EHS402: OPERATIONS AND SUPPLY CHAIN MANAGEMENT (Elective)

Module II **8 hours**

Understanding the Logistics and Supply Chain:

- Introduction to supply chain,
- Supply chain links,
- Role of logistics in supply chain,
- Drivers and metrics in supply chain,
- Designing the supply chain network,
- Online sales and distribution network,
- Factors influencing the network design.

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What is Logistics and Supply Chain Management?

"Logistics typically refers to activities that occur within the boundaries of a single organization and Supply Chain refers to networks of companies that work together and coordinate their actions to deliver a product to market. Also, traditional logistics focuses its attention on activities such as procurement, distribution, maintenance, and inventory management. Supply Chain Management (SCM) acknowledges all of traditional logistics and also includes activities such as marketing, new product development, finance, and customer service" - **Michael Hugos**

What are 'Logistics'?

Logistics is about getting the right **product**, to the right **customer**, in the right **quantity**, in the right **condition**, at the right **place**, at the right **time**, and at the right **cost.**

- Logistics is the overall process of managing how resources are acquired, stored and transported to their final destination.
- Logistics management involves identifying prospective distributors and suppliers, and determining their effectiveness and accessibility.
- Logistics managers are referred to as logisticians.
- "Logistics" was initially a military-based term used in reference to how military personnel obtained, stored and moved equipment and supplies.

- The term is now used widely in the business sector, particularly by companies in the manufacturing sectors, to refer to how resources are handled and moved along the supply chain.

Understanding Logistics:

In simple terms, the goal of logistics management is to have the right amount of a resource or input at the right time, getting it to the appropriate location in proper condition and delivering it to the correct internal or external customer.

- Proper logistics ensure the fulfillment of each customer order, making sure resources move quickly and efficiently from one section of the supply chain to the next.
- Example: In the natural gas industry, logistics involves managing the pipelines, trucks, storage facilities and distribution centers that handle oil as it is transformed along the supply chain.
- An efficient supply chain and effective logistical procedures are essential to reduce costs and to maintain and increase efficiency.
- Poor logistics leads to untimely deliveries, failure to meet the needs of clientele and ultimately causes the business to suffer.

The Transformation of Logistics:

The concept of business logistics has been transformed since the 1960s. The increasing intricacy of supplying companies with the materials and resources they need and the global expansion of supply chains has led to a need for specialists known as supply chain logisticians. In the modern era, the technology boom and the complexity of logistics processes have spawned logistics management software and specialized logistics-focused firms that expedite the movement of resources along the supply chain. Manufacturing companies may choose to outsource the management of their logistics to specialists or manage logistics internally if it is cost-effective to do so.

Primary Functions of a Logistician:

- The tasks for which a logistician is responsible vary depending on the business. Primary responsibilities include overseeing and managing inventory by arranging for appropriate transportation and adequate storage for the inventory.
- A qualified logistician plans out these and other aspects of the logistics process, coordinating the steps as inventory and resources move along the supply chain.

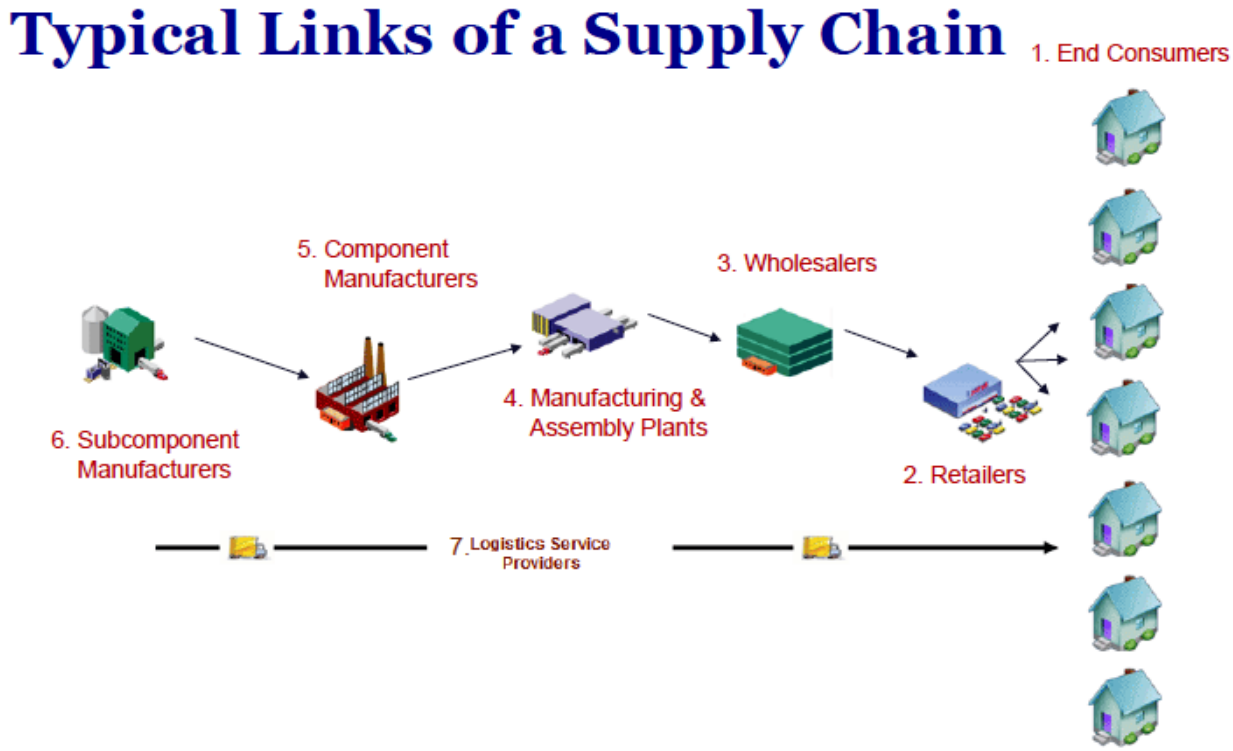
Supply Chain:

What is the 'Supply Chain'

A supply chain is a network between a company and its suppliers to produce and distribute a specific product, and the supply chain represents the steps it takes to get the product or service to the customer.

LINKS is a supply chain management :

LINKS is a supply chain management simulation. LINKS holds all major supply chain elements: suppliers, manufacturers, distributors, retailers, and end-users.
Firms in LINKS are responsible for managing product development, procurement (purchasing/sourcing), manufacturing, distribution and warehousing, transportation, customer service, generate demand, forecasting, information technology, and research studies. Traditional financial statements, various operating reports, and optional research studies provide an information-rich environment for LINKS.
Information management is important within supply chain management and LINKS includes various optional information enhancements (information technology and research studies) available for a fee.



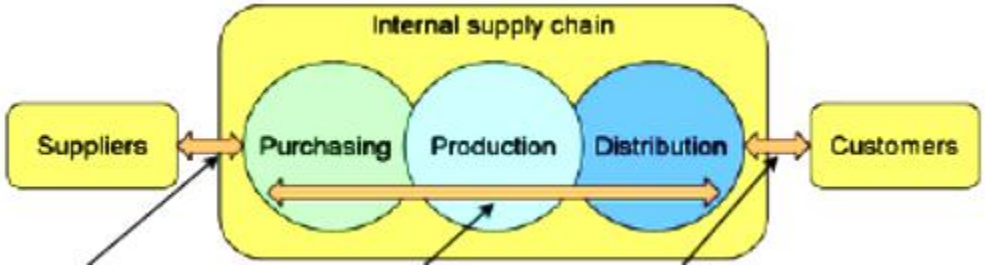
8 Strongest Links from Supply Chain Management:

1. **Demand Planning**: It starts here. What do you think your customers need? What will set you apart from the competition?
2. **Planning/ Inventory management:** Who doesn't have too much, too little, or not the "right" items at the "right" place at the "right" time throughout your end-to-end supply chain?

3. **Inventory accuracy:** Of course inventory accuracy affects efficiencies across the board but little matters if you cannot find your inventory to ship to the customer on time!
4. **Capacity & staffing –** Do you have the machines, tools and resources to produce the demand plan? Are they cross-trained?
5. **Customer service & lead times –** Is your supply chain set up to deliver on-time and with lead times which will edge out the competition?
6. **Logistics –** Are your warehousing, distribution and transportation processes set up to achieve your customer expectations at the lowest cost to you?
7. **Customer & supplier collaboration –** Only those who collaborate will thrive.
8. **SIOP (Sales, Inventory and Operations Planning) / S&OP (Sales & Operations Planning) –** aligns all functions on 1 plan while balancing supply with demand.

Segments of A Supply Chain:

A supply chain can be viewed as having three integrated segments



Supply Chain Management has 3 segments:

1)Upstream

- Sourcing or procurement from external suppliers
- Select suppliers; develop the pricing, delivery, and payment
- Manage inventory, receive and verify shipments, transfer goods to manufacturing facilities

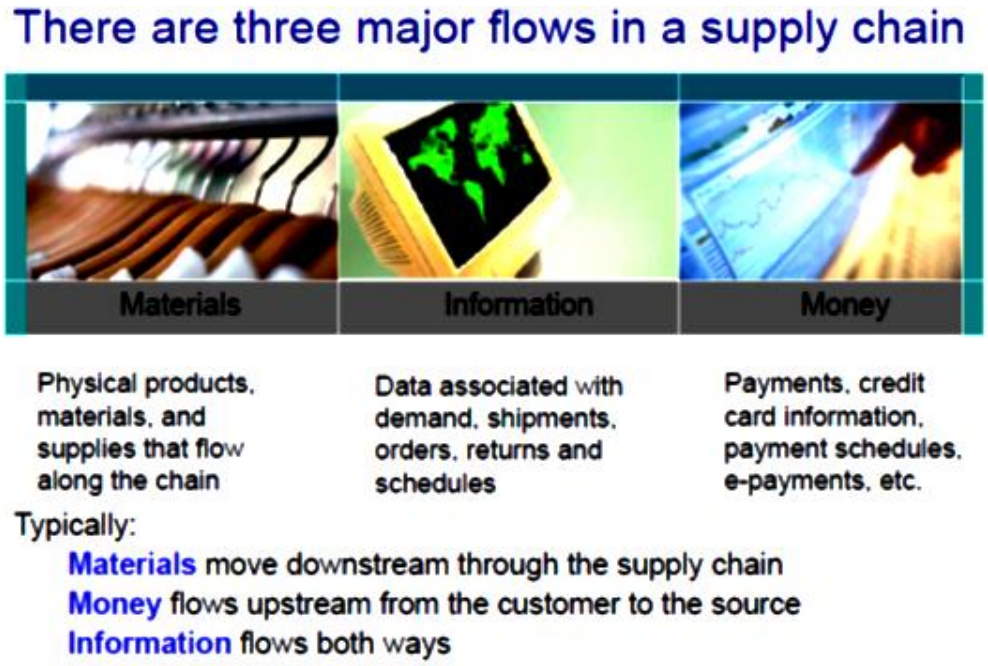
2)Mid-stream/Internal

- Schedule activities necessary for production, Manufacture products, testing, packaging, and preparing goods for delivery
- Monitor quality levels, production output, and worker productivity

3)Downstream

- Receive customer orders, develop a network of warehouses, select carriers, and generates invoice, and delivers goods. Describe the benefits and risk of social commerce?

Flows In Supply Chain Management:



SUPPLY CHAIN (SC) DRIVERS AND METRICS:

Drivers of SC performance

(1) Facilities
(2) Inventory
(3) Transportation
(4) Information
(5) Sourcing
(6) Pricing

Facilities

- Places where inventory is stored, assembled, or fabricated
- Production sites and storage sites
- Decisions regarding location, capacity and flexibilities of facility have a significant impact on SC performance

Inventory

- Raw materials, WIP, finished goods within a supply chain
- Changes in inventory policies can dramatically alter the efficiency and responsiveness of a SC

Transportation

- Moving inventory from point to point in a supply chain
- Combinations of transportation modes and routes can affect the performance of SC

Information

- Data and analysis regarding inventory, transportation, facilities throughout the supply chain
- potentially the biggest driver of supply chain performance

- This driver allow the management with the better opportunity to make the SC more responsive and efficient

Sourcing

- Distinguish the functions a firm performs and functions that are outsourced

Pricing

- Price associated with goods and services provided by a firm to the supply chain

Competitive Strategy is defined as the long term plan of a particular company in order to gain **competitive** advantage over its **competitors** in the industry. It is aimed at creating defensive position in an industry and generating a superior ROI (Return on Investment).

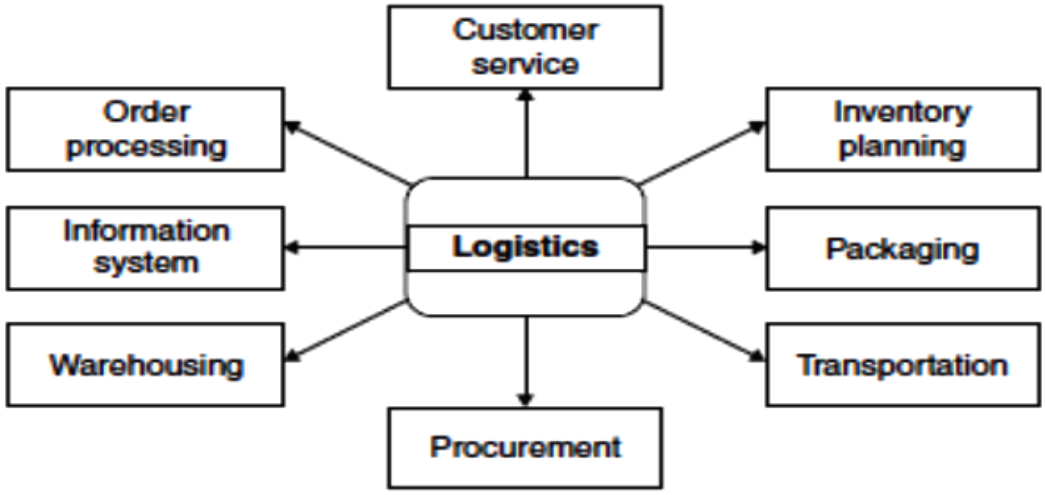
Some Tangible Benefits of Good Supply Chain Management

- Procurement cost reduction
- Inventory reduction
- Maintenance reduction
- Productivity improvement
- Order management improvement
- Transportation logistics cost reduction
- On-time delivery improvement
- Financial-close cycle improvements
- Cash management improvements
- Personnel reduction
- IT cost reduction

Bottom Line: It

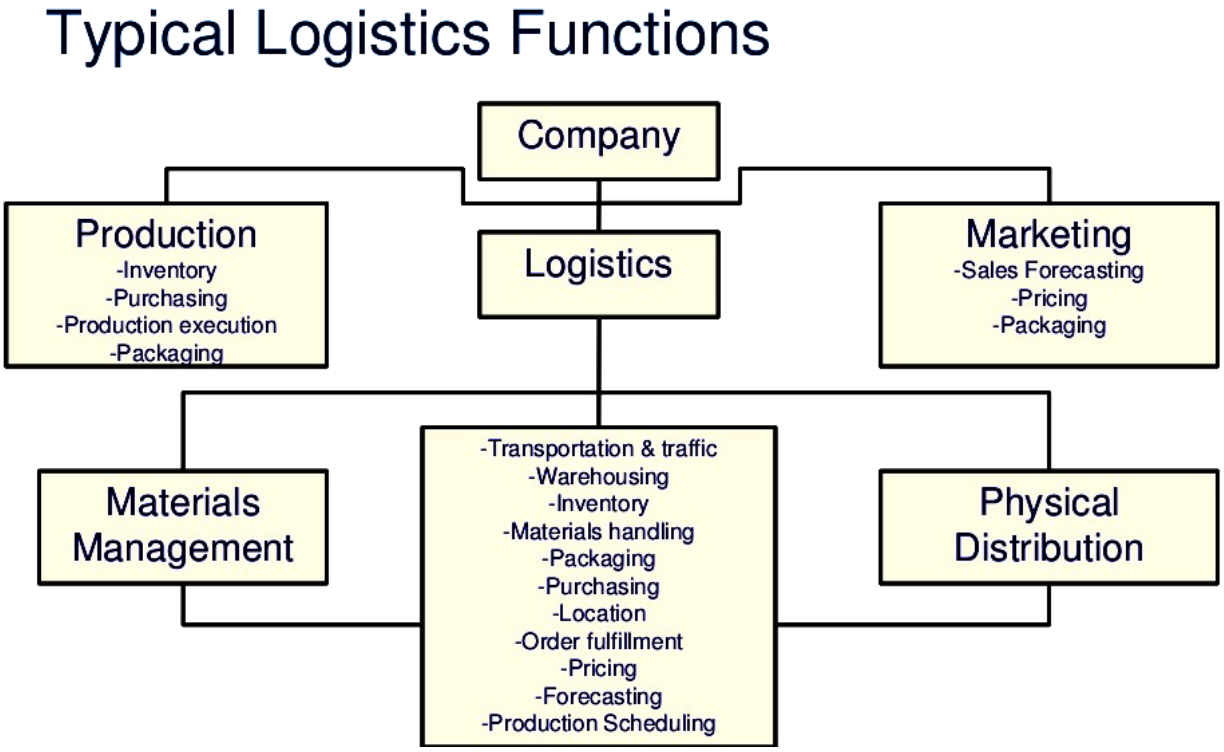
ROLE OF LOGISTICS IN SUPPLY CHAIN:

Logistics System Components

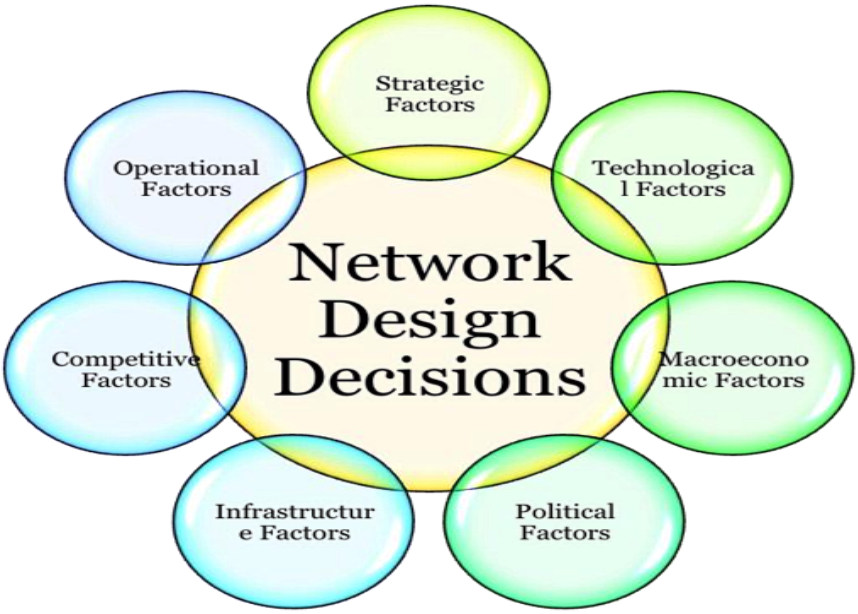


According to the Council of Supply Chain Management Professionals

- Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements.
- Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities.
- Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers.
- In essence, supply chain management integrates supply and demand management within and across companies.



Factors Influencing Network Design Decisions



Strategic factors: Local vs. global SC networks –

Strategic role of each facility: Offshore facility, Source facility, Server facility, Contributor facility, Outpost facility and Lead facility.

Technological factors: technology fixed cost and flexibility

Macroeconomic factors: taxes, tariffs, free trade zones, limits on import, exchange rates and demand risk.

Political factors: Stability and clarity of legal systems.

Infrastructure: availability of sites and labor, access to transportation

Competitive factors: Positive externalities vs. locating to split the market.

Customer response time and local presence:

Logistics and facility costs:

Network Modeling Approach

Distribution network is to satisfy customer demand at specified service levels and at the lowest cost.

Specialist Supply Chain network modeling software is used to allow cost and service optimization of the network to be established.

Networks can be modeled from factory to the consumer, taking into account all the key cost and service drivers such as:

1. Customer location
2. Order size and frequency
3. Transport costs
4. Transport vehicle types
5. Transport modes
6. Warehouse (Distribution Centre) size, location, resources, costs…
7. Service level requirements
8. Factory and supplier locations
9. Ports of entry for imported products
10. and many more key variables

Six steps to effective network planning

1.Orient the project. The objective of this step is to understand the scope of the project and schedule important deadlines and milestones. The related document is the Orientation & Issues Worksheet.

2. Define the variables. The purpose of this step is to create a modeling framework for the variables and trade-offs. These are recorded on the Variables Summary Sheet.

3. Analyze the sensitivities. The output of this step is a validated baseline model that replicates the company's current performance. This is recorded on the Baseline Validation Worksheet.

4. Create scenarios. In this step, the company models the results for alternative network plans relative to the baseline. These results are summarized on the Scenario Summary Worksheet.

5. Evaluate the alternatives. During this phase, the project team will select a network plan from among the alternatives. All of the analysis for this step is summarized on the Alternatives Analysis Worksheet.

6. Detail and do. In this last step, the team creates a detailed protocol for implementing the selected network plan, which is represented on the Detail and Do Worksheet.

Designing Distribution Networks and Applications to Online Sales

Designing Distribution Networks and Applications to Online Sales

Learning Objective Identify the key factors to be considered when designing a distribution network Discuss the strengths and weaknesses of various distribution options Understand how online sales have affected the design of distribution networks in different industries

- **The Role of Distribution in the Supply Chain**
  Distribution – the steps taken to move and store a product from the supplier stage to the customer stage in a supply chain
- Drives profitability by directly affecting supply chain cost and the customer experience
- Choice of distribution network can achieve supply chain objectives from low cost to high responsiveness

Factors Influencing Distribution Network Design

- Distribution network performance evaluated along two dimensions Customer needs that are met
- Cost of meeting customer needs
- Evaluate the impact on customer service and cost for different distribution network options
- Profitability of the delivery network determined by revenue from met customer needs and network costs

Factors Influencing Distribution Network Design

Elements of customer service influenced by network structure:

- Response time
- Product variety
- Product availability
- Customer experience
- Order visibility
- Returnability

Factors Influencing Distribution Network Design

Supply chain costs affected by network structure:

- Inventories
- Transportation
- Facilities and handling
- Information

Inventory Costs and Number of Facilities
Inventory costs increase, facility costs increase, and transportation costs decrease as we increase the number of facilities.

Transportation Costs and Number of Facilities
Inventory costs increase, facility costs increase, and transportation costs decrease as we increase the number of facilities.

Design Options for a Distribution Network
Distribution network choices from the manufacturer to the end consumer Two key decisions Will product be delivered to the customer location or picked up from a prearranged site? Will product flow through an intermediary (or intermediate location)?

The difference between corporate and competitive strategies:

- **Corporate** strategy defines the way in which the organization does the working and implements its planning in the system. It mainly defines what the company does.
- **Competitive** planning defines where the company stands in the market in competition with its rivals and other competitors. It describes the capabilities of the company's strengths and weakness in relation to market competition. The difference between strategy and tactics.

OSCM Module II : Factors influencing the network design.

Factors

a) **Strategic**
b) **Technological**
c) **Macro-economic**
d) **Political**
e) **Infrastructural**
f) **Competitive**
g) **Logistics and facility costs**

- Strategic role of each facility: Offshore facility, Source facility, Server facility, Contributor facility, Outpost facility and Lead facility.
- Technological factors: technology fixed cost and flexibility
- Macroeconomic factors: taxes, tariffs, free trade zones, limits on import, exchange rates and demand risk.
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- Infrastructure: availability of sites and labor, access to transportation
- Competitive factors: Positive externalities vs. locating to split the market.
- Customer response time and local presence Logistics and facility costs

Cost Build up as a function of Facilities in SC network

The following graphs represent the variation of Number of facilities vs various costs