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BBA | SEM 5 | OPERATIONS MANAGEMENT | CALICUT UNIVERSITY

Module III: Operations Planning and Execution in a Global Context

11. Production and Demand Planning for Global Operations: Scheduling and Flowtime

Production and Demand Planning for Global Operations

Production planning is the process of deciding what products should be produced, how much should be produced, and when production should take place.

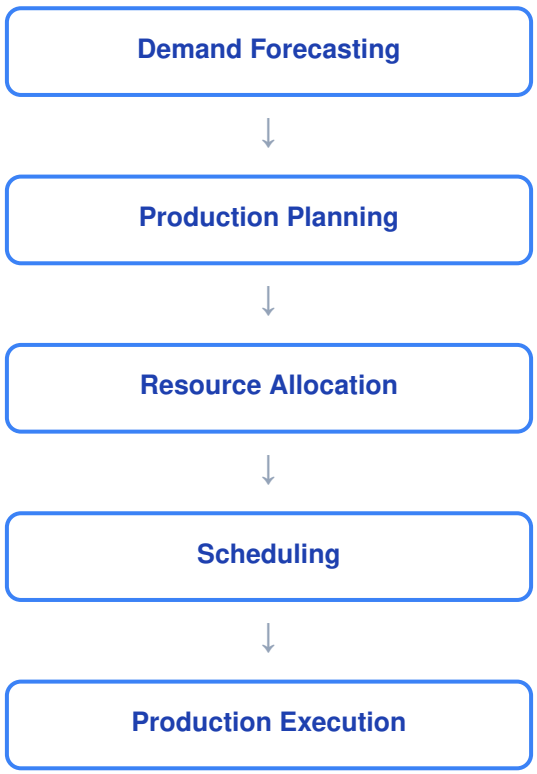
Demand planning involves forecasting customer demand and aligning production activities accordingly.

In global operations, planning becomes more complex because organizations serve customers across different countries with varying demand patterns, regulations, and market conditions.

Objectives of Production and Demand Planning

- Meet customer demand
- Minimize production costs
- Avoid stock shortages
- Optimize resource utilization
- Improve customer satisfaction

Planning Process



> **Example:** A global smartphone manufacturer forecasts demand in different countries before planning production volumes.

Scheduling

Scheduling is the process of assigning resources, tasks, and time to production activities.

It determines when each activity should begin and end.

Objectives of Scheduling

- Ensure timely production
- Reduce idle time
- Improve resource utilization
- Meet delivery deadlines

Types of Scheduling

Forward Scheduling

Production starts immediately and moves forward until completion.

Backward Scheduling

Production starts from the delivery date and works backward to determine when activities should begin.

> **Example:** A garment manufacturer schedules production to ensure clothes are ready before a festive season sale.

Flowtime

Flowtime refers to the total time required for a product or job to move through the entire production process.

It includes:

- Waiting time
- Processing time
- Inspection time
- Transportation time

Importance of Flowtime

- Measures production efficiency
- Helps identify delays
- Improves customer service
- Reduces operational costs

> **Example:** If manufacturing a laptop takes 2 days but it spends 3 days waiting between processes, the total flowtime is 5 days.

12. Learning Curves and Human Resource Planning for Global Operations: Learning Rates, Procedure Durations, and Future Costs

Learning Curves

A learning curve shows the relationship between experience and performance.

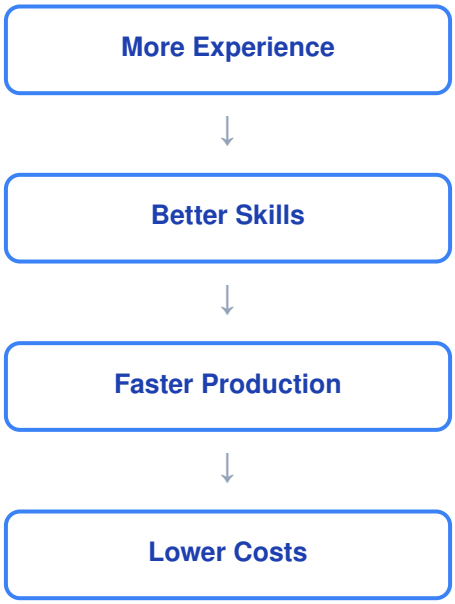
As workers repeatedly perform a task, they become more efficient, resulting in reduced time and cost per unit.

The concept is based on the principle of "learning by doing."

Characteristics of Learning Curves

- Productivity improves with experience
- Time per unit decreases
- Costs reduce over time
- Efficiency increases

Learning Curve Effect



> **Example:** Workers assembling smartphones become faster after producing hundreds of units.

Learning Rates

The learning rate indicates the percentage reduction in production time when cumulative production doubles.

Common Learning Rates

- 70% learning curve
- 80% learning curve
- 90% learning curve

A lower percentage indicates faster learning.

> **Example:** Under an 80% learning curve, if the first unit takes 100 hours, the average time per unit after production doubles will decrease to 80 hours.

Human Resource Planning for Global Operations

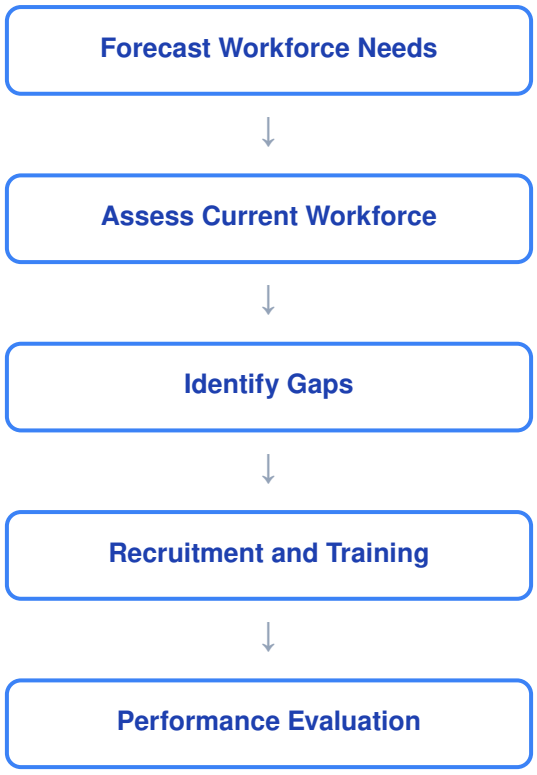
Human Resource Planning (HRP) is the process of determining the workforce required to achieve organizational objectives.

Global organizations must plan for employees across different countries, cultures, and legal environments.

Objectives of HRP

- Ensure availability of skilled employees
- Match workforce supply with demand
- Improve productivity
- Support organizational growth

HR Planning Process



> **Example:** A multinational company planning engineers for a new manufacturing plant.

Procedure Durations

Procedure duration refers to the time required to complete a specific task or activity.

Accurate estimation of procedure durations is important for scheduling and planning.

Factors Affecting Procedure Duration

- Employee skill levels
- Technology used
- Complexity of tasks
- Availability of resources
- Learning effects

> **Example:** A trained worker may complete a task in 15 minutes while a new employee may require 30 minutes.

Future Costs

Future costs refer to costs expected to be incurred in future operations.

Organizations estimate future costs for budgeting, planning, and decision-making.

Factors Influencing Future Costs

- Inflation
- Labor costs
- Raw material prices
- Technological changes
- Learning curve effects

> **Example:** A company estimating future manufacturing costs before launching a new product.

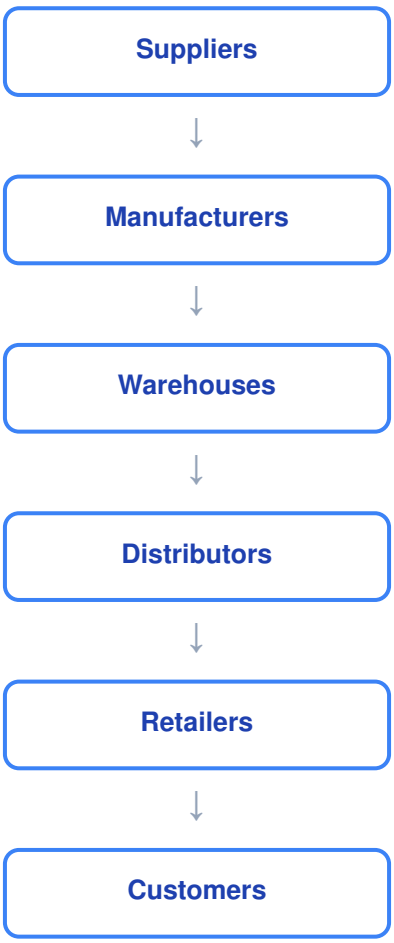
13. Supply Chain Management and Risk Mitigation: Purchasing and Warehousing

Supply Chain Management (SCM)

Supply Chain Management is the coordination and management of activities involved in sourcing, production, transportation, storage, and delivery of goods and services.

SCM aims to ensure that products reach customers efficiently and cost-effectively.

Components of Supply Chain Management



Objectives of SCM

- Reduce costs
- Improve efficiency
- Enhance customer service
- Ensure smooth product flow

> **Example:** An automobile company coordinating suppliers, factories, warehouses, and dealers worldwide.

Risk Mitigation in Supply Chains

Risk mitigation involves identifying and reducing potential disruptions that may affect supply chain performance.

Common Supply Chain Risks

- Natural disasters
- Supplier failures
- Transportation disruptions
- Political instability

- Cybersecurity threats
- Demand fluctuations

Risk Mitigation Strategies

Supplier Diversification

Using multiple suppliers instead of relying on one source.

Inventory Buffers

Maintaining safety stock to handle uncertainties.

Technology Integration

Using tracking systems and analytics.

Contingency Planning

Preparing alternative action plans for emergencies.

> **Example:** A company sourcing raw materials from multiple countries to reduce supply disruptions.

Purchasing

Purchasing refers to acquiring materials, goods, and services required for business operations.

Effective purchasing ensures quality materials at the right price and time.

Objectives of Purchasing

- Obtain quality materials
- Minimize purchasing costs
- Ensure timely availability
- Build supplier relationships

Purchasing Process

> **Example:** A factory purchasing steel from approved suppliers.

Warehousing

Warehousing involves storing goods until they are needed for production or sale.

Warehouses play a critical role in inventory management and supply chain efficiency.

Functions of Warehousing

- Storage
- Protection of goods
- Inventory control
- Order fulfillment
- Consolidation of shipments

Benefits of Warehousing

- Ensures product availability
- Supports smooth production
- Reduces stockouts
- Improves customer service

> **Example:** E-commerce companies use warehouses to store products before delivery.

14. Advanced Topics in Global Inventory Management: MRP and Bullwhip Effect

Material Requirements Planning (MRP)

Material Requirements Planning (MRP) is a computerized system used to determine the quantity and timing of materials required for production.

MRP ensures that materials are available when needed while minimizing inventory costs.

Objectives of MRP

- Ensure material availability
- Reduce inventory levels
- Improve production scheduling
- Enhance operational efficiency

Inputs of MRP

Master Production Schedule (MPS)

Specifies what products will be produced and when.

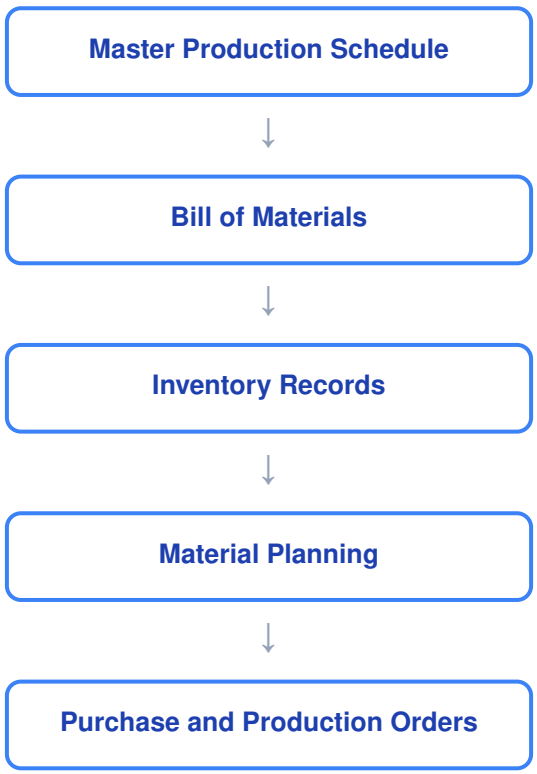
Bill of Materials (BOM)

Lists all materials and components required.

Inventory Records

Provides information about current inventory levels.

MRP Process

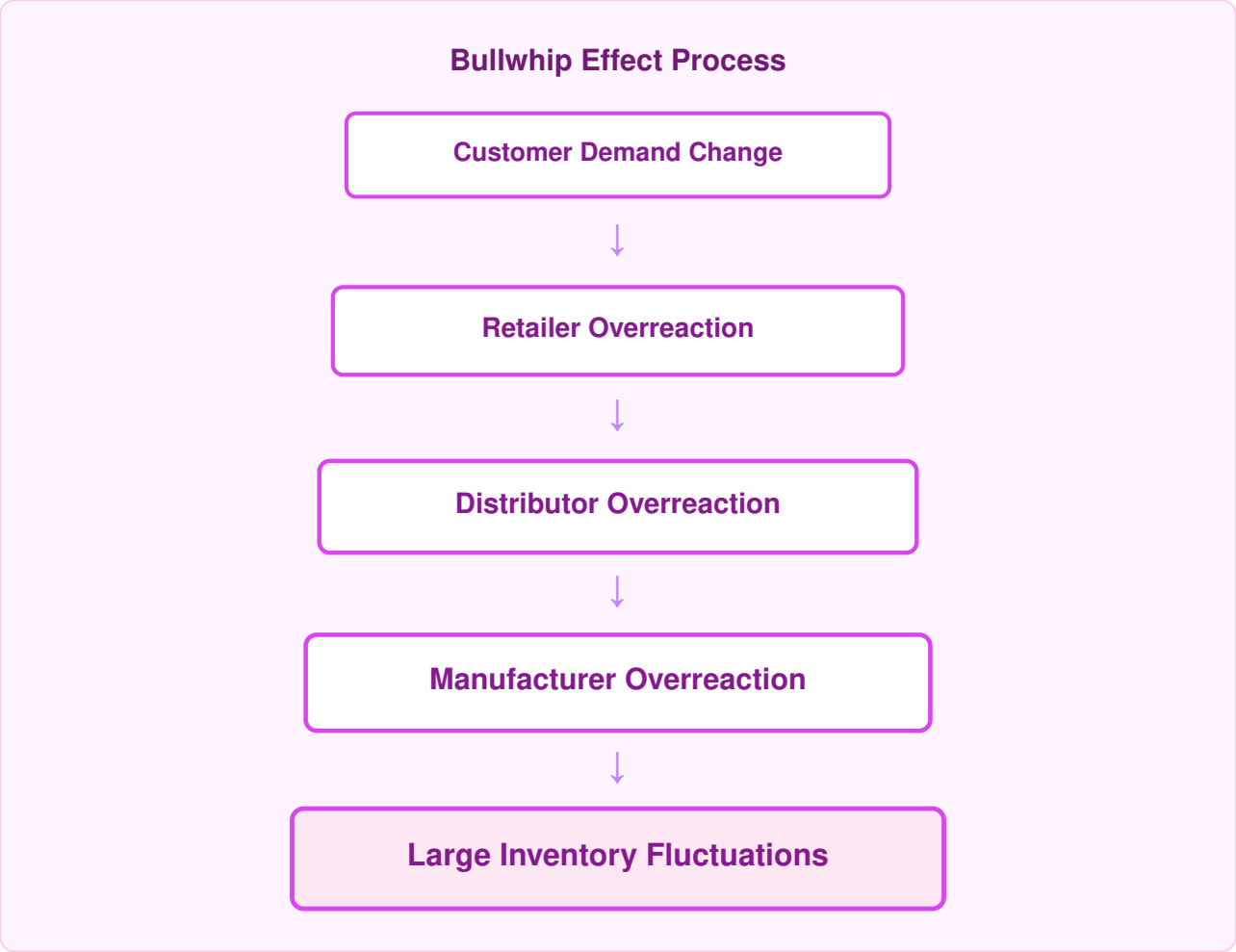


> **Example:** A computer manufacturer using MRP to determine how many processors, screens, and batteries are needed.

Bullwhip Effect

The Bullwhip Effect refers to a situation where small changes in customer demand cause increasingly larger fluctuations in orders throughout the supply chain.

As information moves upstream, demand variations become amplified.



Causes of Bullwhip Effect

- **Demand Forecast Updating:** Businesses repeatedly revise forecasts based on limited information.
- **Order Batching:** Large periodic orders create demand fluctuations.
- **Price Fluctuations:** Discounts and promotions encourage unusual purchasing behavior.
- **Shortage Gaming:** Customers place excessive orders during shortages.

> **Example:** A slight increase in consumer demand for a product may cause retailers, distributors, and manufacturers to order much larger quantities than necessary.

Consequences of Bullwhip Effect

- Excess inventory
- Stock shortages
- Increased operational costs
- Reduced customer service
- Inefficient resource utilization

Reducing the Bullwhip Effect

- **Information Sharing:** Improve communication throughout the supply chain.
- **Better Forecasting:** Use accurate forecasting techniques.
- **Smaller Order Quantities:** Reduce order batching.
- **Stable Pricing Policies:** Avoid excessive discounts and promotions.
- **Collaboration:** Strengthen coordination among supply chain partners.

> **Example:** Retailers and manufacturers sharing real-time sales data can significantly reduce the bullwhip effect.

Difference Between MRP and Bullwhip Effect

MRP	Bullwhip Effect
Inventory planning system	Supply chain problem
Helps determine material requirements	Causes inventory fluctuations
Improves production planning	Creates inefficiencies
Supports operational efficiency	Increases costs and uncertainty

> **Example:** MRP helps a manufacturer order the right quantity of materials, while poor information sharing can create a bullwhip effect and lead to excessive inventory accumulation.