Transportation.

Transportation can be defined as a means through which goods are transferred from one place to another. Given the facilities and information capabilities transportation is the operational area of logistics that geographically positions inventory. Transportation is the most important function of logistics and cost incurred in transportation is also visible.

Functionality

- Transportation provides two basic functions.
- 1. product movement.
- 2. product storage.
- Product movement is a primary transportation function. Transportation moves the product up and down the value chain . Whether the product is in the form of materials , components, assemblies, work in process or finished goods , transportation is necessary to move it to next stage of manufacturing process.

Product storage.

- This is a less common function of transportation . This is because vehicles make rather expensive storage facilities.
- When the in transit product requires to be moved shortly and the cost of unloading and reloading the goods will

- be more than the charge of storage in vehicle to put in the mathematical form it is cost
- Cost of storage in vehicle< cost of unloading+ cost of reloading+ cost of ware house.

Participants in transportation.

- Shipper.
- Consignee.
- Carrier.
- Government.
- Public.

Factors affecting transportation decisions.

- When we make the transportation decisions , factors to be considered vary depending on whether one takes the perspective of a carrier or shipper.
- A carrier makes investment decisions regarding the transportation infrastructure and then makes operating decisions to try to maximize the returns from these assets.
- A shipper in contrast uses transportation to minimize the total cost.

Factors affecting the carrier decisions.

- Vehicle related cost. This is the cost incurred for the purchase or lease of the vehicle used to transport the goods. These costs are considered to be fixed in short run and variable in long and medium term decisions are made. The number of vehicles to be purchased or leased is the decision which the carrier makes. The vehicle related costs is proportional to the number of vehicles purchased or leased.

- Fixed operating costs.
- It includes any cost associated with terminals , airport gates and labor that are incurred whether the vehicles are in operation or not. If the drivers were paid independent of their travel schedule their salary will also be included in this category.
- These costs are fixed costs for operational decisions.

- Trip related costs. It includes price of labor and fuel incurred for each trip independent of the quantity transported. The trip related costs depends on length and duration of the trip but is independent of the quantity shipped. The cost is considered variable while making strategic or operational decisions.

- Quantity related costs. It includes the loading and unloading costs and a portion of fuel costs which also varies with the quantities that is being transported. These costs are variable in all transportation decisions un less labor used for loading and unloading is fixed.

- Over head cost. This category includes the cost of planning and scheduling a transportation network as well as any investment in information technology. When a trucking company invests in a routing software that allows a manager to devise good delivery routes , the investment in software and its operation is included in overhead.

Factors affecting shippers decision.

- Transportation costs. This is the total amount paid to various carriers for transporting products to customers. It depends on the prices offered by different carriers and the extent to which shipper uses inexpensive and slow or expensive fast means of transportation. Transportation costs are considered variable for the shippers as long as they don’t have their own vehicles.

- Inventory costs. This is the cost of holding inventory incurred by the shippers supply chain network. Inventory costs are considered fixed for short term transportation decisions that assign each customer shipment to a carrier.
- Processing costs: this is costs of loading and unloading the orders as well as other processing costs associated with transportation . These are considered variable for all transportation decisions.

- Service level costs: this is the costs of not being able to meet delivery commitments . In some cases it may clearly be specified as a part of contract while in other cases it may be reflected in customer satisfaction. This costs has to be considered in strategic planning and operational decisions.

Design option for a transportation network.

1. Direct shipment network

-all shipments come directly from each supplier to each buyer location

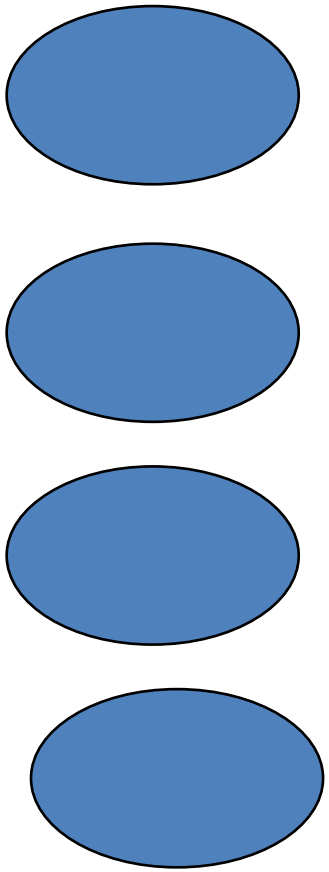
-SC manager only needs to decide on the quantity to ship & the mode of transportation

-trade off between transportation & inventory costs

Direct shipment

Suppliers

Buyer locations



Direct shipment.

- ✓ +elimination of warehouses
- ✓ Large demand at buyer locations
- ✓ Lot size close to TL from each supplier

simple to operate and coordinate

short time due to direct shipment

Direct shipping with milkruns.

- A milkrun is a route in which a truck either delivers a product from a single supplier to multiple retailers or goes from multiple suppliers to a single retailer.
- When using this option the supply chain manager has to decide on the routing of each milk run .

Direct shipping with milk run advantages.

- 1. milk runs lower transportation costs by consolidating shipments to multistores on a single truck.
- 2. if small frequent deliveries are required on a regular basis.
- 3. if a set of suppliers or a set of retailers is in geographical proximity the use of milk run can significantly reduce transportation costs.

All shipments via central DC

- The retail chain divides the stores by geographical region and a distribution center is build for each region.
- Suppliers send their shipments to distribution center and DC forwards appropriate shipments to each retail stores.
- The DC is an extra layer between suppliers and retailers .

DC TWO roles.

- 1. to store inventory .
- 2. to serve a transfer location.
- DC reduce the supply chain costs when suppliers are located far from the retail stores.
- DC allows the supply chain to achieve economies of scale for Inbound transportation to a point close to final destination coz each supplier sends a large shipment to the DC containing product for all stores the DC serves.

Cross docking through DC.

- Dc holds inventory and send product to the retail stores in smaller replenishment lots.
- If the replenishment lots for retail stores is large enough then DC need not have to hold the inventory but can cross dock the product arriving from many suppliers on inbound trucks by breaking each inbound shipment into smaller shipments that are then loaded on to trucks going to each retail stores.

Cross docking.

- Cross docking is a process in which product is exchanged between trucks so that each truck going to a retail store has products from different suppliers.

Cross docking.

- When a DC cross docks the product each inbound truck contains a product for a retail store from several suppliers. A major benefit of cross docking is that little inventory needs to be held and product flows faster in the supply chain .
- Cross docking saves handling costs because product does not have to be moved into and out of supply chain .
- Successful cross docking requires a significant degree of coordination and synchronization between the incoming and outgoing shipments.