

Logistics and Supply Chain Management

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Syllabus

- Discuss Syllabus (Tentative)
- Textbook (Free pdf)
- Office hours
- e-Learning portal
- Facebook group

Course Topics

Topic 1: Introduction to Logistics and SC

Topic 2: Short-haul Freight Transportation

Topic 3: Long-haul Freight Transportation

Topic 4: Logistics Network Design

- What is the relationship between supply chain management and logistics system management?
- What is the meaning of common supply chain and logistics terminology?
- What are the main activities of a logistics system?
- What are the objectives and decisions in logistics systems?
- References: GLM Ch.1, assorted online data sources

Concept 1

- What is the relationship between a supply chain and a Logistics System?

Relationship

Logistics system is a subsystem of the supply chain

Supply Chain Definition

What is a Supply Chain

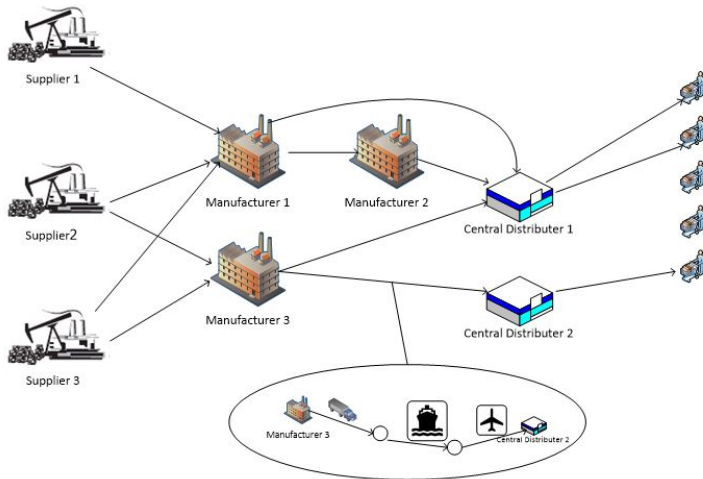


Figure: Supply chain

Examples of Supply Chain

- Hewlett-Packard
 - Creating a product: laser printers
 - Raw inputs: ink cartridges, print heads, plastic
- Delta Airlines
 - Delivering a service: air travel between cities
 - Raw inputs: Airplanes, Foods, information
- Amazon.com
 - Product or service?
 - Fulfillment by Amazon

What is Supply Chain Management?

- Council of Supply Chain Management Professionals (CSCMP) Definition:

Supply chain management, def:

- Key: integrates supply and demand management across companies and functions within a company

What is Logistics?

- "A continuous link that is always in sync"
- "Technology knows right where everything goes"
- "Parts for the line come precisely on time"

What are Logistics systems?

- Logistics system, def: a set of facilities linked by transportation services
 - Facilities:
 - Transportation services:

- Examples of Logistics in service: Garbage collection (Public), Mail delivery ...

What is Logistic Management?

- Council of supply Chain Management Professionals (CSCMP) definition:

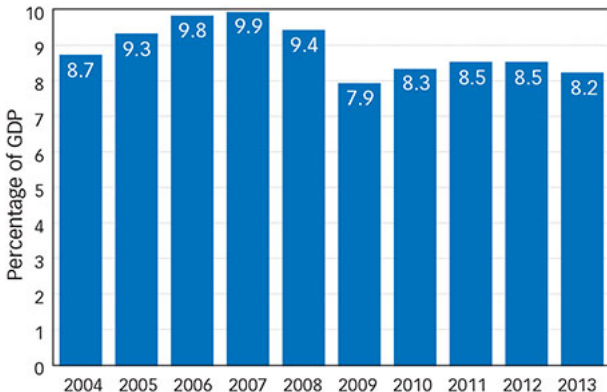
Logistics management, def: that part of supply chain management that plans, implements, and control the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customer's requirements.

Effective and Efficient Logistics systems

- Key to the bottom line profitability of most firms
- Effective: How well does the logistics system accomplish what the firm promises to do?
 - E.g., Mail service provider (USPS, FedEx, ...etc) 2-3 day priority mail
 - What is an appropriate measure of the effectiveness of the priority mail service?
- Efficient: How well are firms resources used to achieve what the company promises to do?
 - What did it cost to sort and deliver the packages?

Significance and State of Logistics

[FIGURE 3] U.S. LOGISTICS AS A PERCENTAGE OF GDP



[SOURCE: 25TH ANNUAL "STATE OF LOGISTICS REPORT," 2014]

Concept 1 Refresher

- What is the relationship between supply chain management and logistics system management?

What is the meaning of common supply chain and logistics terminology?

Assorted Supply Chain Concepts

- *Pull/make-to-order (MTO) supply chain*: finished products manufactured only when customer requires them
 - Little to no inventories needed
 - Used when lead times short and/or products expensive and/or demand is highly variable
 - Ex:
- *Push/make-to-stock (MTS) supply chain*: production and distribution decisions based on forecasts
 - Inventories held in warehouses and at retailer
 - Appropriate when lead times long, products inexpensive, and demand easy to predict
 - Ex:

Assorted Supply chain Concepts

- *Make-to-assembly (MTA) supply chain*: components and semi-finished products assembled in push-based manner and final assembly is pull-based
 - Sometimes, last minute customization/product changes performed by distributor
 - Ex.:
- *Product and information flows in supply chain*
 - Product flows forward from suppliers to customers
 - Information flows in reverse from customers to suppliers
 - No flows instantaneous
 - Note: be aware of other types of flows and the reverse logistics

Assorted Supply Chain Concepts

- *Degree of vertical integration*
 - A supply chain is fully vertically integrated if its components (raw material sources, plants, transportation system, etc.) all belong to a single firm
- *3rd party logistics (3PL)*
 - Long-term commitment to use an outside company to perform all or part of a company's product distribution
 - Allows company to focus on its core competency

Assorted Supply Chain Concepts

- *Retailer-managed versus vendor-managed resupply*
 - Retailer-managed resupply: Retailer in charge of monitoring inventory and placing orders for replenishment as needed
 - Vendor-managed resupply: vendors monitor consumption and inventories through electronic data interchange (EDI) and decide how and when to replenish

Concept 2 Refresher

- Which type of supply chain requires the least amount of inventory to be held?
 - Make-to-assembly
 - Make-to-stock
 - Make-to-order

Concept 3

What are the main activities of a logistics system?

The Main Activities of Logistics systems

- Order Processing
- Inventory Management
- Freight transportation

Order Processing

- Includes order transmission, verification of product availability and customer's credit status, keeping customer informed of status of order
- Bar code technology, electronic data interchange (EDI) simplifying process

Inventory Management

- *Inventories, def*: stockpiles of goods waiting to be manufactured, transported, or sold
- Types of inventory
 -

Inventory Management

- Reasons to hold inventory
 - Improve service level
 - Reduce transportation costs
 - Cope with randomness (demand, lead time)
 - Speculate on price patterns
- Cost of inventory
 - Opportunity cost
 - Warehousing space

Inventory Management

- *Inventory management, def*: determination of stock levels in order to minimize total operation cost while satisfying customer service requirements
- Policy should consider:
 - Relative importance of customers
 - Economic significance of different products
 - Transportation policies
 - Production process flexibility
 - Competitors' policies

Freight Transportation

- To be discussed in detail
 - Costs
 - Transit Time
 - Reliability
 - Mode choice
 - Etc...

Concept 3 Refresher

- **True/False:** The four main activities of logistics systems are:
 - Order Processing
 - Marketing
 - Inventory Management
 - Freight transportation

What are the objectives and decisions in logistics systems?

Three Main Objectives

- Capital reduction: level of investment in logistics system
- Cost reduction: minimize total cost associated with transportation and storage
- Service level improvement: lead time between order placement and receipt of goods

Logistics Decisions

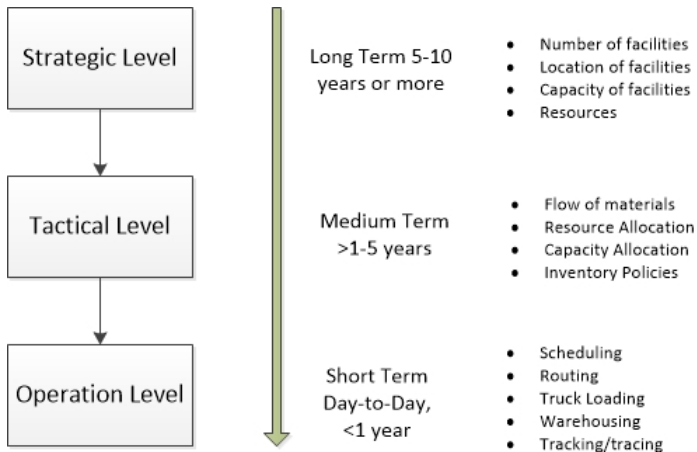


Figure: Decisions Levels in Logistics

Supply Chain Management Activities

- All activities required to plan and operate a supply network, including:
 - Relationship management
 - Finance
 - Product marketing
 - SC inventory management
 - Inventory Control
 - Production planning and scheduling
 - Facility design
 - Transportation management
 - Network Design

Semester Map

- Introduction, transportation modes, cost, selection
- Short haul freight transportation problems
 - Networks, shortest paths, traveling salesman problem, vehicle routing
- Exam 1
 - March 3rd, covers through TSP or VRP
- Long haul freight problems
 - Fleet composition, flow assignment, consolidation, terminal design, vehicle allocation, driver assignment
- Exam 2
 - April 7th, covers material since Exam 1 through vehicle allocation/driver assignment
- Location models
 - Single and multi-commodity models, public sector, integrated location and routing
- Final Exam
 - To be determined later, cumulative with emphasis on material since exam 2