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Operations and Productivity

By

ATEEKH-UR-REHMAN

Part 3 Chapter 1



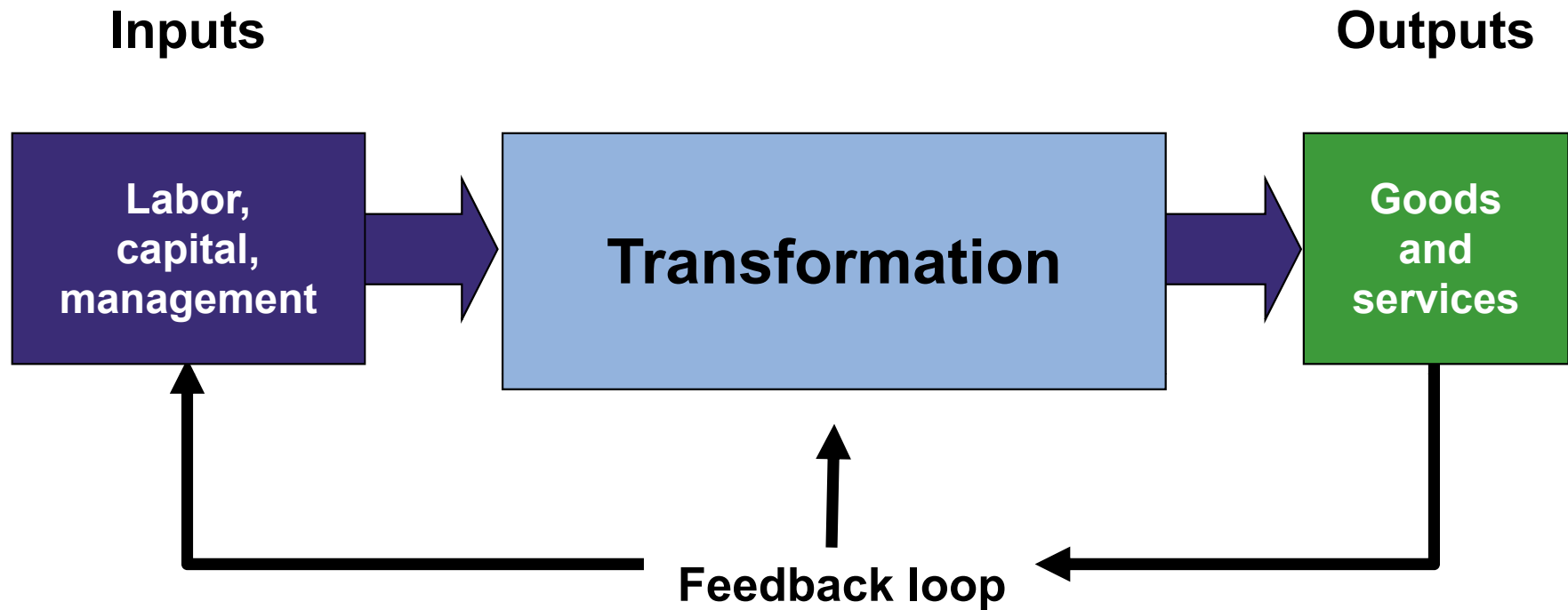
Productivity Challenge

Productivity is the ratio of outputs (goods and services) divided by the inputs (resources such as labor and capital)

The objective is to improve productivity!

Important Note!
Productivity is a measure of output only and not a measure of efficiency

The Economic System



Productivity

$$\text{Productivity} = \frac{\text{Units produced}}{\text{Input used}}$$

- ◆ **Measure of process improvement**
- ◆ **Represents output relative to input**
- ◆ **Only through productivity increases can our standard of living improve**

Productivity Calculations

Labor Productivity

$$\text{Productivity} = \frac{\text{Units produced}}{\text{Labor-hours used}}$$

$$= \frac{1,000}{250} = 4 \text{ units/labor-hour}$$

One resource input ⇒ single-factor productivity

Multi-Factor Productivity

$$\text{Productivity} = \frac{\text{Output}}{\text{Labor} + \text{Material} + \text{Energy} + \text{Capital} + \text{Miscellaneous}}$$

- ◆ Also known as total factor productivity
- ◆ Output and inputs are often expressed in dollars

Multiple resource inputs \Rightarrow multi-factor productivity

Example

- ◆ **Collins Title wants to evaluate its labor and multifactor productivity with new computerized title search system. The company has a staff of four, each working 8 hours per day (for a cost of \$160 per staff per day) and overhead expenses of \$ 400 per day. Collins processes and close on 8 titles each day. The new computerized title search system will allow the processing of 14 titles per day. Although the staff, their work hours, and pay are the same, the overhead expenses are now \$800 per day.**

Collins Title Productivity

Old System:

Staff of 4 works 8 hrs/day

Payroll cost = \$640/day

8 titles/day

Overhead = \$400/day

New System:

14 titles/day

Overhead = \$800/day

$$\text{Old labor productivity} = \frac{8 \text{ titles/day}}{32 \text{ labor-hrs}} = .25 \text{ titles/labor-hr}$$

$$\text{New labor productivity} = \frac{14 \text{ titles/day}}{32 \text{ labor-hrs}} = .4375 \text{ titles/labor-hr}$$

Collins Title Productivity

Old System:

Staff of 4 works 8 hrs/day

Payroll cost = \$640/day

8 titles/day

Overhead = \$400/day

New System:

14 titles/day

Overhead = \$800/day

$$\text{Old multifactor productivity} = \frac{8 \text{ titles/day}}{\$640 + 400} = .0077 \text{ titles/dollar}$$

$$\text{New multifactor productivity} = \frac{14 \text{ titles/day}}{\$640 + 800} = .0097 \text{ titles/dollar}$$

Problems

Example 1: John Lucy makes wooden boxes in which to ship motorcycles, John and his three employees invest a total of 40 hours per day making the 120 boxes. What is their productivity? John and his employees have discussed redesigning the process to improve efficiency. If they can increase the rate to 125 boxes per day. What will be their new productivity? What will be their increase in productivity?

Example 2: Riverside metal works produces cast bronze valves on a 10-person assembly line. On a recent day, 160 valves were produced during 8-hour shift. Calculate the labor productivity of the line.

Example 3

Lori produces “Final care packages” for resale by the sorority. She is currently working a total of 5 hours per day to produce 100 care packages. What is Lori’s productivity? Lori thinks that by redesigning the package she can increase her total productivity to 133 care packages per day. What will be her new productivity? What will be the increase in productivity if Lori makes the changes?