

Basics of Logistics Management

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Definition – Logistics Management

- Logistics management tries to have the “*right product*”, in the “*right quantity*”, at the “*right place*”, at the “*right time*”, with the “*right cost*”
- Logistics management must balance 2 basic targets:
 - Quality of Service
 - Low Cost
- **Logistics / Supply Chain in a business aim to the following contributions:**
 - Achieve maximum customer service level
 - Ensure high product quality
 - Achieve minimum (possible) cost
 - Be flexible in the constant market changes

Definition – Logistics Management

- One quite widely accepted view shows the relationship as shows:

Logistics = Supply + Materials management +
Distribution

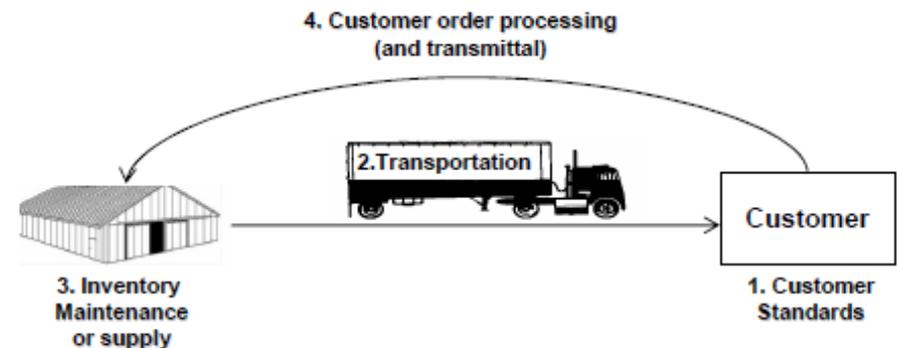
- *Logistics is the . . .*
 - *“process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.”*
 - *Council of Logistics Management*

Difference between SCM and Logistics

| Logistics | Supply Chain |
|--|---|
| <p>Logistics is the process of planning, implementing and controlling</p> <ul style="list-style-type: none">• the efficient, cost-effective• flow and storage of• raw materials, in-process inventory, finished goods and related information• from the point of origin to point of consumption• for the purpose of conforming to customer requirements. | <p>SCM is the integration of all activities</p> <ul style="list-style-type: none">• associated with the flow and transformation of goods• from raw materials through to end user,• as well as information flows,• through improved supply chain relationships,• to achieve a sustainable competitive advantage. |

Key components of Logistics – Key activities

- The logistics activities can be classified into a) core and b) supporting
- They contribute the most to the total cost of logistics or they are essential to the effective coordination and completion of the logistics task.
- These are mentioned below:
 - a) Customer service (typically defined by marketing)
 - b) Transportation
 - c) Inventory management
 - d) Information flows and order processing



Key components of Logistics – Support activities

- Support activities vary from company to company
- A comprehensive list includes:
 - **Warehousing** (Space determination, stock layout, configuration, stock placement)
 - **Materials handling** (equipment selection & replacement policies, order-picking procedures, stock storage & retrieval)
 - **Purchasing** (supply source selection, purchase timing, purchase quantities)
 - **Protective packaging** (designed for handling, storage, protection from loss/damage)
 - **Cooperate with production/operations** (specify aggregate quantities, sequence & time production output, schedule supplies)
 - **Information maintenance** (info collection, Storage & manipulation, data analysis, control procedures)

Logistics Strategy

- Selecting a good logistics strategy may yield a competitive advantage. It must not be seen as a less creative process than developing the corporate strategy.
- It is suggested that a logistics strategy has three (3) objectives:

| Strategy | Description | Sample Issues |
|---------------------|---|--|
| Cost Reduction | <ul style="list-style-type: none">❑ Minimizing the variable costs associated with movement and storage. | Evaluate alternative courses of action: <ul style="list-style-type: none">❑ choosing among different warehouse locations, or❑ evaluate alternative transport modes |
| Capital Reduction | <ul style="list-style-type: none">❑ Minimizing the level of investment in the logistics system.❑ Maximizing the return on logistics assets | <ul style="list-style-type: none">❑ Shipping direct to customers to avoid warehousing,❑ choosing public warehouses over privately owned,❑ selecting a just-in-time supply approach rather than stocking to inventory |
| Service Improvement | <ul style="list-style-type: none">❑ Recognizing that revenues depend on the level of logistics services provided | <ul style="list-style-type: none">❑ Provide different and better services than the competition |

Making Trade-offs in Logistics

- Logistics affect many procedures and activities in a business, leading to increasing operational costs and decreased customer service in case of “bad” logistics management.
- Logistics interfere with many business areas and, thus, it is suggested to identify and determine several “*cost trade-offs*” in order to provide a positive benefit to the logistics system as a whole.
- Four (4) different levels of trade-off are proposed:
 - ***Within distribution components***, e.g. the decision to use random storage locations compared to fixed storage locations in a depot. The first better storage utilization, more difficult for picking; the second has the opposite results
 - ***Between distribution components***: e.g. a company might increase the strength and thus the cost of packaging but find greater savings through improvements in the warehousing and storage of the product
 - ***Between company functions***: e.g. a trade-off between optimizing production run lengths and the associated warehousing costs of storing the finished product. Long production runs produce lower unit costs (and thus more cost-effective production) but mean that more product must be stored for a longer period (which is less cost-effective for warehousing).
 - ***Between the company and external organizations***: e.g. a change from a manufacturer’s products being delivered direct to a retailer’s stores to delivery via the retailer’s depot network might lead to mutual savings for the two companies.

Examples of Trade-offs

| Trade-off | Finance | Production | Distribution | Marketing |
|-------------------------------------|--------------------------------------|--|--|--|
| Longer production runs | Lower production unit costs | Lower production unit costs | More inventory & storage required | Lower prices |
| Fewer depots | Reduced costs | No impact | Less complicated logistics structure | Service reduction due to increased distance of depots from customers |
| Lower FG stocks | Reduced costs | Shorter production run so higher production unit costs | No need to expand storage facilities | Poorer product availability for customers |
| Lower RM & component stocks | Reduced costs | Less efficient production scheduling due to stock unavailability | Lower stock-holding requirements | No direct impact |
| Less protective transport packaging | Reduced costs | No impact | Reduced transport modal choice | No impact |
| Reduced warehouse supervision | Cost savings through lower headcount | No impact | Reduced efficiency due to less supervision | Lost sales due to less accurate order picking |

Logistics Process Design

3. Inventory Strategy

- Inventory levels
- Deployment of inventories
- Control methods

4. Transport Strategy

- Modes of transport
- Carrier routing/ scheduling
- Shipment size/ consolidation



2. Location Strategy

- Number, size & location of facilities
- Assignment of stocking points to sourcing points
- Assignment of demand to stocking points or sourcing points
- Private/public warehousing

Source: Ballou, H. P.

1. Customer Service

- Definition of Logistics
- Different for Different companies.
 - Make to Stock
 - Assemble to Order
 - Make to Order
 - Engineer to Order

Mainly :- How much Customer is ready to Wait?

1. Customer Service (Cont)

- Customer service metrics are indications of a company's ability to satisfy the needs of customers by meeting customers needs on a timely basis and creating exceptional values to the customers

Customer Service Metrics

- Goals

- Flexible response
- Product/service innovation
- Customer satisfaction
- Customer value
- Delivery performance

- Measures

- Number of choices & average response time
- Customer contact points and product finalization points
- Product Error
- Order fulfillment rate
- Customer profitability
- Delivery speed & reliability

2. Location Strategy

What's located?

☐ Sourcing points

- ☐ Plants

- ☐ Vendors

- ☐ Ports

☐ Intermediate points

- ☐ Warehouses

- ☐ Terminals

- ☐ Public facilities (fire, police, and ambulance stations)

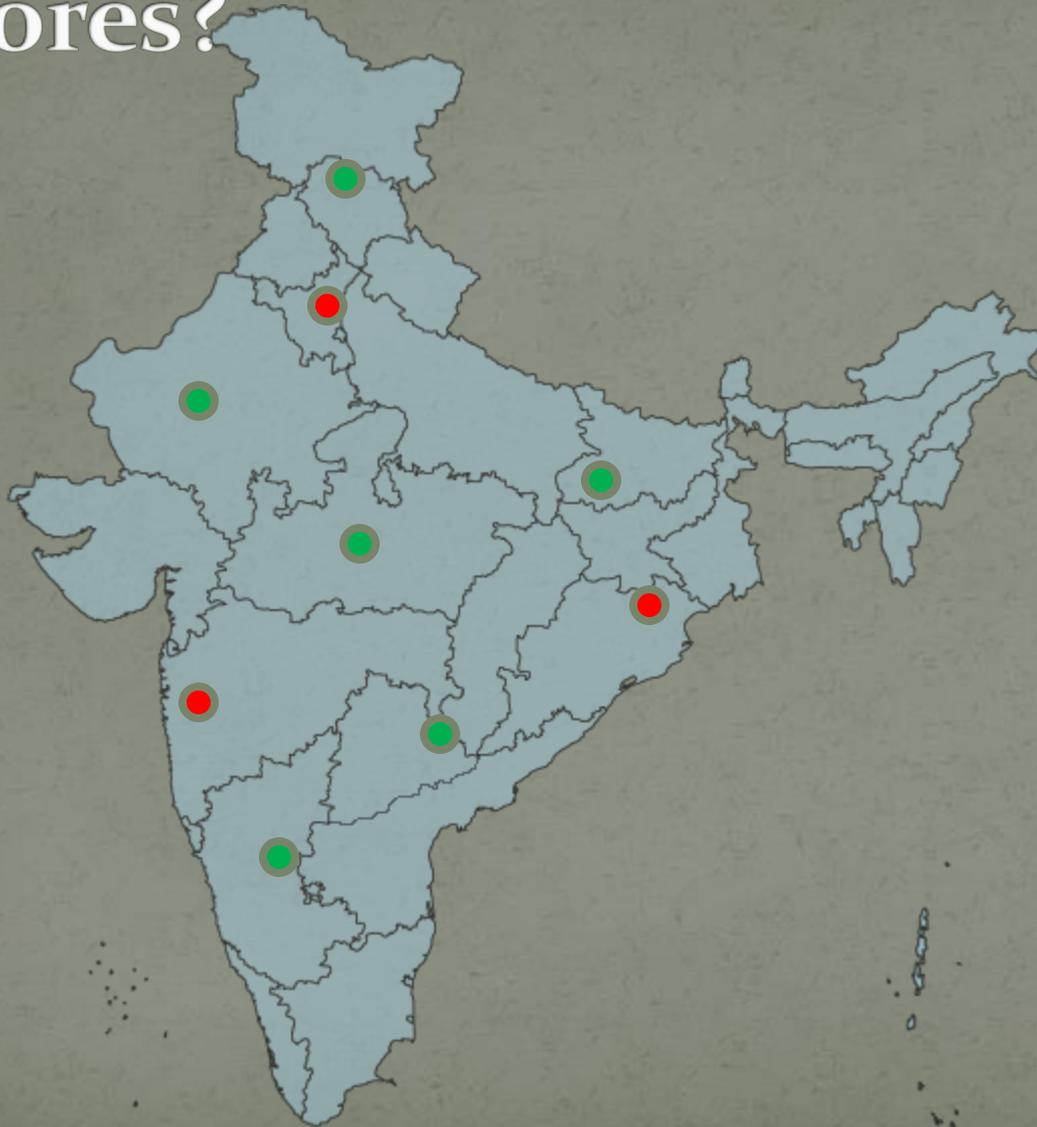
- ☐ Service centers

☐ Sink points

- ☐ Retail outlets

- ☐ Customers/Users

Where do I locate Plant / Warehouse / Stores?



● Plant

● W/H

2. Location Strategy

Key Questions

- ☐ How many facilities should there be?
- ☐ Where should they be located?
- ☐ What size should they be?

Why Location is Important?

- ☐ Gives structure to the network
- ☐ Significantly affects inventory and transportation costs
- ☐ Impacts on the level of customer service to be achieved

2. Location Strategy

Manufacturing (plants & warehouses)

- Decisions are driven by economics. Relevant costs such as transportation, inventory carrying, labor, and taxes are traded off against each other to find good locations.

Retail

- Decisions are driven by revenue. Traffic flow and resulting revenue are primary location factors, cost is considered after revenue.

Service

- Decisions are driven by service factors. Response time, accessibility, and availability are key dimensions for locating in the service industry.

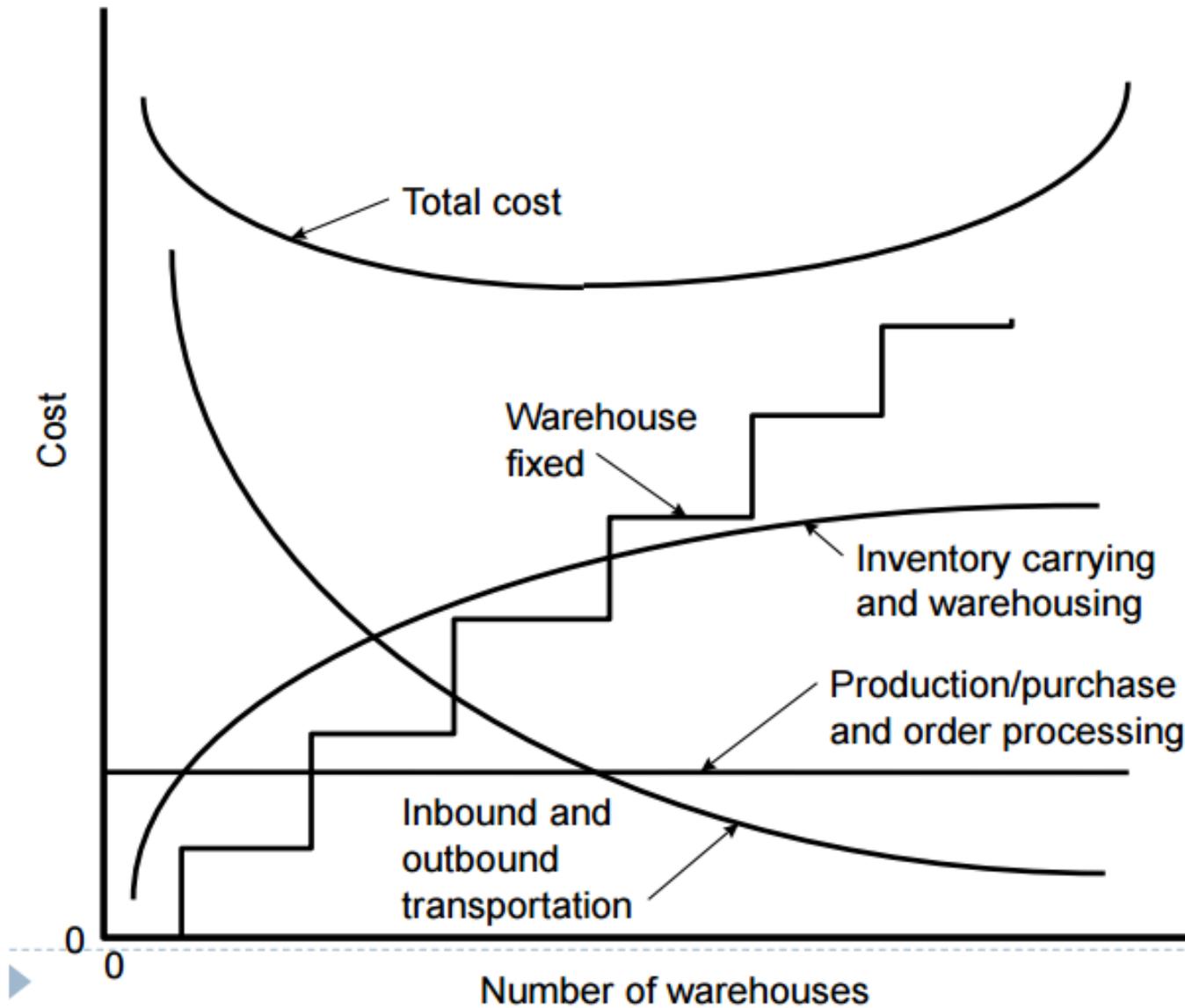
2. Location Strategy

Key Questions

- ☐ How many facilities should there be? – *Depends of Demand/ Capacity/ Fixed cost.*
- ☐ Where should they be located? – *Discussed Above*
- ☐ What size should they be? – *Futuristic Demand*

Basically, it's a Cost Decision without impacting Customer service

Location Cost Trade-Offs



3. Inventory Planning

Will be covered in Planning discussion

4. Transport Strategy

- Transport: moving goods from one place to another.
- Transport involves
 - Facility (Terminals, DCs, Hubs),
 - equipment (trucks, planes, trains, boats, pipeline),
 - people (drivers, loaders & unloaders),
 - decisions (routing, timing, quantities, equipment size, transport mode).

Transport Fundamentals

- Performance
 - Average transit time
 - Transit time variability
 - Loss and damage
 - Other factors including availability, capability, frequency of movement, and various less tangible services
- Cost
 - Line haul
 - Terminal/local
 - Accessorial or special charges

Transport Cost Characteristics

- Fixed costs:
 - Terminal facilities
 - Transport equipment
 - Carrier administration
 - Roadway acquisition and maintenance
- Variable costs:
 - Fuel
 - Labor
 - Equipment maintenance
 - Handling, pickup, and delivery

Types of Transport Modes

| Type of Transport | |
|-------------------|---|
| Air | <ul style="list-style-type: none"><input type="checkbox"/> Although air transportation is considered as expensive, it offers long-distance transportation in short time periods.<input type="checkbox"/> Air transportation depends heavily on weather conditions and delays schedule deviations may occur. |
| Sea | <ul style="list-style-type: none"><input type="checkbox"/> Sea Transportation offers the ability to carry large quantities of commodities (.000 tones) using specialized cargo ships.<input type="checkbox"/> Sea Transportations offers low flexibility in determining routes and schedules.<input type="checkbox"/> Depends on weather conditions (not as hard as in air transportation) |
| Rail | <ul style="list-style-type: none"><input type="checkbox"/> Rail transportation is considered as a slow transport mode.<input type="checkbox"/> Low cost materials and Raw Materials are usually transferred.<input type="checkbox"/> Weather conditions do not influence rail operations.<input type="checkbox"/> Many stops in local areas can be made in order to load / unload commodities. |
| Road | <ul style="list-style-type: none"><input type="checkbox"/> Offers lower capacity and quantity capabilities in comparison with rail transportation<input type="checkbox"/> Advantage of road transportation is the ability to offer door-to-door services and the existence of many different and specialized vehicles<input type="checkbox"/> Weather conditions do not influence rail operations. |
| Pipeline | <ul style="list-style-type: none"><input type="checkbox"/> Used to transport Liquids and Gases (i.e. Oil, Natural Gas)<input type="checkbox"/> Although transportation is slow (3-4 miles per hour), the ability to operate 24 hours a day makes it an efficient transportation mode of these product types.<input type="checkbox"/> As in rail transportation, offers a specific network with specific stops, intersections, etc.<input type="checkbox"/> Weather conditions do not influence rail operations and limited technical problems may occur. |

Characteristics of Transport Modes

| | Transport Types | | | | |
|-------------------|---|--|--|---|---|
| Components | Air | Sea | Road | Rail | Pipelines |
| Facilities | Facilities are the fixed components of a transportation network | | | | |
| | <input type="checkbox"/> Airports, <input type="checkbox"/> Cargo Terminals <input type="checkbox"/> Control Towers | <input type="checkbox"/> Ports <input type="checkbox"/> Docks <input type="checkbox"/> Waterways | <input type="checkbox"/> Distr. Centers <input type="checkbox"/> Warehouses <input type="checkbox"/> Hubs | <input type="checkbox"/> Rail Hubs <input type="checkbox"/> Rail Tracks | <input type="checkbox"/> Pipes <input type="checkbox"/> Pumps Stations <input type="checkbox"/> Storage |
| Equipment | Consists of the variables parts of a transportation network. Usually equipment belongs and maintained by the shippers or the carriers and includes: | | | | |
| | <input type="checkbox"/> Aircrafts <input type="checkbox"/> Containers | <input type="checkbox"/> Vessels <input type="checkbox"/> Containers | <input type="checkbox"/> Vehicles (tracks, scooters) <input type="checkbox"/> Containers | <input type="checkbox"/> Cars <input type="checkbox"/> Locomotives <input type="checkbox"/> Containers | <input type="checkbox"/> Control Units |
| People | People that are involved in transportation-related or transportation supportive functions are one of the crucial components of transportation networks. Related working positions are Operating Personnel, Supportive Personnel and Managerial / Administrative Personnel | | | | |
| | <input type="checkbox"/> Pilots <input type="checkbox"/> Air Traffic Controllers <input type="checkbox"/> Maintenance Personnel <input type="checkbox"/> Loading / Unloading | <input type="checkbox"/> Vessel Personnel <input type="checkbox"/> Loading / Unloading Personnel <input type="checkbox"/> Port / Docks Personnel <input type="checkbox"/> Maintenance Personnel | <input type="checkbox"/> Drivers <input type="checkbox"/> Loading / Unloading Personnel <input type="checkbox"/> Maintenance Personnel | <input type="checkbox"/> Locomotive Operators <input type="checkbox"/> Loading / Unloading Personnel <input type="checkbox"/> Terminal Stations Personnel <input type="checkbox"/> Maintenance Personnel | <input type="checkbox"/> Control Personnel <input type="checkbox"/> Maintenance Personnel |

An Indicative Comparison of Transport Modes

- Selecting which modes to combine and how is a decision that is based on the following parameters:

| | Parameters | | | | |
|----------|----------------------------|----------------------|------------------------|-----------------------|------------------------------|
| Mode | Cost (Price) | Delivery Time | Time Variability | Geographical Coverage | Loss & Damage |
| Rail | 3 | 3 | 4 | 2 | 5 |
| Road | 4 | 2 | 3 | 4 | 4 |
| Sea | 1 | 5 | 5 | 1 | 2 |
| Air | 5 | 1 | 1 | 3 | 3 |
| Pipeline | 2 | 4 | 2 | 5 | 1 |
| Legend | 1 ⇒ Cheap 5 ⇒ Expensive | 1 ⇒ Fast 5 ⇒ Slow | 1 ⇒ Small 5 ⇒ Large | 1 ⇒ Good 5 ⇒ Poor | 1 ⇒ Safest 5 ⇒ Least Safe |

Transport Providers: Introduction

- Warehousing and Transportation of Products / Commodities consist of one of the core procedures in Business Operations.
- These procedures can be performed by own resources or by external partners:
 - Common & Private Carriers (distribution)
 - Freight Forwarders (distribution & storage)
 - Third Party Logistics Providers (3PL) (integrated distribution & storage)
- Each company selects (based on their needs) the types of services to outsource to an external partner.
- 3PL companies provide an wide variety of services, apart from simple distribution and storage procedures.

Transport Providers: Common Carriers and Freight Forwarders

- A common carrier is a business that transports people and/ or goods, offers its services to the general public under license or authority provided by a regulatory body.
- Common carriers typically transport persons or goods according to defined and published routes, time schedules and rate tables upon the approval of regulators.
- Public airlines, railroads, bus lines, cruise ships, motor carriers (i.e., trucking companies) and other freight companies generally operate as common carriers.
- FF business is to:
 - Hire “transport space” from transportation means (carriers, ships, etc.)
 - Group and integrate loads and shipments
- The advantages of the existence of freight forwarders and their provided services can be summarized in the following:
 - They succeed in better transport means’ capacity utilization (due to consolidation of shipments)
 - Consolidation of shipments and the handling of larger integrated loads/ shipments leads to efficient material handling (loading , unloading, transshipment, etc.)
 - Due to the consolidation and the transshipment of larger shipments, freight forwarders succeed in lower transport prices with the transport means’ operators, leading to minimized cost in comparison with sending smaller

Transport Providers: Third Party Logistics (3PL) Providers

- Recent trends in logistics and business operations have led to the 3PL providers.
- A 3PL firm provides outsourced services to companies for part, or sometimes all of their supply chain management function.
- Typically specialize in integrated operation, warehousing and transportation services that can be scaled and customized to customer's needs based on market conditions and the demands and delivery service requirements for their products and materials.

Third Party Logistics (3PL) Providers

- ❑ Apart from the usual operations (warehousing, collection, distribution, picking, fleet management, etc.) 3PLs also undertake other operations that are related to the transport of goods.

| Other Services Provided | Description |
|---|--|
| Assembly Services | <ul style="list-style-type: none">❑ PC manufacturers sent the components (monitors, hard drives, etc) of computers to 3PL companies, where the final assembly (and software installation) is taking place and forwarded to the final destination. |
| Packing & Repacking | <ul style="list-style-type: none">❑ 3PL companies undertake the packing operations of several products to be transported.❑ Additionally, repacking operations (such as containerization, pallets or blister-packing) are performed |
| Reverse Logistics & Packing Materials Returns | <ul style="list-style-type: none">❑ Due to legislations, packing some packing materials may have to be returned in order to be re-used❑ Containers may have to be returned to their starting locations (empty or loaded)❑ Damaged or malfunctioned products should be returned to the shipper. |
| Time-Related Services | <ul style="list-style-type: none">❑ The major 3PL providers support the JIT (just-in-time) operations of major manufacturers by supplying accurately and in the proper volumes (based on production schedules) raw materials or spare parts (i.e. TOYOTA) |

Advantages of 3PL Services

| | Description |
|-----------------|---|
| Cost / Expenses | <ul style="list-style-type: none"><input type="checkbox"/> Investments to Facilities (warehouses, transshipment centers) or equipment (vehicles, material handling) are not required.<input type="checkbox"/> Costs / expenses are known in advance in detail and based on the transported volumes and distances (usually based on contractual agreements)<input type="checkbox"/> Economies of Scale: It is cheaper for small manufacturers and shippers in contrast to maintain own facilities and fleets.<input type="checkbox"/> It is easier to change the operational logistics model, in order to succeed in more efficient logistics services, than re-engineer the company's own logistics services (if there are already fixed facilities and resources) |
| Organization | <ul style="list-style-type: none"><input type="checkbox"/> Companies (shippers) can focus to their core business operations (sales, marketing, etc.)<input type="checkbox"/> Can gain immediate access to intelligent IT & Telematics infrastructure (without the additional cost of investment) |
| Physical | <ul style="list-style-type: none"><input type="checkbox"/> Offers great flexibility in market penetration (due to the wide distribution network of a 3PL company)<input type="checkbox"/> 3PL companies offer a wide variety of vehicles that can undertake commodities with specialized characteristics and even use multiple-compartment vehicles that can transport different products simultaneously (i.e. frozen goods with simple product compartments in a vehicle) |

Disadvantages of 3PL Services

- Apart from the advantages of utilizing a 3PL provider for some of the operational procedures of a company there are also some disadvantages that should be taken under consideration when selecting a 3PL provider or when deciding to adapt a logistics strategy based on 3PL services:
 - Using 3PL providers may lead to lose control of the distribution and storage procedures of the products (Usually it is managed through contractual agreements and Key Performance Indicators-KPIs)
 - 3PL providers have a physical advantage in comparison to the shippers (“since they own all related facilities, equipment's, systems) and the shipper may start to depend on specific 3PL providers
 - Shippers cannot gain expertise and experience in distribution and storage operations and processes (and it becomes difficult to re-adapt a non-3PL distribution and storage model)
 - Service provision issues may arise: (1) the company's sales and deliveries to customers may not be aligned and in-time and (2) there is no direct contact with customers.
 - Trust issues may arise: 3PL companies that serve different competitive shippers

Recap

- Definition
- Difference between SCM and Logistics
- Key components of Logistics
- Logistics Strategy
- Logistics Process Design
 - Customer Service
 - Location Strategy
 - Transportation Strategy

