 \rightarrow 0 - [1*(-5)]/1 = 5$

Tableau - II

c_j	3	5	0	0	0			
c_i	x_i	b_i	x_1	x_2	w_1	w_2	w_3	Ratio
0	w1	6	3	0	1	0	-2	$6/3 = 2$
0	w2	4	1	0	0	1	0	$4/1 = 4$
5	x2	6	0	1	0	0	1	$6/0 = \alpha$
I_j	$Z = 30$		-3	0	0	0	5	

- Key Column \rightarrow Min I_j
- Key Row \rightarrow Min positive ratio.

Tableau - III

			c_j	3	5	0	0	0
c_i	x_i	b_i		x_1	x_2	w_1	w_2	w_3
3	x_1	2		1	0	$1/3$	0	$-2/3$
0	w_2	2		0	0	$-1/3$	1	$2/3$
5	x_2	6		0	1	0	0	1
<hr/>			I_j	$Z = 36$	0	0	1	0
								3

- This is the final Tableau.

The Optimal Solution is $x_1 = 2, x_2 = 6$

giving $Z = 36$

- Simplex Method to Standard Maximization Problem :
- Shortcuts and key points

$$Max Z = 3x_1 + 5x_2$$

Simplex Method

$$s / t \quad 3x_1 + 2x_2 \leq 18 \quad -(I)$$

$$x_1 \leq 4 \quad -(II)$$

$$x_2 \leq 6 \quad -(III)$$

$$x_1, x_2 \geq 0$$

Standard Form :

$$Max Z = 3x_1 + 5x_2 + 0w_1 + 0w_2 + 0w_3$$

$$3x_1 + 2x_2 + w_1 + 0w_2 + 0w_3 = 18$$

$$x_1 + 0x_2 + 0w_1 + w_2 + 0w_3 = 4$$

$$0x_1 + x_2 + 0w_1 + 0w_2 + w_3 = 6$$

Tableau - I

			c_j	3	5	0	0	0	
c_i	x_i	b_i	x_1	x_2	w_1	w_2	w_3	Ratio	
0	w_1	18	3	2	1	0	0	$18/2 = 9$	
0	w_2	4	1	0	0	1	0	$4/0 = \alpha$	
0	w_3	6	0	1	0	0	1	$6/1 = 6$	
<hr/>									
I_j	Z = 0		-3	-5	0	0	0		

- $18 \rightarrow 18 - (6*2)/1 = 6$

$$New\ No. = Old\ No. - \frac{(Corresponding\ Key\ Column\ No.)}{Key\ No.}$$
(Corresponding Key Row No.).

- $I_{(w3)} = 0 \rightarrow 0 - [1 * (-5)]/1 = 5$

Tableau - II

c_j	3	5	0	0	0			
c_i	x_i	b_i	x_1	x_2	w_1	w_2	w_3	Ratio
0	w1	6	3	0	1	0	-2	$6/3 = 2$
0	w2	4	1	0	0	1	0	$4/1 = 4$
5	x2	6	0	1	0	0	1	$6/0 = \alpha$
I_j	Z = 30		-3	0	0	0	5	

- Key Column \rightarrow Min I_j
- Key Row \rightarrow Min positive ratio.



Tableau - III

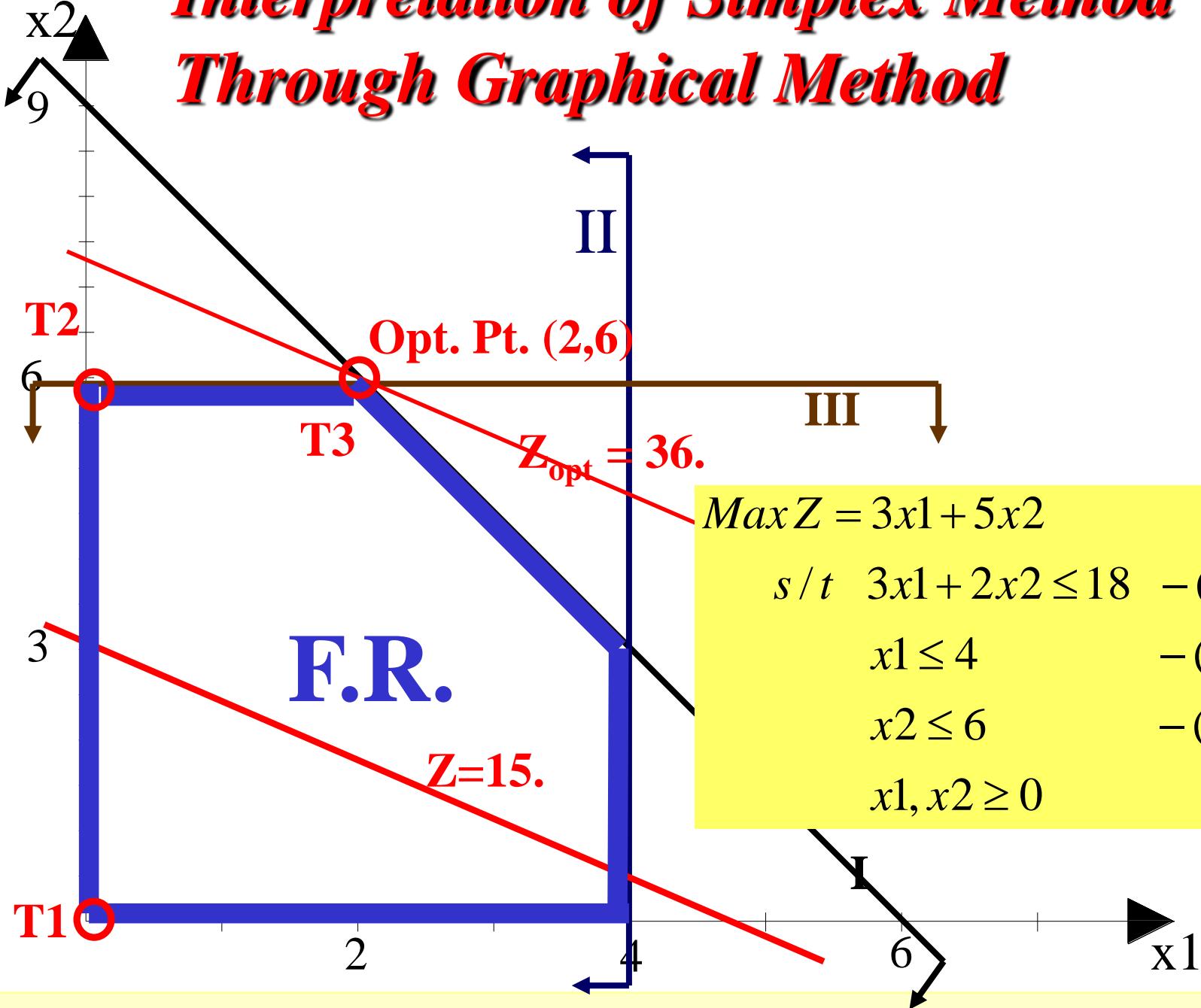
			c_j	3	5	0	0	0
c_i	x_i	b_i		x_1	x_2	w_1	w_2	w_3
3	x_1	2						
0	w_2	2						
5	x_2	6						
I_j	$Z = 36$			0	0	1	0	3

Hence, Optimal Solution is

$x_1=2, x_2=6$ giving $Z = 36$.

- Interpretation of Simplex Method through Graphical method.

Interpretation of Simplex Method Through Graphical Method



GATE - 2002

- (1) A furniture manufacture produces Chairs & Tables. The wood working department is capable of producing 200 chairs or 100 tables or any proportionate combinations of these per week. The weekly demand for chairs and tables is limited to 150 and 80 units respectively. The profit from a chair is Rs. 100 and that from a table is Rs. 300.
- (a) Set up the problem as a Linear Program.
 - (b) Determine optimal product mix and optimal value of objective function.
 - (c) If a profit of each table drops to Rs. 200 per unit, what is the product mix and profit ?

GATE - 2002

(a) Formulation

$$\text{MaxZ} = 100x_1 + 300x_2$$

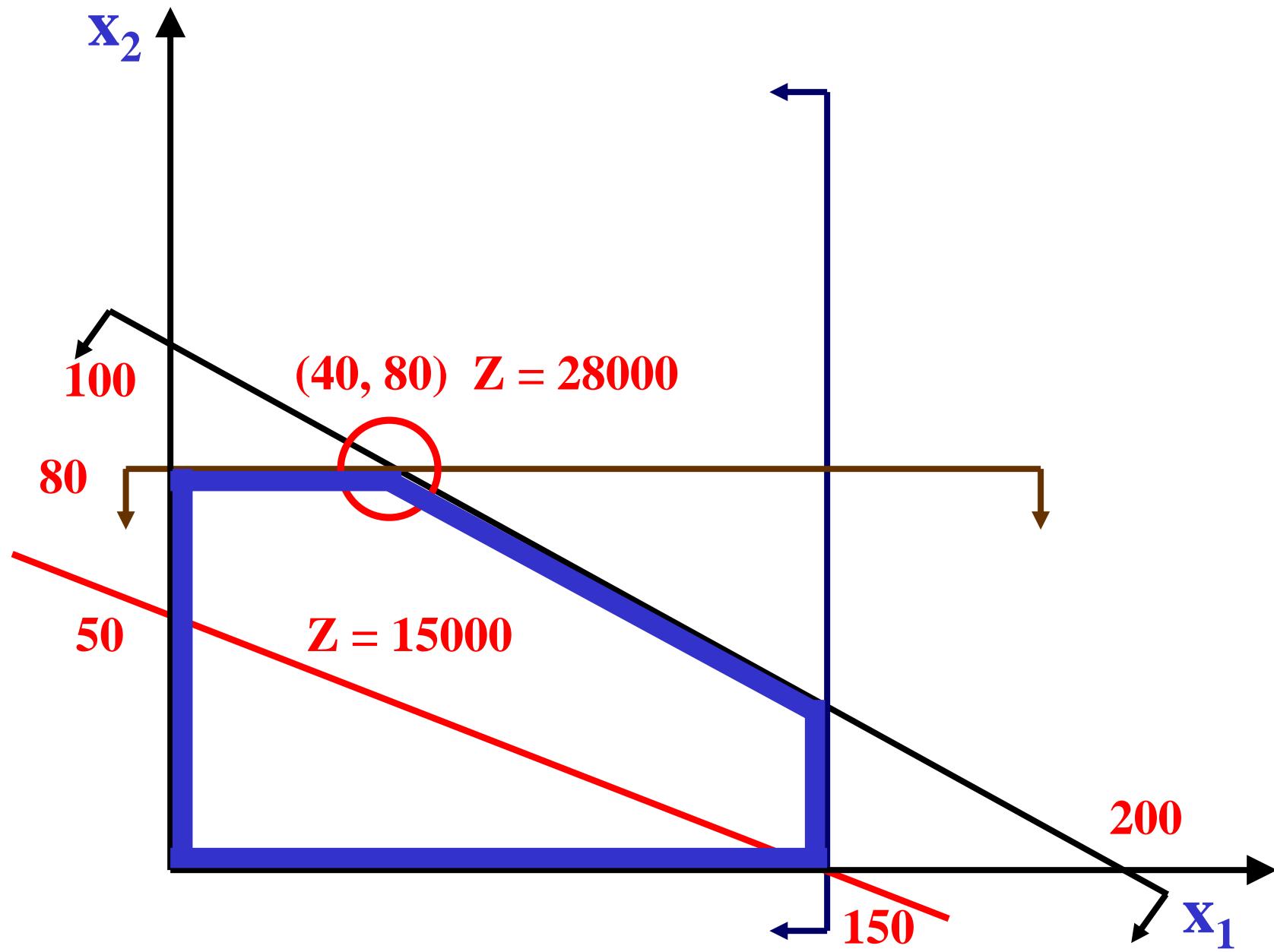
$$\text{S/t} \quad \frac{x_1}{200} + \frac{x_2}{100} \leq 1$$

$$x_1 \leq 150$$

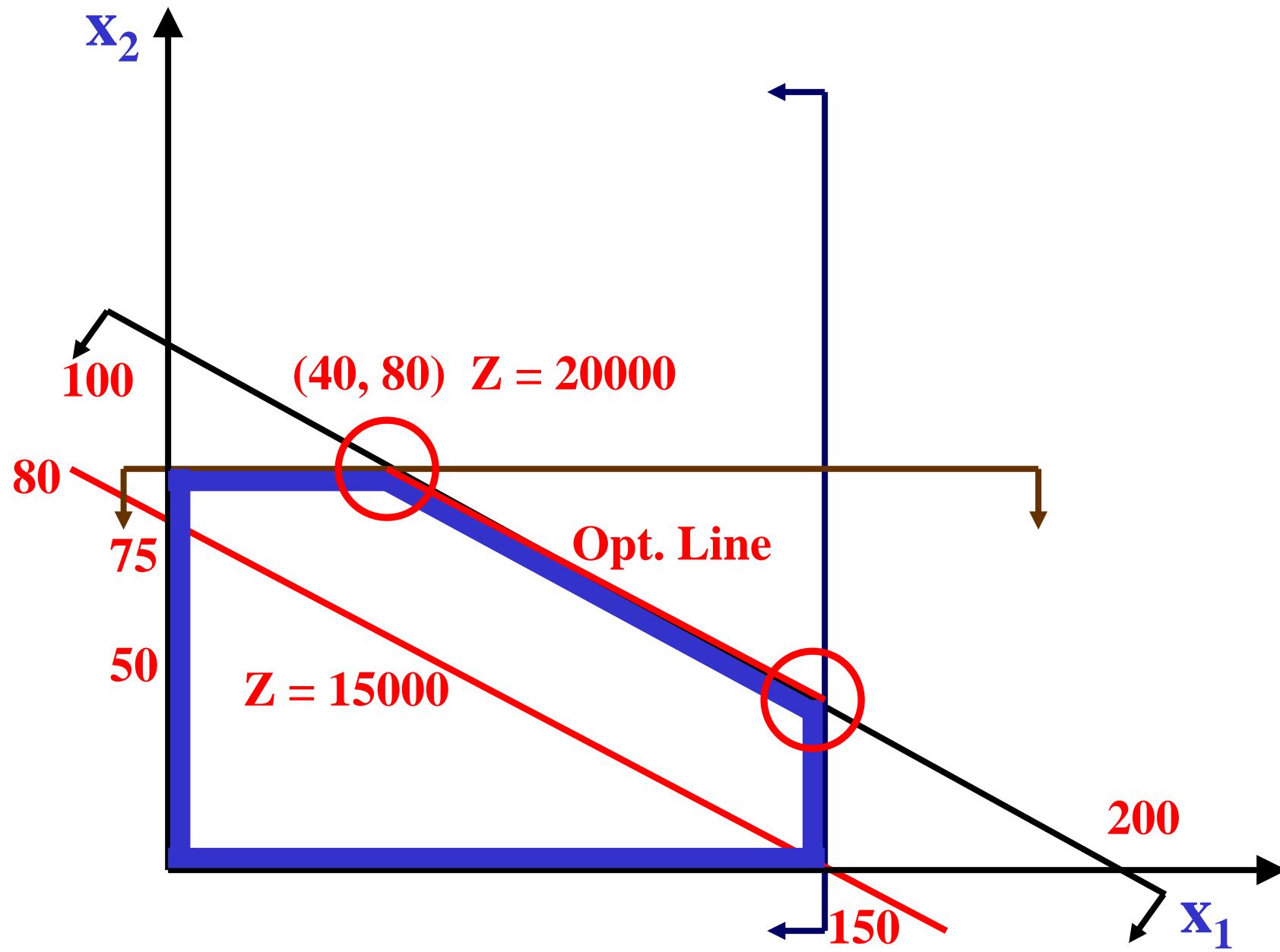
$$x_2 \leq 80$$

$$x_1, x_2 \geq 0$$

(b) Optimal Solution



(c) Multiple Optimal Solutions



GATE - 2003

- (1) A manufacture produces two types of products, 1 and 2, at production levels of x_1 and x_2 respectively. The profit is given $2x_1 + 5x_2$. The production constraints are :

$$x_1 + 3x_2 \leq 40$$

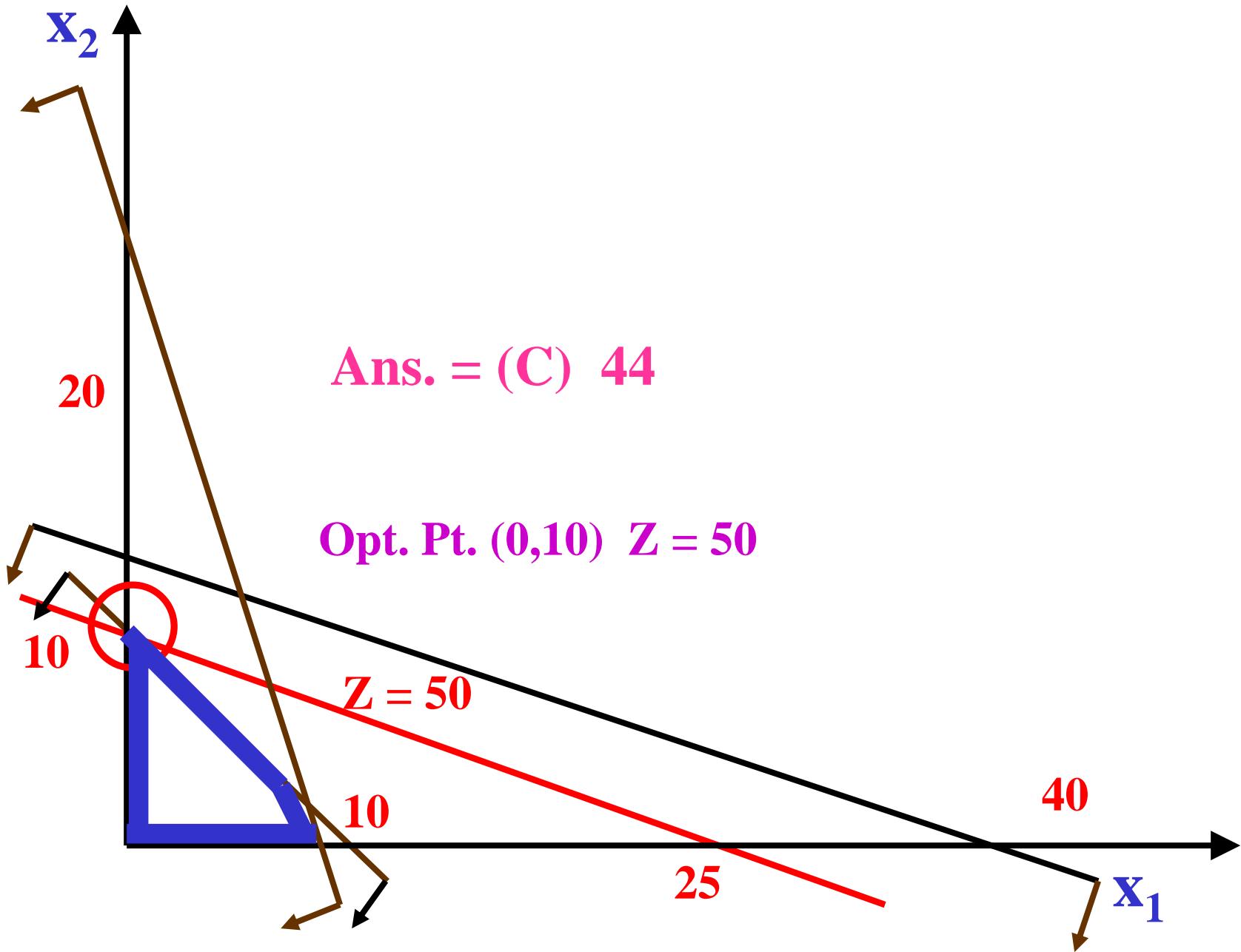
$$3x_1 + x_2 \leq 24$$

$$x_1 + x_2 \leq 10$$

$$x_1 > 0, x_2 > 0$$

The maximum profit which can meet the constraint is

- (A) 29 (B) 38 (C) 44 (D) 75



GATE - 2000

Solve : Max $Z = 4x_1 + 6x_2 + x_3$

S/t $2x_1 + x_2 + 3x_3 \leq 5$

$x_1, x_2, x_3 \geq 0$

If $x_2 \leq 2$ is added then what will be the solution ?

GATE - 2000

Solution : Through Simplex Method, in two iterations the solution of basic problem is :

$$x_1 = 0, \quad x_2 = 5, \quad x_3 = 0 \quad \text{giving} \quad z = 30$$

If $x_2 \leq 2$ is added then the solution through Simplex Method, in three iterations will be :

$$x_1 = 3/2, \quad x_2 = 2, \quad x_3 = 0 \quad \text{giving} \quad z = 18$$

Thank you

For any Query or suggestion :

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Market Structures

Market Structures

- Degree of competition in the industry
- High levels of competition – Perfect competition
- Limited competition – Monopoly
- Degrees of competition in between

Market Structure

- Determinants of market structure
 - Freedom of entry and exit
 - Nature of the product – homogenous (identical), differentiated?
 - Control over supply/output
 - Control over price
 - Barriers to entry

Market Structure

- Perfect Competition:
 - Free entry and exit to industry
 - Homogenous product – identical so no consumer preference
 - Large number of buyers and sellers – no individual seller can influence price
 - Sellers are price takers – have to accept the market price
 - Perfect information available to buyers and sellers

Market Structure

- Examples of perfect competition:
 - Financial markets – stock exchange, currency markets, bond markets?
 - Agriculture?

Market Structure

- **Advantages of Perfect Competition:**
- High degree of competition helps allocate resources to most efficient use
- Price = marginal costs
- Normal profit made in the long run
- Firms operate at maximum efficiency
- Consumers benefit

Market Structure

- **What happens in a competitive environment?**
 - firm makes short term abnormal profit
 - Other firms enter the industry to take advantage of abnormal profit
 - Supply increases – price falls
 - Long run – normal profit made
 - Choice for consumer
 - Price sufficient for normal profit to be made but not more

Market Structure

- **Imperfect or Monopolistic Competition**
 - Many buyers and sellers
 - Products differentiated
 - Relatively free entry and exit
 - Each firm may have a tiny ‘monopoly’ because of the differentiation of their product
 - Firm has some control over price
 - **Examples** – restaurants, professionals etc., building firms – plasterers, plumbers, etc.

Market Structure

- **Oligopoly – Competition amongst the few**
 - Industry dominated by small number of large firms
 - Many firms may make up the industry
 - High barriers to entry
 - Products could be highly differentiated – branding or homogenous
 - Non–price competition
 - Price stability within the market - kinked demand curve
 - Abnormal profits
 - High degree of interdependence between firms

Market Structure

- **Examples of oligopolistic structures:**

- Network provider
- Chemicals
- Oil
- Medicinal drugs
- Broadcasting

Market Structure

- **Measuring Oligopoly:**
- **Concentration ratio** – the proportion of market share accounted for by top X number of firms:
 - E.g. 5 firm concentration ratio of 80% - means top 5 five firms account for 80% of market share
 - 3 firm CR of 72% - top 3 firms account for 72% of market share

Market Structure

- **Duopoly:**
- Industry dominated by two large firms
- Possibility of price leader emerging – rival will follow price leaders pricing decisions
- High barriers to entry
- Abnormal profits likely

Market Structure

- **Monopoly:**
- Pure monopoly – industry is the firm!
- Actual monopoly – where firm has >25% market share
- Natural Monopoly – high fixed costs – gas, electricity, water, telecommunications, rail

Market Structure

- **Monopoly:**

- High barriers to entry
- Firm controls price OR output/supply
- Abnormal profits in long run
- Possibility of price discrimination
- Consumer choice limited
- Prices in excess of MC

Market Structure

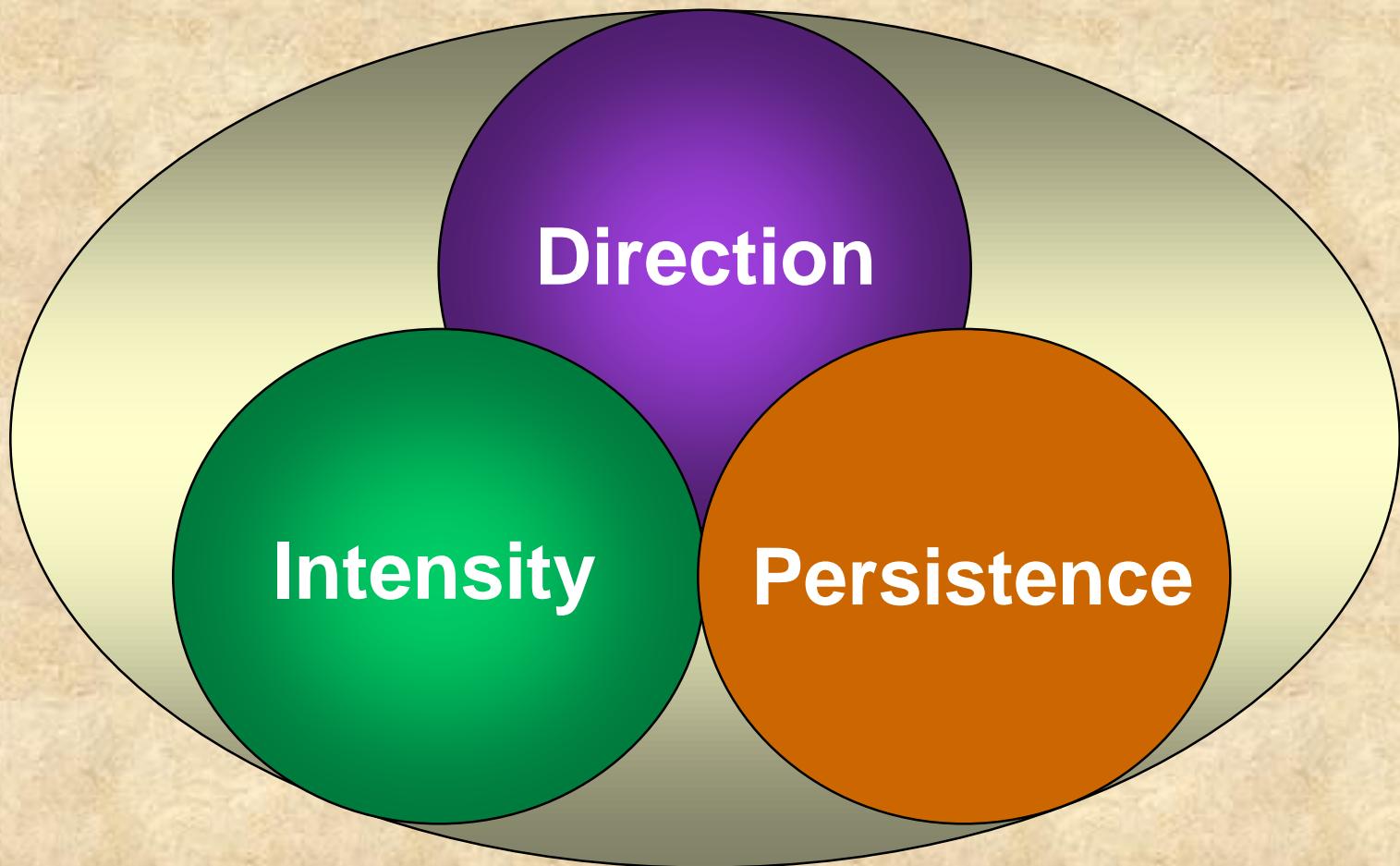
- **Advantages and disadvantages of monopoly:**
- **Advantages:**
 - May be appropriate if natural monopoly
 - Encourages R&D
 - Encourages innovation
 - Development of some products not likely without some guarantee of monopoly in production
 - Economies of scale can be gained – consumer may benefit

Market Structure

- **Disadvantages:**

- Exploitation of consumer – higher prices
- Potential for supply to be limited - less choice
- Potential for inefficiency

What Is Motivation?



What is Motivation?

Motivation

The processes that account for an individual's intensity, direction, and persistence of effort toward attaining a goal.

Key Elements

1. **Intensity:** how hard a person tries
2. **Direction:** toward beneficial goal
3. **Persistence:** how long a person tries

Hierarchy of Needs Theory (Maslow)

Hierarchy of Needs Theory

There is a hierarchy of five needs—physiological, safety, social, esteem, and self-actualization; as each need is substantially satisfied, the next need becomes dominant.

Self-Actualization

The drive to become what one is capable of becoming.

Maslow's Hierarchy of Needs

Lower-Order Needs

Needs that are satisfied externally; physiological and safety needs.

Higher-Order Needs

Needs that are satisfied internally; social, esteem, and self-actualization needs.



EXHIBIT 6-1

Assumptions of Maslow's Hierarchy

Movement up the Pyramid

- Individuals cannot move to the next higher level until all needs at the current (lower) level are satisfied.
- Individuals therefore must move up the hierarchy in order

Maslow Application:
A homeless person
will not be motivated to
meditate!

McGregor's Theory X and Theory Y

Theory X

- Traditional theory of human behaviour
- Management is responsible for organising man, material, equipment and people-in the interest of economic end
- With respect to people-this is the process of directing, motivating, controlling, modifying their behavior to fit the needs of organisation.
- Without this active intervention- they would be passive
 - he works as little as possible
 - Inherently self-centred, indifferent to organisational needs
 - Resistant to change.

McGregor's Theory X and Theory Y

Theory Y

- The expenditure of physical and mental efforts in work is natural as play or rest. The average human being does not inherently dislike work
- External control and threat of punishments are not the only means to align their behaviour with org. 's objectives. Man will exercise self direction and self control.
- Commitment to objectives is a function of reward associated with their achievements.
- Average human being under proper condition learns not only to accept , but to seek responsibilities.
- They exercise high degree of imagination, ingenuity and creativity to solve organisational problems.



Ouchi's Theory Z

Suggested five broad features

- Trust
- Strong bond between organisation and employees
- Employee involvement
- No formal structure
- Coordination of human beings

Carrot and Stick approach to motivation

Based on the ‘Principles of Reinforcement’

Comes from the old story that the best way to make donkey move is to put the carrot out in front of him or jab him with a stick from behind.

Herzberg's Two-Factor Theory

Bottom Line: Satisfaction and Dissatisfaction are not Opposite Ends of the Same Thing!

Hygiene Factors:

- Salary
- Work Conditions
- Company Policies

Separate constructs

— Hygiene Factors---
Extrinsic & Related to
Dissatisfaction

Motivators:

- Achievement
- Responsibility
- Growth

— Motivation Factors---
Intrinsic and Related to
Satisfaction

Contrasting Views of Satisfaction and Dissatisfaction

Traditional view

Satisfaction

Dissatisfaction

Herzberg's view

Motivators

Satisfaction

No satisfaction

Hygiene factors

No dissatisfaction

Dissatisfaction

EXHIBIT 6-3

Chapter 12

National Income Accounting and the Balance of Payments

Chapter Organization

- The National Income Accounts
- National Income Accounting for an Open Economy
- The Balance of Payment Accounts

The National Income Accounts

- **Gross national product (GNP)**
 - The value of all final goods and services produced by a country's factors of production and sold on the market in a given time period
- **GNP calculation**
 - Consumption
 - Investment
 - Government purchases
 - Current account balance

The National Income Accounts

- National Product and National Income
 - **National Income**
 - It is earned over a period by its factors of production.
 - It must equal the GNP a country generates over some period of time.
 - One person's spending is another's income (i.e., total spending must equal total income).

The National Income Accounts

- Capital Depreciation, International Transfers, and Indirect Business Taxes
 - Adjustments to the definition of GNP:
 - Depreciation of capital
 - Net unilateral transfers of income
 - Indirect business taxes

The National Income Accounts

■ Gross Domestic Product (GDP)

- It equals GNP minus net receipts of factor income from the rest of the world.
- It does not correct for the portion of countries' production carried out using services provided by foreign-owned capital.

National Income Accounting for an Open Economy

■ The National Income Identity for an Open Economy

$$Y = C + I + G + EX - IM \quad (12-1)$$

where:

- Y is GNP
- C is consumption
- I is investment
- G is government purchases
- EX is exports
- IM is imports
- In a closed economy, $EX = IM = 0$.

National Income Accounting for an Open Economy

- The Current Account and Foreign Indebtedness
 - **Current account (CA) balance**
 - The difference between exports of goods and services and imports of goods and services ($CA = EX - IM$)
 - CA measures the size and direction of international borrowing.

National Income Accounting for an Open Economy

- *CA balance is equal to the difference between national income and domestic residents' spending:*

$$Y - (C + I + G) = CA$$

- *CA balance is goods production less domestic demand.*
 - *CA balance is the excess supply of domestic financing.*

National Income Accounting for an Open Economy

- Saving and the Current Account
 - National saving (S)
 - A country's CA surplus is referred to as its net foreign investment.
- Private and Government Saving
 - $S^p = I + CA - S^g = I + CA - (T - G) = I + CA + (G - T)$ (12-2)

The Balance of Payments Accounts

- A track of both its payments to and its receipts from foreigners.
- Every international transaction automatically enters the balance of payments twice: once as a credit (+) and once as a debit (-).
 - Exports or imports of goods or services
 - Purchases or sales of financial assets
 - Transfers of wealth between countries
 - They are recorded in the capital account

The Balance of Payments Accounts

- The Fundamental Balance of Payments Identity

Current account + financial account + capital account = 0 (12-3)

- The Current Account, Once Again

- Merchandise trade
- Services
- Income

The Balance of Payments Accounts

- The Capital Account
 - It records asset transfers and tends to be small for the United States.
- The Financial Account
 - **Financial inflow (capital inflow)**
 - **Financial outflow (capital outflow)**
- The Statistical Discrepancy

The Balance of Payments Accounts

- Official Reserve Transactions
 - **Official international reserves**
 - **Official foreign exchange intervention**
 - **Official settlements balance (balance of payments)**
 - The book-keeping offset to the balance of official reserve transactions
 - It is the sum of the current account balance, the capital account balance, the nonreserve portion of the financial account balance, and the statistical discrepancy.
 - A country with a negative balance of payments may signal that it is running down its international reserve assets or incurring debts to foreign monetary authorities.

The Balance of Payments Accounts

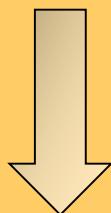
■ Case Study: Is the United States the World's Biggest Debtor?

- At the end of 1999, the United States had a negative net foreign wealth position far greater than that of any other single country.
- The United States is the world's biggest debtor.
- However, the United States has the world's largest GNP.

OPERATIONS RESEARCH

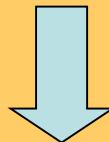
AN OVERVIEW

OPERATIONS



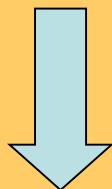
The activities carried out in an organization related to attaining its goals and objectives.

RESEARCH



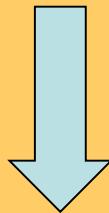
The process of observation and testing characterized by the scientific method. The steps of the process include observing the situation and formulating a problem statement, constructing a mathematical model, hypothesizing that the model represents the important aspects of the situation, and validating the model through experimentation.

ORGANIZATION



The society in which the problem arises or for which the solution is important. The organization may be a corporation, a branch of government, a department within a firm, a group of employees, or perhaps even a household or individual.

DECISION MAKER



An individual or group in the organization capable of proposing and implementing necessary actions.

**MAKING DECISIONS OR
TAKING ACTIONS IS
CENTRAL TO ALL
OPERATION RESEARCH
APPLICATIONS**

Nature of O.R. Characteristics

- Inter-disciplinary team approach
- Systems approach
- Helpful in improving the quality of solution
- Scientific method
- Goal oriented optimum solution
- Use of models
- Require willing executives
- Reduces complexity

PHASES OPERATIONS RESEARCH

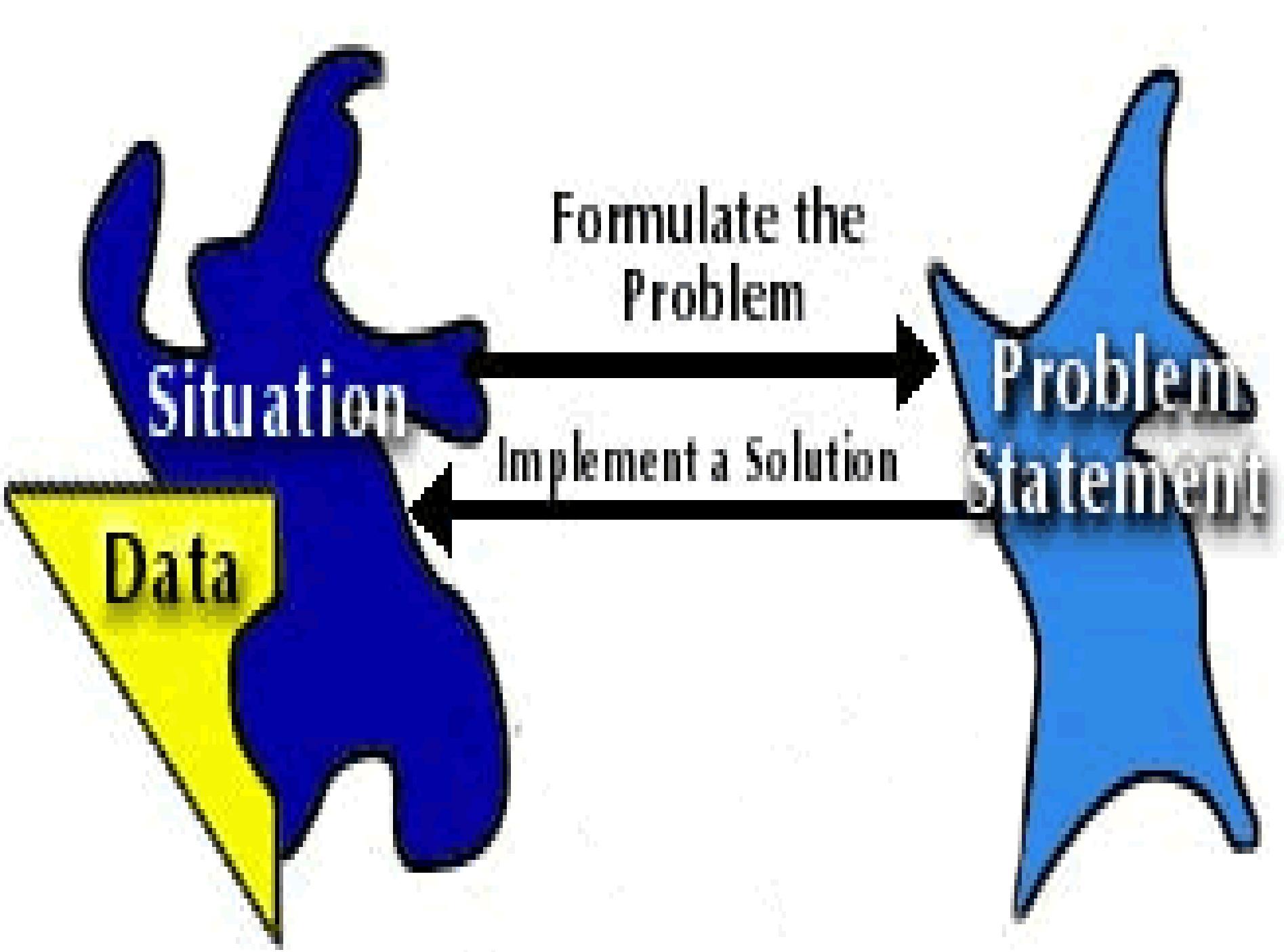


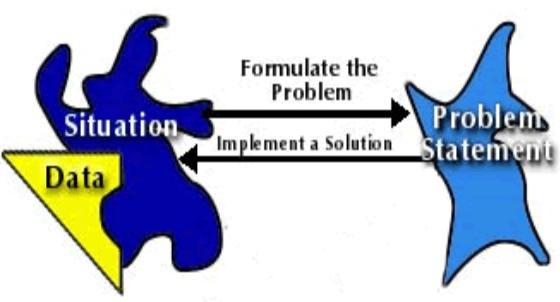
1. *Recognize the Problem*



1. Recognize the Problem

- *Decision making begins with a situation in which a problem is recognized.*
- *The problem may be actual or abstract, it may involve current operations or proposed expansions or contractions due to expected market shifts, it may become apparent through consumer complaints or through employee suggestions, it may be a conscious effort to improve efficiency or a response to an unexpected crisis.*
- *It is impossible to circumscribe the breadth of circumstances that might be appropriate for this discussion, for indeed problem situations that are amenable to objective analysis arise in every area of human activity.*





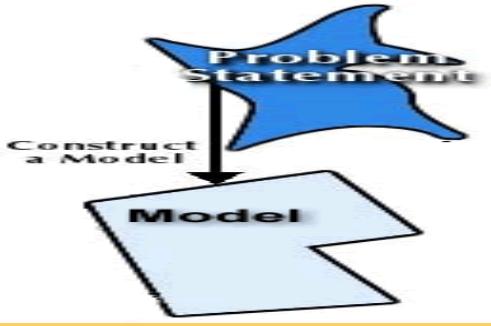
2. *Formulate the Problem*

- At the formulation stage, statements of objectives, constraints on solutions, appropriate assumptions, descriptions of processes, data requirements, alternatives for action and metrics for measuring progress are introduced.
- Because of the ambiguity of the perceived situation, the process of formulating the problem is extremely important. The analyst is usually not the decision maker and may not be part of the organization, so care must be taken to get agreement on the exact character of the problem to be solved from those who perceive it. There is little value to either a poor solution to a correctly formulated problem or a good solution to one that has been incorrectly formulated.

Protocolo de
Sustentabilidade

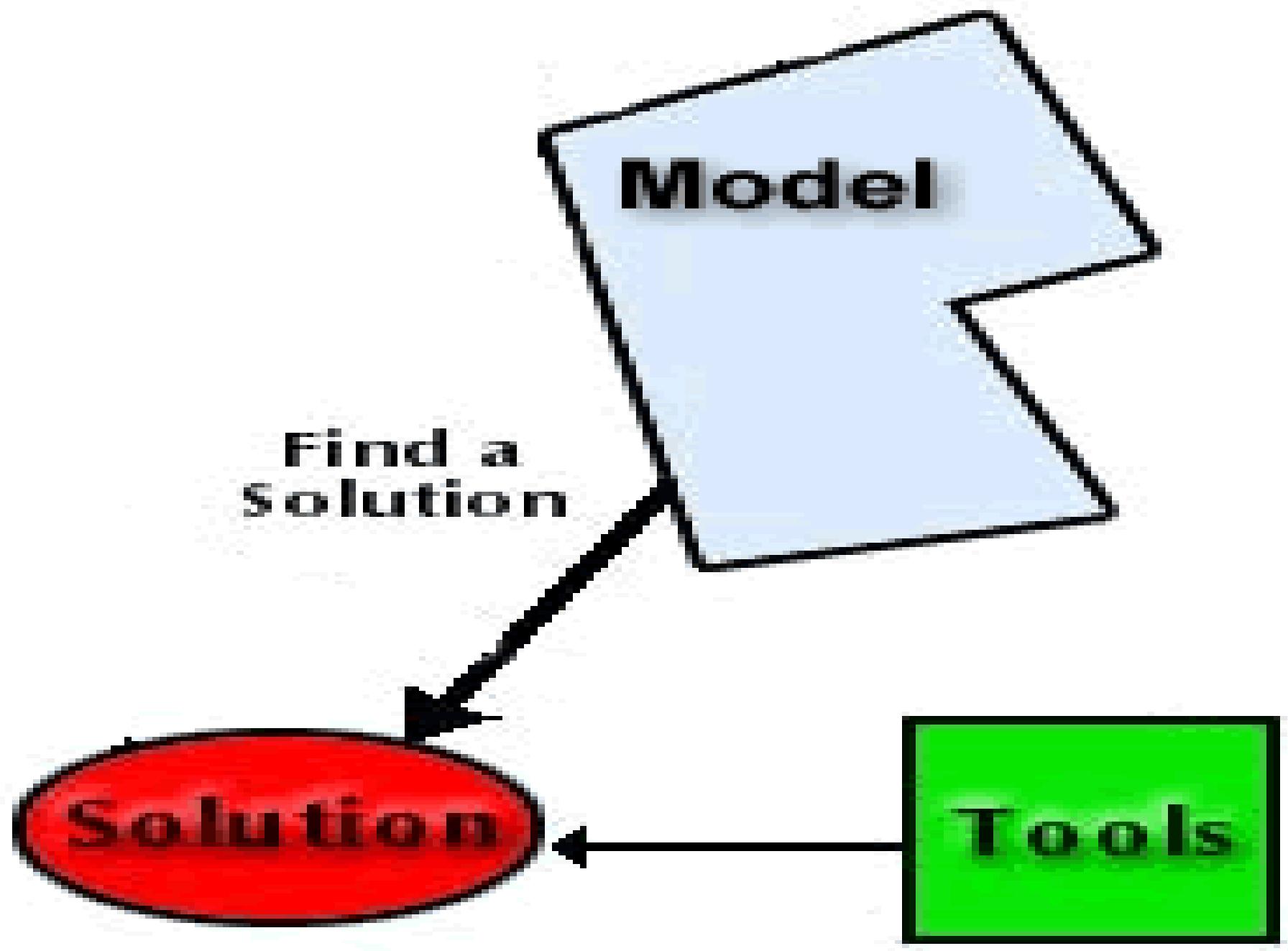
Construção
a Modelos I

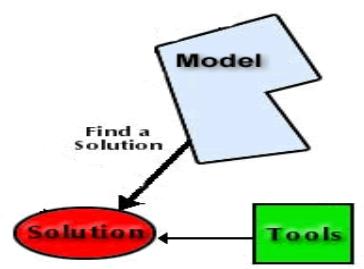
Modelo I



3. Construct a Model

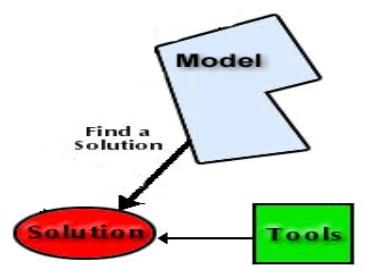
- A mathematical model is a collection of functional relationships by which allowable actions are delimited and evaluated. Although the analyst would hope to study the broad implications of the problem using a systems approach, a model cannot include every aspect of a situation.
- A model is always an abstraction that is, by necessity, simpler than the reality.
- Elements that are irrelevant or unimportant to the problem are to be ignored, hopefully leaving sufficient detail so that the solution obtained with the model has value with regard to the original problem.
- The statements of the abstractions introduced in the construction of the model are called the assumptions. It is important to observe that assumptions are not necessarily statements of belief, but are descriptions of the abstractions used to arrive at a model. The appropriateness of the assumptions can be determined only by subsequent testing of the model's validity.
- Models must be both tractable -- capable of being solved, and valid -- representative of the true situation. These dual goals are often contradictory and are not always attainable. We have intentionally represented the model with well-defined boundaries to indicate its relative simplicity.





4. Find a Solution(1)

- The next step in the process is to solve the model to obtain a solution to the problem. It is generally true that the most powerful solution methods can be applied to the simplest, or most abstract, model.
- Some methods can prescribe optimal solutions while other only evaluate candidates, thus requiring a trial and error approach to finding an acceptable course of action.
- It may be necessary to develop new techniques specifically tailored to the problem at hand. A model that is impossible to solve may have been formulated incorrectly or burdened with too much detail. Such a case signals the return to the previous step for simplification or perhaps the postponement of the study if no acceptable, tractable model can be found.



4. *Find a Solution(2)*

- Of course, the solution provided by the computer is only a proposal. An analysis does not promise a solution but only guidance to the decision maker.
- Choosing a solution to implement is the responsibility of the decision maker and not the analyst. The decision maker may modify the solution to incorporate practical or intangible considerations not reflected in the model.

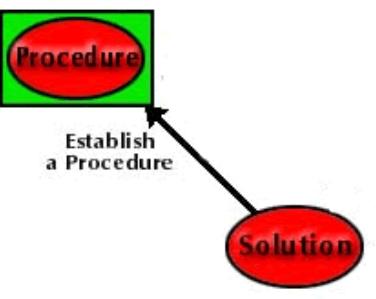


Procedure

Establish
a Procedure

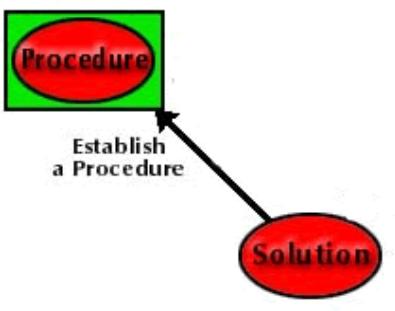


Solution



5. Establish the Procedure(1)

- Once a solution is accepted a procedure must be designed to retain control of the implementation effort.
- Problems are usually ongoing rather than unique. Solutions are implemented as procedures to be used repeatedly in an almost automatic fashion under perhaps changing conditions.
- Control may be achieved with a set of operating rules, a job description, laws or regulations promulgated by a government body, or computer programs that accept current data and prescribe actions.



5. Establish the Procedure(2)

- Once a procedure is established (and implemented), the analyst and perhaps the decision maker are ready to tackle new problems, leaving the procedure to handle the required tasks.
- But what if the situation changes?
- An unfortunate result of many analyses is a remnant procedure designed to solve a problem that no longer exists or which places restrictions on an organization that are limiting and no longer appropriate.
- Therefore, it is important to establish controls that recognize a changing situation and signal the need to modify or update the solution.

```
graph TD; A[Implementation<br/>the Solution] --> B[Procedure]; B --> C[Data]; C --> D[Situation]
```

Situation

Data

Implement
the Solution

Procedure

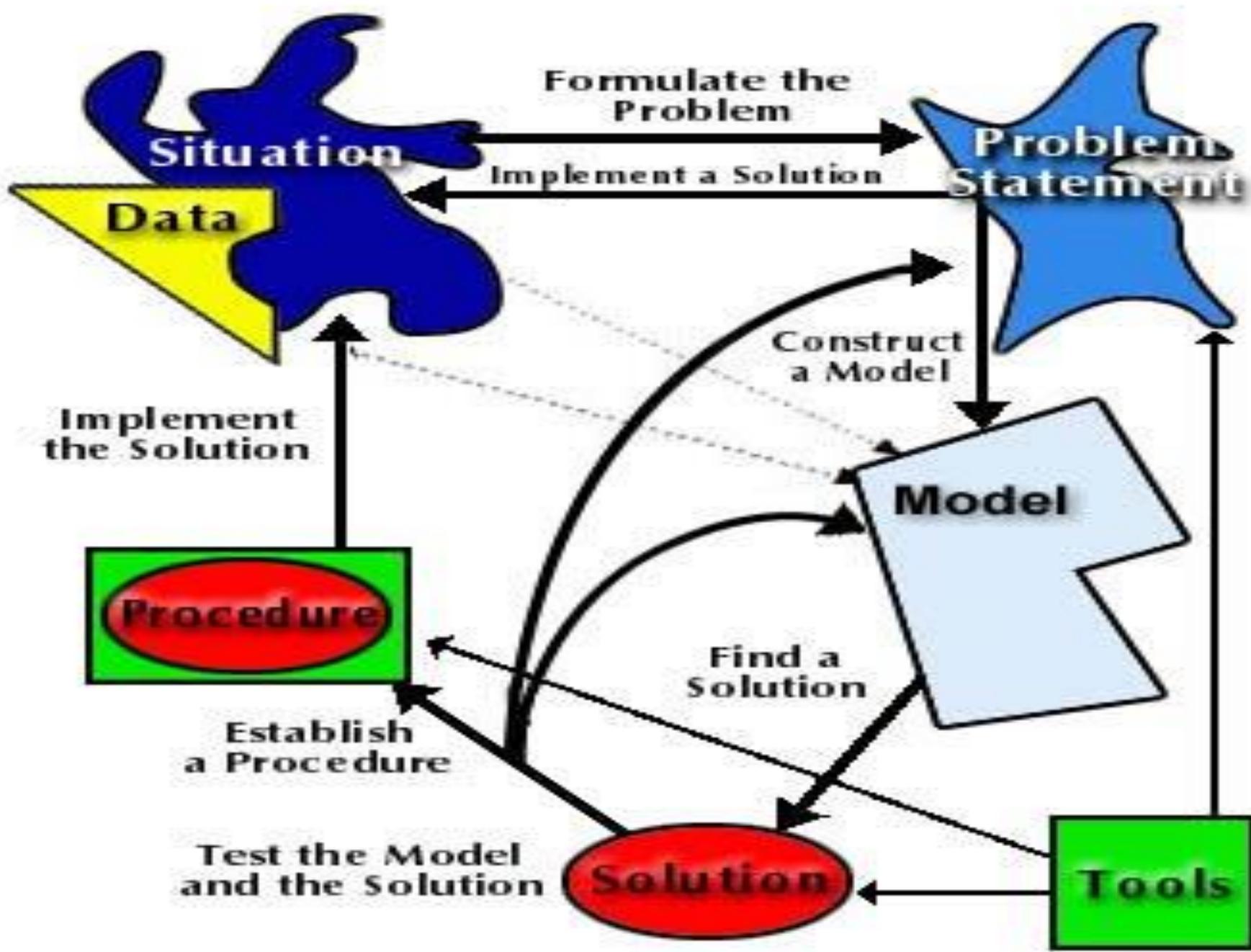


6. *Implement the Solution*

- A solution to a problem usually implies changes for some individuals in the organization. Because resistance to change is common, the implementation of solutions is perhaps the most difficult part of a problem solving exercise.
- Some say it is the most important part. Although not strictly the responsibility of the analyst, the solution process itself can be designed to smooth the way for implementation.
- The persons who are likely to be affected by the changes brought about by a solution should take part, or at least be consulted, during the various stages involving problem formulation, solution testing, and the establishment of the procedure.

The OR Process

- Combining the steps we obtain the complete OR process.
- In practice, the process may not be well defined and the steps may not be executed in a strict order. Rather there are many loops in the process, with experimentation and observation at each step suggesting modifications to decisions made earlier.
- The process rarely terminates with all the loose ends tied up. Work continues after a solution is proposed and implemented. Parameters and conditions change over time requiring a constant review of the solution and a continuing repetition of portions of the process.



TECHNIQUES OF OR(1)

- **Linear programming-** It has been used to solve problems involving assignment of jobs to machines, blending, product mix, advertising media selection, least cost diet, distribution, transportation and many others.
- **Dynamic programming-** It has been applied to capital budgeting, selection of advertising media, cargo loading and optimal routing problems.
- **Waiting line or queuing theory-** It has been useful to solve problems of traffic congestion, repair and maintenance of broken-down machines, number of service facilities, scheduling and control of air-traffic, hospital operations, counter in banks and railway booking agencies.
- **Inventory control / planning-** These models have been used to determine economic order quantities, safety stocks, reorder levels, minimum and maximum stock level.

TECHNIQUES OF OR(2)

- **Decision theory-** It has been helpful in controlling hurricanes, water pollution, medicine, space exploration, research and development projects.
- **Network analysis (PERT& CPM)-** These techniques have been used in planning, scheduling and controlling construction of dams, bridges, roads and highways and development & production of aircrafts, ships, computers etc.
- **Simulation-** It has been helpful in a wide variety of probabilistic marketing situations.
- **Theory of replacement-** It has been extensively employed to determine the optimum replacement interval for three types of replacement problems:
 - i) Items that deteriorate with time.
 - ii) Items that do not deteriorate with time but fail suddenly.
 - iii) Staff replacement and recruitment.

ADVANTAGES

- Provides a tool for scientific analysis.
- Provides solution for various business problems.
- Enables proper deployment of resources.
- Helps in minimizing waiting and servicing costs.
- Enables the management to decide when to buy and how much to buy?
- Assists in choosing an optimum strategy.
- Renders great help in optimum resource allocation.
- Facilitates the process of decision making.
- Management can know the reactions of the integrated business systems.
- Helps a lot in the preparation of future managers.

LIMITATIONS

- The inherent limitations concerning mathematical expressions
- High costs are involved in the use of O.R. techniques
- O.R. does not take into consideration the intangible factors
- O.R. is only a tool of analysis and not the complete decision-making process
- Other limitations
- Bias
- Inadequate objective functions
- Internal resistance
- Competence
- Reliability of the prepared solution

Application Fields

- Industry
- Defense
- Planning
- Agriculture
- Public utilities

THANKS