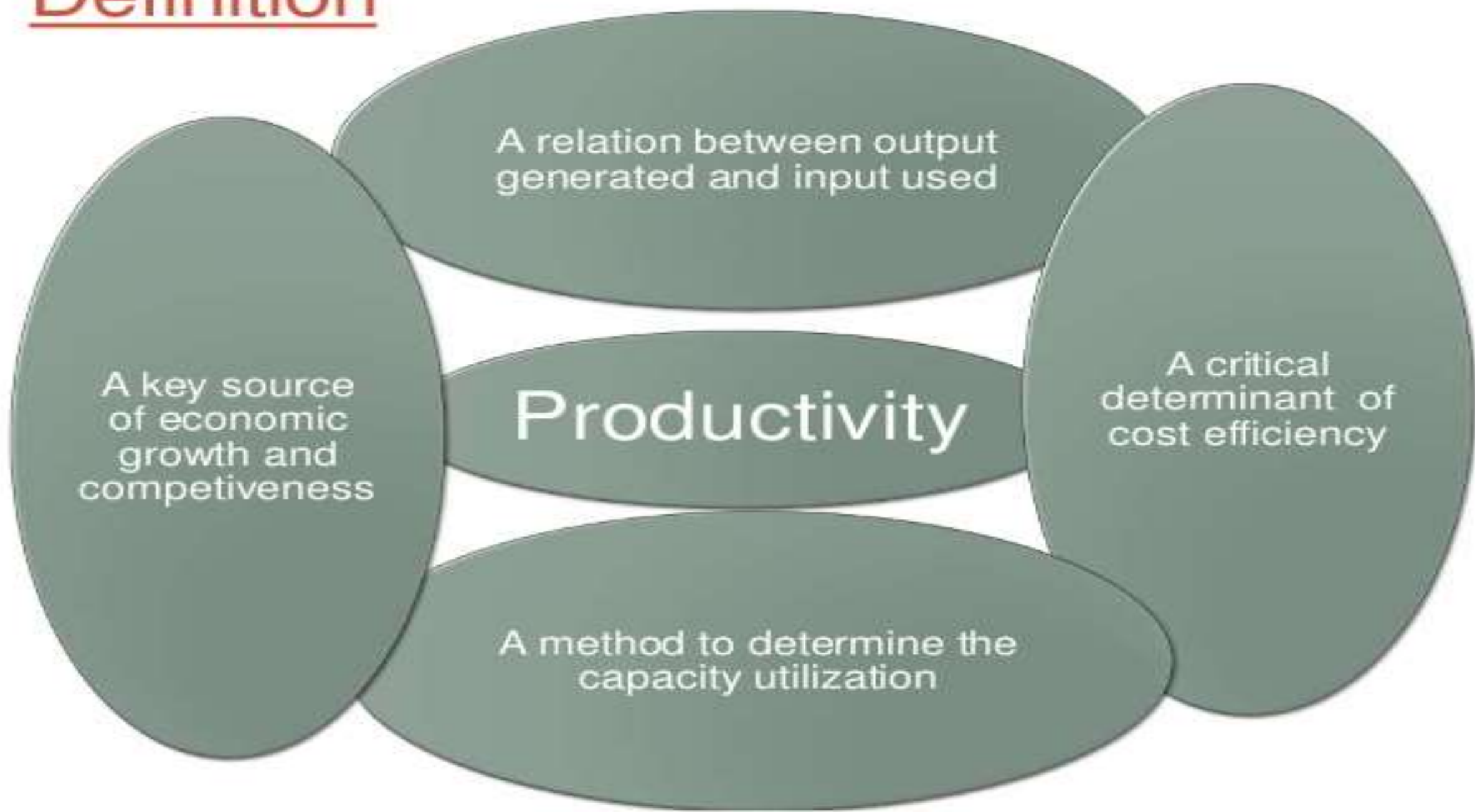


UNIT- III

Industrial Productivity - Productivity & Efficiency - Factors influencing productivity - Measurement of Productivity- Concepts -Scope and Significance- Tools of Productivity- Indian situation. Labour Productivity - Determinants of Labour Productivity - Productivity Movements in India

Definition



Productivity

- Is a measure of the efficiency with which a firm turns inputs into output.
- It is output per unit of input.
- Producing more with the same quantity of inputs
- Producing the same quantity with fewer inputs
- Output rising faster than input or output falling more slowly than inputs.
- Output per Employee = total output/total no. employees
- Output per person per hour = total output/total hours worked

Productivity

- If labor employed to produce non-standard products, then productivity could be expressed in monetary terms.
- Value of output per person = value of output/total no. employed
- Value added per employee = value added by the firm/total number employed

What is Productivity?

- Productivity is a measure of how well resources are utilized to produce output
- It relates output to input in any system, where some value addition is performed on the input resource
- $$\text{Productivity} = \frac{\text{Output Obtained}}{\text{Input Expended}}$$

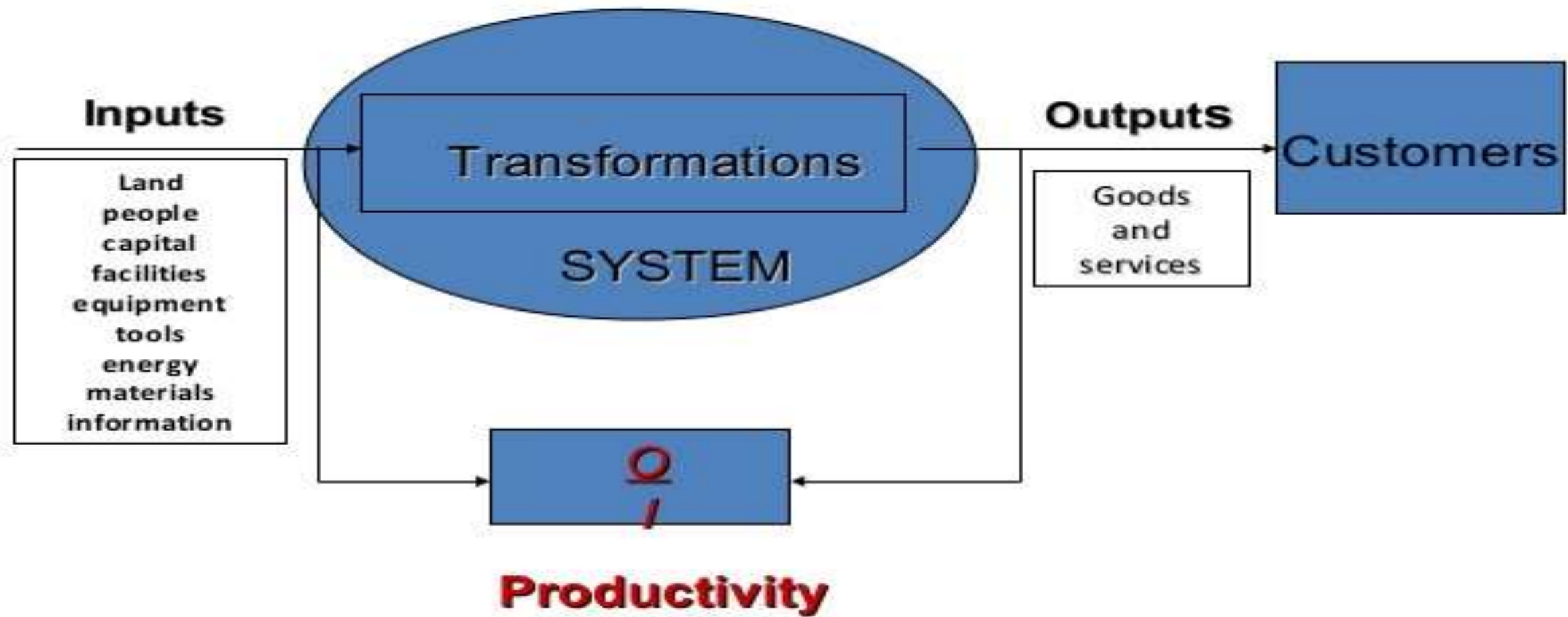
Productivity

The Ratio between “ Output of Work “ and “Input of Resources “
used in the “Process of Creating Wealth”--- ILO.



It is the ratio between the amount Produced (Output) and the amount of Resources (Input) used in Production by eliminating Waste.

Systems Concept



CONCEPTS OF PRODUCTIVITY

Five Concepts of Productivity :

1. Technical Concept
2. Social Concept
3. Economic Concept
4. Management Concept
5. Intregrated Concept

TECHNICAL CONCEPTS

The term Productivity is a broad concept which involves two major aspects :

$$\text{Productivity} = \text{Output/Input}$$

Output = Product of an operation, or Result of special interest.

Input = Resources Consumed in the production , or Delivery of output.

SOCIAL CONCEPTS

Productivity is, above all, an attitude of mind. It seeks to continually improve what already exists. It is based on the belief that One can do things better today than yesterday and better tomorrow than today.

-Asian Productivity Organization.

Summary :

- A. An innate wish of everyone to make tomorrow better than today.
- B. Aims to achieve a better quality of life for all.

ECONOMIC CONCEPTS

Refers to one's ability to create more value for Customer.

For most business Organization, the economic goal and basis for Existence is value Creation.

Economic gains is measured in terms of Value added – Increase in Inputs or Improvement in Productivity.

In most cases, Increases in value added are attained through Expansion in Capital and Labor.

However, a productivity driven growth model focuses on Resource Efficiency and Output superiority to create higher value to customers.

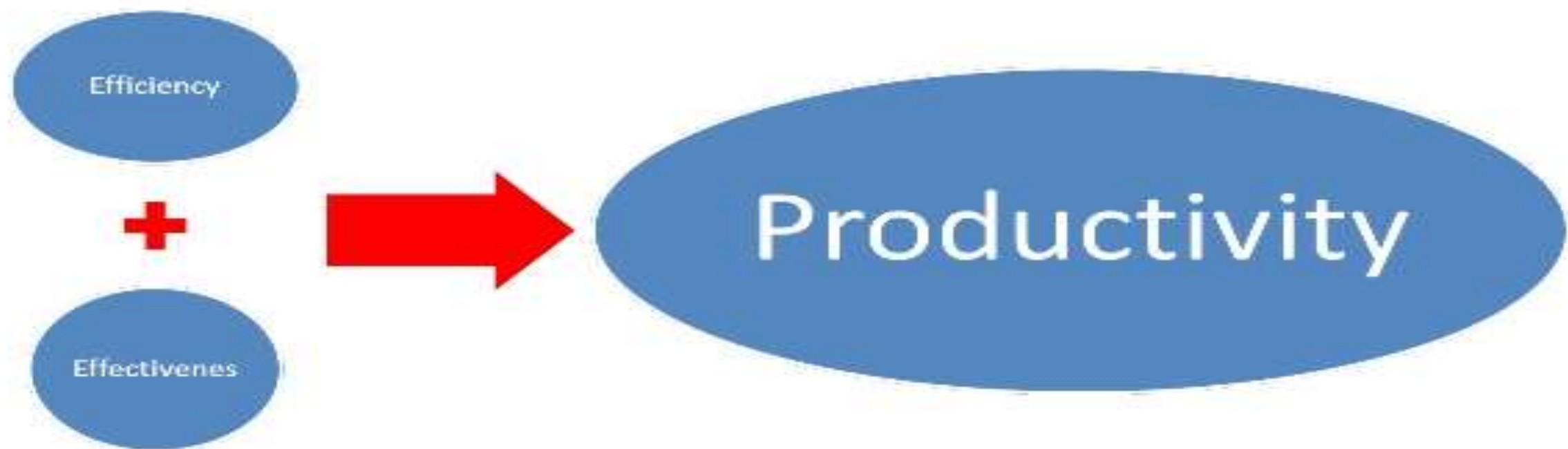
Hence. A long-term sustainable growth in the Economy cannot depend on Expansion strategy alone.

Definition	It is defined as the act of manufacturing goods for their use or sale.	It is defined as the rate at which goods are produced.
Use	It is the actual process of conversion.	It is the utilization of resources to form goods.
Work done	It is the amount of work done or manufactured that is the output.	It is the amount of work one gets for a certain spending cost.
Measurement	It is the measure of produced goods.	It is the measure of efficiency.

Important Note!

Production is a measure of output only and not a measure of efficiency

MANAGEMENT CONCEPTS



- The stock of capital at the disposal of workers
- The efficiency of organization
- The best utilization of human resources
- Working conditions
- Industrial relations
- Employees motivation

- The technology incorporated in the capital
- The age of capital stock
- The skills of workforce
- Production planning
- Inventory management
- Product diversity
- Process and layout
- *Some organizations are capital-intensive while others are labor-intensive.*
- *Total factor productivity = total output/inputs of all factors of production*

Causes of Low Productivity

- Planning
- Management
- Employee motivation
- Training
- Waste
- Process or systems of work

Factors to Raise Productivity

- Work simplification
- Rationalization
- Capital investment
- Material utilization
- Improved planning
- Changes in the human resource mix
- Facilities improvement
- Organizational change
- Simplification and standardization
- Outsourcing

Definition of Efficiency

Efficiency refers to doing things in a right manner. Scientifically, it is defined as the output to input ratio and focuses on getting the maximum output with the minimum resources.

Importance of Industrial Efficiency

1. Rapid growth of industry
2. Growth of national income
3. Reducing unemployment
4. Rapid development
5. Developing the life standard
6. Increasing the importance of business
7. Minimizing the social unrest
8. Ensuring proper usage of resources
9. Minimizing the pollution
10. Improve the expertise
11. Social development
12. Increasing the remittance

1. Defining Goals
2. Creativity
3. Appraisal
4. Transparency
5. Supervision
6. Environment
7. Training
8. Incentive System

1	Doing this in a right manner	Doing the right things
2	This can built inflexibility in the system	More adaptable to the changing the environment
3	Discourage innovation.	Encourages innovation
4	Look at avoiding mistakes error	About gaining success

EFFICIENCY vs EFFECTIVENES

Efficiency

(Doing the right Things)

Machines can compressed
100000 Tablet/Hour

Effectiveness

(Doing things Right)

90000 Tablet = Good
10000 Tablets = Defective

1. Employee morale
2. Communication
3. Decision making

Measurement in Productivity and why ?????

Establish productivity management function

- Set overall productivity goals for organization
- Raise awareness among employees

Diagnose

- Access your company current performance
- Identify the gaps and areas of improvement

Develop road map

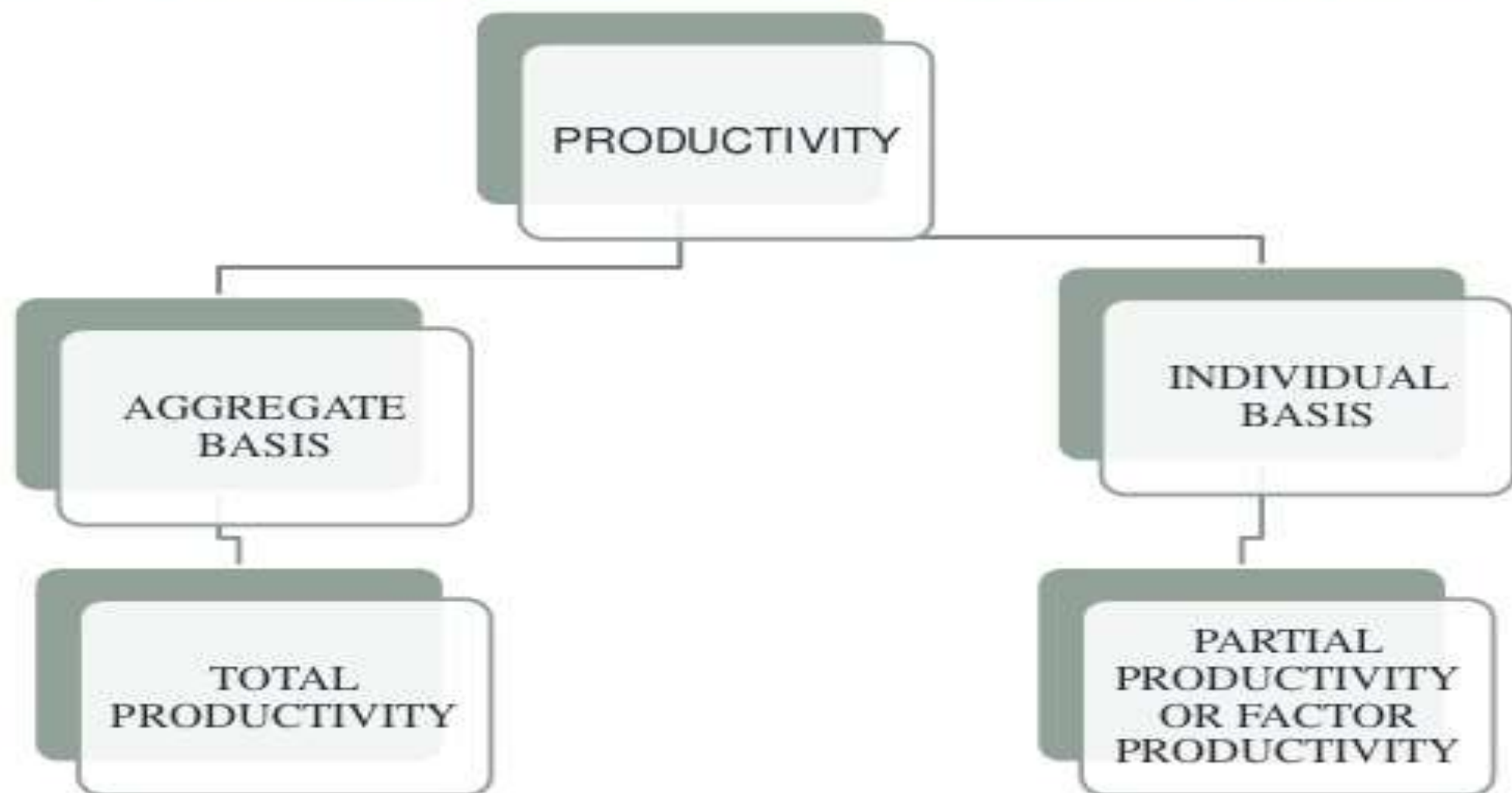
- Set targets and formulate strategy
- Implement specification

Implement measurement system

Implement performance management system

- Link effort and reward to employees
- Monitor the review parts

Techniques for Measurement of Productivity:



- On aggregate basis, output is compared with all inputs taken (added) together. This is called as Total Productivity.

Hence,

$$\text{Total Productivity Index} = \frac{\text{Total output}}{\text{Total input}}$$

- Where Total Output=Total production of goods and services and
Total Input= Labor + Material + Capital + Energy.
- **This index measures the productivity of the entire organization with use of all resources. It is a way of evaluating efficiency of entire plant or firm.**

Example : Total Productivity

$$TP = \frac{\text{Output}}{\text{Labor} + \text{Materials} + \text{Overhead}}$$

$$TP = \frac{(10,000 \text{ units}) * (\$10)}{(500) * (\$9) + (\$30,000) + (\$15,500)}$$

$$TP = 2.0$$

Individual Basis

- On individual basis, output is compared with any one of the input factor and this is called as Partial Productivity or Factor Productivity.
- Factor productivity or partial productivity indices are of following types:
 - I. **Labor productivity**
 - II. **Material productivity**
 - III. **Machine Productivity**
 - IV. **Capital productivity**

- Labor productivity is simply defined as the ratio of total output to the Labour input i.e.

$$\text{Labor Productivity} = \frac{\text{TOTAL OUTPUT}}{\text{LABOUR INPUT}}$$

- Labor productivity depends upon how labors are utilized.
- Labor productivity can be higher or lower depending on factors like availability of work load, material, working tools, availability of power, work efficiency, level of motivation, level of training, level of working condition (comfortable or poor) etc.

Material productivity

- **Material productivity = $\frac{\text{Total output}}{\text{Material input}}$ or**
- **M.P = $\frac{\text{Number of units produced}}{\text{Total material cost}}$**
- Material productivity plays important role in cost of production.
- Material productivity depends upon how material is effectively utilized in its conversion into finished product.
- Material productivity can be increased by using skilled workers, adequate machine tools, good design of product etc.

Machine Productivity

- Production system converts raw material into finished product through mechanical or chemical process with the help of machines and equipment's.
- **Machine productivity = $\frac{\text{Total output}}{\text{Machine input}}$ or**
- **M.P = $\frac{\text{Output in standard hours}}{\text{Actual machine hours}}$**
- Machine productivity depends upon availability of raw material, power, skill of workers, machine layout etc.

Capital Productivity

- For any production set-up, facilities of machines, tools, land etc. are required which are assets of organization. Capital is needed for such assets.
- **Capital productivity = $\frac{\text{Total output}}{\text{Capital input}}$ or**
- **Capital productivity = $\frac{\text{Total output}}{\text{Capital employed}}$**
- Capital productivity depends on how effectively assets are utilized.

IMPORTANCE OF PRODUCTIVITY


- **Productiveness increases the overall efficiency of an organization.**
 - **Increased production due to efficient utilization of organizational resources leads to a lower cost production resulting in better sales and profits.**
 - **Concept of productivity can be viewed from the following points:**
 - 1. To Beat the Competition**
 - 2. Guide the Management**
 - 3. Indicator of Progress**
 - 4. Maximum Utilization of Scarce Resources**
- Key to National Prosperity**

WAYS AND MODELS OF CALCULATING PRODUCTIVITY

1. Partial productivity

- Ratio of output to one particular class of input.

- Partial Productivity =
$$\frac{\text{Output}}{\text{A particular class of input}}$$

- Often there is a factor which plays an important role.
 - There is one factor which is an appropriate factor for comparison, this is called an “apple to apple” comparison
 - Such ratios are used for selection of a particular area of improvement.
 - Organisations can use this formula to determine performance of labour, machines, energy, capital, department, organisation, etc.
- 

Total Factor Productivity

Total factor productivity (TFP) is a measure of productivity calculated by dividing economy-wide total production by the weighted average of inputs i.e. labour and capital. It represents growth in real output which is in excess of the growth in inputs such as labour and capital.

Productivity is a measure of the relationship between outputs (total product) and inputs i.e. factors of production (primarily labour and capital). It equals output divided by input. There are two measures of productivity: (a) labour productivity, which equals total output divided by units of labour and (b) total factor productivity, which equals total output divided by weighted average of the inputs.

TFP = Total output / weighted Average of Inputs

- Example: production worth Rs.80 lakhs was manufactured and sold in a month. It consumed labour hours worth Rs.12 lakhs and capital worth Rs.48 lakhs
- $TFP = \frac{\text{Output}}{\text{Inputs of (Labour + Capital)}}$
 $= \frac{80}{(12+48)} = 1.33$



Labor Productivity

- Labor productivity is simply defined as the ratio of Total output to the Labour input i.e.

$$\text{Labor Productivity} = \frac{\text{TOTAL OUTPUT}}{\text{LABOUR INPUT}}$$

- Labor productivity depends upon how labors are utilized.
- Labor productivity can be higher or lower depending on factors like availability of work load, material, working tools, availability of power, work efficiency, level of motivation, level of training, level of working condition (comfortable or poor) etc.

Factors Affecting Productivity

▶ Factors affecting productivity of labor:

Internal Factors:

1. managers
2. The way of management
3. Coworkers
4. Rules and regulations of the company
5. Working days

Factors Affecting Productivity

► Factors affecting productivity of labor :

a) **Internal Factors:**

1. Working hours
2. Place of carrying out the job (office, factory ,....)
3. Tools
4. Technology
5. Machines

Factors Affecting Productivity

- ▶ Factors affecting productivity of labor :
- a) **Internal Factors:**
 1. **Feeling of interest**
 2. **Motivation**
 3. **Satisfaction (salary , insurance,)**
 4. **Development and training**
 5. **Career vision (upgrading , dedication ,....)**

Factors Affecting Productivity

► Factors affecting labor productivity

External factors

- 1- country rules and economic situation
- 2- traffic
- 3- family
- 4- distance between workplace and house
- 5- weather
- 6- culture
- 7- health care
- 8- population (may affect positive or negative)

Factors Affecting Productivity

► Factors affecting machines productivity:

- 1- technology
- 2- durability
- 3- maintenance
- 4- labor (operator of the machine)
- 5- proper place
- 6- economic situation (spare parts , ...)
- 7- operating hours

