

[5]

TRANSPORTATION

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1



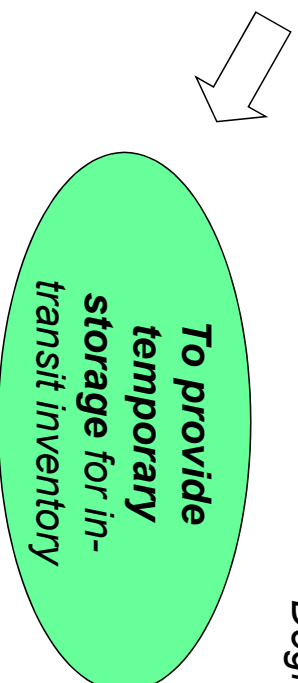
Transportation: The Objectives

**To carry
goods and
materials**

At a minimal cost in

- Time
- Money
- Environmental Degradation

**The Objectives of
Transportation**



2

Product Movement [1]

1. Efficient use of time

- Efficient use of time is a factor in developing a successful transportation strategy because inventory in transit isn't available for use in production or for sale to customer.
- Transportation cost trade off against inventory costs.

3

Product Movement [2]

2. Efficient use of money

- Vehicle costs
- Driver/operator costs
- Vehicle operating costs
- General and administrative costs
- Insurance and security costs

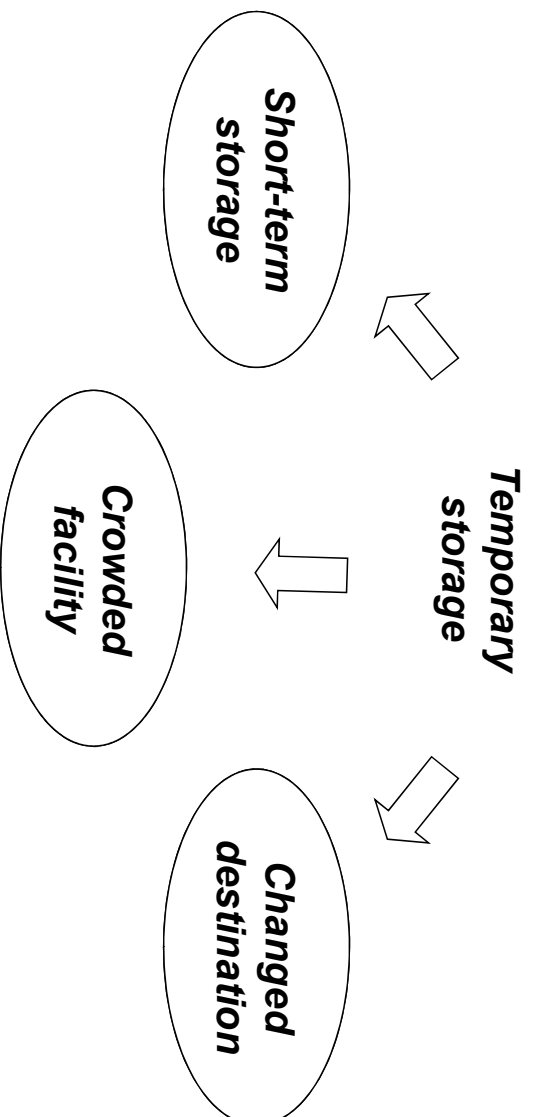
4

Product Movement [3]

3. Minimal harm to the environment

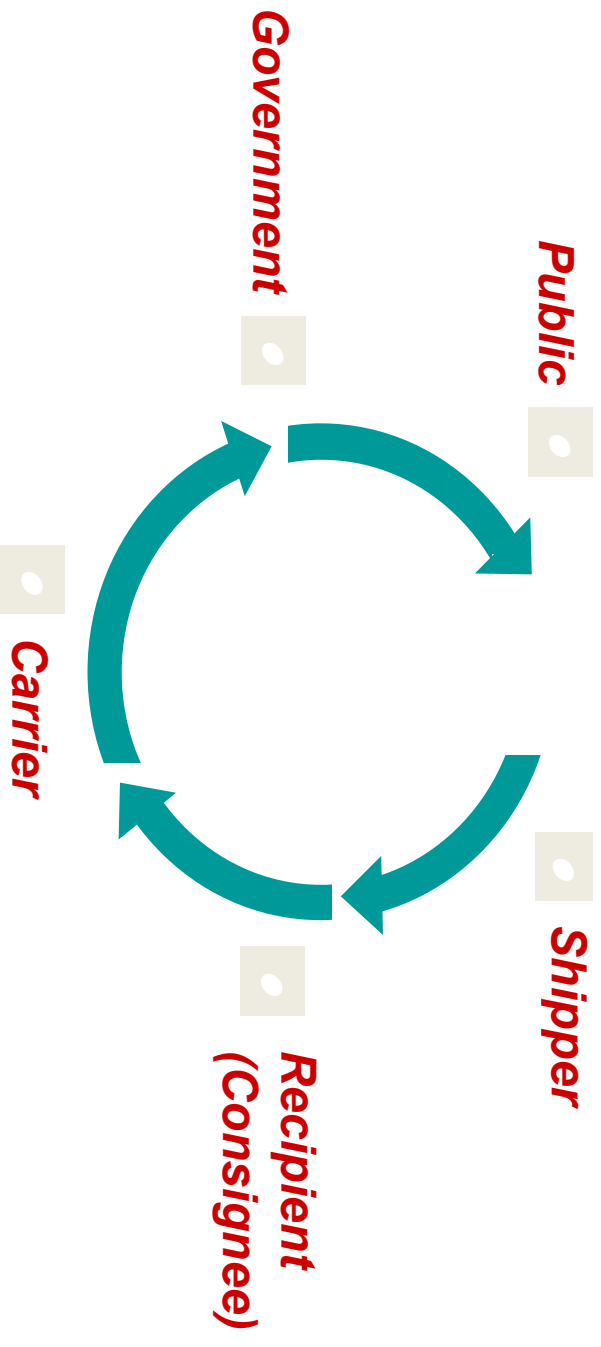
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Temporary Storage

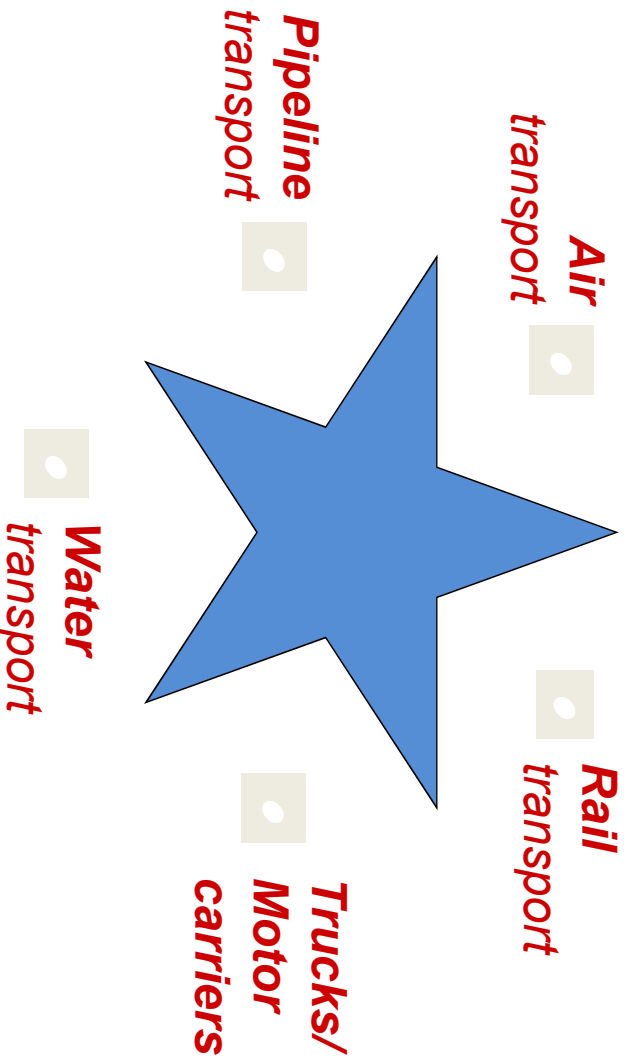


6

Transportation Stakeholders



Major Modes of Transportation



Truckload (TL)

- Average revenue per ton mile (1996) = 9.13 cents
- Average haul = 274 miles
- Average Capacity = 42,000 - 50,000 lb.
- Low fixed and variable costs
- Major Issues
 - Utilization
 - Consistent service
 - Backhauls

9

Less Than Truckload (LTL)

- Average revenue per ton-mile (1996) = 25.08 cents
- Average haul = 646 miles
- Higher fixed costs (terminals) and low variable costs
- Major issues:
 - Location of consolidation facilities
 - Utilization
 - Vehicle routing
 - Customer service

10

Package Carriers

- Companies like FedEx, UPS, USPS, that carry small packages ranging from letters to shipments of about 150 pounds
- Expensive
- Rapid and reliable delivery
- Small and time-sensitive shipments
- Preferred mode for e-businesses (e.g., Amazon, Dell, McMaster-Carr)
- Consolidation of shipments (especially important for package carriers that use air as a primary method of transport)

11

Rail

- Average revenue / ton-mile (1996) = 2.5 cents
- Average haul = 720 miles
- Average load = 80 tons
- Key issues:
 - Scheduling to minimize delays / improve service
 - Off-track delays (at pickup and delivery end)
 - Yard operations
 - Variability of delivery times

12

- Key issues:
 - Location/number of hubs
 - Location of fleet bases/crew bases
 - Schedule optimization
 - Fleet assignment
 - Crew scheduling
 - Yield management

13



Pipeline

- High fixed cost
- Primarily for crude petroleum, refined petroleum products, natural gas
- Best for large and predictable demand
- Would be used for getting crude oil to a port or refinery, but not for getting refined gasoline to a gasoline station (why?)

14

Water

- Limited to certain geographic areas
- Ocean, inland waterway system, coastal waters
- Very large loads at very low cost
- Slowest
- Dominant in global trade (autos, grain, apparel, etc.)

15

Transportation Desirability Criteria

| | Cost | Speed | Relia- bility | Capa- bility | Accessi- bility | Security |
|----------|------|-------|------------------|-----------------|--------------------|----------|
| Rail | 3 | 3 | 4 | 5 | 4 | 3 |
| Road | 2 | 4 | 5 | 4 | 5 | 4 |
| Water | 4 | 2 | 2 | 2 | 2 | 2 |
| Air | 1 | 5 | 3 | 3 | 3 | 5 |
| Pipeline | 5 | - | - | 1 | - | - |

1 = Tidak disukai (sangat lemah)

5 = Disukai (sangat unggul)

16

- Use of more than one mode of transportation to move a shipment to its destination
- Most common example: rail/truck
- Also water/rail/truck or water/truck
- Grown considerably with increased use of containers
- Increased global trade has also increased use of intermodal transportation
- More convenient for shippers (one entity provides the complete service)
- Key issue involves the exchange of information to facilitate transfer between different transport modes

17

Legal Types of Carriers

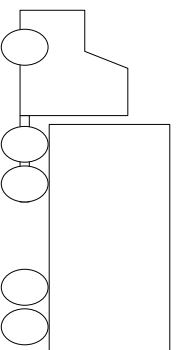
- Private carriers
- Common carriers
- Contract carriers
- Exempt carriers

18

Transportation Economics

- ☑ Distance
- ☑ Volume
- ☑ Density
- ☑ Stowability
- ☑ Handling
- ☑ Liability concerns
- ☑ Dangerous goods (hazardous materials)
- ☑ Market factors

Transport

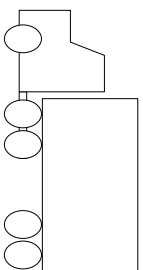


TRANSPORT ECONOMICS

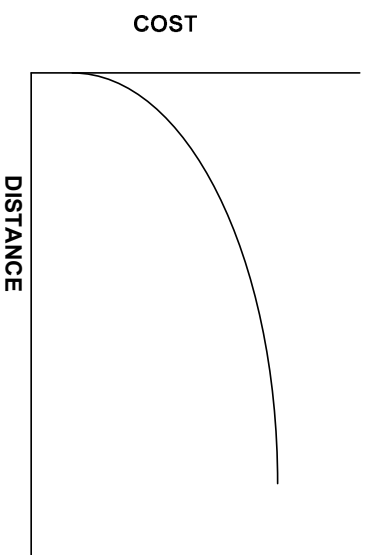
NETWORK

MODE

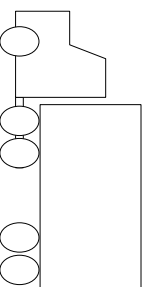
Transport



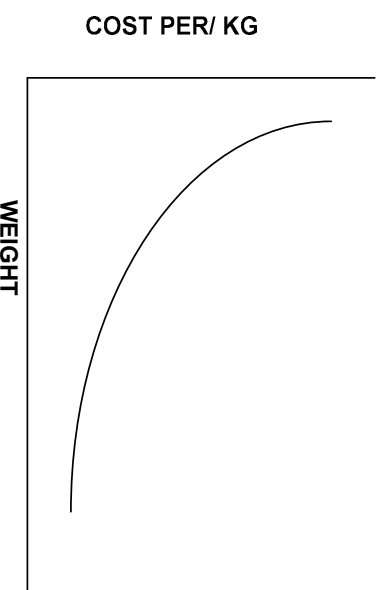
DISTANCE :



Transport

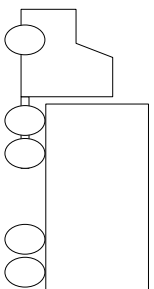


WEIGHT :

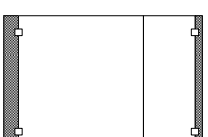




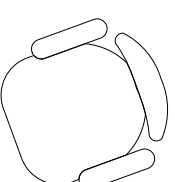
Transport



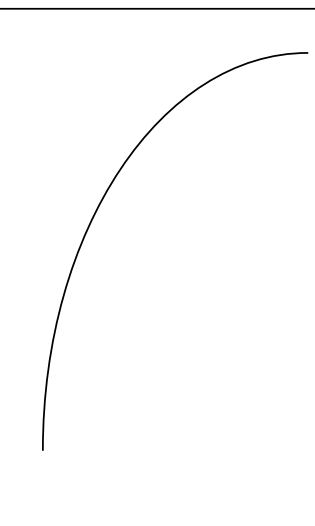
WEIGHT VOLUME: DENSITY



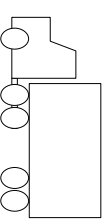
COST PER/ KG



DENSITY

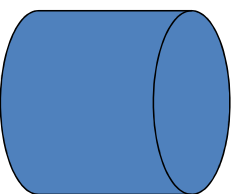


Transport



STOWABILITY

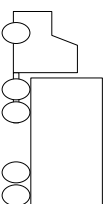
PRODUCT DIMENSION



Transport

HANDLING :

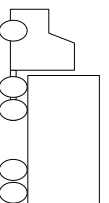
- Fork lift
- Crane
- Lift truck
- Pallet truck
- Tow tractor
- Hand truck
- Walkie pallet truck



Transport

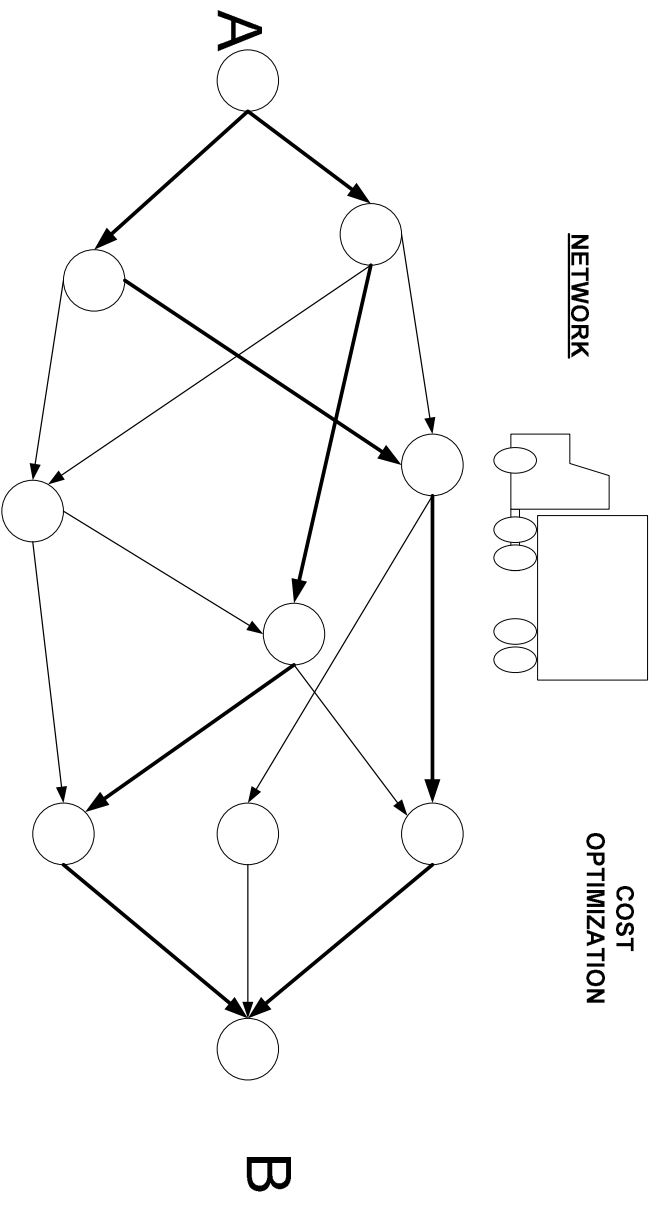
LIABILITY :

- Damage
- Perishability
- Theft
- Explosion
- Combustion
- Value per weight





Transport



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