

Concept and types of transport cost

Mobility tends to be influenced by transport costs. Empirical evidence for passenger vehicle use underlines the relationship between annual vehicle mileage and fuel costs, implying the higher fuel costs are, the lower the mileage. At the international level, doubling of transport costs can reduce trade flows by more than 80 percent. The more affordable mobility is, the more frequent the movements and the more likely they will take place over longer distances. A wide variety of transport costs can be considered.

Terminal costs: Costs that are related to loading, transshipment and unloading. Two major terminal costs can be considered: loading and unloading at the origin and destination, which are unavoidable; and intermediate (transshipment) costs that can be avoided.

Linehaul costs: Costs that are a function of the distance over which a unit of freight or passenger is carried. Weight is also a cost function when freight is involved. They include labor and fuel and commonly exclude transshipment costs.

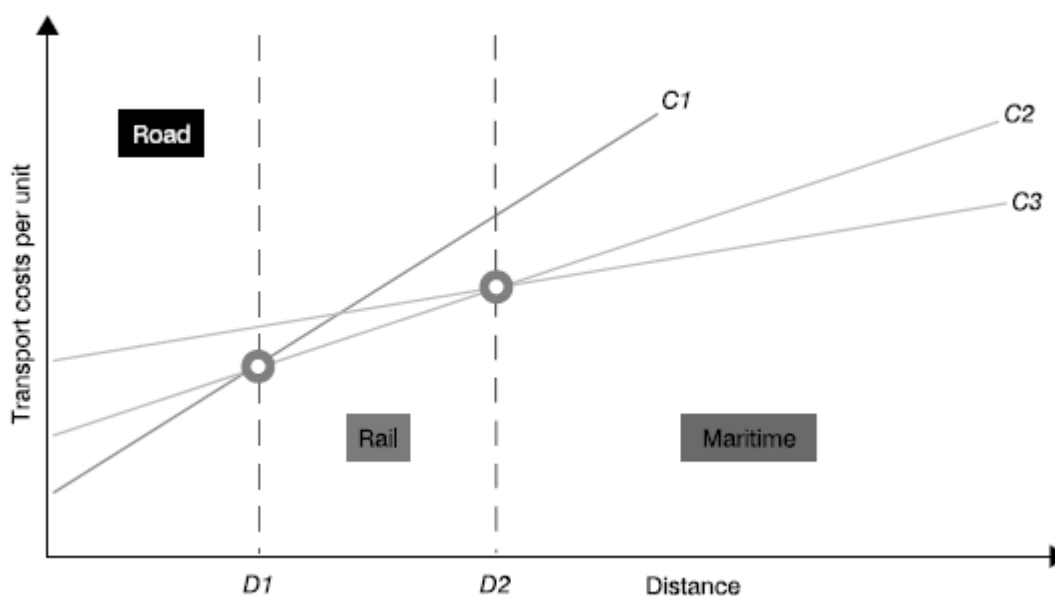
Capital costs: Costs applying to the physical assets of transportation, mainly infrastructures, terminals and vehicles. They include the purchase or major enhancement of fixed assets, which can often be a one-time event. Since physical assets tend to depreciate over time, capital investments are required on a regular basis for maintenance.

Modal competition

Each transportation mode has key operational and commercial advantages and properties. However, contemporary demand is influenced by integrated transportation systems that require maximum flexibility. As a result, modal competition exists at various degrees and takes several dimensions. Different transportation modes have different cost functions according to the serviced distance. Road, rail and maritime transport have respectively a C1, C2 and C3 cost function. While road has a lower cost function for short distances, its cost function climbs faster than rail and maritime cost functions. At a distance D1, it becomes more profitable to use rail transport than road transport while from a distance D2, maritime transport becomes more advantageous. Point D1 is generally located between 500 and 750 km of the point of departure while D2 is near 1,500 km. Although the above relation is rather straightforward, it does not fit reality well, mainly for the following reasons:

It assumes that modal options are **interchangeable**. For many origins and destinations, modal options such as rail or maritime may not be present. Since rail and maritime transportation are

discrete networks **only accessible through a terminal** , most locations will involve a road transportation segment, which changes the cost structure.



Terminal costs

Terminals jointly perform transfer and consolidation functions, and are important economically because of the costs incurred in carrying out these activities. The traffic they handle is a source of employment and benefit to regional economic activities, notably by providing accessibility to suppliers and customers. Terminal costs represent an important component of total transport costs. They are fixed costs that are incurred regardless of the length of the eventual trip, and vary significantly between modes. They can be considered as:

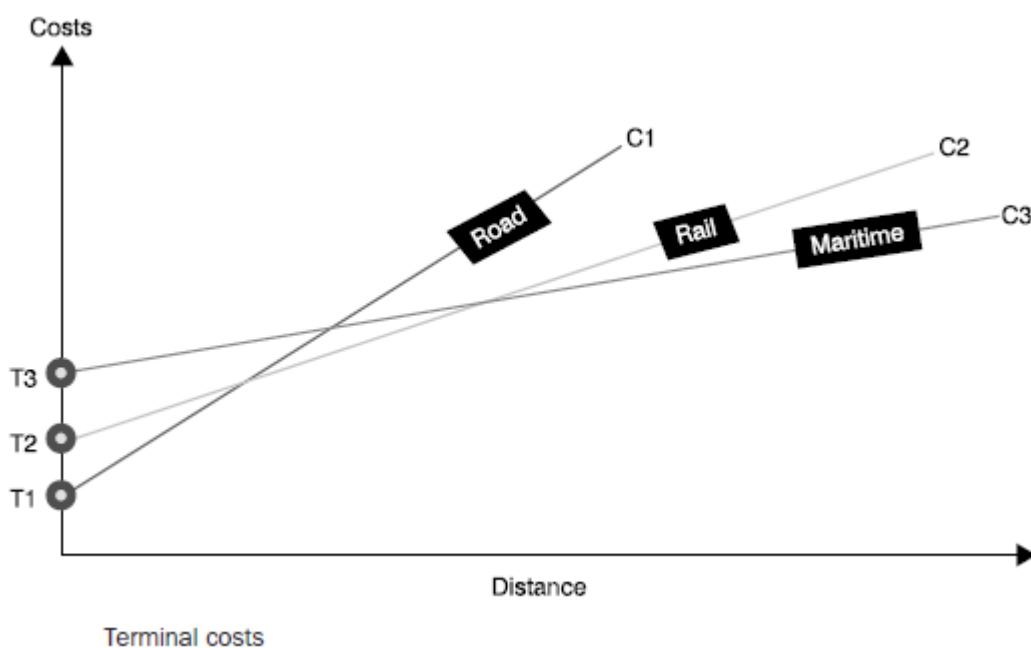
- **Infrastructure costs:** Include construction and maintenance costs of structures such as piers, runways, cranes and facilities (warehouses, offices, etc.).
- **Transshipment costs:** The costs of loading and unloading passengers or freight.
- **Administration costs:** Many terminals are managed by institutions such as port or airport authorities or by private companies (e.g. terminal operators). In both cases administration costs are incurred.

Figure below represents a simplified assumption concerning transport costs for three modes: road, rail and maritime. The cost functions all begin at some point up the cost axis, which represents terminal costs. Because of terminal costs, maritime shipping (T3) and rail (T2) are at a significant disadvantage compared to road (T1) over short distances. Because ships have

the largest carrying capacities, they incur the largest terminal costs, since it may take many days to load or unload a vessel. Conversely, a truck or a passenger bus can be loaded much more quickly, and hence the terminal costs for road transport are the lowest. Terminal costs play an important role in determining the competitive position between the modes. Because of their high freight terminal costs, ships and rail are generally unsuitable for short-haul trips. Competition between the modes is frequently measured by cost comparisons. Efforts to reduce transport costs can be achieved by using more fuel-efficient vehicles, increasing the size of ships, and reducing the labor employed on trains. However, unless terminal costs are reduced as well, the benefits would not be realized.

These have included introducing information management systems such as EDI (electronic data interchange) that have greatly speeded up the processing of information and removed delays typical of paper transactions. The most significant development has been the mechanization of loading and unloading activities. Mechanization has been facilitated by the use of units of standard dimensions such as the pallet and, most importantly, the container. The container, in particular, has revolutionized terminal operations.

For the mode most affected by high terminal costs, ocean transport, ships used to spend as much as three weeks in a port undergoing loading and unloading. The much larger ships of today spend less than a couple of days in port. A modern container ship requires approximately 750 man/hours to be loaded and unloaded. Prior to containerization it would have required 24,000 man/hours to handle the same volume of cargo.



The rail industry too has benefited from the container, which permits trains to be assembled in freight yards in a matter of hours instead of days. Reduced terminal costs have had a major impact on transportation and international trade. Not only have they reduced overall freight rates, thereby reshaping competition between the modes, but they have had a profound effect on transport systems. Ships spend far less time in port, enabling ships to make many more revenue-generating trips per year. Efficiency in the airports, rail facilities and ports greatly improves the effectiveness of transportation as a whole.

Activities in transport terminals represent not just exchanges of goods and people, but constitute an important economic activity. Employment of people in various terminal operations represents an advantage to the local economy. Dockers, baggage handlers, crane operators and air traffic controllers are examples of jobs generated directly by terminals. In addition there are a wide range of activities that are linked to transportation activity at the terminals. These include the actual carriers (airlines, shipping lines, etc.) and intermediate agents (customs brokers, freight forwarders) required to carry out transport operations at the terminal. It is no accident that centers that perform major airport, port and rail functions are also important economic poles.

References:

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