



(CLS1105) Production and Operations Management

Productivity Measurement

The company need the
output to be “High or Low”
in Productivity?



If you say... **“High”**

So,.....



**The company need to measure
the Productivity to see
(it's High or Low)**



Productivity Measurement

Productivity may be measured either on aggregate basis or on individual basis, which are called **total measure (Multiple factors)** and **partial measure (Single factor)**.

❖ Total measure (Multiple factors)

$$\text{Total productivity Index/measure} = \frac{\text{Total output}}{\text{Total input}}$$



Productivity Measurement

(Cont.)

❖ Partial measure (Single factor)

$$\text{Labour productivity Index/Measure} = \frac{\text{Output in unit}}{\text{Man hours worked}}$$

$$\text{Management productivity Index/Measure} = \frac{\text{Output}}{\text{Total cost of management}}$$

$$\text{Machine productivity Index/Measure} = \frac{\text{Total Output}}{\text{Machine hours worked}}$$

$$\text{Machine productivity Index/Measure} = \frac{\text{Total Output}}{\text{Machine hours worked}}$$

$$\text{Land productivity Index/Measure} = \frac{\text{Total Output}}{\text{Area of Land used}}$$

$$\text{Partial Measure} = \frac{\text{Output}}{\text{Labour}} \text{ or } \frac{\text{Output}}{\text{Capital}} \text{ or } \frac{\text{Output}}{\text{Materials}} \text{ or } \frac{\text{Output}}{\text{Energy}}$$



PROBLEMS:

Example-1

The input and output data for an industry given in the table. Find out various productivity measures like total, multifactor and partial measure.

Output and Input production data in dollar (\$) as the following table:

<u>Input</u>	<u>Output</u>
1. Human 3,000	1. Finished units 10,000
2. Material 153	2. Work in progress 2,500
3. Capital 10,000	3. Dividends 1,000
4. Energy 540	4. Bonds -----
5. Other Expenses 1,500	5. Other income -----



Solution:

$$\text{Total measure} = \frac{\text{Total Output}}{\text{Total Input}} = \frac{13,500}{15,193} = 0.89$$

$$\text{Multi factor measure} = \frac{\text{Total Output}}{\text{Human+Material}} = \frac{13,500}{3,153} = 4.28$$

$$\text{Multi factor measure} = \frac{\text{Finished units}}{\text{Human+Material}} = \frac{10,000}{3,153} = 3.17$$

$$\text{Partial Measure1} = \frac{\text{Total Output}}{\text{Energy}} = \frac{13,500}{540} = 25$$

$$\text{Partial Measure2} = \frac{\text{Finished units}}{\text{Energy}} = \frac{10,000}{540} = 18.52$$

Other fields for the measurement of partial measures of productivity are:

Business

- Restaurant
- Retail Store
- Utility plant
- Paper mill

Productivity Measure

Customers (Meals) per labor hour

- Sales per square foot
- Kilowatts per ton of coal
- Tons of paper per cord of wood

Note: For multifactor and partial measures it is not necessary to use total output as numerator. Often, it is described to create measures that represent productivity as it relates to some particular output of interest.

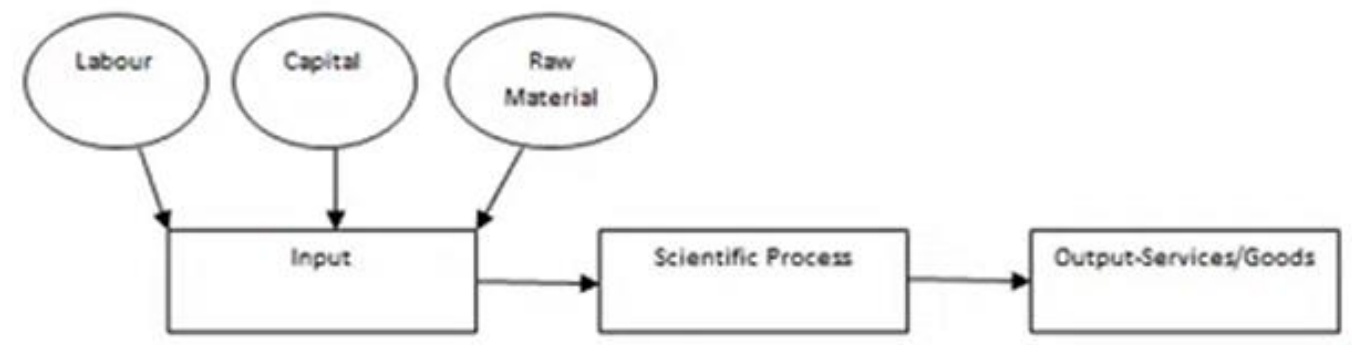


Conclusion



Production & Operations Management

A scientific process which involves transformation of raw material (input) into desired product or service (output) by adding economic value.



Deliver value for customers in products and services

Production through separation



Production by modification or improvement



Production by assembly



Identify the customer needs and convert that into a specific product or service

Do back-ward working to identify raw material requirements

Engage internal and external vendors to create supply chain

Importance of Production Function and Production Management



Production Management Vs Operations Management

- **Output:** Production management deals with manufacturing of products like (computer, car, etc.) while operations management cover both products and services.
- **Usage of Output:** Products like computer/car are utilized over a period of time whereas services need to be consumed immediately
- **Classification of work:** To produce products like computer/car more of capital equipment and less labor are required while services require more labor and lesser capital equipment.
- **Customer Contact:** There is no participation of customer during production whereas for services a constant contact with customer is required.

Citation:

- https://www.vssut.ac.in/lecture_notes/lecture1429900757.pdf
- <https://www.investopedia.com/terms/o/operations-management.asp>
- <https://emeritus.org/in/learn/what-is-operations-management/>



Q&A

THANK YOU