OPERATION MANAGEMENT
UNIT -I

1.What is operation management?

Operations management is the administration of business structure, practices, and processes to enhance efficiency and maximize profit. It refers to the management of functions that a business needs to run effectively day-to-day, including:

- Overseeing multiple departments and providing goals
- Overseeing and streamlining processes
- Balancing revenue and costs
- Developing strategic plans
- Production, logistics, and supply chain

2.List two milestones in OM.

The three milestones in operations management are:

1. The Industrial Revolution
2. The advent of scientific management
3. The rise of mass production

3.Write down the difference characteristics of services.

- **Heterogeneity/Variability:** Given the very nature of services, each service offering is unique and cannot be exactly repeated even by the same service provider.

While products can be mass produced and be homogenous the same is not true of services. eg: All burgers of a particular flavor at McDonalds are almost identical. However, the same is not true of the service rendered by the same counter staff consecutively to two customers.

- .**Perishability:** Services cannot be stored, saved, returned or resold once they have been used. Once rendered to a customer the service is completely consumed and cannot be delivered to another customer. eg: A customer dissatisfied with the services of a barber cannot return the service of the haircut that was rendered to him. At the most he may decide not to visit that particular barber in the future.
- .**Inseparability/Simultaneity of production and consumption:** This refers to the fact that services are generated and consumed within the same time frame. Eg: a haircut is delivered to and consumed by a customer simultaneously unlike, say, a takeaway burger which the customer may consume even after a few hours of purchase. Moreover, it is very difficult to separate a service from the service provider. Eg: the barber is necessarily a part of the service of a haircut that he is delivering to his customer.

4.Distinguish between goods and services.

Basis	**Goods**	**Services**
Meaning	Goods are tangible items that can be felt, touched or seen.	Services are intangible that cannot be seen, felt, touched or seen; but are experienced by the consumer.
Nature	Goods are tangible in nature.	Services are intangible in nature.

Type	Goods are homogeneous and can be produced exactly the same.	Services are heterogeneous and depend upon the person providing the service and the customer's preferences.
Transfer of Ownership	The ownership of goods can be transferred from one person(seller) to another(buyer).	The ownership of services cannot be transferred from one person to another.
Inconsistency	There is consistency in case of goods, as different customers get standardised demand fulfilled. For example, laptops.	There is inconsistency in services, as different customers have different demands and get their demands fulfilled accordingly. For example, different people need different services in salons.

5.Outline the scope of production management.

- It brings down the cost of production.
- It is advantageous for market competition to expand.
- Your chances of attaining your company's objectives are higher.
- It could significantly improve how people view your business as a whole.
- All of your resources can be used effectively.
- Good production management is essential.

6.What do you mean by transformation process?

Changes made in a business or other organization which improve the company's employee and management participation in the development of the business. A transformation process can give a failing business new life and can improve the smooth operation of any company.

7.What is operation strategy?

An operations strategy refers to the system an organization implements to achieve its long-term goals and mission. It involves decisions based on multiple factors, including product management, supply chain, inventory, forecasting, scheduling, quality, and facilities planning and management.

8.What is positioning strategy?

A positioning strategy—also known as a market or brand positioning strategy—is a type of marketing strategy that focuses on distinguishing a brand from its competitors. The goal of a positioning strategy is to influence consumer perception by effectively communicating a brand's competitive advantage.

9.what do you mean by strategic fit?

Strategic fit expresses the degree to which an organization is matching its resources and capabilities with the opportunities in the external environment. The matching takes place through strategy and it is therefore vital that the company has the actual resources and capabilities to execute and support the strategy.

10.List out the function of production and operation management.

- Production planning
- Production planning
- Quality planning
- Industrial engineering
- Purchasing
- Plant engineering.
- Manufacturing

11.What are the problems of production and operations management?

- Labor SHORTAGES
- Better Labor Management
- logistical delays
- long lead times
- equipment downtime
- inventory management
- space shortages
- safety
- communication
- quality control

12.What do you mean by Transformation processes in production?

The transformation process is the heart of any manufacturing or service organization. It takes the inputs (raw materials, information, labor, etc.) and converts them into outputs (finished products, services, etc.). The process can be as simple as a single assembly line or as complex as a worldwide supply chain.

13. What is procurement cycle

This is the interface between the first-tier supplier and the second-tier supplier to that product. Includes all the process necessary to ensure materials or components are available for the production cycle and the first-tier supplier.

14. Which operational management processes can be made more efficient?

The technology used by employees will also play an important role in their efficiency. If technology is slow, outdated, or requires a lot of maintenance, employees won't be able to fulfil their potential for maximum productivity. By keeping technology up-to-date, higher rates of efficiency are more easily achievable. Consider renewable energy options such as LED lighting and solar with battery storage

Production system consists of three main components inputs, "conversion Process and Output

15.What is production system?

Input: include raw materials, machines, man hours, components or parts, drawing, instructions and other paper works

Conversion process

includes operations $actual production process%. Operations may be either manual or mechanical or chemical. Operations convert inputs into output. "Onversion process also includes supporting activities, which help the process of conversion. The supporting activities include& production planning and control, purchase of raw materials, receipt, storage and issue of materials, inspection

of parts and work-in# progress, testing of products, 'quality control, warehousing of finished products, etc.

Output: includes finished products, finished goods parts%, and services.

16.What do you mean by production sharing?

Agreement to share the production or extraction costs between two governments, a government and a corporation, or a corporation and an individual. This can be accomplished when two countries agree to allow certain raw materials to be shipped tariff free from the first country to the second country where the materials are manufactured into a finished product.

17.What is system perspective?

system perspective facilitates a comprehensive understanding of the various aspects of operations management. essentially involves identifying the input, the output, the processing and feedback mechanism in a system.

18.What is operational trends?

All activities strive towards increasing efficiency and maximizing profits. Emerging trends and advancements in technology are always embraced into business to ensure market competitiveness. It could range from cost reduction measures to automation of repeated process or by scraping off redundant tasks and additional expenses. Latest trends and management synergies keep changing globally targeting business optimization. This tutorial discusses on the recent trends and developments that are happening in operations management.

19.What is intermittent function?

Intermittent production is an umbrella term for manufacturing processes that use irregular production schedules to create several different products using one production line. It's used by manufacturers who produce low-volume, high-variety products for either mass customization or bespoke manufacturing.

20.What do you mean by principle of aligility?

Consumer Enrichment

While lean is more waste oriented, agile is more customer oriented. One of the most important principles within agile is enriching the customer through various factors such as identification, monitoring, and understanding factors such as Quality Function Deployment. Satisfying consumer demands is a key component within agile manufacturing.

Competitive Enhancement

Having all departments on board for agile methodology can ensure for a much more efficient and competitive atmosphere. This is by partnering with firms that have the same ideas and mindset about the production. This is how you can set yourself a step above competitors and adopt a much more flexible and adaptable supply chain.

21.What are the relevance of operations?

The role of operations strategy is to provide a plan for the operations function so that it can make the best use of its resources. Operations strategy specifies the policies and plans for using the organization's resources to support its long-term competitive strategy.

22.list out the responsibility of operation manager.

- Manage and direct operations team to achieve business targets.

- Assist in developing or updating standard operating procedures for all business operational activities.
- Build strong relationship by addressing customer issues and complaints in a timely manner.
- Assist in employee appraisals, promotions, compensation and termination based on the performance review.

23.Define Current priority.

A priority is the concern, interest or desire that comes before all others." vocabulary.com. Our priorities are the areas of our lives that are meaningful and important to us. They're usually activities, practices, or relationships that we want to put genuine effort and time into.

24.List out the elements of operational strategy.

- Forecasting for planning. Forecasting operations typically involve a company making plans for the future. ...
- Equipment optimization. ...
- Planning the use of resources. ...
- The quality of finished products. ...
- Supply chain management. ...
- Inventory delivery and storage. ...
- Assembly and products. ...
- Resource management.

25.What is operational framework?

An operational framework is a guide to a company's policies, goals, standards, procedures and training. The framework sets out the way the company does business and promotes a corporate culture and identity. An operational framework may also include principles of good governance and set out company values and divisions within the firm. Each operational framework diagram contains different elements.

UNIT-II

1.Defined productivity

The productivity of a production process can be defined as the efficiency with which goods and services are produced. Productivity is typically measured by comparing an aggregate output with a single input or comparing an aggregate input with an aggregate output, over time.

2.What is labor productivity?

Labour productivity is defined as output per worker or per hour worked. Factors that can affect labour productivity include workers' skills, technological change, management practices and changes in other inputs (such as capital).

3.What is partial productivity?

Partial productivity can be defined as the relationship between the output and the single input which is used in the production. For instance – there has been a 10% rise in the labor. The effect of the increase in the labor is shown by partial productivity.

The formula for the calculation of the partial productivity is given below:

$$\text{Partial productivity} = \frac{\text{output}}{\text{single input}}$$

4.What do you mean by world class manufacturing?

Manufacturing has evolved considerably since the advent of industrial revolution. In current global and competitive age, it is very important for organization to have manufacturing practice which is lean, efficient, cost-effective and flexible. World class manufacturing is a collection of concepts, which set standard for production and manufacturing for another organization to follow. Japanese manufacturing is credited with pioneer in concept of world-class manufacturing. World class manufacturing was introduced in the automobile, electronic and steel industry.

5. Define Hall's framework of value-added engineering.

According to Hall (1987), manufacturing excellence is attained by 'value-added manufacturing', which is based on the principle that 'purge anything that does not add value to the product or service, whether material, equipment, space, time, energy, systems, or human activity of any sort'.

6.Limitation of world class manufacturing.

World Class Manufacturing (WCM) is a method of improving the cycle of production and logistics with the goal of increasing quality and reducing production costs. However, there are a few limitations to this method:

- WCM requires a significant amount of investment in order to be implemented, which may be difficult for smaller businesses.
- It needs a highly-skilled workforce, which can be expensive and hard to find.
- It can be difficult to measure the success of WCM, as the results may not be immediately obvious.

- WCM may not always be suitable for all types of businesses and can be difficult to adapt to different circumstances.
- It can be difficult to motivate staff to embrace and adhere to the WCM system.

7. What is mean by productivity index?

The productivity index on a workload degradation display, the reporter uses the productivity index definitions contained in a member of the REDPARM partitioned data set called DEFAULTP. The definitions in the DEFAULTP member group detailed wait reasons into three categories: **Productive** States are those in which the workload is executing in some fashion, and are not considered degradation. By default, Using CPU, Active I/O, and STIMER waits are considered productive states.

8.Defined Schonberger's framework of world class manufacturing?

According to Schonberger's (1986), the goal of world-Class Manufacturing (WCM) is 'continual and rapid improvement'. He argues that continual improvement in quality, cost, lead time, customer service and flexibility will lead to 'World-Class' status.

9.What is Gunn's model of world class manufacturing.

Gunn's model (1972) of tourism has three major aspects related to a site of attraction. The three major aspects are The Nucleus, The Zone of Closure and The Inviolate Belt. All these 3 aspects somewhat determine the layover of any tourist attraction.

10.Define Maskell's model of world class manufacturing.

According to Maskell, World-Class manufacturing generally includes the, following: A new approach to product quality. Just-in-time (JIT) production techniques. Change in the way the workforce is managed; and. A flexible approach to customer requirements

11.What is mean by American's best plan model of world class manufacturing?

In 1990, Industry Week magazine recognized 12 facilities exhibiting world-class manufacturing practices as the first "America's Best Plants." Each year since, IW's editors have chosen 10 additional facilities to join their ranks. In America's Best: Industry Week's Guide to World-Class Manufacturing Plants (1996, John Wiley & Sons Inc.), author Theodore B. Kinni reveals the collective lessons of the America's Best Plants winners. The criteria are organized into three core strategies-customer focus, quality and agility; and six supporting competencies-employee involvement, supply management, technology, product development, environmental responsibility and safety, and corporate citizenship. This excerpt focuses on the core strategy of quality.

12.List out the importance of world class manufacturing.

The main parameters which determine world-class manufacturers are quality, cost effective, flexibility and innovation. World class manufacturers implement robust control techniques but there are five steps, which will make the system efficient.

12.What is total factor productivity?

All businesses strive for growth. Growth means you can expand your team, pay better wages, and share stronger profits with owners and shareholders. How can businesses achieve growth? One of the most important ways is through higher productivity.

This kind of growth is different from using more resources or capital to hire more people or make more products. It comes from efficiency. Total factor productivity is a way to measure it.

13.What is mean by raw material productivity?

The major portion of cost incurred on finished product produced by any industry is the cost of raw materials in such cases the material productivity is regards as a significant factor to produce the goods at lower cost. The ratio of output to the material input is also known as material productivity. Input materials can be the natural resources used by the factory, or even the industrial goods produce by the other factory, acting as the raw material productivity= output/material input.

14.Define Energy productivity

Energy productivity is an indicator of the amount of economic output that is derived from each unit of energy consumed. Economy-wide energy productivity is generally measured as national gross domestic product (GDP - in millions of dollars) divided by petajoules (PJ) of primary energy consumed.

15.What is mean by machinery productivity?

Machine productivity is a straightforward calculation consisting of the total volume of parts produced divided by the number of machines used. The measurement must include: The number of machines. The time under consideration (shift, daily, or weekly hours). A reliable count of finished parts or goods.

16.List out the tools increasing in productivity.

- Product development
- Market, consumer, Product research
- Value Analysis
- Process planning and Research
- Method study
- Operator Training
- Production planning and Control

17.List out the factors influencing productivity.

The 6 important factors which are affecting the industrial productivity are

1) Government Policy
2) Quality of Human Resources
3) Availability of Finance
4) Technological Development
5) Natural Factors
6) Managerial Talent.

18.What is mean by run time?

Run Time means the manufacturing process is scheduled for production and is running. Run Time is calculated by subtracting downtime from planned production time. Run time includes time when the process could be experiencing small stops, reduced speed, and making reject parts.

19.What is mean by Throughput Time

Throughput time refers to the total amount of time that it takes to run a particular process in its entirety from start to finish. For example, a manufacturer can measure how long it takes to produce a product, from initial customer order to sourcing raw materials to manufacturing to sale.

20. Consumer Enrichment

While lean is more waste oriented, agile is more customer oriented. One of the most important principles within agile is enriching the customer through various factors such as identification, monitoring, and understanding factors such as Quality Function Deployment. Satisfying consumer demands is a key component within agile manufacturing.

21. What is graphical method ?

Graphical methods are commonly used for determining whether the data support an interpretation of mixing of two potential sources or fractionation of a single source**.**

22. What is awards?

The award is presented to organizations in five broad categories: large scale manufacturing, small scale manufacturing, large scale service sector, small scale service sector and best overall. Furthermore, there are 14 commendation certificates for organizations showing excellence in various fields, including but not limited to biotechnology, chemicals, electronics, food and drugs, metallurgy, textiles, jewelry, education, finance, healthcare and information technology.

23.What is RCCP ?

It is a long-term plan capacity planning tool that marketing and production use to balance required and available capacity, and to negotiate changes to the master schedule and/or available capacity. You can change your master schedules by changing master schedule dates and increasing or decreasing master schedule quantities. You can change your available capacity by adding or removing shifts, using overtime or subcontracted labor, and adding or removing machines.

RCCP is a gross capacity planning technique that does not consider scheduled receipts or on-hand inventory quantities when calculating capacity requirements. Your rough cut capacity plans are therefore a statement of the capacity required to meet your gross production requirements.

24.What is CRP?

c-reactive protein test measures the level of c-reactive protein (CRP) in a sample of your blood. CRP is a protein that your liver makes. Normally, you have low levels of c-reactive protein in your blood. Your liver releases more CRP into your bloodstream if you have inflammation in your body. High levels of CRP may mean you have a serious health condition that causes inflammation.

25.What is Trial and Error methods?

Trial and error is a fundamental method of Problem solving. It is characterized by repeated, varied attempts which are continued until success, or until the agent stops trying. Until getting the right answer the problem is repeating through various steps. This type of problem solving is called trial and error method.

UNIT-III

1. What is capacity planning?

A capacity planning process involves determining how much production capacity is required to meet changing demand for products. Design capacity refers to an organization's maximum capacity to accomplish work over a given time period in capacity planning.

Capacity planning process is used by organizations to determine their production capacity in order to meet the changing needs of their products. A design capacity is an organization's maximum ability to complete a specified amount of work in a given time period, in the context of capacity planning.

2.**List out the needs of capacity planning.**

- Ensuring that an organization has enough capacity to meet customer demand.
- Minimizing excess capacity and waste.
- Reducing costs associated with underutilized capacity.
- Improving overall efficiency and competitiveness.

3.List out the objectives of capacity planning.

- Create and follow a capacity management plan.
- Ensure to perform the objectives timely and within budget.
- Constantly monitor capabilities to meet service level management.
- Aid in the diagnosis and resolution of incidents
- Examine the impact of capacity variability and initiate appropriate measures to improve performance where it is most cost-effective.

4. What is mean by long range capacity planning?

Long-range capacity planning is **the process of ensuring that sufficient production resources (facilities, people, equipment, and operating hours) are available to meet an organization's long-range production needs. Capacity requirements planning** is used in conjunction with material requirements planning (MRP).

5. What is mean by Short range capacity planning?

the short term, capacity planning **concerns issues of scheduling, labor shifts, and balancing resource capacities**. The goal of short-term capacity planning is to handle unexpected shifts in demand in an efficient economic manner. The time frame for short-term planning is frequently only a few days but may run as long as six months.

6.What are the types of capacity planning?

- Lead capacity planning: anticipates future capacity needs and increases capacity before demand rises.
    - Lag strategy planning: waits for demand to increase before increasing capacity, avoiding excess capacity and costs.
    - Match strategy planning: adjusts capacity incrementally in response to demand fluctuations, balancing costs and service levels.
    - Short-term capacity planning: focuses on immediate capacity needs and is usually done daily or weekly.
    - Long-term capacity planning: focuses on capacity needs over a year or more and is used to make strategic decisions on capacity expansion or reduction investments

7.What is Rough-cut capacity planning?

Rough Cut Capacity Planning (**RCCP/RCP) is a long-term plan capacity planning tool**. It's for balancing required and available capacity, and to negotiate changes to the master schedule and/or available capacity. Changes can be made either to planned production or available capacity based on your RCCP analysis.

8. What is Capacity requirement planning?

Capacity requirements planning (CRP) is the process of discerning a firm's available production capacity and whether it can meet its production goals. The CRP method first assesses the company's planned manufacturing schedule. Then, capacity requirements planning weighs this schedule against the company's actual production capabilities to see if the current capacity can successfully meet the existing production schedule.

9. List out the importance of capacity requirement planning .

- Ensuring that an organization has enough capacity to meet customer demand.
- Minimizing excess capacity and waste.
- Reducing costs associated with underutilized capacity.
- Improving overall efficiency and competitiveness.

10.What is Toggl plan

Toggl Plan's shared timelines mean no one is overwhelmed, even when juggling several projects at the same time."Managing team workloads in spreadsheets was a nightmare. Toggl Plan makes it easy to see everyone's schedule in one place.

11.Define Aggregate planning.

Aggregate planning is the process of determining the scope of a company's operations. It involves forecasting the potential demand for an organization's goods or services and preparing the company to fulfill this demand. This process allows business leaders to coordinate the right amount of resources to cover the demand efficiently, without causing over or underproduction. It typically uses information like sales goals, current levels of production, current inventory and client backlogs to determine how to meet consumer demand at a minimum cost.

12.List out the techniques for aggregate planning.

- Level strategy: The main goal of the level strategy is to create an aggregate plan that keeps both production and employment stable.

· Chase strategy: When using the chase strategy, a company adjusts capacity to match demand constantly.

· Hybrid strategy: This approach utilizes the best of both methods. It focuses on maintaining consistent production and human resources in a company

13.What is graphical method?

Graphical Method: Owing to the importance of linear programming models in various industries, many types of algorithms have been developed over the years to solve them. Some famous mentions include the Simplex method, the Hungarian approach, and others. Here we are going to concentrate on one of the most basic methods to handle a linear programming problem i.e. the graphical method.

14.What is linear programming ?

Linear programming may thus be defined as a method to decide the optimum combination of factors (inputs) to produce a given output or the optimum combination of products (outputs) to be produced by given plant and equipment (inputs). It is also used by a firm to decide between varieties of techniques to produce a commodity.

15.What is mixed -integer programming?

integer programming problem is a mathematical optimization or feasibility program in which some or all of the variables are restricted to be integers. In many settings the term refers to **integer linear programming** (ILP), in which the objective function and the constraints (other than the integer constraints) are linear.

15.What is Linear Decision Rule?

The linear decision rule **specifies the release** during any period of reservoir operation as the difference between the storage at the beginning of the period and a decision parameter for the period. The decision parameters for the entire study horizon are determined by solving the linear programming problem.

16.What is mean by RCCP?

Preparation and planning of the master schedule planner use it later, responsible for managing the resources and materials required.Rough-cut capacity planning is an easy and simplified technique that does not involve many hidden values or inventories.

17.What is mean by IQMS?

IQMS is a California-based software company that specializes in providing manufacturing industry-specific, ERP and manufacturing execution system (MES) software. Targeting

midmarket, repetitive, batch-process and discrete manufacturing, IQMS provides an integrated ERP and MES software for the automotive, medical, aerospace and defense, assembly, food and beverage, packaging, plastics, stamping and metals and process-specific industries.

18.What are the factors affecting capacity planning?

- Level of demand: the expected demand for the products or services
- Cost of production: the expenses involved in producing the products or services
- Availability of funds: the financial resources available for investing in capacity
- Management policy: the strategic goals and objectives of the organization
- Facilities: the design, size, location, and expansion of the facilities
- Products or services: the variety, complexity, and quality of the products or services

19.What is Decision trees?

A decision tree is a supervised learning algorithm that is used for classification and regression modeling. Regression is a method used for predictive modeling, so these trees are used to either classify data or predict what will come next. Decision trees look like flowcharts, starting at the **root node** with a specific question of data, that leads to branches that hold potential answers. The branches then lead to **decision (internal) nodes**, which ask more questions that lead to more outcomes. This goes on until the data reaches what's called a **terminal (or** "**leaf**") **node** and ends.

20.What is Kanban Board?

A kanban board is an agile project management tool designed to help visualize work, limit work-in-progress, and maximize efficiency (or flow). It can help both agile and DevOps teams establish order in their daily work. Kanban boards use cards, columns, and continuous improvement to help technology and service teams commit to the right amount of work, and get it done!

21What is Gantt chart?

A gantt chart is a horizontal bar chart used in project management to visually represent a project plan over time. Gantt charts typically show you the timeline and status—as well as who's responsible—for each task in the project.

22.What is waiting line model?

The study of waiting lines, called queuing theory, is one of the oldest and most widely used quantitative analysis techniques. Waiting lines are an everyday occurrence, affecting people shopping for groceries, buying gasoline, making a bank deposit, or waiting on the telephone for the first available airline reservation to answer. Queues, another term for waiting lines, may also take the form of machines waiting to be repaired, trucks in line to be unloaded, or airplanes lined up on a runway waiting for permission to take off. The three basic components of a queu-ing process are arrivals, service facilities, and the actual waiting line.

23.Define CRP.

C-reactive protein (CRP) is a protein made by the liver. The level of CRP increases when there's inflammation in the body. A simple blood test can check your C-reactive protein level.A high-sensitivity C-reactive protein (hs-CRP) test is more sensitive than a standard C-reactive protein test. That means the high-sensitivity test can find smaller increases in C-reactive protein than a standard test can.The hs-CRP test can help show the risk of getting coronary artery disease. In coronary artery disease, the arteries of the heart narrow. Narrowed arteries can lead to a heart attack.

24.List out the tools for capacity planning.

- Waiting line methods.
- Decision tree

- Kanban Board
- Critical Board
- Gantt Board

25.What are the factors affecting capacity planning?

- Process design
- Product design
- Product quality
- Production scheduling
- Material management
- Maintenance
- Job design and personnel management

UNIT-IV
Facility Location,Sourcing & Procurement

1. Define plant location.

Plant location decisions are strategic, long term and non-repetitive in nature. Without sound and careful location planning in the beginning itself, the new plant may pose continuous operating disadvantages. Location decisions are affected by many factors, both internal and external to the organization's operations.Internal factors include the technology used, the capacity, the financial position, and the work force required.External factors include the economic, political and social conditions in the various localities.Most of the fixed and some of the variable costs are determined by the location decision. The efficiency, effectiveness, productivity and profitability of the plant are also affected by the location decision. Location decisions are based on a host of factors, some subjective, qualitative and intangible while some others are objective, quantitative and tangible.

2. List out the characteristics of facility location.

- Proximity to customers, suppliers, and skilled labor
- Environmental regulations
- Financial incentives offered by state and local development authorities
- Quality-of-life considerations
- Potential for future expansion

3. List out the need for selection of location.

- Costs: The cost perspective is an essential criterion concerning the location of a facility. Any wrong decision will adversely impact the company's finances.

· Competition: Effective location decision helps in achieving a competitive advantage in the markets. ...

· Hidden Effects: The plant's location affects many factors in the long run in a direct or indirect manner.

4. What are the factors affecting facility location decision?

- Facilities: the availability and cost of land, utilities, and infrastructure.

· Competition: the presence and strategies of competitors in the area.

· Logistics: the proximity and accessibility to suppliers, customers, and transportation networks.

5.What is Dominant factors?

Capacity planning is the process of determining the potential needs of your project. The goal of capacity planning is to have the right resources available when you'll need them. Resources could mean individuals with the right skills, time available to add another project, or the necessary budget.

6.What is secondary factor?

It is also referred as Agglomerative and Deglomerative factors.both the agglomerative and deglomerative factors are used for arrangement and allocation of an industry. The agglomerative factor refer to the benefits and reduction in production and marketing as the production is done at one place while deglomerative factors refers to the reduction in production by decentralization of production.

7.List out of the steps in selection of facility location.

- ❖ Decide on the criteria for evaluating location alternatives.
- ❖ Identify important factors.
- ❖ Develop location alternatives.
- ❖ Evaluate the alternatives.
- ❖ Make a decision and select the location.
- ❖ Concept of Facility Location Procedures and Techniques for Selecting Facility Location.

8.Write a short note on single facility location.

A simple facility location problem is the Weber problem, in which a single facility is to be placed, with the only optimization criterion being the minimization of the weighted sum of distances from a given set of point sites. More complex problems considered in this discipline include the placement of multiple facilities, constraints on the locations of facilities, and more complex optimization criteria.

9.What is multi facility location?

Multi-facility location problems involve locating a number of distinct new facilities to serve customers (or existing facilities, work stations). The new facilities may also provide service to each other, in which case the location decisions are interdependent.

10.Define Weber's theory.

Bureaucratic theory stresses that organizations are formal, rational systems with well-defined rules and procedures, defined by specialization, hierarchy, well-trained employees, managerial

dedication, and the impartiality of management.Weber's ideal type of bureaucracy was described in *Economy and Society*, published in 1921.Weber believed that bureaucracies are the most efficient way to organize large organizations and was a result of the inevitable rationalization and impersonalization of society.

11.What are facility location theories?

A simple facility location problem is the Weber problem, in which a single facility is to be placed, with the only optimization criterion being the minimization of the weighted sum of distances from a given set of point sites. More complex problems considered in this discipline include the placement of multiple facilities, constraints on the locations of facilities, and more complex optimization criteria. In a basic formulation, the facility location problem consists of a set of potential facility sites *L* where a facility can be opened, and a set of demand points *D* that must be serviced. The goal is to pick a subset *F* of facilities to open, to minimize the sum of distances from each demand point to its nearest facility, plus the sum of opening costs of the facilities.

12.Define Sargent florence's theory.

Professor Sargent has followed the inductive method in formulating his theory of location. Sargent's theory is more practical and realistic than that given by Weber. After properly analyzing statistical data, Sargent tried to ascertain the tendency of location of industries. On the basis of production census he has tried to find out the statistical measures of location and has not accepted the traditional view of the geographical context, not the region or area as such but the working population in that area is more important. Sargent has used two new concepts in his theory of location.

13.List out the Sargent florence's theory

- Location factors
- Coefficient of location

14.What is Location factors?

Industrial location is a balance between capital, material, and labor and markets. The goal is overall lowest cost. Sometimes pushing down one category, like labor, can increase other costs, like transportation. Substitution is possible across categories. For example, additional capital can replace labor through automation. Earlier factories were built in cities in order to use the labor that was available there. Building in the middle of nowhere could have created an immediate labor shortage. Of course, labor will also migrate to places with available employment.

15.**What is coefficient of location?**

Coefficient of localization indicates the **propensity of concentration of industries**. This has no relation as such with the area. If the percentage of workers over different areas is also given in percentage, the variance between the two percentages is divided by 100 which give the coefficient of location.

16.Define Renner's theory.

Three principle of industrial location".has given a simple principle of industrial location' which is entirely based on geographic elements.

17.What is edgar hoover's location theory?

The location and shoe and leather industry (1937) and the location of economic activity (1984).discuss on cost factor and demand factor.He argue that if the production cost is constant than transport cost,it determines the price of commodities.

18.What is Tord palander's theory of location?

he Swedish economist Tord Palander completed a 1935 PhD, Contributions to Location Theory, which considered the market area division of two competing firms. The American economist William Henry Dean, Jr. completed his Harvard PhD in 1938, The theory of the geographic location of economic activities

19.What is central place theory?

Central-place theory, in geography, an element of location theory (*q.v.*) concerning the size and distribution of central places (settlements) within a system. Central-place theory attempts to illustrate how settlements locate in relation to one another, the amount of market area a central place can control, and why some central places function as hamlets, villages, towns, or cities.The German geographer Walter Christaller introduced central-place theory in his book entitled *Central Places in Southern Germany* (1933).

20.What is factor rating system?

The Factor Rating Method is a tool used to evaluate suppliers. It involves rating suppliers on a number of factors, such as quality, delivery, price, and service. The ratings are then used to identify the best supplier for a particular product or service. It is quick and easy to use, and it provides a clear picture of supplier performance. The method is also flexible, allowing for different factor weights to be assigned depending on the importance of the factors being evaluated.

21.Define walter Isard Theory.

Isard, Walter. 1969. General Theory: **Social, Political, Economic, and Regional, with Particular Reference to Decision-making Analysis.** Cambridge, Massachusetts: M.I.T. Press. Isard, Walter. 1971. Regional Input-output Study: Recollections, Reflections, and Diverse Notes on the Philadelphia Experience.

22.Define Fetter's law of industrial location.

In 1924 **Frank A. Fetter had proposed the law of industrial location. He proved that all the production can be sold in the markets which are having unlimited demand**. In other words, industries have been located according to the demand and consumption.

23.What is location break even analysis?

Locational break even analysis happens to be an important management tool, it shows the point where the business has met all its expenses and has now began to show profit for the organization. Locational break even analysis is done by breaking down costs as variable cost and fixed cost and comparing these costs to a certain level of sales. Where variable cost is the happens to be directly related to the production process or those necessary in providing the services, and fixed cost is where the cost remains the same and is not affected by the change in the output.

24.What is simple median method?

It's **easy** to take paper for granted and even easier to forget how refined of a **medium** it truly is. After thousands of years, the use of paper feels natural and innate. In the words of Getting Things Doneguru David Allen, "…the easiest and most ubiquitous way to get stuff out of your head is pen and paper."

25.What is mean by Virtual factory?

It is especially in USA and UK majority of the large number of factors which may influence the decision.it is almost impossible to finalise a location which possess all the essential characteristics that are needed for the initiation of the process.but an attempt is made to ensure that maximum possible facilities are available and alternative action are sought for those that are unavailable.

26.What is Virtual proximity?

The advancement that is made in the telecommunication sector has brought the concept of virtual proximity into the picture.in firms that are into the line of providing the software services,majority of work take place through this route.high end communicating device are used to share the information through long distance.

UNIT-V

1.Defined quality.

"Quality itself has been defined as fundamentally relational: 'Quality is the ongoing process of building and sustaining relationships by assessing, anticipating, and fulfilling stated and implied needs.'

2.List out the types of quality.

- product Quality. Products that fit customer needs and fulfill customer expectations. ...
- Service Quality. Services involve intangible elements of quality such as environments, customer service and customer experience. ...
- Experience Quality. ...
- IT Quality. ...

3.What is Juran's Quality Trilogy

The Juran Trilogy, also called Quality Trilogy, was presented by Dr. Joseph M. Juran in 1986 as a means to manage for quality. The traditional approach to quality at that time was based on quality control, but today, the Trilogy has become the basis for most quality management best practices around the world.

4.What is mean by Pareto Principle?

The Pareto Principle, named after economist Vilfredo Pareto, specifies that 80% of consequences come from 20% of the causes, asserting an unequal relationship between inputs and outputs. This principle serves as a general reminder that the relationship between inputs and outputs is not balanced. The Pareto Principle is also known as the Pareto Rule or the 80/20 Rule.

5.Defined Total Quality Management.

Total Quality Management (TQM) is a management approach that seeks to provide long-term success by providing unparalleled customer satisfaction through the constant delivery of quality IT services.

6.What is PDPC?

The process decision program chart (PDPC) is defined as a new management planning tool that systematically identifies what might go wrong in a plan under development. Countermeasures are developed to prevent or offset those problems. By using PDPC, you can either revise the plan to avoid the problems or be ready with the best response when a problem occurs.

7.List out the need for Quality Awards.

- ✓ Identify your strengths and weaknesses,
- ✓ set clear goals and objectives,
- ✓ measure your progress and outcomes,
- ✓ and benchmark your performance against best practices and competitors.

8.What is MBNQA?

The Malcolm Baldrige National Quality Award (MBNQA) is an award established by the U.S. Congress in 1987 to raise awareness of quality management and recognize U.S. companies that have implemented successful quality management systems. The award is the nation's highest presidential honor for performance excellence.

9.What is mean by Golden Peacock Award?

Golden Peacock Awards for Corporate Leadership and Institutional Excellence, over the time, have become a hallmark of excellence, both locally and globally. No award has achieved such respectability and admiration from the industry as the 'Golden Peacock Awards', which today receives over 1000 applications for various Awards each year.

10.Write a short note on Arrow diagram.

Arrow diagram is defined as a process diagramming tool used to determine optimal sequence of events, and their interconnectivity. It is used for scheduling and to determine the critical path through nodes.

11.What is Industrial Cycle?

The industry life cycle refers to the evolution of an industry or business through four stages based on the business characteristics commonly displayed in each phase. The four phases of an industry life cycle are the introduction, growth, maturity, and decline stages.

12.What is Hidden plant?

The Hidden Factory forms when a defect flows downstream. When the defect is caught, a workaround is created as it is removed from the line, fixed, and placed back on the line. This may

solve the problem in the short term, but when you do the same thing over and over again, the workarounds add up, and a hidden factory ultimately develops.

13.What is six sigma?

Six Sigma is a set of methodologies and tools used to improve business processes by reducing defects and errors, minimizing variation, and increasing quality and efficiency. The goal of Six Sigma is to achieve a level of quality that is nearly perfect, with only 3.4 defects per million opportunities.

14.Defined quality circles.

A quality circle or quality control circle is a group of workers who do the same or similar work, who meet regularly to identify, analyze and solve work-related problems. It consists of minimum three and maximum twelve members in number.

15.Defined JIT.

The just-in-time (JIT) inventory system is a management strategy that minimizes inventory and increases efficiency. Just-in-time manufacturing is also known as the Toyota Production System (TPS) because the car manufacturer Toyota adopted the system in the 1970s.

16.List out the need of Six sigma.

Six Sigma not only helps you reduce waste, but it also helps you further leverage effective processes. With formal training, you will learn how to utilize resources to achieve maximum effectiveness using your current business processes.

17.List out the objectives of six sigma.

Six Sigma is used to identify and reduce errors and increase the efficiency of business processes. The primary objective of Six Sigma is customer satisfaction, and to achieve the objective, various methods are followed to improve the performance of a product or business process

18.what is process mapping?
A process map outlines the individual steps within a process, identifying task owners and detailing expected timelines. They are particularly helpful in communicating processes among stakeholders and revealing areas of improvement. Most process maps start at a macro level and then provide more detail as necessary.

19. What is mean by Competitive Enhancement

Having all departments on board for agile methodology can ensure for a much more efficient and competitive atmosphere. This is by partnering with firms that have the same ideas and mindset about the production. This is how you can set yourself a step above competitors and adopt a much more flexible and adaptable supply chain.

20. **What is Perishability?**

Services cannot be stored, saved, returned or resold once they have been used. Once rendered to a customer the service is completely consumed and cannot be delivered to another customer. eg: A customer dissatisfied with the services of a barber cannot return the service of the haircut that was rendered to him. At the most he may decide not to visit that particular barber in the future

21 .What is technology storage?
The technology used by employees will also play an important role in their efficiency. If technology is slow, outdated, or requires a lot of maintenance, employees won't be able to fulfil their potential for maximum productivity. By keeping technology up-to-date, higher rates of efficiency are more easily achievable. Consider renewable energy options such as LED lighting and solar with battery storage

2**2.What is problem solving process?**

Problem solving is the act of defining a problem; determining the cause of the problem; identifying, prioritizing, and selecting alternatives for a solution; and implementing a solution.

23. What is total factor productivity?
All businesses strive for growth. Growth means you can expand your team, pay better wages, and share stronger profits with owners and shareholders. How can businesses achieve growth? One of the most important ways is through higher productivity.
24.What is manufacturing?
The manufacturing process is scheduled for production and is running. Run Time is calculated by subtracting downtime from planned production time. Run time includes time when the process could be experiencing small stops, reduced speed, and making reject parts.
25. What is shifting?
Manufacturing has evolved considerably since the advent of industrial revolution. In current global and competitive age, it is very important for organization to have manufacturing practice which is lean, efficient, cost-effective and flexible. World class manufacturing is a collection of concepts, which set standard for production and manufacturing for another organization to follow. Japanese manufacturing is credited with pioneer in concept of world-class manufacturing

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UNIT-1 (13 Marks)

1,Describe the recent trends in operation management.

Lack Of Staff Is Causing Tension, But It Doesn't Have To

Personnel is the top cause of stress for line managers, especially frontline teams who lack workers due to the complex job market. Employees are taking on more of the slack, which causes them to feel overloaded and strained.

Due to the sheer staffing issues, operations managers will have a big chance in 2022. It doesn't seem like the labor dispute will end anytime soon. However, shift scheduling software can relieve so much pressure by giving users immediate access to the latest tasks and making it easier to interact with coworkers to change schedules. Plus, frontline team leaders will benefit from streamlined approval options and **functions of operations management**.

2. Using Common Motivating Factors To Drive Frontline Employees And Team Leaders

Team leaders believe a welcoming and open workplace atmosphere is the secret to employee loyalty. On the other hand, team members are less focused on culture and more obsessed with issues that affect their daily duties, such as human resources and new policies.

The good news is that feedback, performing well at work, and gaining new skills are among the intrinsic incentives shared by managers and frontline employees.

To achieve effective operations in 2022, it is important to leverage these motivating elements. Here are some methods your company can use to do that:

- Explore your frontline information environment for feedback channels
- Invest in frontline automated systems
- Optimize shift scheduling
- Spend money on training for senior and new staff

3. Designing An Environment That Puts Employees First

The year 2021 was the age of adaptability and resilience. In 2022, businesses will make radical changes to create an employee experience. It helps bridge the gap between line staff value and corporate ambition while enhancing productivity and motivation. In the long run, employees are more motivated and constructive.*Staff policy and working environment must be prioritized*

Furthermore, employees' physical and mental well-being should always be highlighted during 2022 when developing an employee experience. Operations managers, in particular, must be involved for this to be successful.

4. Process Automation In Face Of Huge Leaving

In 2021, approximately 4% of the retail staff quit their jobs. In June 2021 alone, about 632,000 workers resigned from retail positions. Almost one million hospitality and tourism workers left the industry in September.l

Without a doubt, talent retention will be the highest priority for companies in 2022. As a result, businesses invest time and money into workflow performance improvements involving process integration.

Digitization, in particular, is a major element in supply chain management for 2022. It not only makes things a lot easier for direct managers, but it also makes employees happy and satisfied.

Staff tasks can be performed in minutes using the best technology and tools.

Automation does more than boost employee satisfaction. It also:

- Increases operational productiveness
- Ensures accuracy and reliability throughout the organization
- Improves the overall employee experience
- Optimize workflows

5. Integrating Different Systems For Smooth Frontline Tech Experience

Frontline workers are nowadays multitasking a lot. Additionally, operations managers must streamline processes whenever possible so that mission-critical employees can concentrate on what is better for the company.

Browsing through unconnected information across various platforms is a major source of frustration for production workers. Do you know how strenuous it is to switch between different platforms and apps in search of a prompt response?

Workflows are separate, sluggish, and ineffective without a centralized, digital information source. Workers can lose an average of three hours per week when they can't collect the facts they need whenever needed.

Five Transforming Frontline Recent Trends In Operations Management 2022

Due to COVID-19 global outbreaks, customer habits and business trends have changed significantly, and thus, managers need to transform their processes and programs to adapt to new operational challenges and opportunities.

1. Priority on Well-Being and Safety

All operations managers will focus more on safety and health for the following long periods. Adapt quickly to internal systems and practices changes to stay compliant with new safety and compliance laws.

2. Digitizing Manual Processes

Technology use has increased because of COVID-19, resulting in less efficiency. On the bright side, digitalization will eliminate monotonous chores, cut expenses, and grow capacities in ways your teams could not handle.

2. Explain the detail about the operations strategy and strategic fit with example.

Operations or operational strategy refers to a system of decisions that shapes all long-term operational capabilities and their offering to the overall achievement of a strategy. Quite simply, it's a series of decisions that can help an organization implement competitive and sustainable business strategies. It supports linking long and short-term operational-level decisions with corporate strategy. From a strategic viewpoint, this allows organizations to make key operations decisions and maintain consistency with its overall objectives.

From operations strategy examples, we see that it drives an organization's operations the part of the business responsible for producing and distributing services and goods. Along with a business strategy, it's critical for a business to compete in dynamically shifting markets. Effective strategies enable operations management professionals to optimize the use of people, processes, technology and resources.

To develop a sound operational level strategy, we must consider two main elements market requirement and operations resources. Market requirements consist of goals related to performance such as time, quality, cost, dependability and flexibility. Performance objectives are mainly influenced by factors like offerings to attract customers over competitors and addressing appropriate customer needs. Operations resources deal with an organization's capabilities, assets and processes.

3. Explain in detail about the operational strategy and strategy fit with example.

Types Of Operations Strategy

Organizations can examine and implement efficient and effective systems for using work processes, personnel and resources. Here are a few common types of operations strategy:

Customer-Driven Strategy

To meet the desires and needs of the target customers, an operations strategy must include customer-driven approaches. Organizations must continuously evaluate the changing business environment and adapt to it. This helps them enhance core competencies and develop new strengths regularly. Organizations must also monitor industry trends to avoid threats as well as create new opportunities. Good customer-driven strategies ensure more clients by improving the system of new and repeat customers by building loyalty and referral.

Product Strategy

A strategy for product development must aim to deliver a compelling product or service that resonates with customers. But the job involves more than releasing new products. Organizations also need to maintain and upgrade their existing products for those who won't buy the new ones. For example, even though smartphone brands release new models every year, they continue to provide low-cost upgrades and free patches to improve their existing models.

Market Penetration Strategy

Market penetration is an operational level strategy that focuses on capturing a larger share of the target customer base in an industry. Managers can choose strategies to target new users who have no experience with the brand or lure customers away from industry rivals. They may use multiple geographical locations to target a demographic. Adding value to existing customers is also a great way to increase spending on products or on service upgrades.

Supply Chain Strategy

This operations strategy deals with the process of building superior delivery capabilities to create excellence. Organizations can take many paths, such as minimizing product costs by making bulk purchases or increasing customer value by offering product customizations while delivering goods more efficiently. Improving the efficiency of delivery operations can involve changing warehouse layout to reduce time and effort in fulfilling orders. For example, a warehouse manager may decide to bring all frequently bought products to the front and nearer the loading dock. This saves time for both customers and employees and saves on labor by expediting the process.

Service-oriented organizations use basic operations strategy to create an efficient management team and link short- and long-term corporate decisions.

Operations Strategy Examples

Let's look at some examples of operations strategy to get a better idea of the concept:

McDonald's

Apart from business expansion throughout the world, McDonald's business strategy is concerned with preparing quality food for customers quickly and at comparatively lower rates than others.

To achieve their goals, they control all their operational activities by developing strategies at the management level and implementing them across all branches. The operations managers at different branches are responsible for monitoring these activities and controlling a few of them. McDonald's uses information technology to implement new ways of enhancing its operations. Using a stock control database system, they avoid unnecessary ordering and keep stocks updated at stores, spending less time. Their competitive priorities are –

1. **Quick service time**: McDonald's realized pretty early that if they meet the demand of providing fast delivery, they can attract a lot of customers and reduce costs. They invested in expensive machinery that could prepare food quickly, making their products ready to serve.
2. **Cost**: To offer quality products at reasonable rates, McDonald's had to adopt more than one operational level strategy to reduce the cost of its operations. They use efficient equipment that saves time and lights that consume less electricity. They directly purchase most of their vegetables, especially potatoes, from farmers. Along with a low-cost supply chain, McDonald's has also implemented strategies to manage and reduce unnecessary storage and wastage.
3. **Quality**: McDonald's strategy is to focus on price, product, promotion, people and place. They don't compromise on quality, have efficient employees to serve customers and their promotions are based on good marketing and activities to build trust. Their restaurants and outlets aim to offer comfort, hygiene, safety and modern amenities. They have quality centers in North America, Europe and Asia to make sure that training is proper and quality standards are maintained.
4. **Flexibility**: McDonald's offers a wide variety of products. They generate new ideas and implement them in producing products or making them attractive. By adjusting output levels, they've created an opportunity to tackle unexpected changes in product demand.

Dell had a distinct supply chain management model in its early years. They started selling customized PCs directly to customers to meet a rapidly increasing demand. Dell became a high-tech pioneer and industry leader with its innovative sales model, offering great value to its shareholders. They were a multinational enterprise that gained a competitive advantage by competently and flawlessly executing an unrivaled global strategy. Dell's competitive priorities are –

1. **Inventory management:** Competitors used market forecasts to pre-build standard machines and stuffed their inventories. Dell made machines as per order with a mere 12 days of inventory. They implemented the Just-In-Time (JIT) strategy to operate with low inventory levels in the market. Since the cost of electronic components depreciates by almost 1% every week, Dell managed to have a cost advantage due to no excess inventory.
2. **Direct selling:** Direct selling was an important tool in Dell's operational level strategy. It significantly reduced costs by taking intermediaries such as retailers and wholesalers out of the equation. With customization options for computers and a vast network of suppliers with real-time information, their services proved to be attractive and customer-centric.
3. **Manufacturing locations:** Another reason for Dell's competitive advantage was their choice of manufacturing locations. Manufacturing units were located close to regional markets to allow better market access, minimize shipping costs and improve delivery

response. In places like India, setting up manufacturing units dramatically improved their sales as products didn't have to be shipped from Malaysia and delivery times were reduced by 50%.

Operational strategy allows organizations to translate their product plans and competitive priorities into processes related to making decisions. Operation decisions help determine the different processes for producing volume and variety of products.

Arriving at the right strategy is a process of inquiry, reasoning and elimination. Ask the right questions to test assumptions and uncover new information. Harappa's Select A Strategy program will teach you to seek, absorb and interpret information. You'll be able to actively engage in cognitively challenging tasks and purposefully seek knowledge. You'll also learn to make data-driven decisions after investigating all available options. Harappa's **Select A Strategy** pathway is an overarching framework to get you where you want to be.perational risk refers to the potential for losses arising from inadequate or failed internal processes, people, systems, or external events. It is a crucial aspect of risk management for banks and organizations. In this article, we will explore the different types of operational risk, the significance of managing operational risk, and effective risk management strategies. Real-life examples of operational risk will illustrate its impact, and we will discuss the benefits of implementing sound risk management practices.

There are a few key elements that go into a company's operations strategy.

1. 1. **Production system**: An organization's production system determines the short-term and long-term planning for how resources are turned into marketable products and services. A comprehensive production system includes clear workflows, quality control benchmarks, and supply chain management strategies.
2. 2. **Facilities**: A company's operational capabilities are influenced by the size and number of production facilities. To function properly, specific facilities require achievable production goals, clear safety procedures, and inventory management systems.
3. 3. **Product or service**: One of the most important elements of any operations strategy is the quality management of a product or service. Businesses analyze the lifecycle of their products and services in order to predict market trends, adjust their product or service, and allocate resources to new service development and product development.
4. 4. **Technology**: Operations strategy increasingly depends on new technological developments like machine learning, production line automation, real-time metrics, and market forecasting tools.
5. 5. **Resources**: A comprehensive overall strategy for operations takes into account the total operations resources available to an organization, including locational, mechanical, and human resources.

5 Types of Operations Strategies

Businesses employ different types of operations strategies based on their specific market needs.

1. 1. **Core competency strategies**: Core competency operations strategies revolve around the main strengths of a company's business model. By identifying the best core business

processes within an organization, core competency operations strategies focus on leveraging existing strengths to maximize profitability.

2. 2. **Corporate strategies**: This type of operations strategy adheres to a company's mission statement and aligns itself to a larger corporate strategy. Businesses using this type of operations strategy develop production initiatives, key performance indicators (KPIs), and decision-making processes based on an overall strategic plan determined by company leaders and stakeholders.
3. 3. **Competitive strategies**: Companies using this type of strategy develop their operations processes in order to distinguish their product or service from competitors. By identifying competitive priorities within a specific economy, businesses can change their operations strategy to move toward a competitive advantage, whether that's a higher-quality product or a faster lead time during production.
4. 4. **Product or service strategies**: This type of operations strategy revolves around the quality control of existing products or services as well as the development of new products and services. Businesses using this model often determine their operations strategies based on the research and ideas from product managers.
5. 5. **Customer-driven strategies**: Organizations using customer-driven strategies make operations decisions based on the customer experience. This type of operations strategy aligns with sales and marketing strategies to manage and fulfill customer expectations.

Example of Operations Strategy

An example of an operations strategy is a furniture retailer deciding to change its manufacturing strategy by outsourcing production to an automated facility. By using new technological resources, this hypothetical furniture company can manage its supply chain better and create products faster to improve its competitive position.

4.Discuss in detail about the challenges and current properities in operation management.

Current Challenges for Operations Management

There are multiple challenges that operations managers face frequently:

1. **Globalization** - Globalization is defined as the process by which businesses interact with people, companies, and governments on an international scale. This is being driven by the reduction of trade barriers, advancements in information/transportation technology, and more. The benefit of globalization is that there is more interactions between different populations around the globe and allows companies to reach a wider market. However, operations managers have found themselves facing competition not only from their country of origin, but from countries all around the globe. To maintain their competitive advantage, operations managers must keep up with the trends and software technology available to help increase their production.
2. **Sustainability** -Sustainability is a frequent issue discussed among various news outlets - with manufacturing being one of the largest factors contributing to conversation. There is much debate over whether or not we will have the appropriate amount of resources needed in order to have a sustainable future. When discussing the concept of sustainability, the three

pillars of sustainable usually come into play, which include social, environmental, and economic. Operations managers need to be aware of the outcomes of each of these pillars, including how their production facility or work will affect these factors. Effective operations management will implement practices that will address these concerns pertaining to sustainability

3. **Effective Communication** - Consistency and effectiveness of communication is extremely difficult within organizations. The challenge for operations managers is to be able to communicate effectively with all internal and external stakeholders. This will ultimately allow for more thorough transparency within your production facility, which will aid your factory floor immensely. Having everyone on the same page can boost efficiency within your manufacturing operation with ease and operations management needs to look into softwares that can make this much simpler for them. Effective communication is a must for manufacturing facilities that are seeking to boost operational efficiency in areas such as demand planning, demand forecasting, using the plan/forecast, and ultimately implementing this into a proper production plan.
4. **Ethical Conduct** - Ethics is defined as a subset of business ethics that is meant to ensure that production functions or activities are not damaging to people or society. Understanding the ethics of business will ensure that you will not fall out of line in terms of keeping the people and environment of your business safe. Unethical behavior has contributed to the demise of various companies around the globe - which is why understanding them is so important. Being ethical across all functions of your business will ensure that your operation runs smoothly and that you will not turn into one of the companies that have failed due to this.

5.Briefly discuss the historical development of operation management.

The idea of operations management began in the eighteenth century as manufacturing management. An economist, Adam Smith, realized that specialization of labor could be very beneficial to any organizations economy.

He therefore came up with the idea of breaking up jobs into sub units where only workers specialized in a certain field would take up the task not only to ensure efficient delivery of the task but also to further increase their skills (Kumar, and Suresh, 2009, p. 284). Early in the twentieth century, F. Taylor enforced this law which then resulted to the development of scientific management. Since then until in the early nineties, many developments were made based on the traditional of the operation.

In 1776, Adam Smith developed the theory of specialization of labor in the manufacturing industry (Kumar, and Suresh, 2009, p. 284). This was followed by development of cost accounting in 1799 by Eli Whitney among other scientists. Later in 1832, Charles Babbage developed division of labor and assigning of tasks depending on employees' skills as well as the necessity of time management (Kumar, and Suresh, 2009, p. 284).

From the scientific management of time, Frederick Taylor developed planning and work performance in the year 1900. Soon after, in 1900, Frank Gilbert came up with the motion of studying jobs (Wilson, 995, p. 87). This was followed by the development of techniques for scheduling of work for employees as well as the development of manufacturing jobs which required the use of machinery.

These two developments were done by Henry Gantt in 1901. In 1915, F.W. Harris developed the use of inventory for economic controls. The human relations department was developed by Elton Mayo in 1927 (Kumar, and Suresh, 2009, p. 284). Following this development was the use of statistical information to check and control the quality of various products by use of quality control charts.

This development was by W.A. Shewart in 1931. This contribution was further developed into sampling techniques to control quality of products and for inspection purposes in 1935 by H.F. Dodge and H.F. Roming. In 1946, a group of scientists among which was P.M. Blacker contributed in the application of operations research in the Second World War (Meredith, 2006, p. 189).

A very significant contribution happened in 1946 when John Mauchlly and J.P. Eckert developed digital computers. Following the use of computers, G.B. Dantzig and William developed software for programming business operations in 1947.

Linear mathematical programming was later developed in 1950 by two scientists, A. Charnes and W.W. Cooper. Since the initial digital computer was multipurpose, large scale computers were developed in 1951 by Sperry Univak to help in computation of data. Later in 1966, L. Cummings and L. Porter introduced organizational behavior whose aim was to continuously study people at workplace (Kumar, and Suresh, 2009, p. 284).

In 1970, W. Skinner and J. Orlicky developed the incorporations of all operations in an organization into a unified strategy with common policies. In the same year, G Wright introduced the use of computers in the manufacturing industry alongside control and planning of required materials. In 1980, application of quality productivity was introduced by W.E. Deming from Japan (The term production management therefore was the term for since 1930s up to 2950s. Managers worldwide developed techniques for efficient manufacturing operations. From then, other scientists started studying sociology especially on human behavior in workplace while mathematical as well as computer scientists developed more advanced techniques for data analysis.

With these new advancements, the name operations management came into be which put a lot of emphasis on expansion of the manufacturing sector. Emphasis was also put on production in the management practices rather than the usual analyzing duties

Historical Development of Operations Management: Its Impact

The development of these management operations has resulted to many positive impacts on businesses although some negative effects have been felt as well. Production in manufacturing industries has now been an organized activity where every sector of the factory has its own

specialists. As a result, every sub system has an objective which it works towards achieving it. This has ensured efficiency in productivity with quality production of products.

Since the subsections operate together with the whole of the organization, it becomes easier to get feedback from all the sections concerning the activities involved (Lewis, 2003, p. 64). This has enabled the organizations to control and make necessary adjustments on the system performance. The system of classifying productions has made it possible for manufacturers to produce a given quantity of products for specific customers at a fixed cost and time which is beneficial to both the business and the customer.

The idea of a job shop has been useful where there is a variety of products supplied to customers but in low volumes. Detailed planning of required materials has helped in determining the essential requirements of each product and consequently, priorities of orders by customers (Evans, 2005, p. 55).

One of the major impacts of operations management is mass production where the manufacturing system operates in large volumes in terms of inputs as well as outputs. This has mainly been made possible by the advancements of machinery where the machinery is arranged in a layout which allows automatic process of production. This has also enabled standardization of products to ensure quality maintenance.

Mass production has been applied in many factories today especially those that involve large volume of productions within shorter periods of time. However, for mass production to be cost effective, flow of raw materials should be continuous to ease the process of controlling and planning the production operations

Mass production has also been beneficial in capacity utilization as machines are always outlined in a balanced manner. This has enabled businesses to utilize only a limited space but produce large volumes of products leading to increased profits.

Only a few skilled operators are required to operate the machines and this has impacted businesses by reducing expenditures on salaries and wages. The cost of manufacturing a unit of products has reduced compared to production of small volumes of products. Basically, the major impacts of the development of operations management have been felt through mass production in many manufacturing businesses which is a very cost effective way of production

Another significant impact of the development of operations management in manufacturing businesses is continuous production which is facilitated by the sequential arrangement of machines and other production equipments.

This has made the production process faster that it was before and this has helped many manufacturing businesses meet their customers' requirements and orders in time. However, the production process is not flexible something which has made manufacturing businesses unable to accommodate changes in product manufacture especially on quantity.

These operations developments have as well enabled businesses to provide quality products to their customers through the standardization of products. Manufacturing businesses have been enabled to satisfy the needs of their customers by producing quality products depending on the cost of production of a particular product. This way, customers get satisfied and the business obtains comfortable profits

Through operations management, businesses have made use of right quantity production to prevent capital build up as well as shortage of products which would otherwise lead to lose of customers. In addition, planned production of goods has enabled many manufacturing businesses to deliver the products in time to their customer since all the involved processes are in place at all times.

Through production planning, manufacturing businesses have been in a better position to pre-determine the production cost prior to the actual manufacturing process. This has helped the businesses' managements to make suitable decisions after comparing the cost of production to the expected inflow.

Planning activities have also helped business to set goals and objectives with which to work on towards quality production. The operations development has promoted organization activities in businesses which have in return played a key role in achieving the set goals and objectives by specifying the role of every individual as well as determining authority and the responsibilities involved

With the increasing competition in businesses especially in manufacturing firms, operations management has impacted the global business environment. Manufacturing products (both goods and services) are now being delivered to distant locations because of the competitiveness of the products which have resulted from the advancements of the operations management.

As a result, international manufacturing has been practiced by many businesses due to the globalization of the operations with many local manufacturing businesses producing goods specifically for the international markets rather than selling them locally (Chopra, 2006, p. 75). The chains of supplies have as well been affected with many businesses obtaining their economic inputs form all over the globe.

Due to the ramifications involved in the manufacturing industry nowadays, specialized chains of supply for inputs have been developed to meet the ever rising demand for such services. Many businesses have now embraced the basic dimension of satisfying customers' needs considering the competitive markets (Lowson, 2002, p. 619). This has resulted to understanding the values of customers and therefore putting into considerations the specific needs and preferences of customers.

This understanding has promoting the manufacture of products or provision of service that makes the most of the customers' needs. Another very key concern that businesses are now working on is the minimization of costs and utilization of resources with the objective of making maximum profits. Many businesses have also changed from the traditional ways of mass production to the approaches of producing goods on-demand

Conclusion

The development of operations management has, no doubt, brought about significant advancements in the manufacturing industry. With the development of new production technologies and machinery, businesses have been able to affect their production activities. The definition of the role of management in production has as well promoted organization, planning and effective control of all production activities especially with the introduction of specialization and division of labor.

The assignment of tasks to specific employees who have specialized in that particular field of production has been widely adopted to enhance quality product provision which would lead to customer satisfaction and consequently meet the competitive marketing requirements. Customer satisfaction should always be the key objective of any business while putting into considerations the profitability concerns.

For this objective to be achieved, the management should be very careful in effective planning and organization of the production activities. Continuous availability of inputs is very essential in ensuring that all customers' needs and orders are met within the specified time frame. The costs of products should as well be favorable to customers, failure to which a business is likely to lose its customers to other firms who are offering lower prices.

However, the cost of production should be considered when designing price limits to prevent loses by the business. It is therefore the role of the management to ensure smooth running of a business. Besides effective management, dedicated employees play a significant role by working towards the common goal of making the business a success. Proper implementation of the operations management is a close guarantee of any businesses' success in today's competitive world.

UNIT=2

I. Answer the following question

1. Illustrate the different tools of capacity planning.

capacity planning tool is software that helps businesses monitor and evaluate their resource capacity. That includes team capacity, resource allocation, available resources, and even your technology and tool capacity. Capacity tools will take all of that information and use demand forecasting to make sure that there are enough resources available to complete incoming projects.

Project managers rely on capacity planning tools for project scheduling. The capacity planning process is complicated, and when you don't have the right tools, it can be overwhelming and lead to major issues. With the right project planning tools and resource management tools, it becomes easier for capacity planners to do their job and help improve teamwork while moving the company towards its goals.

Learn how Teamwork's resource management features can help take the guesswork out of your capacity planning.

Key features to look for in capacity planning software

Here are a few of the key features that you'll want to be on the lookout for when comparing your resource capacity planning software options:

Uses a simple yet effective dashboard

A powerful feature of a resource management system is a simple, user-friendly dashboard that delivers clear answers. When a dashboard is complicated or doesn't display useful information, the entire tool can become a chore to use. A good dashboard will show you things like current and future capacity, billable hours, and resource availability at a glance.

Provides actionable data and real-time reporting

A capacity planning tool should capture important metrics and allow managers to use that data to make better decisions. Real-time reporting is important in today's modern workplace, as it allows managers and project planners to be more agile and get a true picture of their current capacitEncourages automation of workflows

Some of the biggest slowdowns in the workplace are repetitious and time-consuming tasks. Trying to manually track down each employee to check on their capacity is just about impossible. A great capacity planning tool will help you to effectively automate workflows so that you can focus on the optimization of your systems and high-level tasks.

Integrates easily with the other tools in your agency's tech stack

No matter how many great features a software has, it won't be useful to your organization if you can't integrate it with other tools. A resource planning tool should be able to integrate with things like your customer relationship management (CRM) system, office calendar, and any other management systems that you use to operate your business.

5 powerful capacity planning tools

Now that you know what makes a capacity planning tool effective, let's look at five different tool options so that you can evaluate if they will fit your organization's needs

1) Teamwork

Teamwork is a project management platform completely focused on client work. Every aspect of the platform helps you deliver work on time and to the satisfaction of your clients. You can use Teamwork to track and manage projects, resources, and budgets. The easy-to-use dashboard gives you a snapshot of your entire team, and the collaboration and knowledge-sharing tools are incredibly advanced.

Teamwork's Workload Planner enables you to view and manage your team's capacity at a granular level. It provides a real-time update of all the time logged against a project or task so you can see if the team is working over or under capacity.

Unique features

Built-in time tracking to measure time spent on tasks and projects A workload planner to understand if your team is working under or over capacityResource Scheduler enables high-level planning of resources Utilization Report to report on and analyze how your team's time was distributed Integrates with Hubspot, Slack, Google Drive, Gmail, and more

Pricing options

Teamwork offers both a free trial of the software and a free version, which helps it stand out from many other tools in the space. Subscription pricing begins at $9.99 per user per month, or $17.99 for a Grow plan. Enterprise-level businesses should reach out directly for custom pricing information.

2) Resource Guru

Resource Guru is a project management tool focused on resource management. It helps you manage the usage of all of your different resources across the organization and monitors the utilization rate of each resource in your toolbox. It also helps you manage your team closely and keep a pulse on their availability and bandwidth, from their time off requests to their current calendars.

Unique features

Allows you to put the entire team's schedule into a single calendar view

Gives you an alert when a resource isn't available

Helps manage employee time-off requests

Many filters for custom fields

Easy-to-use availability bar for team capacity

Drag-and-drop features for resource scheduling

No free trial or free version

Doesn't integrate with many other tools

Lacks a Gantt chart function for easy displays

Pricing options

Resource Guru doesn't offer any free plans or trials of the product. Instead, they begin their plans at $3 per user per month and go up from there based on the number of users and tool accessibility.

3) Saviom

Saviom is a resource management tool for enterprise businesses. It helps large companies optimize their resource usage and plan their team capacity. This can help organizations maximize their efficiency, reduce downtime, and save on overhead costs. It has a user-friendly scheduling tool and advanced reporting and analytics to help businesses get the most out of their workflow management.

Unique features

Drag-and-drop calendar feature

Demand projections for future resource allocatio

Integrations with calendar and planning tools

Simplifies the planning process with easy tools

Provides calendar tools to schedule resources easily

Offers a free trial

Not a great choice for small businesses

Limited features

Lacks customization features

Pricing options

Saviom offers users a free trial of the software. After that, pricing is quote-based for each company, so you will need to reach out to the company directly to determine what pricing will look like for your organization.

4) Mosaic

Mosaic is an all-in-one tool for capacity planning and resource management. It helps you unify your team and ensure that your projects are scheduled accurately. It provides many real-time tools for tasks like time tracking, budgeting, reporting, creating timesheets, and project

scheduling. It also allows you to prioritize resources to improve your resource planning management.

Unique features

AI-powered recommendations for planning

Workload heat map to help determine which team members are overloaded

Budget adjustment for evolving project

No free trialPricing options

While there is no free trial of the software, Mosaic does offer a free version of the tool with limited features and accessibility. Subscription plans begin at $9.99 per month for each user. A business plan begins at $14.99 per user per month, and the enterprise plan is priced based on the project.

5) Smartsheet

Smartsheet, as the name might suggest, is a tool that focuses on spreadsheets for project organization and resource allocation — but takes it to the next level. It's a popular tool used by millions across the globe and helps increase collaboration and teamwork in your organization.

Unique features

Integrations with Google Apps, Salesforce, and more

Forms and data collection

Process management at scale

Task automation

Extensive library of templates to choose from

Wide range of customization tools

Ability to manage large and complex project

Laggy on large projects

Confusing onboarding and setup

Limited features compared to other tools

Pricing options

Smartsheet offers a free trial of the tool — but no free plan. Pricing begins at $7 per user per month, although some organizations (like schools and nonprofits) can receive a discounted rate. Pricing goes up depending on the project and the number of users.

Organize your teams' workload with Teamwork

At Teamwork, we understand how important it is for a project team to know their resource availability. With the help of a capacity planning tool like Teamwork, you can improve resource scheduling across your organization and create better systems for assigning tasks, creating projects, and managing your teams. To learn more about how Teamwork can make a difference in your business, read

Confusing onboarding and setup

Limited features compared to other tools

Pricing options

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2. Elaborate the different location models in detail.

n traditional economic models, consumers display preference given the constraints of a product characteristic space. Consumers perceive certain brands with common characteristics to be close substitutes, and differentiate these products from their unique characteristics. For example, there are many brands of chocolate with nuts and others without them. Hence, the chocolate with nuts is a constraint of its product characteristic space.

On the other hand, consumers in location models display preference for both the utility gained from a particular brand's characteristics as well as its geographic location; these two factors form an enhanced "product characteristic space." Consumers are now willing to sacrifice pleasure from products for a closer geographic location, and vice versa. For example, consumers realize high costs for products that are located far from their spatial point (e.g. transportation costs, time, etc.) and also for products that deviate from their ideal features. Firms have greater market power when they satisfy the consumer's demand for products at closer distance or preferred products.

1929, Hotelling developed a location model that demonstrates the relationship between location and pricing behavior of firms.[1] He represented this notion through a line of fixed length. Assuming all consumers are identical (except for location) and consumers are evenly dispersed along the line, both the firms and consumer respond to changes in demand and the economic environment.

In Hotelling's Location Model, firms do not exercise variations in product characteristics; firms compete and price their products in only one dimension, geographic location. Therefore, traditional usage of this model should be used for consumers who perceive products to be perfect substitutes or as a foundation for modern location models.

An example of fixed firms

Advanced analysis

Given the assumptions of the Hotelling model, consumers will choose either firm as long as the combined price and transportation cost of the product is less than the competitive firm.

For example, if both firms sell the product at the same price consumers in quadrants and will pick the firm closest to them. The price realized by the consumer is

, where is the price of the product including the cost of transportation.

As long as for Firm x is greater than Firm y, consumers will travel to Firm y to purchase their product; this minimizes . Only the consumers who live at point , the halfway point between the two firms, will be indifferent between the two product locations.

Assumptions

Assume that the consumers are equidistant from one another around the circle. The model will occur for one time period, in which only one product is purchased. The consumer will have a choice of purchasing variations of

Product A (a differentiated product) or Product B (an outside good; undifferentiated product).

There are two firms also located equidistant around the circle. Each firm offers a variation of Product A, and an outside firm offers a good, Product B.

Given the assumptions of the Hotelling model, consumers will choose either firm as long as the combined price and transportation cost of the product is less than the competitive firm.

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An example of firm relocation

Assumptions

Assume that the line in Hotelling's location model is actually a street with fixed length.

All consumers are identical, except they are uniformly located in four quadrants , , and ; the halfway point between the endpoints is point . Consumers face an equal transportation/time cost for reaching a firm, denoted by ; they have no preferences for the firms.

There are two firms in this scenario, Firm x and Firm y; each one is located at a different end of the street, is able to relocate at no cost, and sells an identical product.

Analysis

In this example, Firm x and Firm y will maximize their profit by increasing their consumer pool. Firm x will move slightly toward Firm y, in order to gain Firm y's customers. In response, Firm y will move slightly toward Firm x to re-establish its loss, and increase the pool from its competitor. The cycle repeats until both firms are at point , the halfway point of the street where each firm has the same number of customers. This result is known as Hotelling's law, however it was invalidated in 1979 by d'Aspremont, J. Jaskold Gabszewicz and J.-F. Thisse.[2] Consider that quick (short run) price adjustment and slow (long run) location adjustment is modelled as a repeated two-stage game, where in the first stage firms will make an incremental relocation and in the second period, having observed each other's new locations, they will simultaneously choose prices. d'Aspremont et al. (1979) prove that when firms are sufficiently close together (but not located in the same place) no Nash equilibrium price pair (in pure strategies) exists for the second stage subgame (because there is an incentive to undercut the rival firm's price and gain the entire market). For example, when firms are equidistant from the centre of the street, no equilibrium price pair exists for locations 1/4 or closer than 1/4 of the length of the street from the centre. The non-existence of a Cournot equilibrium precludes the ending of the game, and so it is not repeated. Thus, although both firms at the halfway point itself is an equilibrium, there is no tendency for firms to agglomerate here.

3.Illustrate the factors influencing and favoring make or buy decision.

If only Firm x can relocate without costs and Firm y is fixed, Firm x will move to the side of Firm y where the consumer pool is maximized. Consequently, the profits for Firm X significantly increase, while the profits for Firm Y significantly decrease. A make-or-buy decision is an act of choosing between manufacturing a product in-house or purchasing it from an external supplier.

Also referred to as an outsourcing decision, a make-or-buy decision compares the costs and benefits associated with producing a necessary good or service internally to the costs and benefits involved in hiring an outside supplier for the resources in question.

To compare costs accurately, a company must consider all aspects regarding the acquisition and storage of the items versus creating the items in-house, which may require the purchase of new equipment, as well as storage costs.

Understanding a Make-or-Buy Decision

Regarding in-house production, a business must include expenses related to the purchase and maintenance of any production equipment and the cost of production materials. Costs to make the product can include the additional labor required to produce the items, which takes the form of wages and benefits, storage requirements within the facility, holding costs overall, and the proper disposal of any remnants or byproducts from the production process.

Buy costs related to purchasing the products from an outside source must include the price of the good itself, any shipping or importing fees, and applicable sales tax charges. Additionally, the company must factor in the expenses relating to the storage of the incoming product and labor costs associated with receiving the products into inventory. It also includes signing any contracts with suppliers that might require the company to be locked-in to certain deals for a certain period of time.

In a make-or-buy decision, the most important factors to consider are part of quantitative analysis, such as the associated costs of production and whether the business can produce at required levels.

Choosing Make or Buy

The results of the quantitative analysis may be sufficient to make a determination based on the approach that is more cost-effective. At times, the qualitative analysis addresses any concerns a company cannot measure specifically.

Factors that may influence a firm's decision to buy a part rather than produce it internally include a lack of in-house expertise, small volume requirements, a desire for multiple sourcing, and the fact that the item may not be critical to the firm's strategy.

A company may give additional consideration if the firm has the opportunity to work with a company that has previously provided outsourced services successfully and can sustain a long-term relationship.

Similarly, factors that may tilt a firm toward making an item in-house include existing idle production capacity, better quality control, or proprietary technology that needs to be protected. A company may also consider concerns regarding the reliability of the supplier, especially if the product in question is critical to normal business operations. The firm should also consider whether the supplier can offer the desired long-term arrangement if that is what it requires.

4.illustrate the types of process design

A business process is how work gets done, then process design is simply a way of ensuring that work gets completed as consistently, efficiently, and impactfully as possible.

You can apply different types of process design to any area where you need to optimize workflow to meet your goals for performance or strategy. And while there are different types of process design you can use, the approach you take to mapping out your business procedures will depend largely on whether you're formulating the steps in a process for the first time or revamping an existing workflow.

The main goal of process design is to consistently transform a defined set of resources into a specific outcome through a structured flow of established work tasks.

Of course, that's not always as straightforward as it sounds.

Some processes must unfold as a strict series of events, some will occur simultaneously as part of a bigger system, and some will inevitably overlap with other workflows.

Fortunately, you can use different types of process design to clarify work purpose and parameters by:

- Visually organizing the activities that make up a particular process or sub processes
- Defining the roles of work flow participants
- Determining which resources must perform which tasks, in what order, under what conditions, and to what standard to achieve a particular goal

Applying the right process design ensures key business procedures are repeatable, allows you to predict costs and timing more accurately, and makes it easier to evaluate how changes to a process will affect its results.

Why use different types of process design?

Different approaches to process design serve different purposes. They may be categorized by the role a particular process plays in your organization, by its complexity, or by the goal it helps you accomplish.

The type of process design you use will ultimately depend on whether you want to:

- Map out a new workflow or lay down an established process (process mapping or process documentation)

- Create a single-stream flow of events or multiple, interconnected workflows (serial vs parallel process design)
- Revise a current process by testing different workflow options to see which operates most efficiently (process improvement or process modeling)

Let's see how choosing the most appropriate path to clear, predictable results will help you and your team achieve the best possible outcomes.

3 key types of process design

Broadly speaking, most business processes fall into one of two categories: primary or supportive.

- Primary or operational processes create a customer-driven value stream for your organization. They could include order processing, client onboarding, or the manufacture of a product.
- Support processes prop up your primary processes and may be driven by administrative, compliance, or legal requirements. They could include employee onboarding, expense report management, or safety training.

In either case, the process you design may include a straightforward chain of sequential events, or a compound system of workflows that contribute to your overall goal. Your first step, however, should be to determine whether you'll be mapping out an entirely new process or overhauling one that already exists.

1. Process mapping

Process mapping is a catch-all design process that can be used in virtually any business scenario. It works especially well when you need to visually lay out the steps for a new process or for an established procedure that's yet to be documented.

Mapping software like MindManager makes it easy to use flowcharts and other types of process design tools to illustrate:

- The flow of activities required to carry out a particular process
- Relationships between tasks, people, materials, and other resources
- Various decision points along the way

Committing key processes to paper (figuratively speaking) allows you to share, track, analyze, and improve on them over time. And that offers big benefits whether you're creating a process around a new product, service, or marketing initiative – or mapping established workflows for an employee training manual.

2. Serial vs Parallel process design

The processes you design for your business may be simple or complex, but you can capture their structures either way by organizing your workflow activities accordingly:

- Serial process design lets you illustrate tasks that need to occur one after the other
- Parallel process design lets you display interrelated activities that can – or should – be carried out simultaneously to save time or increase productivity

If you were designing the process for company webinar production, for example, your workflow might require choosing a topic and then a format, but the tasks of creating a script, contacting potential guests, and nailing down promotional tactics could all be carried out at once.

3. Process improvement

Laying out primary and support processes with the help of swim lane diagrams and other efficiency tools allows you to better evaluate workflow performance. And spotting weak points, bottlenecks, or redundancies in a process highlights where improvements can be made:

- Are certain workflow tasks taking too long or costing too much? A design process focused on continuous improvement may help you conclude that automating certain steps is the solution. You could, for example, decide to introduce customer relationship management (CRM) software to follow up with new email subscribers, or an accounting app to capture invoice data digitally.
- Have the goalposts for a particular process shifted? Taking a process modeling approach to process design lets you map out and test different workflow paths and outcomes. You could, for example, experiment with adapting your current event planning process to one that's focused on virtual gatherings.

5.Discuss the criteria and approach of product design

Fast Company's Innovation By Design award winners in 2019 all have a few things in common: they're sleek, intuitive, and many have a sustainability focus. From a carbon-negative, algae-based plastic raincoat to a reusable takeaway-cup service for large venues, the winning designs all meld form and function to create a great user experience for the customer and the planet. There are several user interface design companies that put user experience at the forefront of their decision-making.

Designing a great product doesn't happen overnight. There are many product development strategies an entrepreneur can take to reach a breakthrough design. The process could start with something as simple as a napkin scrawl and continue with finding the right partner to move your design a leap ahead. Here are the different approaches that many businesses take to designing a new product.

TRADITIONAL BUSINESS APPROACH

The traditional business approach considers two factors when designing a product. Will the product be viable, i.e., how does it benefit the business? And, what is the operational and technical feasibility of designing the product? Using the traditional business approach to design, a company would identify a problem, or a set of problems, and then derive what the company thought it could offer as a profitable solution.

The traditional business approach to product development strategy seems relatively straightforward, but it often doesn't lead to success. It focuses on the "how" and "what," rather than the "why" – why does a customer need a product? The metrics for greenlighting a product design, namely viability and feasibility, are company-centric and don't consider the needs of the end-user. Hence, the rise of design thinking.

DESIGN THINKING APPROACH

Design thinking incorporates the user experience into the design process, moving beyond the simple look and feel part of product design. Design thinking was popularized by IDEO founder Tim Brown, who describes it as "a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success."

One of the aspects of design thinking that makes it so successful is the prototyping phase. Designers can help lower the risk of launching a new product by testing the product design with small groups of users throughout the development process. A prototype helps validate that the product is something a customer can understand, will use, and that the design is appealing before the product goes to mass production.

LEAN UX APPROACH

The Lean Start-up and Lean UX approaches take design thinking a step further, putting the prototyping process front and center. Lean Start-up is an approach to starting a business venture that takes an idea, translates it into a product or service, measures how customers respond, and then takes the learnings to pivot or iterate. Lean UX takes that same approach and applies it specifically to design.

Lean UX focuses on the human experience behind the design. The deliverables of the entire product development strategy are less important than the learnings the design process delivers. "The core objective is to focus on obtaining feedback as early as possible so that it can be used to make quick decisions," explains one UX blog.

The goal of Lean UX is to get feedback quickly and use it to continuously improve. It's an approach that is particularly collaborative – as if the customer is designing the product alongside the company. The drawback is that this approach to design can ignore other factors related to development; Lean UX can lead to somewhat of a product design bubble.

DESIGN SPRINT APPROACH

Design Sprint is a subset of the design thinking approach. There are five phases to the design sprint process that takes place on five separate days:

Design sprints focus on a small part of the problem, or one aspect of the design, rather than building a completely new product. The process allows designers to work with their customers in the prototyping and testing phases, and to learn quickly – within five days – to continue to design a

winning product. Obviously, design sprints integrate elements from the other approaches, but with a more focused, disciplined aspect to product design.

Which approach is right for you? It depends on the maturity of your company and the resources at your disposal. Reasearch the many different options for user interface design companies, before you make your choice. Speak to one of the experts at Gembah to learn how our experts can help with product development strategy.

UNIT-3

Chapter-6,7

1. What are the principles and importance of facility layout?

Facility layout and design is an important component of a business's overall operations, both in terms of maximizing the effectiveness of the production process and meeting the needs of employees. The basic objective of layout is to ensure a smooth flow of work, material, and information through a system.

Example of a Product Facility Layout. A fixed-position layout lets the product stay in one place while workers and machinery move to it as needed. Products that are impossible to move—ships, airplanes, and construction projects—are typically produced using a fixed-position layout.

he primary criteria for evaluating any layout will be the: minimizion of material

handling costs.

MH cost components: depreciation of MH equipment, variable operating costs, and

labor expenses. Also, MH costs are typically directly proportional to (a) the

frequency of movement of material, and (b) The length over which material is

moved.

1. Principle of integration: A good layout is one that integrates men,

materials, machines and supporting services and others in order to get the

optimum utilisation of resources and maximum effectiveness.

2. Principle of minimum distance: This principle is concerned with the

minimum travel (or movement) of man and materials. The facilities

3should be arranged such that, the total distance travelled by the men and materials should be minimum and as far as possible straight line movement should be preferred.

3. Principle of cubic space utilisation: The good layout is one that utilise both horizontal and vertical space. It is not only enough if only the floor space is utilised optimally but the third dimension, i.e., the height is also to be utilised effectively.

4. Principle of flow: A good layout is one that makes the materials to move in forward direction towards the completion stage, i.e., there should not be any backtracking.

5. Principle of maximum flexibility: The good layout is one that can be altered without much cost and time, i.e., future requirements should be taken into account while designing the present layout.

6. Principle of safety, security and satisfaction: A good layout is one that gives due consideration to workers safety and satisfaction and safeguards the plant and machinery against fire, theft, etc.

7. Principle of minimum handling: A good layout is one that reduces the material handling to the minimum.

Advantages of the criteria (reduced material movements):

1. Reduction of Aisle space required.

2. Lower WIP levels.

3. Lower throughput times.

4. Less product damage and lower obsolescence.

5. Reduced storage space.

6. Simplified material control and scheduling.

7. Less overcrowding in system.

2.Illustrate the various planning tools and techniques.

2. Write note on:

I) Stage gate approach

Stage-Gate is a value-creating business process and risk model designed to quickly and profitably transform an organization's best new ideas into winning new products.[2]

When embraced by organizations, it creates a culture of product innovation excellence – product leadership, high-performance teams, customer and market focus, robust solutions, accountability, alignment, discipline, speed and quality.

Companies willing to work hard at creating innovation capabilities become top performers and are realizing the benefits. Success rates, in the marketplace, are 2.5 times higher (63-78 percent) than the poor performers that achieve only a 24 percent success rate.

Given the large amount of resources – both people and money – dedicated to innovation in most companies, the rate of return for success versus the cost of failure will have a significant impact on whether your organization will achieve its revenue and profit goals from new product innovation. Hence the need for a business process like Stage-Gate which drives value.

Who are these companies with Stage-Gate innovation processes that seem to win more in the marketplace than they lose? It is not hard to identify them in any given industry. These are the companies that year-over-year have a proven innovation track record in their industry sectors. Firms, for example, like 3M, Abbott Nutrition, Baker Hughes, BASF, Corning, Exxon, GE, Hallmark, Kellogg, Pepsi, National Oilwell Varco, Procter & Gamble, to name but a few.

More than 80 percent of companies in North America use some type of a Stage-Gate innovation model. Worldwide the adoption of Stage-Gate continues to grow as organizations seek to improve their innovation capabilities.

II)Types of process

- Material processes, which involve the transformation of physical or financial resources (e.g., procuring, producing, storing and financing).

- Formal processes, which involve the coordination of activities and information (e.g., planning, controlling and decision-making).
- Management processes, which govern the operation of a system (e.g., strategic management, corporate governance and risk management).
- Operational processes, which execute the core business of an organization (e.g., manufacturing, marketing and sales).
- Supporting processes, which enable the effective functioning of the core processes (e.g., accounting, human resources and IT support).

3.What are the influencing factors of product design?

Bringing a successful product to market requires a lot of collaborative effort from all the members of the team. While designers are in charge of the factors affecting product design such as usability, utility, and the rest of the AI user experience, there are numerous other aspects that influence the success or failure of a product design.

Without a doubt, the world is now full of opinions & ideas and it is unquestionably difficult to satisfy all these opinions. Every new invention that gets appreciation after a long run would have definitely counted criticism along the way and it's a vice-versa process. This challenging opportunity has drawn the attention of many creative geeks to land their careers in Product Designing as there is always a scope for creativity and ideas.

Nonetheless, understanding the emotions of the end-user is a predominant aspect of a Product Designer along with the other factors controlling quality of design. Getting feedback and improvising the nooks and corners of the design gives out a highly impressive and pre-eminent outcome. As the design forms the index of the product before formulating the strategies, it is certainly important to have a look at the factors affecting the product design.

While every product that comes out to the market has traditionally had a purpose, they are increasingly becoming the very pivotal symbol of meaning. Without a doubt, every good product design aims to successfully communicate its very meaning to the customers.

However, there are numerous product design elements to consider, as well as numerous nuances to be aware of. The factors influencing product design or factors that affect design are as follows:

- Customer Requirements
- Functionality
- Cost
- Materials
- Durability
- Shapes
- Cultures

Let's take a quick glance at each of the factors affecting the product design!

1. Customer Requirements

One of the most important aspects is to meet and satisfy all the customer requirements. Since the end-users are the ones who leverage the product, it's indeed a designer's duty to get the requirements from the client before formulating the prototype and conceptualizing the ideology. To fit in all possible variations & conditions, the designed product needs to be streamlined in a way that it draws attention and convinces the targeted audience. Also, the designer should be able to eradicate the use of high-end technologies if it creates a negative feeling or inferior emotions in the client.

2. Functionality

Customer satisfaction is extraordinarily high when the factors affecting design of a product fulfills the purpose for which it is developed. The designed product should be functionally commanding and should extensively meet the end goal. Functionality is one such factor that influences the product design, and it is hence the designers' responsibility to maintain the coordination between the look and the way the product needs to work.

3. Cost

A product designer must balance the top-notch appeal and the cost-effectiveness together. Saying so, the cost comes next on the list of factors affecting product design. Acquiring all the required essentials in the allocated budget helps to mark the designer's name everywhere. This is hence one of the biggest constraints that a designer holds before crafting the creative outlet. Thus, the cost stays valid among the factors affecting design of a product and in determining the high quality of a great functional product.

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4. Materials

It is essential to have adequate knowledge of all the materials before designing a product. The designer must be updated and well renewed with all the new materials & technologies existing in the market. The quality of material preferred while producing a product gives a major impact on the factors affecting new product design. In order to impress the audience and to create the desired product, the designer must be aware of the availability of novel and finer materials.

4.List out and explain The 8 Steps of the New Product Development Process

With a common understanding of what NPD actually is, let's now jump into the 8 steps of the new product development process.

1. Idea Generation

The new product development process starts with idea generation. Idea generation refers to the systematic search for new-product ideas. Typically, a company generates hundreds of ideas, maybe even thousands, to find a handful of good ones in the end. **Two sources of new ideas can be identified:**

- *Internal idea sources:* the company finds new ideas internally. That means R&D, but also contributions from employees. For instance, many companies use a so-called suggestion box, which employees can throw new ideas into. In many cases, employees are the best source of new ideas, as they work with the product, but also the feedback of customers every day.
- *External idea sources:* the company finds new ideas externally. This refers to all kinds of external sources, e.g. distributors and suppliers, but also competitors. The most important external source are customers, because the new product development process should focus on creating customer value. Collecting new product ideas from customers becomes ever more important and simple in the digital era, where the conversation between companies and customers is as interactive as never before. Actively listening to customers' suggestions can be a great source of innovation.

2. Idea Screening

The next step in the new product development process is idea screening. Idea screening means nothing else than filtering the ideas to pick out good ones. In other words, all ideas generated are screened to spot good ones and drop poor ones as soon as possible.

While the purpose of idea generation was to create a large number of ideas, the purpose of the succeeding stages is to reduce that number of ideas. The reason is that product development costs rise greatly in later stages. Companies cannot afford to take every single idea to the next stages. Therefore, it is necessary to filter and go ahead only with those product ideas that are likely to turn into profitable products. Dropping the poor ideas as soon as possible is, consequently, of crucial importance.

At this early stage, filtering for the potentially profitable ideas can be tricky. A key to success is to initiate the conversation with customers early and look for feedback. For instance, by surveys and focus group interviews, companies can get early insights whether their ideas might meet customer demands in a better way than existing products.

3. Concept Development and Testing

To go on in the new product development process, attractive ideas must be developed into a product concept. A product concept is a detailed version of the new-product idea stated in meaningful consumer terms. You should distinguish the following sub-stages:

- *A product idea* – this is really just an idea for a possible product.

- *A product concept* – this is a detailed version of the idea stated in meaningful consumer terms.
- *A product image* – this is the way consumers perceive an actual or potential product.

Concept development and testing is a crucial stage in the new product development process. Therefore, let's go into the two sub-stages in more detail.

Concept Development

Imagine a car manufacturer that has developed an all-electric car (BEV). The idea has passed the idea screening stage and must now be developed into a concept. The marketer's task is to develop this new product into a number of alternative product concepts. Then, the company can find out how attractive each concept is to customers and choose the best one.

A product concept should at least capture the realization or form the product will take, the target group it caters to, as well as the main use cases. Possible product concepts for the electric car idea could

- Concept 1: An affordably priced mid-size car designed as a second family car to be used around town for visiting friends and doing shopping.
- Concept 2: A mid-priced sporty compact car appealing to young singles and couples for fun rides in their free time.
- Concept 3: A high-end midsize utility vehicle appealing to those who like the space SUVs provide but also want an economical car for everyday use in the city.

As you can see, these concepts need to be quite precise in order to be meaningful. In the next sub-stage, each concept is tested.

Concept Testing

New product concepts, such as those given above, need to be tested with groups of target consumers. The concepts can be presented to consumers either symbolically or physically. The question is always: does the particular concept have strong consumer appeal? For some concept tests, a word or picture description might be sufficient. However, to increase the reliability of the test, a more concrete and physical presentation of the product concept may be needed. After exposing the concept to the group of target consumers, they will be asked to answer questions in order to find out the consumer appeal and customer value of each concept.

At the end of the concept testing stage, you should have a clear idea of which product concept is the best in terms of customer feedback. In some cases, it may be that several concepts seem to work great. For instance, two different versions may prove to cater well to two different sub-target groups. Provided each of the target groups provides a sufficiently large and relevant target market, the company may choose to go ahead with both product concepts.

4. Marketing Strategy Development

The next step in the new product development process is the marketing strategy development. When a promising concept has been developed and tested, it is time to design an initial marketing strategy for the new product based on the product concept for introducing this new product to the market.

The marketing strategy statement consists of three parts and should be formulated carefully:

- A description of the target market, the planned value proposition, and the sales, market share and profit goals for the first few years.
- An outline of the product's planned price, distribution and marketing budget for the first year.
- The planned long-term sales, profit goals and the marketing mix strategy.

5. Business analysis

Once the company has decided upon a product concept and marketing strategy, management can evaluate the business attractiveness of the proposed new product. The fifth step in the new product development process involves a review of the sales, costs and profit projections for the new product to find out whether these factors satisfy the company's objectives. If they do, the product can be moved on to the product development stage.

In order to estimate sales, the company could for instance look at the sales history of similar products and conduct market surveys. Having a precise view of the likely demand for the eventual product is absolutely crucial. There are countless cases where this stage was underestimated. For example, think of cars that turned out to be flops when introduced to the market. Often, companies tend to skip this stage or spend too little time on it. The reason is in many cases a bias to focus too much on the company perspective, rather than listening to customers. When you come up with a new idea, think it through, design the product, include all those features you like and so on, you may have developed a great product for yourself. However, this does not mean that it will be a great product for the market. Customer feedback is therefore a critical element along all stages of the new product development process.

Once the initial demand analysis has been estimated, the company should be able to estimate minimum and maximum sales to assess the range of risk. Based on the sales forecast, the company should estimate the expected costs and profits for a product, including marketing, R&D, operations etc. All the sales and costs figures together can eventually be used to analyze the new product's financial attractiveness.

6. Product development

The new product development process goes on with the actual product development. Up to this point, for many new product concepts, there may exist only a word description, a drawing or perhaps a rough prototype. But if the product concept passes the business test, it must be developed into a physical product to ensure that the product idea can be turned into a workable

market offering. The problem is, though, that at this stage, R&D and engineering costs cause a huge jump in investment.

The R&D department will develop and test one or more physical versions of the product concept. Developing a successful prototype, however, can take days, weeks, months or even years, depending on the product and prototyping methods.

Also, products often undergo tests to make sure they perform safely and effectively. This can be done by the firm itself or outsourced.

In many cases, marketers involve actual customers in product testing. Consumers can evaluate prototypes and work with pre-release products. Their experiences may be very useful in the product development stage.

7. Test marketing

The last stage before commercialization is test marketing. In this stage of the new product development process, the product and its proposed marketing program are tested in realistic market settings. Therefore, test marketing gives the marketer experience with marketing the product before going to the great expense of full introduction. In fact, it allows the company to test the product and its entire marketing program, including targeting and positioning strategy, advertising, distributions, packaging etc. before the full investment is made.

The amount of test marketing necessary varies with each new product. Especially when introducing a new product that requires a large investment, when the risks are high, or when the firm is not sure of the product or its marketing program, a significant amount of time may be spend on test marketing.

8. Commercialization

Test marketing has given management the information needed to make the final decision: Launch or do not launch the new product. The final stage in the new product development process is commercialization. Commercialization means nothing else than introducing a new product into the market. At this point, the highest costs are incurred: the company may need to build or rent a manufacturing facility. Large amounts may be spent on advertising, sales promotion and other marketing efforts in the first year.

Some factors should be considered before the product is commercialized:

- *Introduction timing* – For instance, if the economy is down, it might be wise to wait until the following year to launch the product. However, if competitors are ready to introduce their own products, the company should push to introduce the new product sooner.
- *Introduction place* – Where to launch the new product? Should it be launched in a single location, a region, the national market, or the international market? In many cases, companies may lack the confidence, capital and capacity to launch new products into full

international distribution from the start. Instead, they usually develop a planned market roll out over time.

5. Briefly explain the facility layout and its types.

Facility Layouts in Industries -

● Facility Layouts refers to represent the physical arrangement of a Equipments and different

components of a factory at site location

● Here, the factory or production center may be small or large scale

● Simply to say, it is about how an industry will arrange of different equipments, raw materials storage

location, inventory storage, tool rooms, maintenance rooms, worker amenities etc a factory

locations

● Such arrangement layouts are called as " Facility Layout" or "Plants Layouts"

● There are various types of layout

Generally, there are 5 types of layouts that are widely in usage by industries

● They are -

1. Plant Layout

2. Process Layout

3. Product Layout

4. Combination Layout

5. Fixed Position Layout

Plant Layout -

● It refers to arrangement of the various facilities and services of the plant within the area of the site

selected previously.

● Plant layout design starts along with factory building

● All the facilities like equipments, raw materials, machinery, tools, futures, workers, etc. are placed at

appropriate place.

● In deciding the place for equipment, the supervisors and workers are consulted and their due

consideration are taken into account before they put into plant location

● However, consultation may not mandatory but consideration will help organization to have

co-operation with employees while in production as it will create a multiplier effect on production

● Placing the equipment where it is not convenient for employees while being in production will impact

the production levels

Objectives of Good Plant Layout:

● Minimize hurdles in transportation of equipment or materials of production

● Adequate space for production and services

● Safe working conditions for employees

● Optimum use of available space

● Design should not hinder the process of production

● Design should be flexible enough for future expansion

● Design should focus on to minimise the movements of employees from one equipment to

another equipment otherwise, it will create a loss of production hours

Process Layout:

● It is also referred as functional layout

● Process Layout focuses on keeping similar machines or similar operations at one place in layout

● Here, all similar functional Equipments are placed at one location and are grouped into one

department

● Process Layouts are more suitable for industries, as its production of goods is done based on series

of activities or process a site

Suitability of Process Layout -

This type of Layout is most preferable when -

● Several types of products need to be produced

● If volume of production of individual products is low

● When production of products needs continuous handling by mechanical methods

● If need of any intermittent production

UNIT -IV

CHAPTER-1OPERATIONS,RESOURCES &INVENTORY PLANNING

1. **Explain the Deming 's 14 principle.**

1.Create Constancy of Purpose

This is the first point from Deming's 14 points, according to this. The management must make all efforts for constant improvement in products and services to remain competitive in the market. Quality and not profit should be the organization's purpose. According to Deming, profit is automatically had when the organization can maintain quality. Therefore, the management must maintain a constant effort to improve and shift its focus from short-term interests to long-term ones.

2 Adopt The New Philosophy

According to Deming's 14 points, modern methods and advanced technology should be applied to improve product and service quality. All organizational members should support the new culture and dedicate themselves to improving quality.

3 Cease Dependence on Mass Inspection

Quality can be maintained by improving the process and not by inspecting it. Inspection for the faulty product is unnecessary if the quality is maintained from the very beginning.

4 End The Practice of Awarding Business on Price Tag Alone

Purchasing department normally gives orders to the lowest-priced vendors. But they do not ensure quality materials and suppliers. It is essential to maintain long term, loyal, and trust relationship with a single supplier who deals with high quality. According to Deming, price is not significant until it is related to quality.

5 Seek Continuous Improvement

Management must continuously improve the production process for better productivity and lower costs. In other words, it is the responsibility of the management to innovate alternatives to reduce waste and to improve quality. According to Deming's 14 points, corporate re engineering and process improvement is not a one-time effort

6 Institute Modern Methods of Training On-The-Job

Generally, junior workers learn their job from seniors who were never trained formally. It may not be developed the new scientific knowledge and skills among them. On the other hand, on-the-job training helps them to increase the required knowledge and skills to complete a given job.

7 Institute Leadership

The responsibility of managers and supervisors is to help workers to reach their full potential. They need to adopt and institute leadership to heps workers to do a better job. Management must ensure that immediate action is taken on reports of inherent defects, poor tools, unclear operational definition, and all conditions detrimental to quality.

8 Drive Out Fear

The feeling of fear of employees to express their views, opinions, ideas must be avoided. They must feel secure to ensure quality and productivity in the workplace. For this, management needs to encourage effective two-way communication.

9 Break Down Barriers Between Staff Areas

The management must break down barriers between department and staff areas. The practice of teamwork and group efforts must be encouraged. Employees can improve productivity by learning from each other and coordinating efforts regardless of their functional expertise. A feeling of team spirit must be developed between departments and employees.

10 Eliminate Slogans and Targets

Deming suggested that signs, slogans, and targets to motivate and inspire employees must be eliminated It is necessary to focus on continuous improvement in quality. Control charts and other process control tools give employees direction and encouragement. Effective leadership and continuous improvement of the system helps to meet the target.

11 Eliminate Numerical Quotas

Deming advocates that only focus on numerical quotas may diminish the quality. Managers should focus on quality instead of blindly pursuing numbers. Focusing on quality enables an organization to attract a potential and profitable market.

12 Remove Barriers To Pride of Workmanship

The management should support employees to overcome the obstacles that may arise in the course of functioning. It is necessary to improve continuously the management system, inadequate instruction, faculty equipment, and defective materials. The management should eliminate the annual merit rating system.

13 Institute a Vigorous Program of Education and Training

According to Deming's 14 points, both management and workers must be educated and trained in the new methods to improve quality. Continuous improvement should be the purpose of every member of the organization. Introducing a teamwork culture and the philosophy of TQM is helpful to improve quality.

14 Take Action To Accomplish Transformation

This is the last point from Deming's 14 points, according to this, all organizational members must understand these 14 points and work together to reach quality goals. The top management must develop strategic plans to achieve the highest level of quality. Neither the worker nor the management alone improves the quality, thus, they should work together.

2. **Explain the PDCA** .

(**plan–do–check–act** or **plan–do–check–adjust**) is an iterative design and management method used in business for the control and continual improvement of processes and products. It is also known as the **Shewhart cycle**, or the **control circle**/**cycle**. Another version of this PDCA cycle is OPDCA. The added "O" stands for *observation* or as some versions say: "Observe the current condition." This emphasis on observation and current condition has currency with the literature on lean manufacturing and the Toyota Production System.PDCA cycle, with Ishikawa's chang, can be traced back to S. Mizuno of the Tokyo Institute of Technology in 1959.

The PDCA cycle is also known as PDSA cycle (where S stands for Study). It was an early means of representing the task areas of traditional quality management. The cycle is sometimes referred

to as the Shewhart / Deming cycle since it originated with physicist Walter Shewhart at the Bell Telephone Laboratories in the 1920s. W. Edwards Deming modified the Shewhart cycle in the 1940s and subsequently applied it to management practices in Japan in the 1950s.

Dr. Deming found that the focus on Check is more about the implementation of a change, with success or failure. His focus was on predicting the results of an improvement effort, studying the actual results, and comparing them to possibly revise the theory.

Plan

Establish objectives and processes required to deliver the desired results.

Do

Carry out the objectives from the previous step.

Check

During the check phase, the data and results gathered from the do phase are evaluated. Data is compared to the expected outcomes to see any similarities and differences. The testing process is also evaluated to see if there were any changes from the original test created during the planning phase. If the data is placed in a chart it can make it easier to see any trends if the PDCA cycle is conducted multiple times. This helps to see what changes work better than others and if said changes can be improved as well.

Example: Gap analysis, or Appraisals.

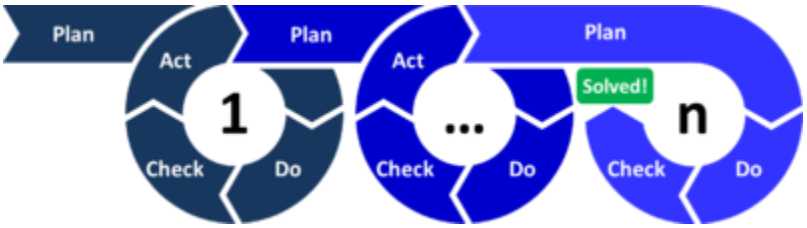
Act

Also called "Adjust", this act phase is where a process is improved. Records from the "do" and "check" phases help identify issues with the process. These issues may include problems, non-conformities, opportunities for improvement, inefficiencies, and other issues that result in outcomes that are evidently less-than-optimal. Root causes of such issues are investigated, found, and eliminated by modifying the process. Risk is re-evaluated. At the end of the actions in this phase, the process has better instructions, standards, or goals. Planning for the next cycle can proceed with a better baseline. Work in the next do phase should not create a recurrence of the identified issues; if it does, then the action was not effective.

About

PDCA is associated with W. Edwards Deming, who is considered by many to be the father of modern quality control; however, he used PDSA (Plan-Do-Study-Act) and referred to it as the "Shewhart cycle".Later in Deming's career, he modified PDCA to "Plan, Do, Study, Act" (PDSA) because he felt that "check" emphasized inspection over analysis The PDSA cycle was used to create the model of know-how transfer process, and other models.

The concept of PDCA is based on the scientific method, as developed from the work of Francis Bacon (*Novum Organum*, 1620). The scientific method can be written as "hypothesis–experiment–evaluation" or as "plan–do–check". Walter A. Shewhart described manufacture under "control"—under statistical control—as a three-step process of specification, production, and inspection He also specifically related this to the scientific method of hypothesis, experiment, and evaluation. Shewhart says that the statistician "must help to change the demand [for goods] by showing [...] how to close up the tolerance range and to improve the quality of goods." Clearly, Shewhart intended the analyst to take action based on the conclusions of the evaluation. According to Deming, during his lectures in Japan in the early 1920s, the Japanese participants shortened the steps to the now traditional *plan, do, check, ac* Deming preferred *plan, do, study, act* because "study" has connotations in English closer to Shewhart's intent than "check".[12]



Multiple iterations of the PDCA cycle are repeated until the problem is solved.

A fundamental principle of the scientific method and PDCA is iteration—once a hypothesis is confirmed (or negated), executing the cycle again will extend the knowledge further. Repeating the PDCA cycle can bring its users closer to the goal, usually a perfect operation and output.[12]

PDCA (and other forms of scientific problem solving) is also known as a system for developing critical thinking. At Toyota this is also known as "Building people before building cars".Toyota and other lean manufacturing companies propose that an engaged, problem-solving workforce using PDCA in a culture of critical thinking is better able to innovate and stay ahead of the competition through rigorous problem solving and the subsequent innovations.

Deming continually emphasized iterating towards an improved system, hence PDCA should be repeatedly implemented in spirals of increasing knowledge of the system that converge on the ultimate goal, each cycle closer than the previous.One can envision an open coil spring, with each loop being one cycle of the scientific method, and each complete cycle indicating an increase in our knowledge of the system under study. This approach is based on the belief that our knowledge and skills are limited, but improving. Especially at the start of a project, key information may not be known; the PDCA—scientific method—provides feedback to justify guesses (hypotheses) and increase knowledge. Rather than enter "analysis paralysis" to get it perfect the first time, it is better to be approximately right than exactly wrong. With improved knowledge, one may choose to refine or alter the goal (ideal state). The aim of the PDCA cycle is to bring its users closer to whatever goal they choose.[3]:160

When PDCA is used for complex projects or products with a certain controversy, checking with external stakeholders should happen before the Do stage, since changes to projects and products that are already in detailed design can be costly; this is also seen as Plan-Check-Do-Act.The rate

of change, that is, the rate of improvement, is a key competitive factor in today's world. PDCA allows for major "jumps" in performance ("breakthroughs" often desired in a Western approach), as well as kaizen (frequent small improvements).In the United States a PDCA approach is usually associated with a sizable project involving numerous people's time,and thus managers want to see large "breakthrough" improvements to justify the effort expended. However, the scientific method and PDCA apply to all sorts of projects and improvement activities

- Software development process
- Theory of constraints
- Total security management

3.Explain the quality management tools.

The 7 Quality Tools with Examples

Each of these seven important statistical quality tools has a distinct form and purpose.

Histogram

Histograms are graphs that are commonly used to show frequency distribution, or how often each “value” (or range of values) occurs in different sets of data. Each bar represents a data group, while the height of the bar demonstrates the frequency with which a value appears in that group. Histograms can break down frequency for any group or category that is numerical such as age, days of the week, physical measurements, etc.

Example: You can easily visualize the rejection levels of manufactured parts by plotting the number of parts rejected in weekly sample batches.

Stratification

Stratification is used to separate data gathered from multiple sources (using different colors) and sort it into distinct groups. It can reveal patterns that help you determine the meaning of your data.

Example: If purity is a recurring problem, stratifying data from different labs may reveal the problem is concentrated mostly within one lab.

Check Sheet (also known as a Tally Sheet)

A check sheet is a generic form that is structured for collecting and analyzing various types of data, either quantitative or qualitative. (It’s known as a tally sheet when used for quantitative data.) A check sheet’s simple format records data as checks or tally marks that indicate how many times a particular value has occurred.

Example: You can use a check sheet to gather data on the number of times over the course of a week that labels are found missing on a product.

Pareto Chart (also known as the 80-20 rule)

A pareto chart is a special form of a bar graph. It highlights the relative importance of a variety of factors, enabling you to focus on factors with the biggest contribution to the cumulative total of the effect. This approach leverages the 80-20 rule, which posits that 80% of a process' problems are caused by 20% of the major factors.

Example: To deal with a high level of customer complaints, it's helpful to chart them and see which problems in the design, production, and/or delivery are cited most commonly.

Control Chart

Control charts study how a process changes over time. They apply historical data to help you determine if a process is predictable, consistent, and stable, or unpredictable and out of control. Control charts are a very flexible and effective way of performing control activities on virtually any kind of process, from discrete to continuous production, from quantitative to qualitative attributes, from services to manufacturing industries.

Example: A hospital might use a control chart to track readmissions, in order to determine if there is a special cause variation currently occurring that requires investigation.

Scatter Diagram (Also known as the Shewhart Chart)

Scatter diagrams depict the relationship between two variables. This helps in the identification of cause-and-effect relationships. Pairs of numerical data are graphed, one variable on each axis. If the variables are correlated, the points will fall along a line or curve. The stronger the correlation, the tighter the points will hug the line and the stronger the relationship will be between variables.

Example: The color of a product might be graphed against the temperature at which it was prepared. A strong correlation would mean that the temperature of preparation likely affects the final product color.

Cause and Effect diagram (also known as a Fishbone or Ishikawa Diagram)

First developed by Kaoru Ishikawa and sometimes known as a Fishbone because of its shape, a cause and effect diagram is one of the more complicated statistical tools used in quality management. It aims to identify multiple potential causes for a problem and sort them into useful categories. Probable causes and sub-causes are usually grouped into six main groups—methods, materials, measurements, machines, personnel, and environment.

Example: If you are having delivery problems, a fishbone diagram could help you sort out potential causes such as vehicle breakdowns, bad weather, mislabelling, faulty estimation of delivery times, inadequate driver training, etc.

Effective Quality Management Software Can Increase Compliance and Agility

Identifying and resolving quality issues quickly is one critical aspect of a quality management system that can be improved with the use of an effective cloud-based Quality, Health, Safety and Environment (QHSE) management software solution like Veeva's QualityOne.

QualityOne's configurable reports and dashboards automatically track and trend quality data for products or processes and enable information to be easily shared with the team and external stakeholders.

QualityOne is intuitive and easy to use, unlike cumbersome on-premise legacy programs, so your staff will be able to easily and effectively use it to manage document control, training, quality processes, and HSE events.

- Reduce the cost of quality management
- Quickly and easily find and fix quality issues
- Access your files & dashboards from any device
- Visualize all product or quality data in one system
- Ensure your suppliers meet your quality standards
- Be audit-ready, anytime an auditor calls

UNIT-V

1. Explain the ISO 9000 SERIES.

ISO 9000 can help a company satisfy its customers, meet regulatory requirements, and achieve continual improvement. It should be considered to be a first step or the base level of a quality system.

- ISO 9000 vs. 9001
- 30 years of ISO 9000
- ISO 9000 resources

ISO 9000 VS. 9001

ISO 9000 is a series, or family, of quality management standards, while ISO 9001 is a standard within the family. The ISO 9000 family of standards also contains an individual standard named ISO 9000. This standard lays out the fundamentals and vocabulary for quality management systems (QMS).

ISO 9000 series of Standards

The ISO 9000 family contains these standards:

- ISO 9001:2015: Quality Management Systems - Requirements
- ISO 9000:2015: Quality Management Systems - Fundamentals and Vocabulary (definitions)
- ISO 9004:2018: Quality Management - Quality of an Organization - Guidance to Achieve Sustained Success (continuous improvement)
- ISO 19011:2018: Guidelines for Auditing Management Systems

ASQ is the only place where organizations can obtain the American National Standard Institute (ANSI) versions of these standards in the ISO 9000 family.

ISO 9000 history and revisions: ISO 9000:2000, 2008, and 2015

ISO 9000 was first published in 1987 by the International Organization for Standardization (ISO), a specialized international agency for standardization composed of the national standards bodies of more than 160 countries. The standards underwent revisions in 2000 and 2008. The most recent versions of the standard, ISO 9000:2015 and ISO 9001:2015, were published in September 2015.

ASQ administers the U.S. Technical Advisory Groups and subcommittees that are responsible for developing the ISO 9000 family of standards. In its standards development work, ASQ is accredited by ANSI.

ISO 9000:2000

ISO 9000:2000 refers to the ISO 9000 update released in the year 2000.

The ISO 9000:2000 revision had five goals:

1. Meet stakeholder needs
2. Be usable by all sizes of organizations
3. Be usable by all sectors
4. Be simple and clearly understood
5. Connect quality management system to business processes

ISO 9000:2000 was again updated in 2008 and 2015. ISO 9000:2015 is the most current version.

ISO 9000:2015 principles of Quality Management

The ISO 9000:2015 and ISO 9001:2015 standards are based on seven quality management principles that senior management can apply to promote organizational improvement.

2.Explain the concept of JIT with an suitable examples.

Just-in-time manufacturing (JIT manufacturing) is a production model in which items are created to meet demand, not created in surplus or in advance of need. Organizations adopt the JIT approach to increase efficiency, reduce costs and speed up product delivery. To achieve these goals, however, they must eliminate the types of waste typically associated with manufacturing, such as overproduction, unnecessary wait times and excessive inventory -- only then can they implement an effective JIT strategy.

The history of JIT manufacturing

The JIT methodology, also known as the Lean production model, is commonly associated with manufacturers in post-World War II Japan. Faced with a lack of working capital and natural resources, Japanese companies had to incorporate lean, efficient business practices into their manufacturing processes. This meant building smaller factories and producing items in smaller batches, while paying close attention to the efficiency of their production processes.

Toyota was at the forefront of the JIT effort in Japan, implementing JIT practices so successfully that the company's approach became known as the Toyota Production System (TPS). According to TPS philosophy, manufacturers are susceptible to seven types of waste:

1. **Overproduction.** More items are produced than are currently required by customers.
2. **Waiting.** Items sit waiting for other processes to complete before production can continue forward.
3. **Inventory.** The manufacturer has too much inventory on hand, requiring extra storage and management.
4. **Transportation.** Materials or products are transported unnecessarily during the production process.
5. **Processing.** Inefficient processing results in unnecessary efforts, equipment or time spent in production.
6. **Motion.** Workers move inefficiently and unnecessarily during the production process.

7. **Defects.** Defective products result in wasted time, materials and effort and can impact the company's reputation.

Implementing the JIT methodology

The JIT methodology requires that manufacturers establish strong relationships with suppliers and supply chain visibility to ensure that materials are delivered reliably and without interruption. Manufacturers must also implement standardized internal processes, with an emphasis on efficiency and effective communications. In addition, they must continuously look for ways to improve business processes and operations, no matter how well they currently work.

Through the careful implementation of JIT methodologies, manufacturers can reduce inventory levels, lower ongoing costs, increase product quality and achieve greater overall efficiency. However, even if a company does everything right, JIT manufacturing is not without risks. As the COVID-19 pandemic showed, JIT processes are highly susceptible to disruptions in the supply chain. If a manufacturer cannot get the material it needs to carry out production, its entire operation can be brought to a standstill.

Because of these risks, some companies have adopted -- or have stuck with -- just-in-case manufacturing (JIC manufacturing). With this system, they maintain large inventories to insure against supply chain disruptions or unexpected increases in demand for the product. However, this approach comes with significant costs for purchasing and maintaining that inventory. Going forward, manufacturers will likely need to find a balance between JIT and JIC manufacturing to effectively control overhead, while minimizing supply chain risks.

3.Discuss about the RGNQA

The **Rajiv Gandhi National Quality Award** is the national quality award given by the Bureau of Indian Standards to Indian organizations that show excellence in their performance. It is named after Rajiv Gandhi, the former Prime Minister of India, and was introduced in 1991 after his death. The award aims to promote quality services to the consumers and to give special recognition to organizations that contribute significantly towards the quality movement of India.

The award is presented annually as per the financial year, and is similar to other national quality awards worldwide like the Malcolm Baldrige National Quality Award of the United States, European Quality Award of the European Union and the Deming Prize of Japan.

The award is presented to organizations in five broad categories: large scale manufacturing, small scale manufacturing, large scale service sector, small scale service sector and best overall. Furthermore, there are 14 commendation certificates for organizations showing excellence in various fields, including but not limited to biotechnology, chemicals, electronics, food and drugs, metallurgy, textiles, jewelry, education, finance, healthcare and information technology.

Apart from the certificated and awards, the winner of Best of All gets a monetary prize of ₹500,000 (US$6,300), while the other four awards carry a cash prize of ₹200,000 (US$2,500). The commendation certificate carries a financial incentive of ₹100,000 (US$1,300).[2]

Best of all" winners[4][5][6]

Year	Recipient
1991–92	Kirloskar Cummins Limited, Pune
1993	Steel Authority of India Limited Bhilai Steel Plant, Bhilai
1994	ITC Limited ILTD Division Chirala (A.P.)
1995	ITC Limited ILTD Division, Anaparti, Andhra Pradesh
1996	Tata Bearings (A Division of TISCO), Kharagpur, West Bengal
1997	Larsen & Toubro Limited, Bangalore Works, Bangalore (Karnataka) Ammunition Factory, Khadki Pune, Maharashtra
1998	Mathura Refinery of Indian Corporation Limited, Mathura
1999	Gujarat Co-operative Milk Marketing Federation Limited, Anand Tata Cummins Limited, Jamshedpur
2000	Tata International Limited, Dewas

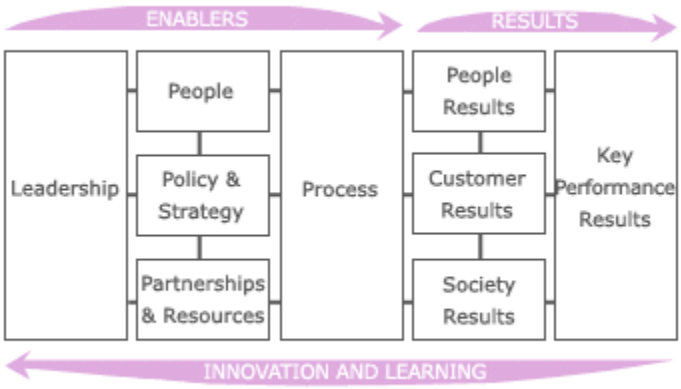
Best of all" winners[4][5][6]	
Year	**Recipient**
2001	Birla Cellulosic, Bharuch
2002	(No award)
2003	Indian Oil Corporation Ltd (Gujarat Refinery), Vadodara Grasim Industries Ltd (Chemical Division), Nagda
2005	Moser Baer India Limited, Greater Noida
2006	Steel Authority of India Limited Bhilai Steel Plant, Bhilai
2007	Steel Authority of India Limited Bokaro Steel Plant, Bokaro
2008	Satluj Jal Vidyut Nigam Limited, Shimla, Himachal Pradesh.
2009	Tata Motors Limited, Lucknow, Uttar Pradesh
2010	Vikram Cement Works (A unit of UltraTech Cement Limited), Khor, Madhya Pradesh
2011	DAV ACC Senior Secondary Public School Barmana, Himachal Pradesh
2012	Rail Wheel factory, Yelahanka, Bangalore
2013	Navjaat Bhaskar

Best of all" winners[4][5][6]	
Year	**Recipient**
2014	Larsen & Toubro Limited

4.Discuss the EFQM Model.

European Foundation for Quality Management (EFQM) Excellence Model, is a self-assessment framework for measuring the strengths and areas for improvement of an organization across all of its activities. The term 'excellence' is used because the Excellence Model focuses on what an organization does, or could do, to provide an excellent service or product to its customers, service users or stakeholders.

While its origins lie in the private sector, public and voluntary sector organizations can also benefit from using the Excellence Model. It is non-prescriptive and does not involve strictly following a set of rules or standards, but provides a broad and coherent set of assumptions about what is required for a good organization and its management. Each organization can use it in its own way to manage and develop improvement, under the control of those who use the methods rather than an external evaluator.



There are nine 'big ideas' or criteria in the Model that underpin this premise and attempt to cover all an organisation's activities. These nine ideas are separated into Enablers and Results. The Enabler criteria are concerned with how the organization conducts itself, how it manages its staff and resources, how it plans its strategy and how it reviews and how it reviews and monitors key processes. They are:

1. Leadership
2. People
3. Policy and strategy
4. Partnerships and resources
5. Processes

The organisation's Results are what it achieves. These encompass the level of satisfaction among the organisation's employees and customers, its impact on the wider community and key performance indicators. They are:

6. People results
7. Customer results
8. Society results
9. Key performance results

Each of the nine criteria is subdivided to describe in more detail the concept of 'Excellence' in that area and to examine how well an organization is doing through a list of practical questions to ask itself. The starting point for most organisation's is to gather evidence relevant to the nine criteria of the Model. This involves asking, for each of the criteria, 'How good are we and how could we improve?' Evidence may take a variety of forms depending upon the organization.

The National Council for Voluntary Organizations (NCVO) suggests that each organization will need to find a method for using the framework that suits them best.

They give examples of:

- Questionnaires based upon the Model.
- A workshop approach where evidence is gathered from across the organization on how the nine criteria are being met.
- An approach in which the organization produces a detailed document describing what it is doing under each of the criteria and sub-criteria.
- An approach for a small organization or small teams within a larger organization, involving half-day sessions working through the Model to gain a rapid picture of where it stands under the various criteria.

Once this self-assessment exercise has been initiated, the organization can take action to improve its performance with help from the guidance contained in the Model's relevant publications or further training in the area that needs improvement.

The British Quality Foundation (BQF) has also developed a software tool called 'BQFsnapshot' that will run on most Windows-based computers. It is intended to provide a quick and simple way of finding out how your organization measures up to the characteristics of Excellence.

Although most organisation's concentrate on improving their performance using the Model, it is possible to 'score' performance against the criteria, providing an internal benchmark of improvement over a period of time.

Development, ownership and support

The **European Foundation for Quality Management (EFQM)** owns the intellectual property of the Excellence Model. It is a not-for-profit membership foundation based in Brussels and was set up in 1989 by the CEOs of large European businesses.

5.Discuss the MBNQA Model.

Three MBNQA awards can be given annually in six categories:

- Manufacturing
- Service Company
- Small Business
- Education
- Healthcare
- Non-profit

The education and healthcare categories were added in 1999, while the government and non-profit categories were added in 2007.

The MBNQA award is named after the late Secretary of Commerce Malcolm Baldrige, a proponent of quality management. The U.S. Commerce Department's National Institute of Standards and Technology manages the award, and ASQ administers it.

THE SEVEN MBNQA CRITERIA CATEGORIES

Organizations that apply for the MBNQA are judged by an independent board of examiners. Recipients are selected based on achievement and improvement in seven areas, known as the Baldrige Criteria for Performance Excellence:

1. **Leadership:** How upper management leads the organization, and how the organization leads within the community.
2. **Strategy:** How the organization establishes and plans to implement strategic directions.
3. **Customers:** How the organization builds and maintains strong, lasting relationships with customers.
4. **Measurement, analysis, and knowledge management:** How the organization uses data to support key processes and manage performance.
5. **Workforce:** How the organization empowers and involves its workforce.
6. **Operations:** How the organization designs, manages, and improves key processes.
7. **Results:** How the organization performs in terms of customer satisfaction, finances, human resources, supplier and partner performance, operations, governance and social responsibility, and how the organization compares to its competitors.

The 2021-2022 Baldrige Excellence Framework is available for the business/nonprofit industries. The 2019-2020 Baldrige Excellence Framework is available for the business/nonprofit, healthcare,

and education industries. The criteria focus on managing all components of an organization as a whole, cybersecurity risks, and understanding the role of risk management within a systems perspective of organizational performance management.

he Baldrige Excellence Framework has three parts: the Criteria for Performance Excellence, core values and concepts, and scoring guidelines. The framework serves two main purposes: (1) to help organizations assess their improvement efforts, diagnose their overall performance management system, and identify their strengths and opportunities for improvement and (2) to identify Baldrige Award recipients that will serve as role models for other organizations. In addition, the framework and its Criteria help strengthen U.S. competitiveness by • improving organizational performance practices, capabilities, and results • facilitating communication and sharing of information on best practices among U.S. organizations of all types • serving as a tool for understanding and managing performance and for guiding planning and opportunities for learning • The framework provide organizations with an integrated approach to performance management that results in • delivery of ever-improving value to customers and stakeholders, contributing to organizational sustainability • improved organizational effectiveness and capabilities • organizational and personal learning

In the early and mid-1980s, many U.S. industry and government leaders saw that a renewed emphasis on quality was necessary for doing business in an expanding and competitive world market.

The Malcolm Baldrige National Quality Improvement Act of 1987, signed into law on August 20, 1987, was developed through the actions of the National Productivity Advisory Committee, chaired by Jack Grayson. The nonprofit research organization APQC, founded by Grayson, organized the first White House Conference on Productivity, spearheading the creation of the Malcolm Baldrige National Quality Award in 1987. The Baldrige Award was envisioned as a standard of excellence that would help U.S. organizations achieve competitive quality.

In the late summer and fall of 1987, Dr. Curt Reimann, the first director of the Malcolm Baldrige National Quality Program, and his staff at the National Institute of Standards and Technology developed an award implementation framework, including an evaluation scheme, and advanced proposals for what is now the Baldrige Award. In its first three years, the Baldrige Award was jointly administered by APQC and the American Society for Quality, which continues to assist in administering the award program under contract to NIST.

Up to 18 awards may be given annually across six eligibility categories—manufacturing, service, small business, education, health care, and nonprofit. As of 2016, 113 awards have been presented to 106 organizations (including seven repeat winners.