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Productivity and Work Study
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CHAPTER ONE

INTRODUCTION TO

PRODUCTIVITY

AND WORK STUDY

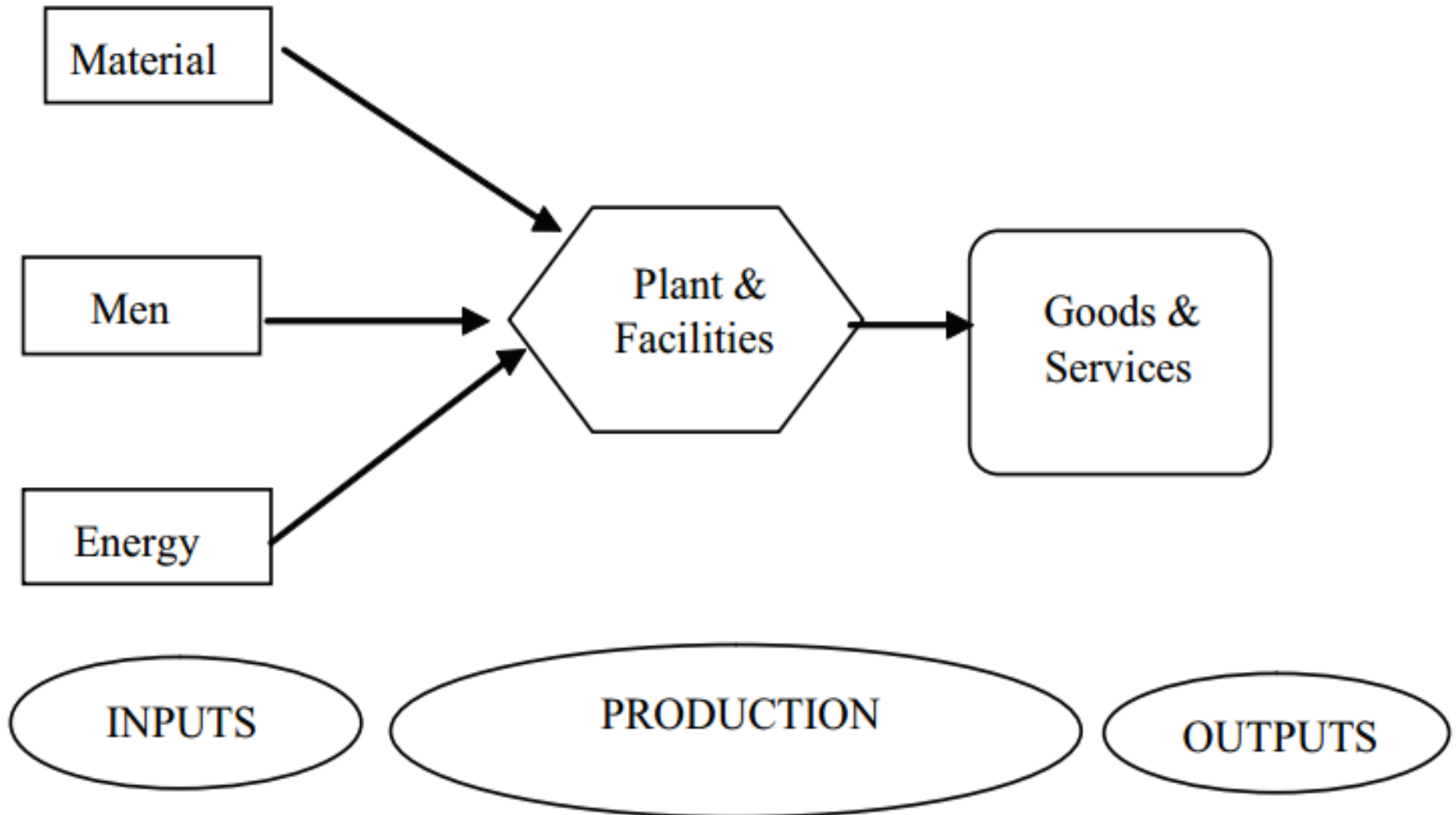
Production

- Production along with marketing, merchandising, operations, and finance is one of the essential functions in apparel manufacturing.
- Production is any progress or procedure developed to transform a set of input elements like men, machinery, capital, information and energy into a set of output elements like finished products and services in proper quality and quantity, thus achieving the objectives of an enterprise (Buffa and Sarin, 2009).
- The essence of production is the creation of goods, may be by the transformation of raw material or by assembling so many small parts.
- Production in everyday life can be noticed in factories, hospitals, offices, etc.
- Production is defined as the process or procedure to transform a set of input into output having the desired utility and quality. Production is a value addition process.

Production System

- A production system is the set of interconnected input–output elements and is made up of three components, namely inputs, processes and outputs.
- Production system is an organized process of conversion of raw materials into useful finished products.
- The production system is a part of a larger system, the business firm, and organization.
- Through the production process, the value of the input (raw material) is added to convert it into value-added output product.
- The concept of production system is applicable to both production of components and production of services as well.
- The production of any component or service can be viewed in terms of a production system.

Figure 1: Production system



Background of Productivity

- The pressure to increase the product volumes while lowering and/or maintaining the production cost helped underline the importance of productivity and the linkage with business planning
- in the early 1800s, the world population had increased rapidly. This increase resulted in the higher demands for the basic goods, fueling the growth in the textile, tobacco, and ship building industries
- the early 1900s, the competition forced the companies to constantly focus on the ability to maintain and/or lower their production cost
- The term productivity became a permanent footprint in an organization during the World War II in which there was a need to increase the volume of war-fighting machines produced under limited resources.
- Key terms and tasks relating to productivity such as work manuals, standardization, interchangeability, workspace, production stoppages, machines' set up, inventory, inbound and outbound, and quantitative analysis emerged
- The efforts on eliminating the wastes such as waiting time, rejects, returns, rework, and work-in process constantly linked to productivity improvement.

Productivity

- Productivity is defined as outputs divided by inputs (Taylor, 1911; and Barnes, 1980).

$$\text{PRODUCTIVITY} = \frac{\text{OUTPUT}}{\text{INPUT}}$$

- The outputs represent products and goods (and later services) generated while the inputs include key resources used for this generation, especially in the immediate factors such as labors, materials, and machines.
- Productivity refers to the efficiency of the production system.
- It is an indicator of how well the factors of production (land, capital, labor and energy) are utilized (Glock and Kunz, 2009).
- When dividing the outputs by the inputs, the implications show how well the inputs (which can be described as the resources) are utilized in order to generate the outputs.
- It may also be defined as human effort to produce more and more with less and less inputs of resources as a result of which the benefits of production may be distributed more equally among maximum number of people.

Continued

- The concept of production and productivity are totally different.
- Production refers to absolute output where as productivity is a relative term where in the output is always expressed in term of inputs.
- Increase in production may or may not be an indicator of increase in productivity.
- If viewed in quantitative terms, production is the quantity of output produced, while productivity is the ratio of the output produced to the input(s) used.
- **PRODUCTIVITY** =
$$\frac{\text{Production}}{\text{Resource Employeed}}$$
- Productivity is said to be increased, when
 1. the production increases without increase in inputs.
 2. the production remains same with decrease in inputs.
 3. the output increases more as compared to input.

Illustration 1.1:

- A company produces 180 kg of single jersey shirts by consuming 240 kg of fabric for a particular period.
- For the next period, the output is doubled 360 kg of shirts produced by consuming 500 kg of fabric.
- For the third period, the output is increased to 450 kg of shirts by consuming 520 kg of fabric .

Solution

- First period

$$\text{Productivity} = \frac{\text{output}}{\text{input}} = \frac{180}{240} = 0.75 = 75\%$$

- Second period

$$\text{Productivity} = \frac{\text{output}}{\text{input}} = \frac{360}{500} = 0.72 = 72\%$$

- Third period

- $\text{Productivity} = \frac{\text{output}}{\text{input}} = \frac{450}{520} = 0.8653 = 86.53\%$

- From the above illustration, it is clear that, for second period, though production has doubled, productivity has decreased from 75% to 72%.
- For the third period, production is increased by 250% and correspondingly productivity increased from 75% to 86.53%.

Benefits from increased productivity

Higher productivity results in higher volume of production and hence increased sales, lower cost and higher profit. It is beneficial to all concerns as stated below:

(a) Benefits to the management:

1. More profit.
2. Higher productivity ensures stability of the organization.
3. Higher productivity and higher volume of sales provide opportunity for expansion of the concern and wide spread market.
4. It provides overall prosperity and reputation of the organization.

(c) Benefits to the consumers:

1. More productivity ensures better quality of product.
2. It also enables reduction in prices.
3. More satisfaction to consumers.

(b) Benefits to workers:

1. Higher wages.
2. More wages permits better standard of living of workers.
3. Better working conditions.
4. Job security and satisfaction.

(d) Benefits to nation:

1. It provides greater national wealth.
2. It increases per capita income.
3. It helps expansion of international market with the help of standardizes and good quality products.
4. It improves standard of living.
5. It helps better utilization of resources of the nation.

RELATIONSHIP BETWEEN INCREASED PRODUCTIVITY AND HIGHER LIVING STANDARDS

- If more is produced at the same cost, or the same amount is produced at less cost, there is a gain to the community as a whole, which may take various forms.
- Higher productivity provides opportunities for raising the general standard of living, including:
 - opportunities for larger supplies both of consumer goods and of capital goods at lower costs and lower prices;
 - Higher real earnings;
 - Improvements in working and living conditions, including shorter hours of work;
 - And in general, a strengthening of the economic foundations of human well-being.

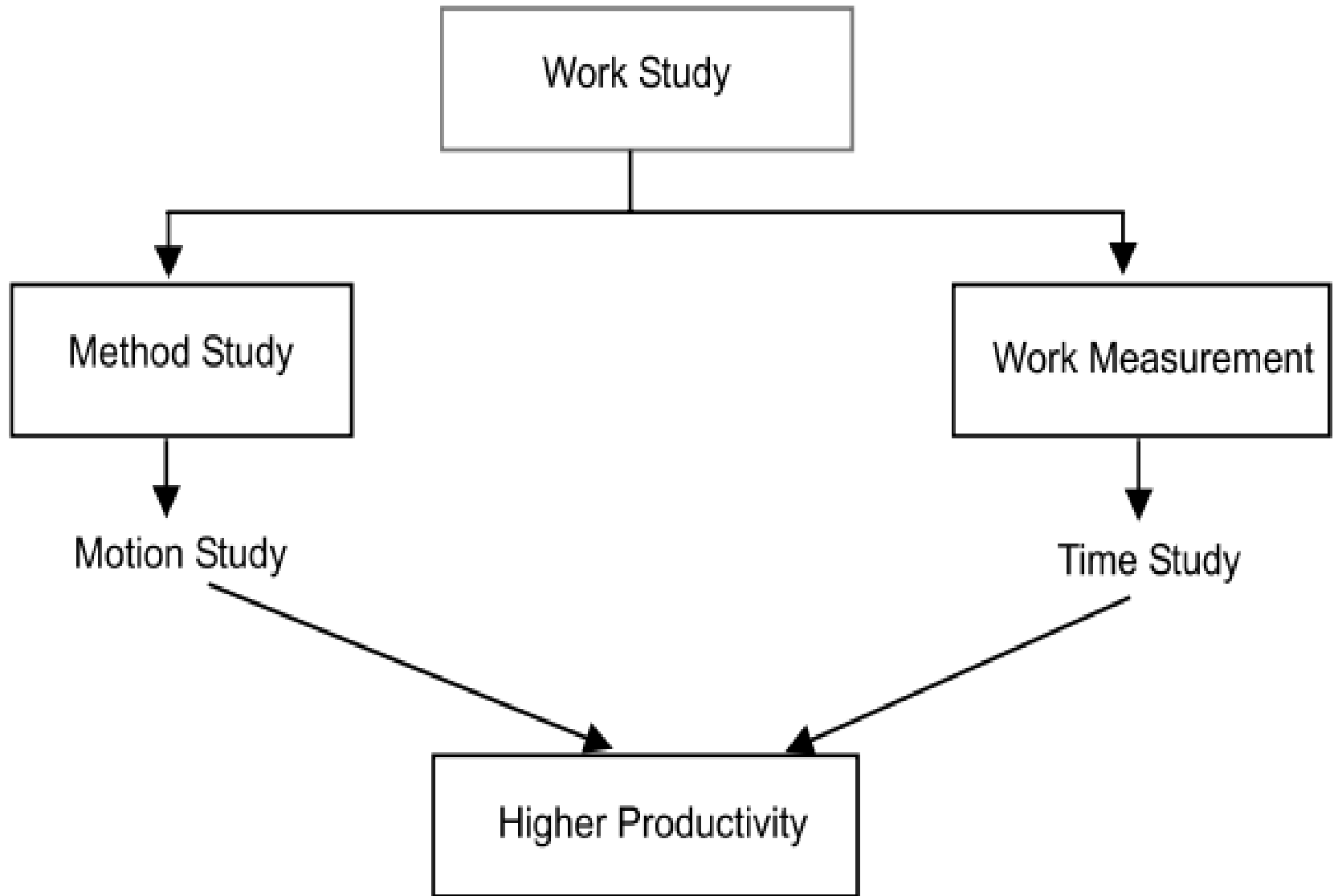
Role of managers

- The vital component of any management system is always a manager (Kurstedt, 1992). Generally, a manager can be anybody regardless of his or her levels of managerial responsibility in an organization.
- Employers and workers also have vital parts to play. The main responsibility for raising productivity in an individual enterprise rests with the management.
- Only the management can carry out a productivity programme in each company.
- Only the management can create good human relations and so obtain the cooperation of the workers which is essential for real success, though this requires the goodwill of the workers too.

Work Study

- “**Work study** is a generic term for those techniques, method study and work measurement which are used in the examination of human work in all its contexts.
- And which lead systematically to the investigation of all the factors which affect the efficiency and economy of the situation being reviewed, in order to effect improvement.”
- Work-study forms the basis for work system design.
- The purpose of work design is to identify the most effective means of achieving necessary functions.
- This work-study aims at improving the existing and proposed ways of doing work and establishing standard times for work performance.

Figure 1: frame work of work study



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- Work-study is encompassed by two techniques, *i.e.*, method study and work measurement.
- *“Method study is the systematic recording and critical examination of existing and proposed ways of doing work, as a means of developing and applying easier and more effective methods and reducing costs.”*
- *“Work measurement is the application of techniques designed to establish the time for a qualified worker to carry out a specified job at a defined level of performance.”*
- There is a close link between method study and work measurement.
- Method study is concerned with the reduction of the work content and establishing the one best way of doing the job.
- Whereas work measurement is concerned with investigation and reduction of any ineffective time associated with the job and establishing time standards for an operation carried out as per the standard method.

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- Work study is a means of enhancing the production efficiency (productivity) of the firm by elimination of waste and unnecessary operations.
- It is a technique to identify non-value adding operations by investigation of all the factors affecting the job.
- It is the only accurate and systematic procedure oriented technique to establish time standards.
- It is going to contribute to the profit as the savings will start immediately and continue throughout the life of the product.

Advantages of work study:

1. It helps to achieve the smooth production flow with minimum interruptions.
2. It helps to reduce the cost of the product by eliminating waste and unnecessary operations.
3. Better worker-management relations.
4. Meets the delivery commitment.
5. Reduction in rejections and scrap and higher utilization of resources of the organization.
6. Helps to achieve better working conditions.
7. Better workplace layout.
8. Improves upon the existing process or methods and helps in standardization and simplification.
9. Helps to establish the standard time for an operation or job which has got application in manpower planning, production planning.