

Introduction to Logistics and Transportation Management

Introduction to Logistics and Transportation Management
Key concepts, functions, and strategic importance

1. What Is Logistics?

Aspect	Definition
Broad Scope	Planning, implementing, and controlling the efficient flow of goods, services, information, and finances from origin to consumption.
Core Objectives	• Reduce total cost • Improve service level • Ensure product availability
Components	• Procurement & sourcing • Production & inventory control • Warehousing & distribution • Reverse logistics (returns, recycling)

1.1. Types of Logistics

Type	Focus
Inbound Logistics	Movement of raw materials and components to the manufacturing site.
Outbound Logistics	Delivery of finished products to customers or distribution centers.
Reverse Logistics	Handling returns, repairs, refurbishing, and disposal.
Green/ Sustainable Logistics	Minimizing environmental impact (e.g., carbon footprint reduction, eco-friendly packaging).

2. What Is Transportation Management?

Element	Description
Definition	The planning, execution, and optimization of the physical movement of goods between locations.

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Element	Description
Goal	Deliver the right product, in the right quantity, at the right time, at the lowest feasible cost.
Modes	• Road (truck, van) • Rail • Air • Sea (container ships, barges) • Intermodal (combination of two or more modes)

2.1. Transportation Modes – Pros & Cons

Mode	Advantages	Disadvantages
Road	• Flexible routing • Door-to-door service • Fast for short-haul	• Congestion & weather sensitivity • Higher per-ton-mile cost for long distances
Rail	• Low cost per ton-mile for bulk • Energy efficient	• Limited to fixed tracks • Requires additional handling for first/last mile
Air	• Fastest for long distances • High security	• Very high cost • Weight/size restrictions
Sea	• Cheapest for large volumes over long distances • Suitable for bulk commodities	• Slow transit time • Port congestion, customs delays
Intermodal	• Leverages strengths of multiple modes • Reduces handling, damage risk	• Complex coordination • Higher planning effort

3. Key Functions of Transportation Management

1. Carrier Selection & Contracting

- Evaluate carriers on cost, reliability, capacity, service coverage, and sustainability.
- Negotiate rates, service level agreements (SLAs), and performance metrics.

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2. Route Planning & Optimization

Management

- Use algorithms (e.g., Vehicle Routing Problem, time?window constraints) to minimize distance, fuel consumption, and delivery time.
- Consider constraints: driver hours, vehicle load limits, traffic patterns.

3. Freight Consolidation

- Combine multiple shipments into a single load to achieve economies of scale.
- Techniques: LTL (Less?Than?Truckload), cross?docking, hub?and?spoke networks.

4. Load Planning & Packing

- Optimize space utilization (cube, weight) and ensure load stability.
- Software tools generate loading diagrams and calculate the best pallet configuration.

5. Tracking & Visibility

- Real?time GPS, RFID, and IoT sensors provide status updates, ETA, and exception alerts.