UNIT 1 AN OVERVIEW TO THE PRODUCTION MANAGEMENT

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1.1 INTRODUCTION

A company can add substantial value to it by improving its competitiveness and long-term profitability. This can be done with better management of the production. The quest to ensure competitiveness and profitability are abundant and mandatory in almost every industrial sector, be it a computer manufacturing company, automobile company or even call centres. For example, a computer manufacturing company constructing its multi-billion rupee fabrication plant to produce its ultra-advanced computer chips would like to locate its plant at the most advantageous site. A call centre company who wants to efficiently utilize the call answering staff to avoid long waits and improving the forecast accuracy would like to take steps to forecast the number of calls received during each work shift.

These situations are some examples of production management decisions. All in all, production management decisions should be taken effectively and efficiently lest it may hurt a company's competitive position and increase its production costs. Good production management decisions can improve profitability and growth. So, understanding the basic concepts of production management is a key to better production management.

Objectives

After studying this unit, you should be able to

- understand production strategy,
- learn development phases of production management,
- explain elements of production strategy, and
- describe the importance of forecasting in production management.

1.2 PRODUCTION AND THE FUNCTIONAL UNITS OF A FIRM

There are three primary functions in any business company viz. production, marketing, and finance. The primary concern of production managers is to manage the activities of this conversion process or production. More than a half of all workers in a company are directly involved in the production function of the organization, and over three-fourths of a typical organization's material equipment costs are incurred by the production function. Marketing managers is concerned with the creation of demand for an organization's product or services. Finance managers have the task of achieving the financial objectives of the firm. As illustrated in Figure 1.1, the three primary functions are not independent; in fact, there is a considerable interaction among them. The demand for products drives the production function. Accounting and financial policies influence production decisions, and the production functions directly affect the future product demand and availability of financial resources. In addition, most organisations have additional supporting functions as well. For example, many organisations have an information systems communication that has the task to gather, organize and distribute information to the other functional units. The research and development and engineering functions to provide technical support in the design of both the products and the production processes that make the products. The human resource function is concerned with the training, selection, and compensation of personnel.

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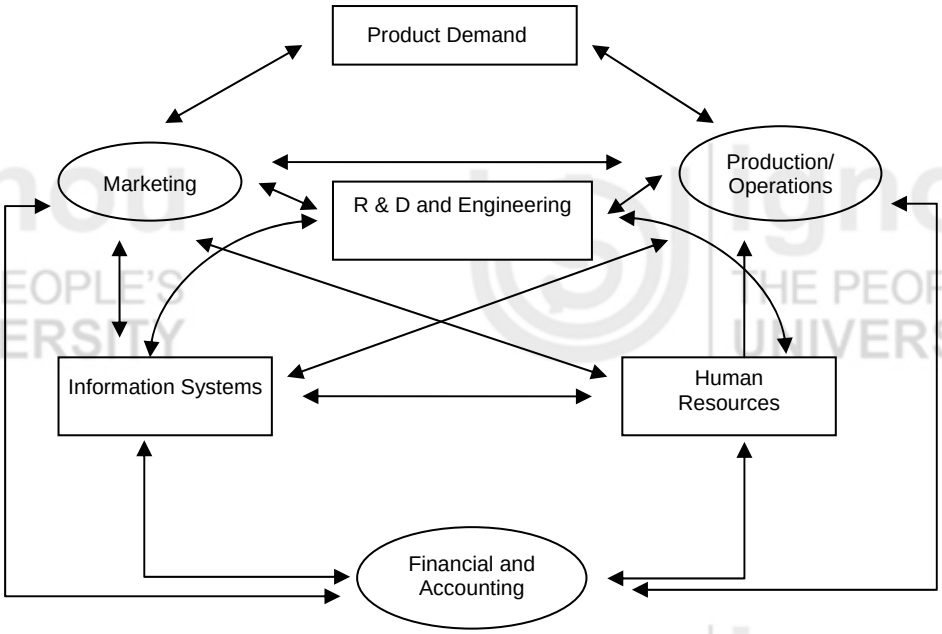

Figure 1.1 : Functional Divisions of an Organization

SAQ 1

(a) What are the functional divisions of an organization?

(b) Describe the primary functions in any business company.

1.3 PRODUCTION MANAGEMENT

Production management is the management of an organization's production systems, which converts inputs into the product and services. A production system takes inputs which include material, personnel, machines, building, technology, cash money,

information and other resources whereas the outputs include the product and services. Thus, production management is the study (practices) of planning, designing, and production systems and subsystems to achieve the goals of an organization. Some of the key features of production management are as follows.

(a) Production management deals with the number of processes. Therefore, a single person cannot perform the function of production management. Production management includes a number of personnel such as supervisors, materials managers, and store managers or anyone who manage personnel, equipment, or materials.

(b) The management term in broad interpretation includes design of the system and performance of all the activities mandatory to operate the system, that encompasses the directions to personnel and acquiring material and equipment.

(c) The term highlights the fact that to manage the production of the organisation's final products, there are many subsystems as parts of the production system. For example, the cost accounting department in an auto manufacturer is part of the production system.

(d) Goal of production management is to minimise costs, for most organizations. It also helps to improve efficiency and productivity of production system. The most of organisations are to earn a steady stream of profits and to maintain long term demand for their products so as to stay in market. The decisions made by production managers influence revenue component of the profit equation as well as the cost, and they affect the long term demand for the organizations products.

1.3.1 The Production Strategy : Reaching the Goals

Nearly two decades ago productivity was the catch word of the business organizations. Concerned about the term productivity, several conferences, research centers, seminars were organized. Consequently, many definitions of productivity have been proposed but all dealing with the efficient use of resources, and thereby reducing the cost of production. But focusing excessively on the cost reduction can result in poorer decisions which are contrary to the goals of the organizations. So, there is a quest to that the operations (production) decisions should be taken in such a way that to achieve broader goals of organizations, such as profitability and growth or for not-for-profit organisations, better public service.

The strategy of an organization reflects its mission and defines its goals, policies, and performance measures precisely. It describes the products produced, ways to compete for customers, and the measures for the performance. It also identifies the centre of the concentration of all the efforts and the competitive advantages the organization will exploit. Each functional unit has its own strategies designed to support the organizations strategy and to enhance the ability of the organization to achieve its goals. Initially, the business strategies were viewed solely in terms of marketing, i.e. deciding about the products to produce and the market to serve. The production function was considered to impact the strategy minimally and producing and delivering to the market via function at a minimal cost. Only recently, production function has received much attention in strategic phase that decisions about production can enhance organization's ability to compete for customers with respect to price, quality, responsiveness and reliability of the delivery, product customization, and flexibility. Good production or operation performance is not sufficient to boost an organization, if the production or operational strategy is not consistent with the organization's strategy. An example, supporting this fact can be a company marketing a product based on quick delivery and product customization may not sell its product if the production function is focusing on product standardization and low cost.

1.3.2 Challenges Faced by Production Managers

The challenges faced by a production manager are various which are listed in Table 1.1. Not every manager has to face all of these challenges but at least one comes in the course of each manager. These challenges can be divided into two types, one primarily involving designing of production systems or subsystems and the other one involving scheduling, operating and controlling the system.

Table 1.1 : Challenges Faced by Production Manager

Design and Planning	Operation and Control
Product design	Aggregate/intermediate-term planning
Capacity planning	Materials management and inventory control
Process design and choice of technologies	Maintenance
Facility location	Scheduling personnel, equipment, jobs
Facility design and layout	Distribution and logistics
Job design and work organization	
Product quality assurance	

Some of the areas of challenges for the production managers are discussed briefly below.

Product Design

Product design itself lies at the heart of all the production decisions. The design characteristics of the product will affect the way of production system so the products should be designed carefully and operated in proper sequence. For example, the materials used in a product will affect the type of machining performed, adjusting of production equipment, assembling of product by the employees, etc. Considerations of production implications at the time of designing enable a firm to produce a higher quality product at a lower cost.

Capacity Planning and Process Design

How to produce and how much to produce are two fundamental aspects of process design. The process design is not only confined to production design but it also supports the marketing strategy of the organization as well. The desired production capacity is closely related to the production method. Capacity decisions such as how many televisions a new factory should produce every year, how many floor a store should have, etc. have great strategic importance. Moreover, some capacity decisions can be tactical such as how many employees to have for a particular task.

Facility Location and Layout

Spatial aspects of many production management problems cannot be understood. The decisions to locate buildings, factories, etc., determine the overall cost to make the products and ease of service to the customers. Internal design of facilities is concerned with the determination of layout of complete manufacturing systems which includes display location of products in retail store, arrangement of items in warehouse, location of labs in a college campus, etc.

Job Design and Work Organisation

The number and skill of the personnel required depend upon the choice of the production process. So design of jobs, development and use of work standards, organization of work and role of personnel in producing high quality products should be well tackled by the production managers. The advantages and disadvantages for having jobs with small number of well defined tasks than with many tasks. Therefore, tradeoffs must be reached.

Product Quality

The tackling of product quality influences both the design and operation of the production system. Factors affecting the final quality of the product include the type of equipments used, maintenance techniques of these equipments, training of employees, evaluation techniques for the product, etc.

Aggregate and Intermediate Term Planning (Coordination between Production Resources and Demand)

Planning for intermediate term enables a manager to execute the short term production operations. These intermediate-term plans coordinate personnel decisions such as hiring, training, layoffs and overtime, with production scheduling and inventory decisions. Therefore, ultimately match the production resources with anticipated product demand.

Management of Materials and Inventories

Not only scheduling operations and personnel but also inventory and materials management require a lot of energy from the production managers. Today, there is a quest to just in time production principle, in which materials are acquired or produced "just in time" for use at the next production stage. This principle uses scheduling and lot-sizing procedures in order to keep inventories to a minimum without harming the efficiency of the production process or reducing customer service. These principles include some features also such as improved work methods, quality assurance methods and they have produced many other benefits.

Scheduling Personnel, Equipment and Work

Scheduling of personnel, machines, production jobs, and production belong the list of never ending task. For example, a company has to shift its sales department to larger building. Then, existing building has to be vacated before some deadline and decisions about tasks, ordering of new phone lines and computers, personnel and starting time of each of the tasks, has to be taken without interrupting the current sales. In essence, a manager must make tradeoffs among cost, customer service, and quality in taking such decisions.

1.3.3 Importance of Skills and Knowledge for a Production Manager

Production management lays emphasis on the process design, planning and operating production systems. In addition to be familiar and sensitive to the characteristics of the employees, production manager should also have

(a) Knowledge of production process.

(b) Knowledge and acquaintance with production management principles.

(c) Knowledge of decision making tools.

Knowledge of Production Processes

Decision made by one manager of a department often affects functioning of other departments. So, in order to identify and solve production problems, a manager needs to have knowledge of entire production systems. Moreover, knowledge of product manufacturing methods and information about the existence of the bottlenecks in the production systems help in supporting secondary functions of the organization such as accounting, information systems, etc.

Production Principles

Over the time, analysis and experience have enabled production manager to develop a number of principles to solve the problems of production management. So, a good manager must be familiar with production principles.

Analytical Tools

Several analytical tools have been developed for specific production problems, such as statistical process control, learning curves, and scheduling heuristics. Five categories of decision making techniques viz. forecasting methods, queuing analysis, optimisation models and linear programming, decision analysis, simulation are widely applied to business and engineering. Some examples of these tools are depicted in Table 1.2.

Table 1.2 : Analytical Tools Used in Production Management

Tools		Examples of Applications
Qualitative methods		Predicting product demand
		Predicting credit card payments
		Predicting material prices
Optimization models	Linear programming	Scheduling production
		Scheduling personnel
		Formulating products
	Integer programming	Locating facilities
		Layouts
		Scheduling machines
	Heuristics	Scheduling jobs
		Designing facilities
		Designing production processes
Queuing analysis		Planning capacity
		Configuring and designing processes
Decision analysis		Panning capacity
		Locating facility
		Selecting new products
Simulation		Designing facilities and processes
		Scheduling operations
		Managing inventories

SAQ 2

(a) Describe features of production management.

(b) What are the skills required by a production management?

(c) Illustrate the challenges faced by a production management.

(d) Write the various tools used in production management.

1.4 HISTORY OF PRODUCTION MANAGEMENT

History of production management can be divided into six parts, viz. the industrial revolution, the post-civil war period, scientific management, human relations behavioralism, operations research, and the service revolution.

The Industrial Revolution

The existence of production systems can be thought to be very old. Be it Egyptian pyramids, Greek Parthenon, the Great Wall of China, they all are the outcomes of the processes of industries and hence the production systems of ancient times. Before 1700s, these production systems were known as cottage systems. Industrial revolution that took place in England in 1700s is concerned with the series of developments involving two principal elements viz. the substitution of machine power for human and water power and establishments of factory systems. In 1774, James Watt invented the steam engine providing machine power to these factories. Later in 1776, Adam Smith published "The Wealth of Nations" and proposed the economic benefits of specializations of labour thereby breaking the production into small specialized tasks. In 1970, Eli Whitney, an American inventor developed the concept of interchangeable parts. The cottage industry was replaced by factory system fully only by the middle 1800s.

Post-Civil War Period

A new industrial era for America was emerged in the earlier part of the twentieth century. The post Civil War period set the platform for the great expansion of production capacity in the new century. Joint stock companies came into existence by the end of Civil War bringing the modern forms of capital investment. This led to the separation of capitalist from the employer, with managers becoming the salaried employees of the financiers who owned the capital. During post-Civil period, J. P. Morgan, Jay Gould, Cornelius Vanderbilt, and others built industrial empires. This period resulted in the extension of railway lines and development of new territory.

By 1900 all of these developments increased capital and production capacity, the expanded urban workforce, new western markets, and an effective national transportation system, resulted in the production explosion of the early twentieth century.

Scientific Management

Frederick Winslow Taylor is known as the father of scientific management. He studied the factory problems of his day scientifically and popularized the notion of efficiency, i.e. to get the desired result with the least waste of time, effort, and materials. At Midvale Steel, his scientific investigations led to the improvements in worker efficiency that resulted in great savings in labour cost. He proposed a *shop system*, which has the following steps :

(a) Determination of skill, strength and learning ability for each worker to employ them to suitable job.

(b) Stopwatch studies, to set standard output per worker on each task, to use for planning and scheduling work and for comparing different methods for performing tasks.

(c) Use of instruction cards, routing sequences, and materials specifications to coordinate and organize the shop so that work method and work flow could be standardized and labour output standards could be met.

(d) Improvement of supervision through selection and training.

(e) Initiation of incentive-pay systems to increase efficiency and to relieve foreman of the traditional responsibility.

Scientific management's force is more on the lower level and less on the higher level of the organization's hierarchy which includes the shop floor, workers, foreman, superintendents and lower middle management, taken in order. The concentration of scientific management was on the shop level, which was site for the most of management problems. Later detailed focus on production raised the need for mass production and efficiency which was met by scientific management.

Human Relations and Behaviouralism

Between the World War 1 and World War 2, it was realized that workers are human beings and their dignity must be maintained while on the job. The *human relations movement* which began in the 1927-1932 was accompanied by Hawthorne Studies by Elton Mayo, F. J. Roethlisberger, T. N. Whitehead, and W. J. Dickson to determine the optimum level of lighting to get the most production from workers. Later on research into the behaviour of workers in their job environments got support from Chester Barnard, Abraham Maslow, Frederick Herzberg, Douglas McGregor, and others brought change in the handling and treatment of workers by the managers.

Operations Research

During and after the World War 2, the organizations faced many complex management decision problems such as enormous manpower, supplies, ships, and other resources management. So, operations research teams were formed in military which were later appreciated by almost all the organizations. As a result total systems approach, complex mathematical techniques evolved to aid these researches. These researches have been introduced and proliferated into the curricula of colleges and universities. Later on, several quantitative and other techniques such as linear programming, PERT/CPM and forecasting models were adopted. Operations research provided the organization, optimal or best, alternatives in various cases through analysis**.**

The Service Revolution

Service organizations grew and expanded after World War 2 which resulted in huge trade surplus in services and investment per office worker exceeded the factory worker. This service revolution affected production management enormously. Some of key process or techniques that affected the production management are as follows :

- Robotics and numerical control
- Computer-assisted design
- Statistical process control for quality
- Lean manufacturing (just in time)
- Benchmarking
- ISO standards
- Time based competition
- Process reengineering
- Outsourcing
- Supply chain management
- "virtual" organization.

SAQ 3

(a) Write contributions made by F. W. Taylor?

(b) Describe the importance of operations research in production management.

1.5 PRODUCTION STRATEGY

Business strategy is a long range game plan of an organization, providing a road map to the achievement of the corporate mission which is set of unique long range goals.

Assessment of global business conditions and weaknesses of company's business units lead to the development of the business strategy. Production strategies are derived from corporate mission and business as illustrated in Figure 1.2.

Distinctive competencies or weaknesses means great competitive advantages or disadvantages in capturing market, which may include automated production technology, skilled workforce, talented sales force, etc.

Production strategy refers to a long range game plan for the company's production and provides a road map to the achievement of business strategy. Production strategy includes the issues of new product development, new production facilities and new production technology. The scope of production strategy can be well grasped by understanding the competitive priorities which are summarized in Table 1.3. The combination of these priorities, appropriate for each product or service are determined by the business strategy. Setting of these priorities is followed by the determination of required production system to provide these priorities for the product or service.

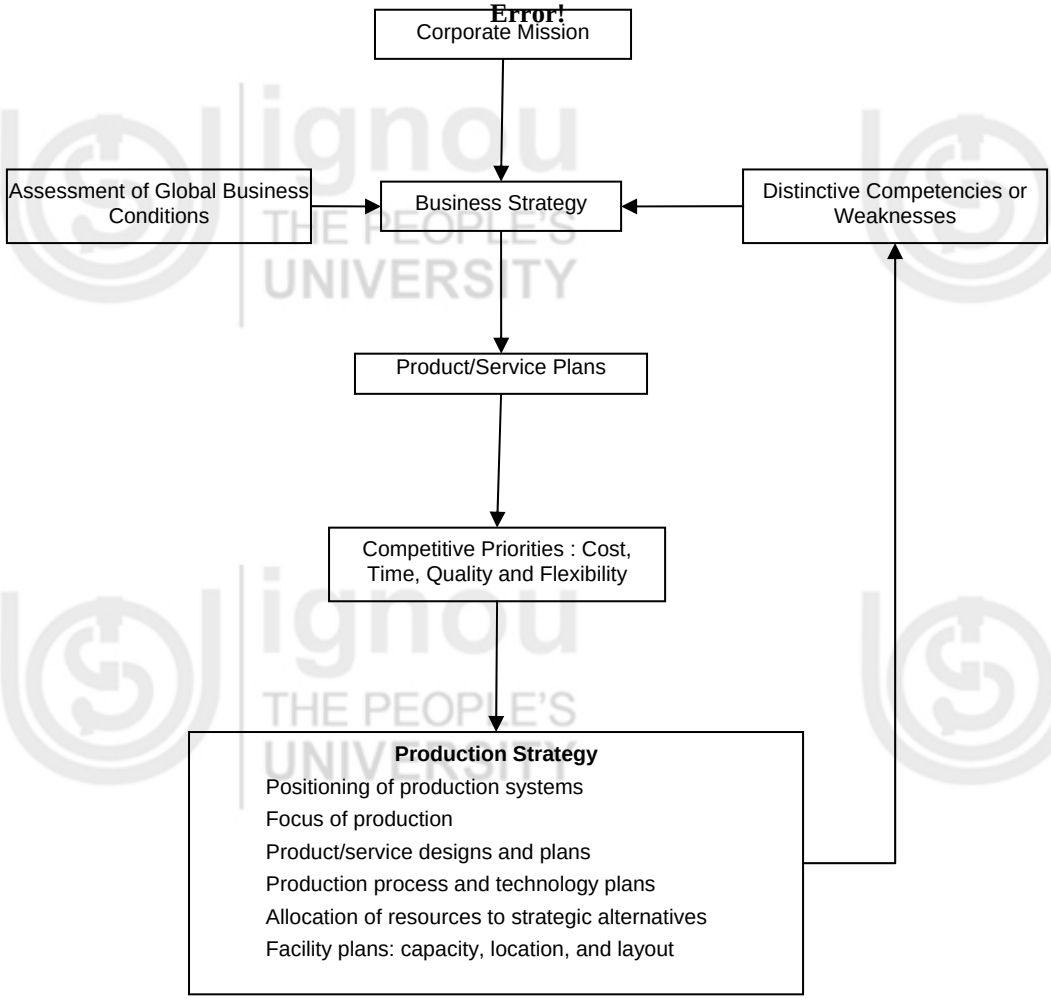

Figure 1.2 : Development of Production Strategy

Table 1.3 : **Competitive Priorities**

Competitive Priority	Definition	Creation
Low production costs	Unit costs of each product, including, labour, material and overhead costs	Redesign of products
		New production technology
		Reduction of inventories
Delivery performance	Fast delivery	Larger finished good inventories
		Faster production rates
		Quicker shipping methods
	On time delivery	More realistic promises
		Better control of production of orders
		Better information systems
High quality products	Customers' perceptions of degree of excellence exhibited by products/services	Improve malfunction or defect rates
		Improve performance and function
		Improve after-sales service
Customer service and flexibility	Ability to quickly change production to order products/services and other production volumes, customer responsiveness	Use of CAD/CAM
		Reduction of work through JIT
		Increase in production capacity

1.5.1 Elements of Production Strategy

Production strategy can be discussed under following subdivisions :

(a) Positioning of production systems
(b) Focus of production
(c) Product/service designs and plans
(d) Production process and technology plans
(e) Allocation of resources to strategic alternatives
(f) Facility plans : capacity, location, and layout

Positioning of Production Systems

Positioning of production system involves the selection of the type of product design, type of production processing system, and type of finished-goods inventory policy for each product group in the business strategy.

Product design is basically two types viz. custom products and standard products. Custom products are designed as per the needs of each of the customers and its choice results in a batch production of many products. On the other hand, standard product's choice results in only a few products leading to a continuous production or a batch production of large size.

Production processes can be of two types viz. product focused or process focused. In the former type which is needed in case of a high volume of a few standard products, machines and workers required for each product are grouped together. While the latter suitable in case of a low volume of many unique products, involves only one type of process by each of the production department.

Selection of finished good inventory policy can be done in two ways viz. produce to stock or produce to order. Produce to stock policy involves the production of products ahead to time and their placement in inventory. Produce to order policy is accompanied by the delay of production till one receives the customers' order. As apparent, produce to stock policy is preferred over the produce to order policy in case of fast delivery of products.

Focus of Production

The specialization of production facility in one or the other way is an important element of production strategy. This idea is called focused factory by Wickham Skinner. He proposed that a factory focusing on a narrow product mix for a particular market niche will outperform the conventional plant. Factories and service facilities can made focused in two ways specializing either in only a few product models or in a few production processes. The specialization prevents the facilities to become vulnerable to smaller and more specialized competitors.

Product/Service Plans

Planning the design, development and introduction of new products and services is an integral part of business strategy which directly influences the production strategy because of following reasons :

(a) Establishment of detailed characteristics of each product is done at the time of designing the products.

(b) Production is directly affected directly by the characteristics of each product.

(c) Design of the production system which is the heart of the production strategy is determined by how the product is made.

The life cycle of a product can be divided in various stages namely introduction, growth, maturity and decline. *Introduction stage* is concerned with the beginning of sales, development of production and marketing and has negative profits. The *growth stage* is reached by the dramatic growth of sales, intensification of marketing efforts and concentration on the fast expansion of capacity to keep up with the demand. Profits begin in this stage. *Maturity stage* is attained while production starts concentrating on the high volume of production, efficiency, and low costs. Marketing switches to competitive sales promotion so as to increase or maintain the market share and the profits are at the peak. *Decline stage* when entered by the product yields declining profit and sales.

Production Process and Technology Plans

Making choices for the selection of production processes and technologies is not easy as there is a great and ever increasing range of production technologies for producing products or services and combining high technology production equipment with the traditional one is even more challenging.

Allocation of Resources to Strategic Alternatives

There is limit on the resources for each and every company in the time being though the degree of scarcity varies for different firms. But these shortages of resources have most immense effect on the production than any other functional unit of the organization. Allocation decisions for cash and capital funds, capacity, workers, engineers, machines, materials, etc., though constrained, should be done in order to maximize the achievement of objective.

Facility Plans : Capacity, Location, and Layout

As enormous capital investment is involved in availing the production capacity, the decisions for providing the capacity have long lasting effects and are subjected to greater risk. The internal arrangement of workers, production processes, and departments, being important positioning steps affect the providing of desired volume, quality and cost of products.

1.5.2 Forming Production Strategies

The development of production strategies carry a number of steps which are illustrated in Figure 1.1, whose core is the formation of positioning strategies. Linking the positioning strategies to the product plans and competitive strategies is critical as it supports the business strategy as well as proactivate the role of production to be used as competitive weapon to capture large market shares.

Evolution of Positioning Strategies

It has been suggested by Hayes and Wheelwright that the characteristics of production systems tend to evolve as products move through their product life cycles. Figure 1.3 illustrates the evolution of positioning strategies for a product.

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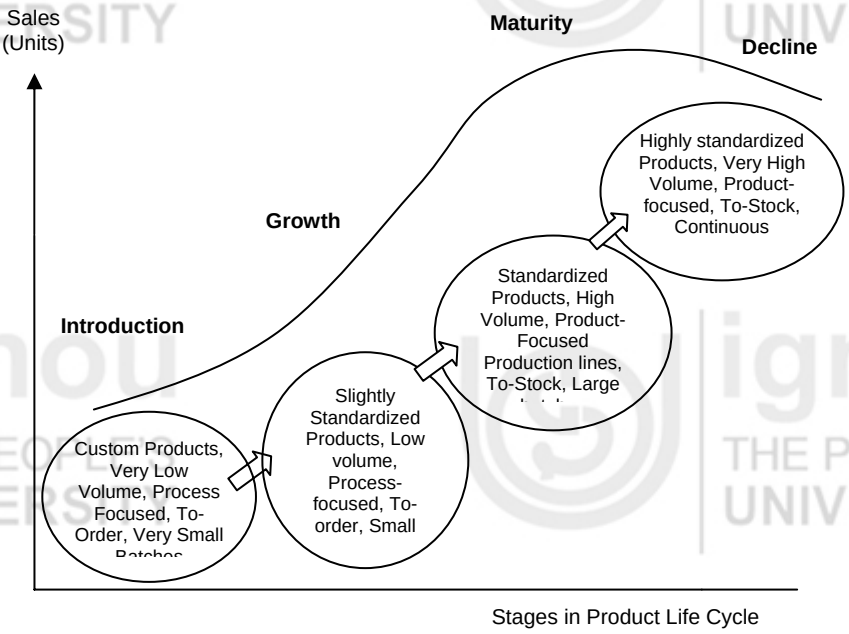

Figure 1.3 : Evolution of Positioning Strategies : Process Life Cycles

In the early stages of product's life cycle, positioning is done via custom design of the product in small batch production which is process focused at produce to order facility. Batch size and volume of the product increases with increase in market demand and as a result of these positioning shifts to standard product design with product focused production at produce to stock factories. At the matured level of demand, highly standard product with product focused production at produce to stock factories. Therefore, maturity of products must be accompanied with the modification of production systems to a changing set of competitive priorities along with capital and production technology.

Correlating Production and Marketing Strategies

Depending upon the combination of types of product, production processes, and finished good inventory policy positioning strategy can be divided into two types viz. pure positioning strategies and mix positioning strategies. This division is indicated in Table 1.4. The two strategies given in the Table 1.4 belong to the pure positioning strategies while other possible combinations belong to mixed positioning strategies.

Table 1.4 : Pure Positioning Strategies

Type of Product	Type of Production Process	Finished-Goods Inventory Policy
Standardized	Product-focused	Produce to stock
Custom	Process focused	Produce to order

All the elements of production strategy must be carefully linked to the market strategy based on competitive price, delivery time and product quality. Table 1.5 summarizes some linking techniques for correlating positioning strategies with market strategies.

Table 1.5 : Pure Positioning Strategies

Some Positioning Strategies	Custom Products		Standardized Products	
	Low Volume	High Volume	Low Volume	High Volume
Product focused	–	–	–	Market strategy : competition based largely on production cost, fast delivery, and quality; e.g. TV sets
Product-focused, To-order	–	–	Market strategy: competition based largely on production cost, keeping delivery promises, and quality; e.g. school buses	–
Process focused, To-stock	–	Market strategy : competition based largely on flexibility, fast delivery of products; e.g. medical instruments	–	–
Process focused, To-order	Market strategy : competition based largely on keeping delivery promises, quality and flexibility; e.g. super computers	–	–	–

SAQ 4

(a) What are the different functional units in an organization? What is the role played by the production unit?

(b) What are various phases of development in the history of production management?

(c) What are the elements of production strategy? How is production strategy formed?

1.6 ESTIMATING FUTURE DEMANDS

Production management is concerned with estimating future demands for products and services (sales forecast) and the required resources. Forecasting is an integral part of production management. While making business plans, managers have to find out what course of action they have to take in future.

Forecasts are of long range type or short range type depending respectively upon whether decisions about products, processes and facilities or about production issues for short span of time. Sales forecast are the starting points for all other forecasts.

There are two methods of estimating future demands :

(a) Qualitative method, and

(b) Quantitative method.

1.6.1 Qualitative Method

The quantitative methods are usually based on judgments about the casual factors that underlie the sales of particular products or services and on opinions about the relative likelihood of those factors being present in the future. These methods are sophisticated to a varying degree depending upon the opinion forming means. Some of the qualitative forecasting methods mentioned below.

Executive Committee Consensus

A committee comprising executives from various departments is formed to develop sales forecast taking inputs from all the parts of the organization. This method leads to a compromise forecast.

Delphi Method

This is a repetitive method in which executives of a committee anonymously answer a series of questions on successive rounds which is fed back to all in the next round. It leads to an ultimate agreement in spite of initial disagreement.

Survey of Sales Force

Estimates from future regional sales forces form all regions are combined which are further transformed into a sales forecast by managers. It requires good communication system between the company and the sales people.

Survey of Customer

Direct estimates of future sales for purchase in different time periods from the individual customers are taken.

Historical Analogy

This method correlates the future sales demand of a product with a similar product. It is helpful in case of forecasting sales of new products.

Market Research

Mail questionnaires, telephone interviews, or field interviews form the basis for testing hypotheses about real markets and statistical extrapolation of products marketed in targeted regions is done. It is preferred for introduction of product into new market segment.

1.6.2 Quantitative Method

These methods use mathematical models based on historical data considered relevant to the future. Several quantitative models, forecast accuracy, long range forecasts and short range forecasts are discussed in following paragraphs.

Forecast Accuracy

It is the closeness of forecasts to the actual data. Due to time gap between forecast and determination of actual data, the forecast accuracy gets determined after a long passage of time. Depending upon the degree of closeness one can have a high accuracy or low accuracy.

Long Range Forecasts

It involves estimating future conditions over one year or more. These types of forecasts are necessary to support strategic decisions about planning products, processes, technologies and facilities.

Cycles, Trends and Seasonality

From the data patterns in a long range forecasting, historical sales data seems to have several components which include trends, cycles, seasonality, and random fluctuation. Trends are upward or downward sloping line, cycles are the data patterns covering several years before its repetition and seasonality is a data pattern that repeats itself over a period of time. Random fluctuation is a pattern resulting from random variation or unexplained causes.

Linear Regression and Correlation

In this forecasting model establishment of a relationship between a dependent variable and independent variable is done. Appropriate regression equation is used for the forecasting.

Short Range Forecasts

These forecasts are usually estimates of anticipated conditions over a short span of time. For these forecast cycles, seasonality and trends have little impact and enable the production managers to take following decisions :

(a) Amount of inventory to be carried next month.

(b) Amount of product to be scheduled for next week.

(c) Amount of each raw material to be ordered next week.

(d) Number of workers to be scheduled to work on a straight time and overtime basis next week.

SAQ 5

What are the characteristics of different forecasting methods in production management? What are the steps involved in each method?

1.7 SUMMARY

In this unit, you have studied the introduction of production management. Functional units in an organization, features of production management and challenges faced by production managers have been elaborated. The unit also describes the history of production management. This is followed by building of production strategy, explaining elements of the strategy and linking of production strategy with market strategy. Estimating future demand is an integral part of production management. Qualitative and quantitative methods are also explained in this unit.

1.8 KEY WORDS

Production Management : Production management is the process of designing, manning, operating, servicing and centralising the activities of a manufacturing organisation, responsible for the actual transformations of materials inputs into marketable finished goods.

Production Manager : The person who is given responsibility for the process of production is called production manager.

Production : Production is a sequence of operations that transforms material from a given to a direct form.

Positioning : Positioning of production system involves the selection of the type of product design, type of production processing system, and type of finished-goods inventory policy for each product group in the business strategy.

Forecasting : It is the estimation of future demands for products and services, and the resources required.

1.9 ANSWERS TO SAQs

Refer the relevant text in this unit for answers to SAQs.