



Unit-4

Sourcing and Transporting:
sourcing decisions and
transportation in supply chain –
infrastructure suppliers of transport
services – transportation
economics.

Sourcing and Transporting

- Sourcing is the process of vetting, selecting, and managing suppliers who can provide the inputs an organization needs for day-to-day running.
- Sourcing is tasked with carrying out research, creating and executing strategy, defining quality and quantity metrics, and choosing suppliers that meet these criteria.

Role of Sourcing in SCM

- Sourcing is the entire set of business processes required to purchase goods and services.
- The most significant decision is **outsource** or **perform in-house**.
- Outsourcing results in the supply chain function performed by a third party.
- Will the third party increase the supply chain surplus relative to performing the activity in house?
- To what extent do risks grow upon outsourcing?

Outsourcing makes sense if it increases the supply chain surplus without increasing the risks!

Sourcing Process

- Once the outsourcing decision is made, sourcing processes include:
 - Outsource or perform in-house
 - Supplier scoring and assessment
 - Supplier selection and contract negotiation
 - Design collaboration
 - Procurement
 - Sourcing planning and analysis

Sourcing Decisions

- Sourcing decisions are high-level, often strategic decisions that address:
 - What will use resources within the firm
 - What will be provided by supply chain partners
- Insourcing – The use of resources within the firm to provide products or services
- Outsourcing – The use of supply chain partners to provide products or services

- The sourcing decision defines responsibilities of operations and supply chain managers:..
- Insourcing – determine required capacity and resources– determine appropriate manufacturing or service processes to use– determine information systems required– manage and coordinate operations
- Outsourcing – identify the most qualified suppliers– manage the buyer-supplier relationship
- Make-or-Buy Decision

Benefits of Effective Sourcing Decisions

- Better economies of scale can be achieved if orders are aggregated
- More efficient procurement transactions can significantly reduce the overall cost of purchasing
- Design collaboration can result in products that are easier to manufacture and distribute, resulting in lower overall costs
- Good procurement processes can facilitate coordination with suppliers
- Appropriate supplier contracts can allow for the sharing of risk
- Firms can achieve a lower purchase price by increasing competition through the use of auctions

Drawbacks of Sourcing Decisions

- Required strategic flexibility
- Required high investment
- Loss of access to superior products and services offered by potential suppliers
- Possibility of choosing a bad supplier
- Loss of control over the process and core technologies
- Communication and coordination challenges
- “Hollowing out” of the corporation

Inourcing and Outsourcing Costs

	Inourcing	Outsourcing
Direct costs	<ul style="list-style-type: none">•Direct material•Direct labor•Freight costs•Variable overhead	<ul style="list-style-type: none">•Price (from invoice)•Freight costs
Indirect costs	<ul style="list-style-type: none">•Supervision•Administrative support•Supplies•Maintenance costs•Equipment depreciation•Utilities•Building lease•Fixed overhead	<ul style="list-style-type: none">•Purchasing•Receiving•Quality control

Sourcing Strategies

- **Single sourcing** – The buying firm depends on a single company for all or nearly all of an item or service
- **Multiple sourcing** – The buying firm shares its business across multiple suppliers
- **Cross sourcing** – Using a single supplier for a certain part or service and another supplier with the same capabilities for a similar part
- **Dual sourcing** – Using two suppliers for the same purchased product or service

- **Cross sourcing has the advantage of providing for a backup supplier in case the primary supplier cannot provide the required volume.**
- **Dual sourcing is typically split 70% – 30% so that the dominant supplier will lose business if performance suffers**

Role of transportation

- Transportation is the physical link connecting the firm to its suppliers and customers.
- In a nodes and links scenario, transportation is the link between fixed facilities (nodes).
- Transportation is an important supply chain driver because products are really not produced and consumed at same location.
- Transportation also adds value to the product by providing time and place utility for the firm's goods.
- As firms engage in global competition, transportation costs are becoming even more significant.
- Outbound transportation was clearly the largest component of total physical distribution costs.
- Cost trade-offs abound in transportation and are typified by trading lower inventory costs for higher transportation costs.

Transportation in supply chain

MODE	RELATIVE ADVANTAGES	RELATIVE DISADVANTAGES
Rail	<ul style="list-style-type: none">• Full capability• Extensive routes• Low cost	<ul style="list-style-type: none">• Some reliability, damage problems• Not always complete pickup and delivery• Sometimes slow
Truck	<ul style="list-style-type: none">• Complete pickup and delivery• Extensive routes• Fairly fast	<ul style="list-style-type: none">• Size and weight restrictions• Higher cost• More weather sensitive
Air	<ul style="list-style-type: none">• Fast• Low damage• Frequent departures	<ul style="list-style-type: none">• High cost• Limited capabilities
Pipeline	<ul style="list-style-type: none">• Low cost• Very reliable• Frequent departures	<ul style="list-style-type: none">• Limited routes (accessibility)• Slow
Water	<ul style="list-style-type: none">• Low cost• Huge capacities	<ul style="list-style-type: none">• Slow• Limited routes and schedules• More weather sensitive

Participants in Transportation

- **Shipper and Consignee**
- **Carrier**
- **Government and**
- **Public**

- **1) Shipper and Consignee:** The shipper and the consignee have the common objective of moving goods from origin to destination within a prescribed time at the lowest cost. The service should include a specified pick-up and delivery time, predictable transit time, zero loss, and damage as well as accurate and timely transaction of information.
- **2) Carrier:** The carrier is an intermediary between the shipper and the consignee. The main objective of carrier is to maximize the revenue associated with the transaction while minimizing the cost associated complete the transaction. The objective is to charge the highest price acceptable to the above par keeping the cost namely, labor, fuel, and vehicle cost required to move the goods at the minimum.

- **3) Government:** Transportation is an important factor as it affects the economy to a large extent and hence maintains a high level of interest in it. It is desirable to have a stable and efficient transportation environment to sustain the economic growth. Transportation enables the efficient movement of products to markets throughout the country and thus promotes product availability at a reasonable cost.
- Many governments are more involved with carrier activities and practices. Involvement may take the form of regulation, promotion, or ownership.

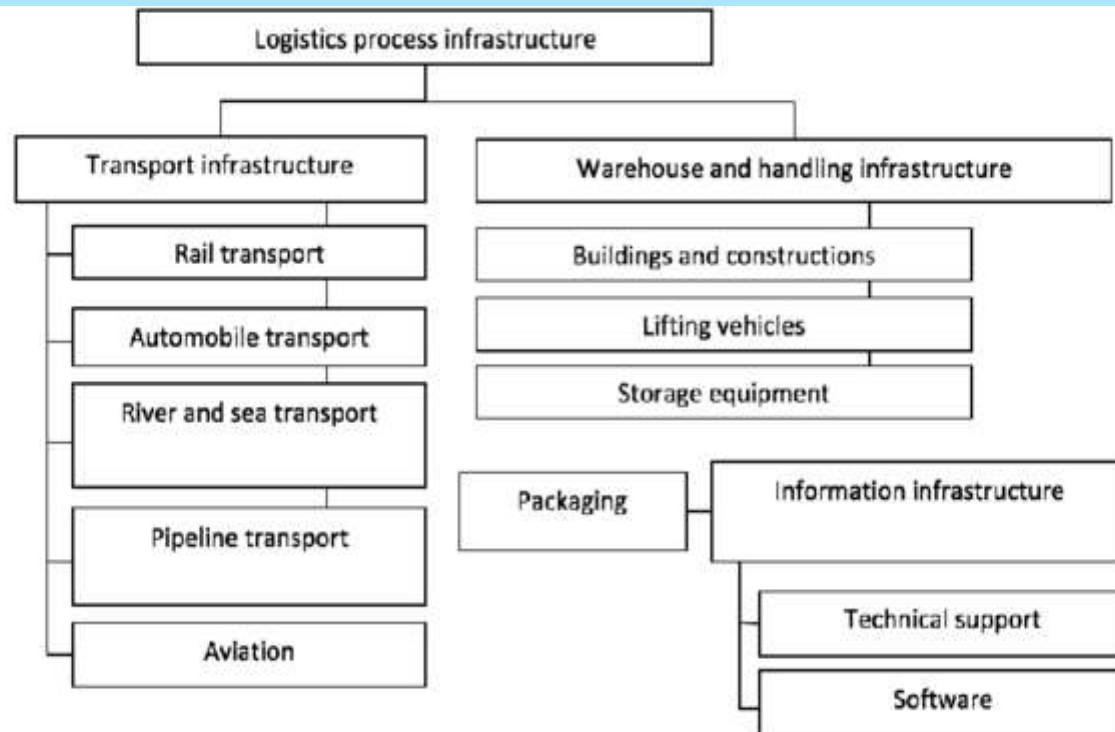
- **4) Public:** The public is concerned with the transportation accessibility, expense effectiveness, environmental and safety standards. The public ultimately determines the need for transportation demanding goods around the world at reasonable price.
- The relationship between these parties is complex because of the interaction between the parties. There conflicts between parties with micro-interest, government, and public. Hence, there is a need for regulations to get the process smooth.

Transportation Infrastructure

- In the movement of raw materials or products from their place of production to their place of consumption, transportation is the most important component of the logistical system. Transportation serves two purposes, one is product movement and the other is the in transit product storage. The movement of product can be achieved through various modes such as road, rail, air and sea subject to the availability and accessibility of infrastructure.

Transportation Infrastructure

- In India 39% of the total cargo movement is by road, followed by rail, which contributes to the extent of 35%, the balanced is shared by inland water, air and sea.



Suppliers of Transportation Service

- Transportation services are offered by a combination of suppliers.
- The services that are offered by different carrier types are described with examples of carriers that are representative of **each category**:
 - Traditional carriers
 - Packaging services
 - Intermodal transportation and
 - Non-operating intermediaries

I. Traditional carriers

- The most basic carrier type is a transportation firm that provides service utilizing only one of the five basic transport modes.
- Focus on a single operational mode permits a carrier to become highly specialized.
- Ex: Airlines are an examples of a single mode carrier for both freight and passenger service that traditionally limits service from airport to airport.

2. Packaging services

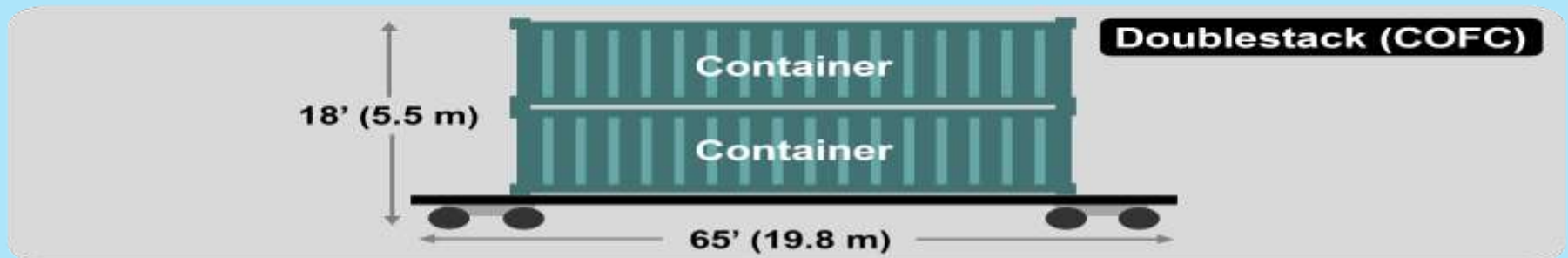
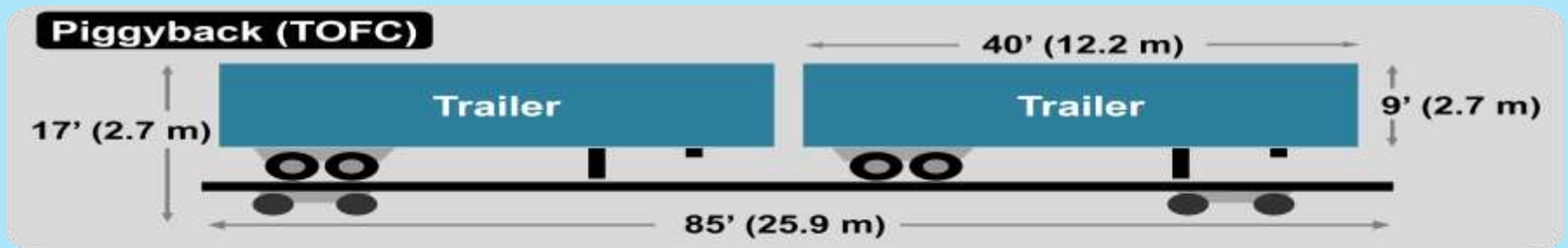
- Over the past several decades a serious problem existed in the availability of small- shipment transportation.
- Package services represent an important part of logistics, and the influence of carriers in this segment is increasing because of their size and intermodal capabilities.
- The advent of e-commerce and the need for consumer-direct fulfillment have significantly increased demand for package delivery.
- While package services are expanding, the services required do not fall neatly into the traditional modal classification scheme.
- Packages are regulatory transported by using the line-haul services of rail, motor and air.
- Package service provides both regular and premium services.

Packaging services-2

- i. **Ground Package Service:** Numerous carriers offer delivery services within metropolitan areas. Other carriers offer package delivery service on a national and global basis. The most recognizable carriers are United Parcel Service(UPS), the United States Postal Service (USPS), Federal Express Ground, and DHL Express.
- ii. **Air Package Service:** Several carriers, such as Federal Express, UPS, and DHL, have entered the package or premium transportation market over the past two decades. Most organizations that provide routine package services also offer premium services UPS, e.g, offers next-day and second-day service, while the United States Postal Service provides a variety of priority services.

3. Intermodal transportation

- This transportation combines two or more modes to take advantage of the inherent economies of each and thus provide an integrated service at lower total cost.
- **i. Piggyback/TOFC/ COFC:** The best known and most widely used intermodal systems are the Trailer on a Flatcar(TOFC) and Container on a Flatcar(COFC)



3. Intermodal transportation-2

- ii. **Containership:** Fishy-back(water and truck), train-ship and containership are the oldest form of intermodal transportation. They utilize waterways, which are one of the least expensive modes for line-haul movement.
- iii. **Coordinated Air and Truck:** Local cartage is a vital part of every air movement because air freight must eventually be transported from the airport to the final delivery destination.

4. Non-Operating Intermediaries:

- These are often exempt carriers that perform pickup and delivery services within the municipal commercial zones.
- i. Freight Forwarded (these accept full responsibility for shipment performance)
- ii. Shippers' Association/ Cooperatives and Agents
- iii. Brokers

Transportation Economics.

- Transportation Economics are concerned with the factors and characteristics that determine the transport costs and rates. This includes following four factors
- Economic Factors
- Transportation Costs
- Pricing Strategies
- Transportation Rates

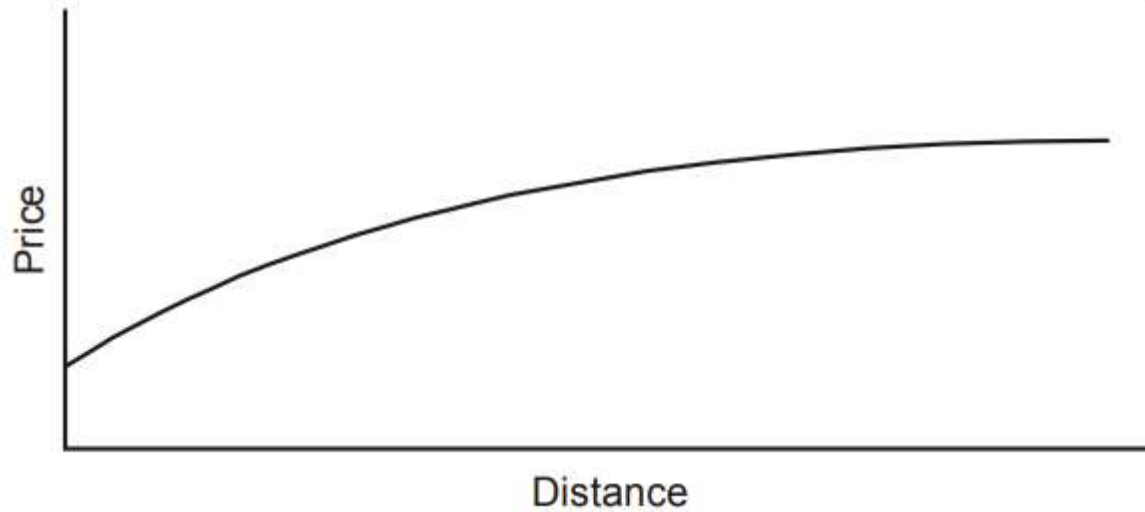
1. Economic Factors

- Distance
- Volume
- Density
- Stowability(Vehicle space Utilization)
- Handling
- Liability
- Market Factors

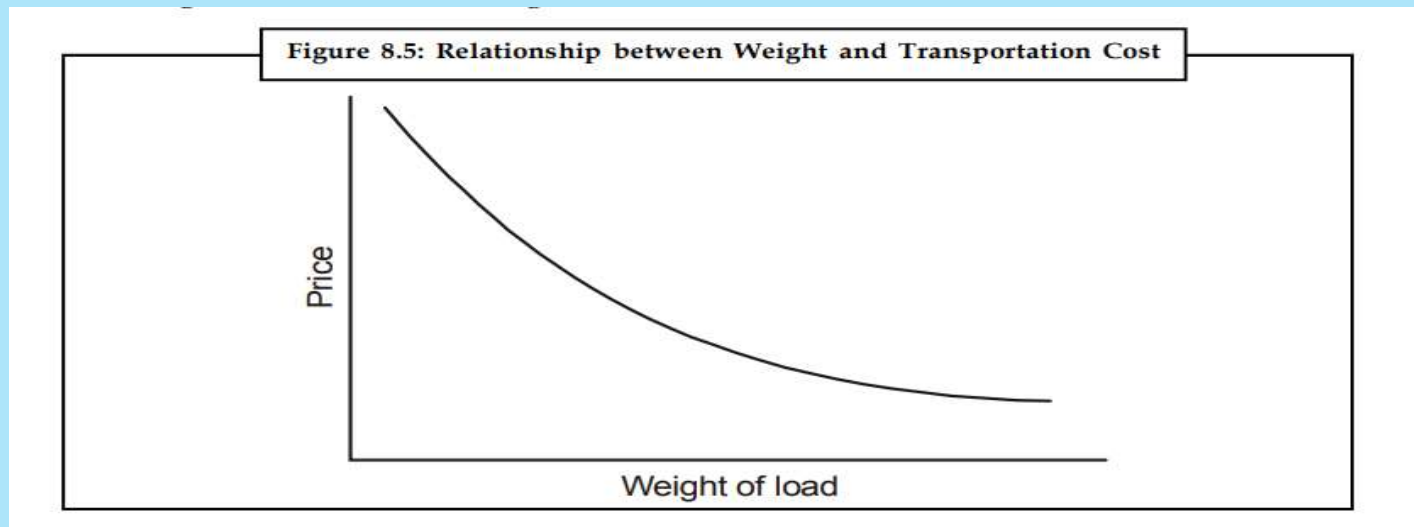
Economic Factors

- Transport economics and pricing are concerned with the factors and characteristics that determine transport costs and rates. Transport economics is influenced by seven factors. These factors are important while developing transportation rates. The specific factors are discussed below.
- **Distance:** Distance is a major influence on transportation cost since it directly contributes to variable cost, such as labour, fuel, and maintenance. This is reflected by the cost-distance curve. The cost curve does not begin at the origin because there are fixed costs associated with shipment pickup and delivery regardless of distance. It increases at a decreasing rate as a function of distance. This is shown in the following Figure

Figure 8.4: Relationship between Distance and Transportation Cost



- **Volume:** The load volume relationship reflects economies of scale in transportation activities. This is illustrated in Figure 8.5. The curve indicates that transport cost per unit of weight decreases as load volume increases. The relationship is limited to the maximum size of the vehicle. Economic transportation requires the consolidation of small loads into larger loads to take advantage of scale economies.



- **Density:** The product weight is a function of the product density and volume. Figure 8.5 reflects weight considerations. If the product is light, it is not possible to increase the amount carried if the space consideration has been met. Since vehicles are limited by both space and weight considerations, once the vehicle is full, actual labour and fuel expenses are not dramatically influenced. Generally, higher density products are assessed at lower transport costs per unit of weight as the capacity is better utilized.
- **Stowability:** Stowability refers to vehicle space utilization as is reflected by product dimensions. Odd sizes and shapes, as well as excessive weight or length, do not stow well and typically waste space.

- **Example:** While steel blocks and rods have the same density, rods are more difficult to stow because of their length and shape. Sometimes large numbers of items can be 'nested' that might otherwise be difficult to stow in small quantities, improving stowability. Products with good stowability attract lower transportation rates.

- **Handling:** Special handling equipment may be required for loading or unloading trucks, railway wagons or ships. By grouping together products, e.g. taping, boxing, or palletizing products, for transport and storage, handling costs can be reduced.
- **Liability:** Liability includes susceptibility to damage, property damage to freight, perishability, susceptibility to theft, susceptibility to spontaneous combustion or explosion, and value per kilogram. Carriers insure their cargoes to protect against possible claims or accept responsibility for any damage. Shippers can reduce their risk, and ultimately the transportation cost, by improved protective packaging or by reducing susceptibility to loss or damage.

- **Market Factors:** Since transportation vehicles and drivers must return to their origin, either they must find a load to bring back (“back-haul”) or the vehicle is returned empty (“deadhead”). When deadhead movements occur, labour, fuel, and maintenance costs must be charged to the shipper. A “Balanced” move, where volume is equal in both directions, is rarely possible because of factors such as demand imbalances in manufacturing and consumption locations, seasonality, etc.
- **Example:** The movement of fruits and vegetables coincide with the growing season. These result in transport rates changing with direction and season. Logistics system design must take this factor into account and add back-haul movement where possible.

2. Transportation Costs

- **Transit time cost:** This element reflects the temporal cost of transportation. From total logistics cost point of view, cost of inventory in transit.
- **Obsolescence and Deterioration costs:** There are certain categories of products which are perishable and delicate in nature, whose physical attributes deteriorate over a period of time, gradually resulting into devaluation of product.
- **Protective Packaging Cost:** For many products, there may be requirements of special packaging. This cost is also a part of total transport cost.
- **Insurance Cost:** Goods in transit insurance covers property against loss or damage while in the transit.
- **Class Rates:** In transportation terminology, the price per kilogram to move a specific product between two locations is referred as the rate. Different rates are charged for different products based on their nature, the higher the class rating, the higher the transportation of the product.
- **Other Costs**(toll tax, local tax etc)
- **Joint Costs:** The costs are expenses unavoidably created by the decision to provide a particular service.

3. Pricing Strategies

- **Cost Service Strategy:** This is the simplest pricing strategy for transportation service. In this, a 'build-up' approach is adopted where transport service provider determines a rate based on the cost of providing the service plus a profit margin to get a predetermined return.
- **Value of the service strategy:** This approach refers to fixation of transportation charge on the basis of value of the service required by the shipper.
- **Combination Strategy:** Combination of above two approaches, this refers to establishment of transport price at some intermediate level between the **cost-of-service minimum** and the **value of service maximum**

4. Transportation Rates

- **Class Rates:** These are the rates which are overhead or maximum rates that can be found for almost all products shipped.
- **Commodity Rates:** These rates are the special or specific rates published without regard to classification. These are applied on a particular commodity between particular points. These are usually lower than the class rates.
- **Exception Rates:** These are the rates which are special rates published to provide shippers lower rates than the prevailing class rate.