

Module No.1: Introduction to Production and Operations Management

Introduction - Meaning of Production and Operations, differences between Production and Operations Management, Scope of Production Management, Production System. Types of Production, Benefits of Production Management, Responsibility of a Production Manager, Decisions of Production Management. Operations management: Concept and Functions

Introduction:

Meaning of Production and Operations:

Production is the process of combining various inputs, both material (such as metal, wood, glass, or plastics) and immaterial (such as plans, or knowledge) in order to create output.

Operations refer to the activities and tasks that organizations use to produce goods and services. Operations include planning, organizing, directing, coordinating and controlling the various aspects of production, such as procurement, manufacturing, distribution and marketing.

Production and operations management:

Production Management

Production management means applying the principles of management to build an effective outline for production. It involves various tasks like planning, supervising, scheduling and enforcing adequate regulation to maximise output.

Operations Management

Operations management applies the principles of management to manage the everyday activities of a company. Therefore, it guarantees the smooth and effective running of an organisation. It involves planning, designing and supervising production as well as other non-production activities.

Production Vs Operations Management

Here are the major distinction between production vs operations management

Basic for Comparison	Production Management	Operations Management
Definition	It revolves around managing all production activities.	It revolves around the management of complete overall business operations, including production and post-production stages.
Scope of Operation	Scope is limited because it focuses on the design, pricing, quality, and quantity of goods production	Broader scope because operations management revolves around routine business activities like workforce management, inventory management, and more

Objective	Ensures that the right quality of products are produced at the right time	Focused on leveraging organizational resources in the most effective way to meet customer requirements
Area of Decision-Making	Relevant specifically for different aspects of production	Relevant for daily business operations in any organization
Capital Requirement	Revolves around high capital requirement initially	Less capital requirements.
Skills Required	Technical skills, IT skills, project management skills, communication skills, and confidence	Leadership skills, data entry and processing skills, decision-making skills, conflict management skills, and organizational skills
Challenges	Meeting deadlines without compromising quality is a major challenge for production managers	Development of technology and innovative business models pose new challenges to operations managers
Advantages	Delivering high quality products on time at low costs	Utilization of resources to improve regular business operations and improving business reputation
Prevalence	Applicable only in organizations where products are manufactured	Applicable in all types of organizations like banks, hospitals, and more

Scope of Production Management:

The scope of production management applies to directing, controlling, planning, and organizing production operations. This is the process that helps encourage raw material conversion into finished goods. The notion of production management includes a large chain. Production starts with input and ends with output, which is the finished good. The following is a list of the scope of production management ranges.

Production Management

Production Management is a vast concept it involves a huge chain. Production starts with input and ends with output i.e finished product. Following is the scope of production management

1. Location of Facilities

The selection of location is a key decision as a large investment is made in building, land, and machinery.

2. Plant Layout & material handling

Plant layout refers to the physical arrangement of facilities. Material handling refers to the moving of material from the storeroom to the machine & from one machine to the next during the process of manufacturing.

3. Product Design

Product design deals with the conversion of ideas about the product into the reality

4. Process Design

It is the decision-making on the overall process route for converting the raw material into the finished goods

5. Production Planning & Controlling (P.P.C)

P.P . C can be defined as the process of planning the production in advance, setting the exact route of each item, fixing the starting & finishing dates for each item to give production orders to shops & to follow up on the progress of products according to the orders.

6. Quality Control

Quality control may be defined as a system that is used to maintain a desired level of quality in a product & service.

7. Material Handling

Material management is that aspect of management function that is primarily concerned with the acquisition control & use of the needed material.

8. Maintenance Management

Maintenance deals with taking care of factory layout, and types of machinery. This is essential for equipment & machinery which are a very important part of the total production process.

Production System:

A production system transforms input to output. Meaning, it's the systems that manufacture a product consisting of whatever components is needed to make it a reality.

There are usually five types of ways of transforming input into output:

- **Separating** – One item enters and two or more exit. Example: A wooden plank is cut into two.
- **Putting together** – Several items enter and one exits. Example: Wooden planks that are glued together.
- **Detaching** – And item enters and exits shaped differently, alongside waste. Example: A block of wood is shaped with a lathe.
- **Forming** – An item enters and exits in a different shape, without waste. Example: A piece of metal is shaped by hammering the object.
- **Quality adaptation** – An item enters and exits with different characteristics. Example: Surface treatment of a metal object.

Types of production systems :

There are three common types of basic production systems: the batch system, the continuous system, and the project system.

- 1. Batch system:** In the batch system, general-purpose equipment and methods are used to produce small quantities of output (goods or services) with specifications that vary greatly from one batch to the next. A given quantity of a product is moved as a batch through one or more steps, and the total volume emerges simultaneously at the end of the production cycle. Examples include systems for producing specialized machine tools or heavy-duty construction equipment, specialty chemicals, and processed food products, or, in the service sector, the system for processing claims in a large insurance company. Batch production systems are often referred to as job shops.
- 2. Production system:** In the continuous system, items to be processed flow through a series of steps, or operations, that are common to most other products being processed. Since large volumes of throughput are expected, specially designed equipment and methods are often used so that lower production costs can be achieved. Frequently the tasks handled by workers are divided into relatively small segments that can be quickly mastered and efficiently performed. Examples include systems for assembling automobile engines and automobiles themselves, as well as other consumer products such as televisions, washing machines, and personal computers.
- 3. Project system:** The third type of production system is the project, or “one-shot” system. For a single, one-of-a-kind product, for example, a building, a ship, or the prototype of a product such as an airplane or a large computer, resources are brought together only once. Because of the singular nature of project systems, special methods of management have been developed to contain the costs of production within reasonable levels.

Types of production:

The methods of production can be classified into many types depending on the company's product and the organization's needs. The five types of production are:

- Mass production,
 - Batch production,
 - Job production,
 - Service production, and
 - Customised production.
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- **Mass Production**

Mass production means there is continuous production and all employees work continuously to produce the same items at the same time. In this kind of production, the forms and size of the products remain the same and every employee focuses on the same product. All resources are utilized to produce the same range. To make production more efficient and effective, multiple tasks may be carried out at once to get quick results.

If one company is producing only white bread on a huge level, all employees will focus on the white bread packets only. In this process, most employees will be working towards white bread making: preparing the dough, baking, etc. Others will be working on packing the produced loaves of white bread at the same time, to generate the loaves of white bread quickly and efficiently at once.

- **Batch Production**

Batch production is similar to mass production. However, the products may be produced in batches. This means that the production may be divided based on product size, colour, form, etc. We can understand this with the example of T-shirt production. The T-shirt manufacturing company may opt for batch manufacturing, as they would want to manufacture in different sizes from small, medium and large, and also in different colours, say red, blue, green, and yellow. Hence, the team may be divided for every batch on the basis of production of the respective size and colour.

- **Job Production**

Job production means the products are produced in a limited quantity and may be specific to customer preferences. Job production is small-scale, and the task of producing an item or product is completed before taking up other jobs.

- **Service Production**

This method of production involves rendering services via an automated process, such as technical support for customers.

One example in current business in terms of service production is delivery services. Consumers now have the benefit of ordering goods and services from the comfort of their own homes and receiving them directly at their doorstep due to the sheer amount and scope of delivery services available.

- **Production**

Customized production is a process in which goods and services are produced on the basis of the customer's needs. This can be divided into 2 categories:

- a. Craft Production*

This category of customised production involves a personal touch based on the specific customer's demand. One of the classic examples of this is designer clothes. Say one dress is specifically designed for a celebrity for a particular award show, on-demand, with a choice of colour and pattern, and customised to the event's theme.

- b. Mass-customised Production*

Mass-customised production is similar to craft production. However, the customised selection is produced in mass quantity. The customisation may be on the basis of shape, colour, pattern, product material, etc.

For example, Coca-Cola may have custom 500ml bottles in glass produced in larger quantities according to need.

Benefits of Production Management:

The success of production management is linked with proper forecasting, production planning and control. Scientific planning of production function will result in enhanced productivity. Increase in productivity will benefit all parties connected with business.

1. Advantages to consumers:

A well planned production function will lead to good quality products, higher rate of production and lower cost per unit. The consumers will be benefitted from prices of goods and will get good quality products. The availability of goods will also be satisfactory and the consumers will be saved from a lot of botheration which may otherwise be caused by scarcity of products.

2. Advantages to Investors:

An enhancement in productivity will increase profitability of the business. The investors will get higher returns on investment if profitability is better. This will also result in appreciation of assets values and ultimately the prices of shares will go up which will also benefit investors.

3. Advantages to employees:

Higher productivity will benefit employees in the form of better remuneration, stability in employment, good working conditions, etc. Better productivity to a worker will give him job satisfaction and improve his morale.

4. Advantages to suppliers:

Every enterprise depends upon supplies of raw materials, finished goods, spare parts etc. The suppliers will always like to deal with a concern having sound financial position. The company and its suppliers will have an enduring relationship only if both are satisfied with each other's dealings.

5. Advantages to the community:

The economic and social stability of a community is linked with growth and development of its industrial structure. An overall improvement in productivity will improve economic welfare of the society.

6. Advantages to the nation:

The advantages of various segments of society improve welfare of a nation. Better production management will result in proper and economical use of natural resources and elimination of wastages. An improved industrial climate will bring all round development and prosperity.

Responsibility of a Production Manager:

Some of the major responsibilities of a production manager are: (1) Production planning (2) Production control (3) Quality control (4) Method analysis (5) Inventory control (6) Plant layout (7) Work measurement and (8) Other functions:

(1) Production planning:

Production planning is the first function performed by the production manager.

Production planning is concerned with thinking in advance what is to be produced, how it is to be produced and by what time should it be produced. It is concerned with deciding about the production targets to be achieved by keeping in view the sales forecasts.

(2) Production control:

Production planning cannot be properly achieved without an effective system of production control. It is in fact concerned with successful implementation of production planning. It aims at completing production well in time and also with lesser costs. A proper system of production control ensures continuous production, lesser work-in-progress and minimisation of wastages.

(3) Quality control:

The production manager is also concerned with maintaining required quality of the product. Quality control is concerned with controlling the negative variables which affect the ultimate quality of a product. It is concerned with use of all the ways and means where by quality standards could be maintained.

(4) Method analysis:

There are many alternative methods for manufacturing a product. Some methods are more economical than others. The production manager should study all the methods in detail by analysing them in detail and select the best alternative out of them. The process of selecting the best alternative is known as methods of analysis.

Methods of analysis are considerably helpful in minimising the cost of production and improving productivity of the concern.

(5) Inventory control:

The next important function to be carried by a production manager is to exercise proper control over the inventory. He should determine economic order size, maximum, minimum, average and danger levels of materials so that problems of overstocking and understocking do not arise. This also helps in minimising wastages of materials.

(6) Plant layout:

Plant layout is primarily concerned with the internal set up of an enterprise in a proper manner. It is related to orderly and proper arrangement and use of available resources viz., men, money, machines, materials and methods of production inside the factory. In other words it is concerned with maximum and effective utilisation of available resources at minimum operating costs.

(7) Work measurement:

Work measurement methods are concerned with measuring the level of performance of work by a worker. Time and motion studies techniques can be used for work measurement. If a worker works below the level fixed by work-measurement techniques, his performance must be improved through positive or negative incentives.

(8) Other functions:

Apart from the above-mentioned functions, the production Department also carries certain other functions viz., cost control, standardization and storage, price analysis and provision of wage incentives to workers etc.

Decisions of Production Management:

Major Decision Areas of Production management A number of decision areas in an organization are touched by production management. These decision areas can be classified under three heads:

- 1.Strategic Decisions
- 2.Tactical Decisions
- 3.Operational Decisions

1.Strategic Decisions:These are the decisions which are taken by the top level of management. Some of such decisions are as under: a)Distribution System Decisions b)Plant Layout Decisions c)Mergers and Acquisitions d)Research and Development Decisions e)Compensation Planning Decisions f)Decisions Regarding Commissioning of New Plant g)Warehousing Location Decisions h)New Product planning i)Quality Decisions j)Dropping Product from Product Mix k)Social Responsibility Planning Decisions, etc.

2.Tactical Decisions:These decisions are initiated by middle level management. Some of these decisions are:

a)Project Scheduling Decisions b)Preventive Maintenance Decisions c)Designing Reward System d)Make or Buy Decisions e)Equipment Decisions f)Pricing of the Product g)Budget Analysis h)Product Improvement i)Evaluating Credit of Buyers j)Short-term Forecasting, etc.

3.Operational Decisions:These are the decisions taken by the bottom level of management and are much related to managing production. Some of these decisions are: a)Production Scheduling Decisions b)Machine Loading Decisions c)Designing sample plans at the time of receiving raw material. d)Daily Operator Scheduling e)Maintenance Scheduling f)Deciding Incentives of Salesman g)Order Entry Decisions, etc.

Operations Management – concept and Functions:

In a manufacturing organization, the ‘operations’ component is responsible for the transformation of raw materials into finished goods. Operations management can then be defined by the management of all processes related to the production of items.

Within the process, operations management makes use of various tools and strategies to increase production output and ensure that customer orders are completed on time.

Key Functions within Operations Management

Some of the key functions of operations management include:

- **Finance** - In any manufacturing organization, finance plays a crucial role in ensuring that financial resources are properly allocated and utilized to their full extent. Finance in operations management helps create a budget that will allow the organization to meet its production goals and can help evaluate various investment opportunities to make the best decision.
- **Strategy** - Strategic management is the planning, monitoring, analysis, and assessment of tall aspects of an organization on a continuing basis. Attention to these elements ensures that a strategy is developed and then implemented in the manufacturing facility. The benefits of

strategic management will help manufacturing organizations make better decisions regarding production planning and scheduling, keep customers happy and allow the facility to meet its overall goals.

- **Operation** - This function of operations management is concerned with planning, organizing, directing, and overall control of all activities within the organization. This is the primary function of operations management and will effectively aid in converting raw materials and human efforts into a durable good and service that consumers will be able to utilize. Operations within production must be scheduled in a way that minimizes the amount of setup required and maximizes the utilization of resource capacity.
- **Product Design** - With new technology becoming available, the selling of a product becomes much more simple. One of the main duties of operations management is to ensure that a product is designed properly and caters to market trends and satisfies the needs of consumers. In addition, introducing new product designs can be challenging due to the existing product mix and available resources. Those are important factors to consider when looking to introduce new items.
- **Forecasting** - Demand forecasting is the process of predicting what the demand for certain products will be in the future. It identifies what both current and future customers will want to buy and tells manufacturing facilities what they should actually produce. Ideally, manufacturing companies want to be able to accurately predict customer demands so that they can produce the right amount of products. Producing too few items leads to stock shortages and can negatively impact customer relationships. On the other hand, having too much inventory is costly and can lead to having excess stock if the items become obsolete
- **Quality Control** - In addition to the product design function, operations managers should strive to produce the best quality product possible. Modern-day consumers are concerned about quality instead of quantity, which is why it is so crucial to develop a durable and top-notch quality product. This is especially important when evaluating the existing processes as improving production processes should not be at the expense of quality.