TOPIC 4: TRANSPORTATION

Topic Outcomes:

You should be able:

1. Define the principles and practices of transportation
2. Identify relationship between transportation and logistics in supply chain management
3. Determine the transportation functions
4. Determine the participants decisions
5. Identify modes of transport
6. Identify suppliers transportation services

4.1.1 Principles and Practices of Transportation

The role of transportation in logistics has changed dramatically over the last four decades. Prior to transportation deregulation, the purchase of transportation could be likened to buying a commodity such as coal or grain. There was very little difference between transport suppliers in terms of product, service or price. Transportation deregulation in 1980 introduced pricing flexibility and significantly increased the range of services transportation companies could provide customers.

Today a wide range of transportation is available to support supply chain logistics. For example, logistics managers may integrate private with for-hire transportation to reduce total logistics costs. Many for-hire carriers offer a wide variety of value-added services such as product sortation, sequencing and customized freight delivery and presentation. Technology has enhancement real-time visibility of the location of freight throughout the supply chain advanced information concerning delivery. Precise product delivery reduces inventory, storage and material handling. As a result, the value of transportation has become greater than simply moving product from one location to another.

4.1.2 Relationship between transportation and logistics in supply chain management

- Transportation provides the critical links between these organizations, permitting goods to flow between their facilities.
- Transportation service availability is critical to demand fulfillment in the supply chain.
- Transportation efficiency promotes the competitiveness of a supply chain

4.1.3 Transportation function and principles in logistics and supply chain

Transport function

a. Product movement

Whether in the form of materials, components, work-in-process or finished goods, the basic value provided by transportation is to move inventory to specified destinations. The primary transportation value proposition is product movement throughout the supply chain. The performance of transportation is vital to procurement, manufacturing and customer accommodation. Transportation also plays a key role in the performance of reverse logistics. Without reliable transportation most commercial activity could not function. Transportation consumes time, financial and environmental resources.

Transportation has a restrictive element because inventory is generally inaccessible during the transportation process. Inventory captive in the transport system is referred to as in-transit inventory. Naturally, when designing logistical systems, managers strive to reduce in-transit inventory to a minimum advancements in information technology have significantly improved access to in-transit inventory and arrival status of shipments by providing exact location and arrival times.

Transportation also uses financial resources. Transportation cost results from driver labor, vehicle operation, capital invested in equipment and administration. In addition, product loss and damage are significant costs.

Transportation impacts environmental resources both directly and indirectly. In direct terms, transportation represents one of the largest consumers of fuel and oil. Although the level of fuel and oil in consumption has improved as a result of more fuel-efficient vehicles, total consumption remains high. Indirectly, transportation impacts the environment through congestion, air pollution and noise pollution.

b. Product storage

A less visible of transportation is the performance of product storage. While a product is in a transportation vehicle, it is being stored. Transport vehicles can also be use for product storage at shipment origin or destination but they are comparatively expensive storage facilities. Since the main value proposition of transportation is
movement, a vehicle committed to storage is not otherwise available for transport. A
trade-off exists between using a transportation vehicle versus temporarily placing
products in a warehouse. If the inventory involved is scheduled to be shipped within a
few days to a different location, the cost unloading, warehousing and reloading the
product may exceed the temporary cost of using the transportation vehicle for storage.

Another transport service having storage implication is diversion. Diversion
occurs when a shipment destination is changed after a product is in transit. For example,
the destination of a product initially shipped from Chicago to Los Angeles may be
changed to Seattle while in transit. Traditionally, the telephone was used to implement
diversion strategies. Today, internet communication between shippers, carriers
headquarters and vehicles facilities more efficient diversion. While diversion is primarily
used to improve logistical responsiveness, it also impacts the duration of in-transit
storage.

So although costly, product storage in transportation vehicles may be justified
from a total cost or performance perspective when loading or unloading costs, capacity
constraints and ability to extend leadtimes are taken into consideration.

**Transport Principles**

a. Economy of scale

Economy of scale in transportation is the cost per unit of weight decreases as the
size of a shipment increases. For example, truckload shipments utilizing an entire trailer
capacity have a lower cost per pound than smaller shipments that utilize a limited portion
of vehicle capacity. It is also generally true that larger-capacity transportation vehicles
such as rail and water vehicles are less costly per unit of weight than smaller-capacity
vehicles such as trucks and airplanes. Transportation economies of scale exist because
fixed cost associated with transportation a load is allocated over the increased weight.
Fixed cost include administration related to scheduling, cost of equipment, time to
position vehicles for loading or unloading and invoicing. Such costs are considered fixed
because they do not vary with the shipment size. In other words, it costs as much to
administer a 100 pound shipment as one weighing 1000 pounds.

b. Economy of distance

Economy of distance refers to decreased transportation cost per unit of weight as distance
increased. For example a shipment of 800 miles will cost less to perform than two
shipments of the same weight each moving 400 miles. Transportation economy of
distance is often referred to as the tapering principle. The rationale for distance
economies is similar to economies of scale. Specifically, longer distances allow fixed cost
to be spread over more miles, resulting in lower per mile charges.
4.1.4 Participants decisions

a. Shipper
Shipper and consignee have a common interest in moving goods from origin to destination within a given time at the lowest cost. Services related to transportation include specified pickup and delivery times, predictable transit time and zero loss and damage as well as accurate and timely exchange of information and invoicing.

b. Carriers and Agents
The carrier, a business that performs a transportation service, desires to maximize its revenue for movement while minimizing associated costs. As a service business, carriers want to charge their customers the highest rate possible while minimizing labor, fuel and vehicle costs required to complete the movement. To achieve this objective, the carrier seeks to coordinate pickup and delivery times to group or consolidate many different shippers’ freight into movements that achieve economy of scale and distance. Brokers and freight forwarders are transport agents that facilitate carrier and customer matching. A more recent development has been the emergence of internet or online brokers that match carrier capacity and shipper requirements.

c. Government
The government has a vested interest in transportation because of the critical importance of reliable service to economic and social well-being. Government desires a stable and efficient transportation environment to support economic growth. Because of the direct impact of transportation on economic success, governments have traditionally been very involved in oversight of carrier practices. Government historically regulated carriers by restricting markets they could service and approving prices they could charge. Governments also promote carrier development by supporting research and providing right-of-way such as roadways and airports. In some countries government maintains absolute control over markets, services and rates. Such control allows government to have a major influence on the economic success of regions, industries and firms.

d. The public
The final transportation system participant, the public is concerned with transportation accessibility, expense and effectiveness as well as environment, security and safety standards. The public indirectly creates transportation demand by purchasing goods. While minimizing transportation cost is important to consumers, concerns also involve environmental impact and safety. The effect of air pollution and oil spoilage is a significant transportation-related social issue. The cost environmental impact and safety is ultimately paid by consumers.
4.1.5 Modes of transport

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<tr>
<th>Modes of transport</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>Railroad</td>
<td>The railroad is basically a long hauler and slow mover of raw materials (coal, lumber and chemicals) and low valued manufactured products (food, paper and wood products) and prefers to move shipment sizes of at least a full carload. Offer special services to the shipper such as movement of bulk commodities, guarantee arrival time, various stop off which permit partial loading and unloading between origin and destination points, pickup and delivery and diversion and re-consignment, which allows circuitous routing and changes in the final destination of a shipment while en route.</td>
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<tr>
<td>Trucking</td>
<td>Trucking moves smaller shipment size compared to rail. The advantages of using truck are its door-to-door service such that no loading or unloading is required between origin and destination.</td>
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<tr>
<td>Air</td>
<td>Air provides the long distance shipment at the shortest period over all the single modes available but at higher costs.</td>
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<td>Water</td>
<td>Water carrier is the most user carrier in the world. Although the cost is very low and it can carry bulk, low value, non-perishable products but it is still the slowest mode and may be affected by the weather.</td>
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<tr>
<td>Pipelines</td>
<td>Pipelines are a specialized means of shipping petroleum, natural gas and chemicals from source to market.</td>
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4.2.1 Supplier transportation services

a. Single modes

The various types of single-service are the rail, truck, air, water and pipeline. These basic transportation modes offer its service directly to users.

The most basic carrier type is a single-mode operator that offers service utilizing only one transport mode. This degree of focus allows a carrier to become highly specialized, competent, and efficient.

However, the approach creates significant difficulties for intermodal transport because it requires negotiation and a transaction with each individual carrier. Airlines are an example of a single-mode carrier for both freight and passenger service since they only offer service from airport to airport. The shipper or passenger is responsible for movement to and from the airport. A series of single-mode operations require more management effort and, thus, increase cost.
b. Specialized carriers

Over the past several decades a serious problem existed in small-shipment transportation. It was difficult for a common carrier to provide a reasonably priced small-shipment service because of significant overhead cost associated with terminal and line-haul service. This overhead forced motor carriers to assign a minimum charge for handling any shipment.

c. Intermodal operators

Intermodal transport services refer to the use of two or more carriers of different modes in order to transport the products. Intermodal services maximized the primary advantages of the combined mode and minimize their advantages. Although there are various combination but the most prevalent forms have been truck-rail, truck-water and truck-air.

The truck-rail is commonly known as piggyback; truck-water as fishyback and truck-air as birdyback. The combination mode physically transfers the motor carrier trailer with the cargo intact in another mode.