

# INSTITUTE OF ADVANCE MANAGEMENT & RESEARCH, GHAZIABAD

## Model Question Bank

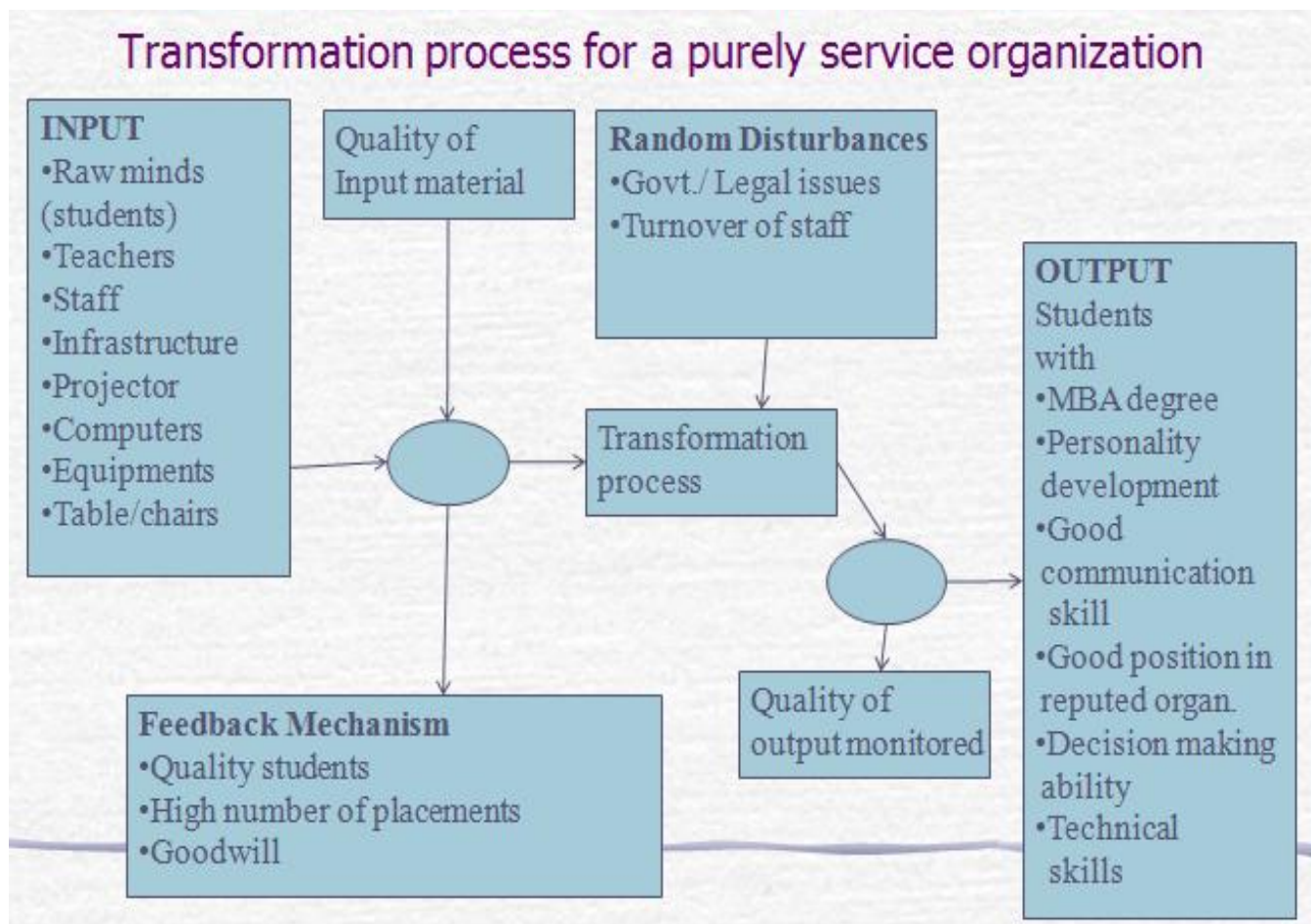
### MBA FIRST YEAR/ SECOND SEMESTER

#### PO&SCM

**Q1. Define POM. List out the functions of production department. What do you mean by productivity & how it is calculated?**

**Ans.** Production and Operations Management: Production/Operations function is that part of an organization which is concerned with the transformation of a range of inputs into the required outputs (products/services) having the requisite quality.

In general the concept of manufacturing products and providing services is called as production and operations management.



## FUNCTIONS OF PRODUCTION MANAGEMENT DEPARTMENT

1. **Materials:** *The selection of materials for the product. Production manager must have sound knowledge of materials and their properties, so that he can select appropriate materials for his product.*
2. **Methods:** *Finding the best method for the process, to search for the methods to suit the available resources, identifying the sequence of process are some of the activities of Production Management.*
3. **Machines and Equipment:** *Selection of suitable machinery for the process desired, designing the maintenance policy and design of layout of machines are taken care of by the Production Management department.*
4. **Estimating:** *To fix up the Production targets and delivery dates and to keep the production costs at minimum, production management department does a thorough estimation of Production times and production costs. In competitive situation this will help the management to decide what should be done in arresting the costs at desired level.*
5. **Loading and Scheduling:** *The Production Management department has to draw the time table for various production activities, specifying when to start and when to finish the process required. It also has to draw the timings of materials movement and plan the activities of manpower. The scheduling is to be done keeping in mind the loads on hand and capacities of facilities available.*
6. **Routing:** *This is the most important function of Production Management department. The Routing consists of fixing the flow lines for various raw materials, components etc., from the stores to the packing of finished product, so that all concerned knows what exactly is happening on the shop floor.*
7. **Despatching:** *The Production Management department has to prepare various documents such as Job Cards, Route sheets, Move Cards, Inspection Cards for each and every component of the product. These are prepared in a set of five copies. These documents are to be released from Production Management department to give green signal for starting the production. The activities of the shop floor will follow the instructions given in these documents. Activity of releasing the document is known as dispatching.*
8. **Expediting or Follow up:** *Once the documents are dispatched, the management wants to know whether the activities are being carried out as per the plans or not. Expediting engineers go round the production floor along with the plans, compare the actual with the plan and feed back the progress of the work to the management. This will help the management to evaluate the plans.*
9. **Inspection:** *Here inspection is generally concerned with the inspection activities during production, but a separate quality control department does the quality inspection, which is not*

under the control of Production Management. This is true because, if the quality inspection is given to production Management, then there is a chance of qualifying the defective products also.

**10. Evaluation:** The Production department must evaluate itself and its contribution in fulfilling the corporate objectives and the departmental objectives. This is necessary for setting up the standards for future.

**Productivity:** Productivity is a relationship between the output (product/service) and input (resources consumed in providing them) of a business system. The ratio of aggregate output to the aggregate input is called productivity.

$$\text{Productivity} = \text{output/Input}$$

$$\text{Labour productivity Index/Measure} = \frac{\text{Output in unit}}{\text{Man hours worked}}$$

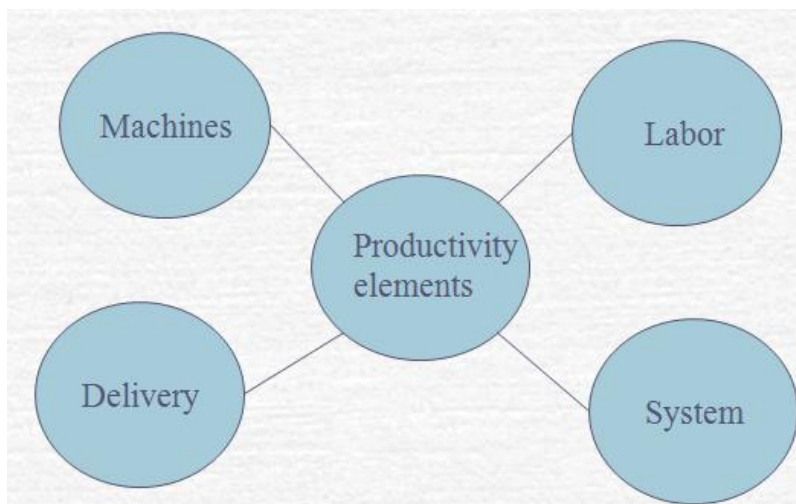
$$\text{Management productivity Index/Measure} = \frac{\text{Output}}{\text{Total cost of management}}$$

$$\text{Machine productivity Index/Measure} = \frac{\text{Total output}}{\text{Machine hours worked}}$$

$$\text{Land productivity Index/Measure} = \frac{\text{Total output}}{\text{Area of Land used}}$$

$$\text{Partial Measure} = \frac{\text{Output}}{\text{Labour}} \quad \text{or} \quad \frac{\text{Output}}{\text{Capital}} \quad \text{or} \quad \frac{\text{Output}}{\text{Materials}} \quad \text{or} \quad \frac{\text{Output}}{\text{Energy}}$$

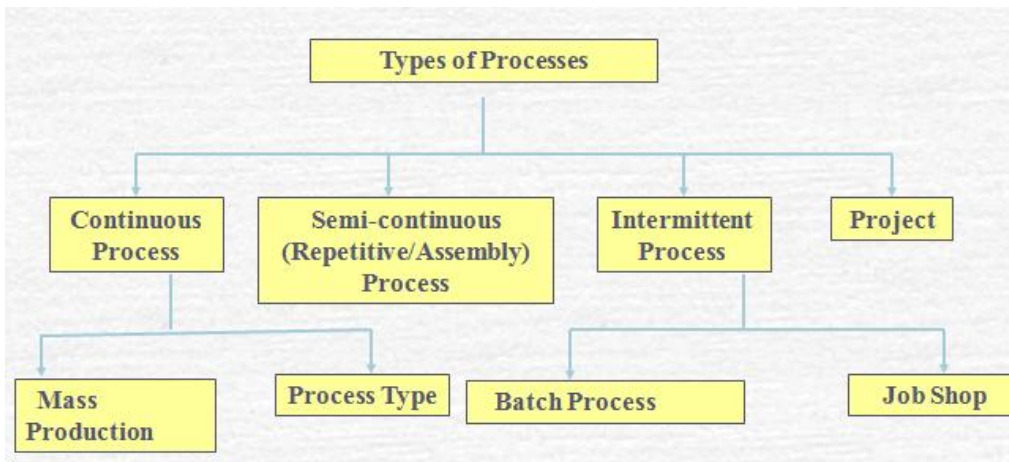
### Factors affecting productivity



**Hint:-** Explain each point

**Q2. Explain types of manufacturing process.**

**Ans.**



**Hint:-** Explain each point

**Q3. What are the characteristics of goods and services? Explain Classification of service. What are the factors that affect service operations? Briefly explain methods for calculation service capacity planning?**

**Ans: Characteristics of Goods:**

- Tangible product
- Consistent product definition
- Production usually separate from consumption
- Can be inventoried
- Low customer interaction

**Characteristics of Services:**

- Intangible product
- Produced & consumed at same time
- Often unique
- High customer interaction
- Inconsistent product definition
- Often knowledge-based
- Frequently dispersed

<b>Basis for comparison</b>	<b>Goods</b>	<b>Services</b>
Meaning	Goods are the material items that can be seen, touched or felt and are ready for sale to the customers.	Services are amenities, facilities, benefits or help provided by other people.
Nature	Tangible	Intangible
Transfer of ownership	Yes	No
Evaluation	Very simple and easy	Complicated
Return	Goods can be returned.	Services cannot be returned back once they are provided.
Separable	Yes, goods can be separated from the seller.	No, services cannot be separated from the service provider.
Variability	Identical	Diversified
Storage	Goods can be stored for use in future or multiple use.	Services cannot be stored.
Production and Consumption	There is a time lag between production and consumption of goods.	Production and Consumption of goods occurs simultaneously.

### **Service Capacity Planning**

Capacity planning is the process of determining the production capacity needed by an organization to meet changing demands for its products.

The basic questions in capacity handling are:

- What kind of capacity is needed?
- How much is needed?
- When is it needed?

## Steps in the Capacity Planning Process

1. Estimate future capacity requirements
2. Evaluate existing capacity and facilities and identify gaps
3. Identify alternatives for meeting requirements
4. Conduct financial analyses of each alternative
5. Assess key qualitative issues for each alternative
6. Select the alternative to pursue that will be best in the long term
7. Implement the selected alternative
8. Monitor results

## Capacity

### Design capacity

- maximum output rate or service capacity an operation, process, or facility is designed for

### Effective capacity

- Design capacity minus allowances such as personal time, maintenance, and scrap

### Actual output

- Rate of output actually achieved--cannot exceed effective capacity.

## Efficiency and Utilization

$$\text{Efficiency} = \frac{\text{Actual output}}{\text{Effective capacity}}$$

$$\text{Utilization} = \frac{\text{Actual output}}{\text{Design capacity}}$$

*Both measures expressed as percentages*



## Efficiency/Utilization Example

Design capacity = 50 trucks/day  
 Effective capacity = 40 trucks/day  
 Actual output = 36 units/day



$$\text{Efficiency} = \frac{\text{Actual output}}{\text{Effective capacity}} = \frac{36 \text{ units/day}}{40 \text{ units/day}} = 90\%$$

$$\text{Utilization} = \frac{\text{Actual output}}{\text{Design capacity}} = \frac{36 \text{ units/day}}{50 \text{ units/day}} = 72\%$$

### Factors for capacity planning

- ☞ Facilities: The size and provision for expansion are key in the design of facilities. Other facility factors include locational factors (transportation costs, distance to market, labor supply, energy sources). The layout of the work area can determine how smoothly work can be performed.
- ☞ Product and Service Factors: The more uniform the output, the more opportunities there are for standardization of methods and materials. Leads to greater capacity.
- ☞ Process Factors: If the quality does not meet standards, then output rate decreases because of need of inspection and rework activities. Process improvements that increase quality and productivity can result in increased capacity.
- ☞ Human Factors: the tasks that are needed in certain jobs, the array of activities involved and the training, skill, and experience required to perform a job all affect the potential and actual output. Employee motivation, absenteeism, and labor turnover all affect the output rate as well.
- ☞ Supply Chain Factors: Questions include: What impact will the changes have on suppliers, warehousing, transportation, and distributors? If capacity will be increased, will these elements of the supply chain be able to handle the increase? If capacity is to be decreased, what impact will the loss of business have on these elements of the supply chain?

### Classification of Services

- ☞ Service can be classified in several ways. Various authors have tried to classify services on the basis of different features /aspects such as the market segments, tangibility factor ,skill type , etc.
- ☞ They are enlisted below:
  - Market segment

- Degree of tangibility
- Skills of the service provider
- Goals of the service provider
- Degree of regulation
- Degree of labor intensiveness
- Degree of customer contact

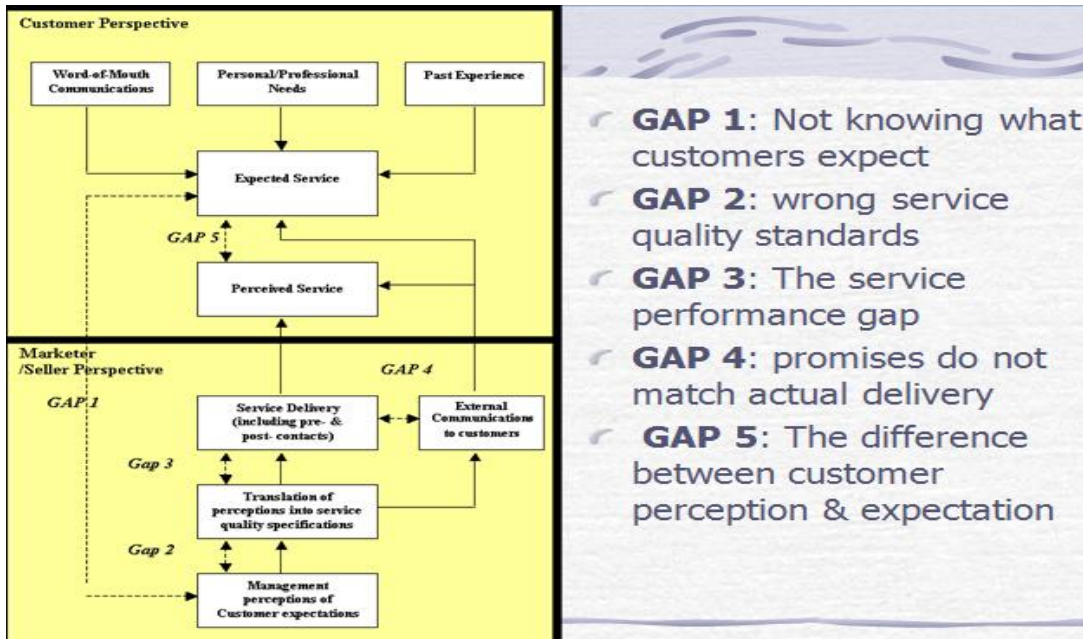
**Hint:-** Explain each point

#### **Q4. Explain SERVQUAL Model.**

**Ans. Dimensions of service quality:**

- ☞ **Reliability:** Perform promised service dependably and accurately
  - Example: receive mail at same time each day.
- ☞ **Responsiveness:** Willingness to help customers promptly
  - Example: avoid keeping customers waiting for no apparent reason
- ☞ **Assurance:** Ability to convey trust and confidence
  - Example: being polite and showing respect for customer
- ☞ **Empathy:** Ability to be approachable
  - Example: being a good listener
- ☞ **Tangibles:** Physical facilities and facilitating goods
  - Example: cleanliness





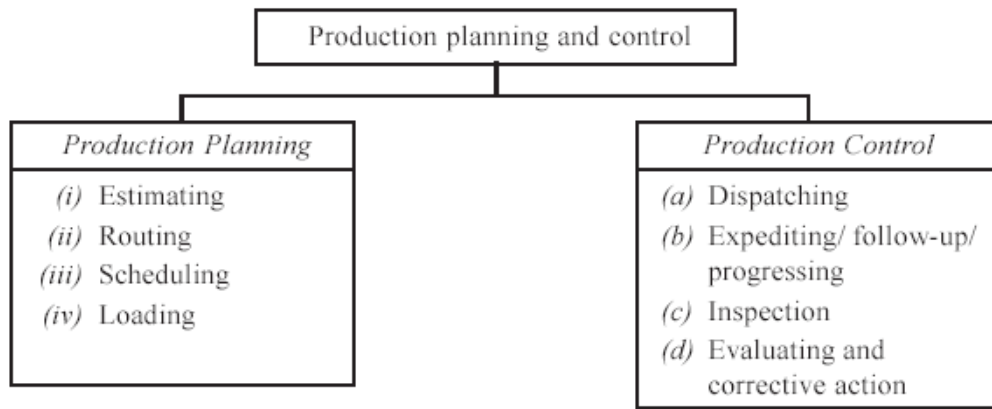
- **GAP 1:** Not knowing what customers expect
- **GAP 2:** wrong service quality standards
- **GAP 3:** The service performance gap
- **GAP 4:** promises do not match actual delivery
- **GAP 5:** The difference between customer perception & expectation

**Hint:-** Explain each gap

**Q5. What is PPC and its main functions? What are the processes of PPC?**

**Ans.** Production/Operations Planning and Control: Planning, direction and co-ordination of the firm's facilities to achieve the predetermined production objectives in the most economical manner.

**Functions of PPC department:**



**Process of PPC:**

Routing, Scheduling, Loading

**Hint:-** Explain each point

**Q6. What do you mean by inventory? Define various types of inventory and techniques to control inventory?**

**Ans.** The term inventory includes raw material, work-in-process, finished goods and stores and spares.

☞ Objectives:

- The primary objective of inventory management is to ensure continuous supply of raw materials and facilitate uninterrupted production.
- Obtaining a reasonable utilisation of people and equipment is one of the reasons for holding inventories.

**Inventory Control Techniques:**

1. Always better control (ABC) classification.
2. High, medium and low (HML) classification.
3. Vital, essential and desirable (VED) classification.
4. Scarce, difficult and easy to obtain (SDE).
5. Fast moving, slow moving and non-moving (FSN).
6. Economic order quantity (EOQ).
7. Two bin system.

**Hint:-** Explain each point

**Just – in – Time (JIT):**

- ☞ JIT is an approach that seeks to eliminate all sources of waste in production activities by providing the right part at the right place at the right time.

Concepts of JIT

☞ 3 fundamental concepts:

1. Elimination of waste and variability
2. “Pull” versus “Push” system
3. Manufacturing cycle time (or “throughput” time)

**Hint:-** Explain each point

**Characteristics of JIT system:**

- Pull method of material flow
- Consistent high quality
- Small lot size

- Uniform workstation loads
- Standardized components and work methods
- Close supplier ties
- Flexible workforce
- Line flow strategy

**Hint:-** Explain each point

### **Major tools & techniques of JIT Manufacturing**

1. Kanban system or Pull scheduling
2. Set up reduction (SMED)
3. Lean production
4. Poka-Yoke (Fool proofing)
5. Quality at the source
6. Standardization and simplification
7. Supplier partnerships
8. Reduced transaction processing
9. Kaizen (continuous improvement)

**Hint:-** Explain each point

### **Q7. Define the term Plant Layout. Explain the factors affecting facility location planning of a plant.**

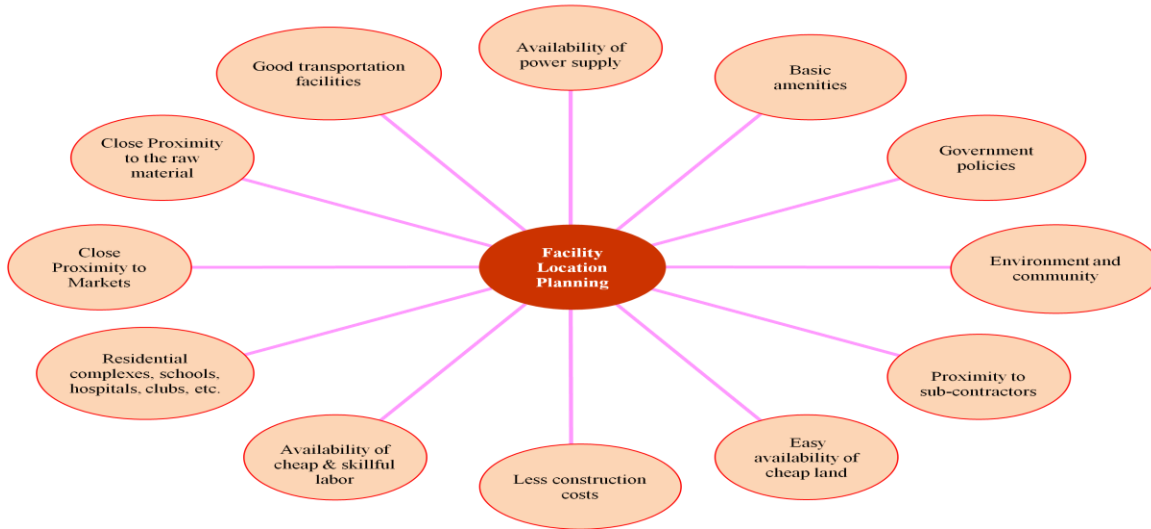
**Ans.** Plant layout: Plant layout refers to the arrangement of physical facilities such as machines, equipment, tools, furniture etc. in such a manner so as to have quickest flow of material at the lowest cost and with the least amount of handling in processing the product from the receipt of raw material to the delivery of the final product.

#### **Types of layout**

1. Process layout or functional layout or job shop layout
2. Product layout or line processing layout or flow-line layout or Assembly Line
3. Fixed position layout or static layout
4. Cellular manufacturing (CM) layout or Group Technology layout
5. Combination layout or Hybrid layout

**Hint:** Explain each point

Plant location is the function of determining location for a plant for maximum operating economy and effectiveness.



**Q8. What are the different drivers of SCM? What do you mean by core and reverse, inbound and outbound supply chain? Explain bullwhip effect in SCM.**

**Ans. Drivers of Supply Chain:**The major drivers of Supply chain performance consists of three logistical drivers & three cross-functional drivers.

☞ Logistical drivers:

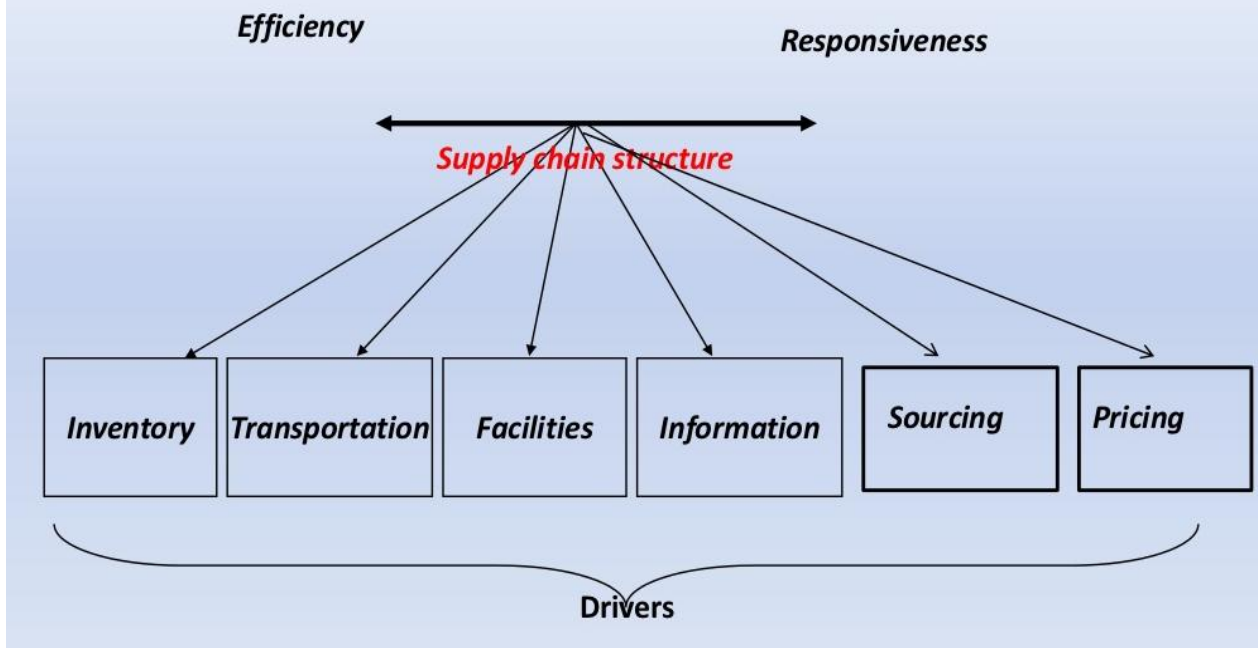
- Facilities
- Inventory
- Transportation

☞ Cross-functional drivers:

- Information
- Sourcing
- Pricing

☞ Company's supply chain achieves the balance between responsiveness & efficiency that best meets the needs of the company competitive strategy.

# Drivers of Supply Chain Performance



## Reverse supply chain:

- ☞ **Reverse** logistics is the process of planning, implementing and controlling the efficient and effective inbound flow and storage of secondary goods and related information for the purpose of recovering value or proper disposal.
- ☞ Typical examples of **reverse supply chain** include: Product returns and management of there.
- ☞ **Reverse supply chain?** It's the series of activities required to retrieve a used product from a customer and either dispose of it or reuse it.

## Reverse Logistics:

- ☞ Once collected, products need to be transported to facilities for inspection, sorting, and disposition.
- ☞ There is no one "best" design for a reverse logistics network; each has to be tailored to the products involved and the economics of their reuse.
- ☞ Bulky products like tires, for instance, will require very different handling than small but fragile products like cameras.
- ☞ Companies should consider not only the costs for shipping and storing but also how quickly the value of the returned products will decline and the need for control over the products.
- ☞ In many cases, it will make sense to outsource the logistics to a specialist.

**Inbound logistics** refers to the transport, storage and delivery of goods coming into a business.

**Outbound logistics** refers to the same for goods going out of a business

**Bullwhip effect:** The **bullwhip effect** is a distribution channel phenomenon in which forecasts yield supply chain inefficiencies. It refers to increasing swings in inventory in response to shifts in customer demand as one moves further up the supply chain.

**Lean supply chain** is one that produces just what and how much is needed, when it is needed, and where it is needed.

**Aggregate Production Planning** is Concerned with Determining The Quantity And Timing Of Production For The Intermediate Future, Often From Three To 18 Months Ahead.

**Q9. What is quality? Mention the various dimensions of product quality.**

**Ans. Quality as per the customer is:**

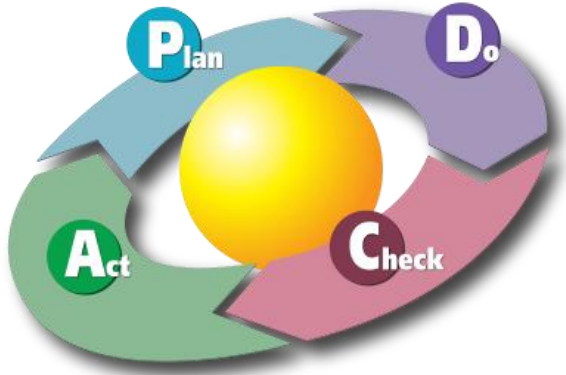
1. Measure of the conformance of the product/service to the customer's needs.
2. Values for money.
3. The ability of a product to meet customer's needs.
4. A customer's perception of the degree to which the product/service meets his/her expectations.
5. Meeting or exceeding customer requirements now and in the future.
6. Fitness for use of a product/service by the intended customer.

**Dimensions of product quality:**

1. Performance
2. Reliability
3. Durability
4. Serviceability
5. Aesthetics
6. Features
7. Perceived Quality
8. Conformance to Standards.

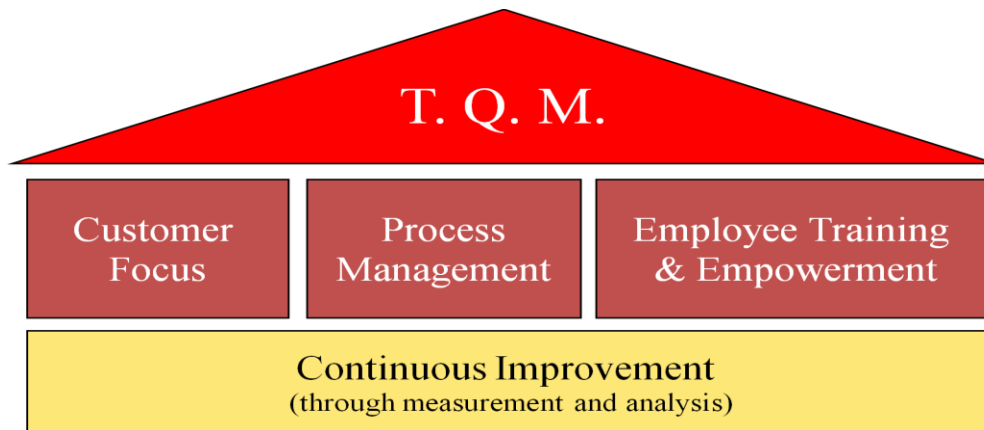
**Q10. Make a diagram of ‘Deming’s PDCA cycle’. What are different pillars of TQM and other quality tools?**

**Ans. PDCA Cycle:**



*Plan what is needed*  
*Do it*  
*Check that it works*  
*Act to correct any problems or improve performance*

**TQM**



**Customer Focus:** Studying customer needs, gathering customer requirements, and measuring and managing customer satisfaction.

**2- Process Management:** Develop a production process that reduce the product variations.

**3- Employee Empowerment (Human side of Quality):** requires a committed and well-trained work force that participates fully in quality improvement activities.

**4- Continuous Improvement:** TQM recognizes that product quality is the result of process quality.

**Six Sigma:** “Six-sigma” is a philosophy which reflects the goal of eliminating defects in the products. Seeks to reduce variation in the processes that lead to product defects

**DMAIC:**

1. Define
2. Measure



3. Analyze
4. Improve
5. Control

**DMADV:**

1. Define
2. Measure
3. Analyze
4. Design
5. Verify

**Kaizen**

KAIZEN means continuing improvement in personal life, home life, social life and working life. When KAIZEN is applied to the workplace it means continual improvement including all members of staff. The KAIZEN theory begins and ends with people.

**Kaizen Cycle**



## ISO:

### What is ISO 9000?

- ✿ A set of standardized requirements for quality management system
- ✿ Applicable to any organization regardless of its size or whether public or private sector
- ✿ Define, establish, and maintain an effective quality assurance system for manufacturing and service industries.
- ✿ The standards provide guidance.
- ✿ Tools to ensure products and services meet customer's requirements.
- ✿ Quality is consistently improved.

### ISO 14000:

- ✿ Environmental management
- ✿ Help organizations to work within healthy environment
- ✿ Help to meet the challenge of climate change
- ✿ Develop 570 international standards

### Total Productive maintenance:

- **TOTAL** = All encompassing by maintenance and production individuals working together
- **PRODUCTIVE** = Production goods and services that meet or exceed customers' expectations
- **MAINTENANCE** = Keeping equipment and plant in as good as or better than the original conditions at all times

	Reactive Maintenance	Preventive Maintenance	Predictive Maintenance	Maintenance Prevention
System description	1. Maintenance department responds to equipment malfunctions and breakdowns	1. Periodic adjustments and checks 2. Periodic replacement of wear parts 3. Periodic overhaul	1. Periodic measurement and trending of equipment and process parameters	1. Equipment design is based upon minimal maintenance requirements
Characteristics	1. Inefficient maintenance department 2. Unpredictable equipment operation 3. All maintenance work is unplanned	1. More predictable operation 2. More efficient maintenance department	1. Predictable maintenance requirements 2. Planned and scheduled equipment repairs	1. Close relationship with equipment suppliers
Examples	1. Light bulb replacement	1. Changing oil and filters	1. Vibration analysis	1. Sealed bearings in small electric motors
Results	1. Steady degradation of equipment performance	1. Maintain level of equipment performance	1. Maintain equipment performance with minimal disruption to production	1. Continually improving equipment designs
Maintenance department responsibility	1. Respond to emergencies 2. Get production back on line	1. Keep machines running by checking, replacing, and overhauling 2. Perform checks during down times	1. Log equipment parameters 2. Trend data 3. Predict equipment repair cycle	1. Input to equipment design 2. Minimize and eliminate maintenance requirements

## **Deming's 14 principles:**

1. Create constancy of purpose for improving products and services.
2. Adopt the new philosophy.
3. Cease dependence on inspection to achieve quality.
4. End the practice of awarding business on price alone; instead, minimize total cost by working with a single supplier.
5. Improve constantly and forever every process for planning, production and service.
6. Institute training on the job.
7. Adopt and institute leadership.
8. Drive out fear.
9. Break down barriers between staff areas.
10. Eliminate slogans, exhortations and targets for the workforce.
11. Eliminate numerical quotas for the workforce and numerical goals for management.
12. Remove barriers that rob people of pride of workmanship, and eliminate the annual rating or merit system.
13. Institute a vigorous program of education and self-improvement for everyone.
14. Put everybody in the company to work accomplishing the transformation.

## **7QC tools:**

1. **Cause-and-effect diagram (also called Ishikawa or fishbone chart):** Identifies many possible causes for an effect or problem and sorts ideas into useful categories.
2. **Check sheet:** A structured, prepared form for collecting and analyzing data; a generic tool that can be adapted for a wide variety of purposes.
3. **Control charts:** Graphs used to study how a process changes over time.
4. **Histogram:** The most commonly used graph for showing frequency distributions, or how often each different value in a set of data occurs.
5. **Pareto chart:** Shows on a bar graph which factors are more significant.
6. **Scatter diagram:** Graphs pairs of numerical data, one variable on each axis, to look for a relationship.
7. **Stratification:** A technique that separates data gathered from a variety of sources so that patterns can be seen (some lists replace "stratification" with "flowchart" or "run chart").