

3. Modal Considerations

Introduction

In 2. Transportation Basics we considered a very simple transportation service – delivery of an LCS television from a distribution center in Mahwah NJ to the buyer in Westport CT – using UPS and its ubiquitous delivery vans.

Implicit in this example is the notion of capacity (weight and volume) and speed. If we think of this service we can position, in a general way, trucking on a capacity-speed chart.

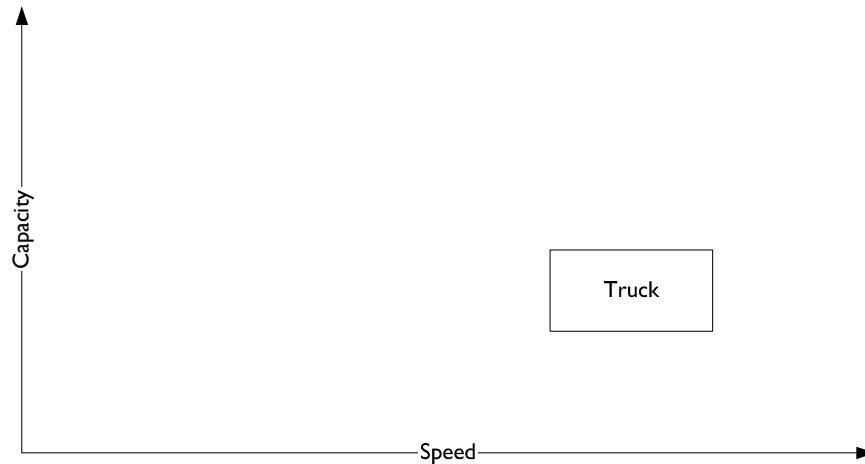


Figure 1 General Characteristics of Trucking

Given the nature of this figure it's not too difficult to infer that there is room for other transportation modes (e.g., ocean shipping) on this chart. Indeed, we will, in fact, complete this chart.

The reason for different modes is related to the commodities to be transported, the distances to be covered, the speed required, and the geography that intervenes in the transportation.

Characteristics of Trucking

This simple example of transportation allows us to begin to characterize transportation modes.

Characteristic	Truck
Speed	Faster
Volume	Low

Table 1 Starting the Modal Comparison

I'm being a bit abstract and arbitrary in the valuing these characteristics, but we need to start somewhere. The abstraction and arbitrariness will be replaced by fact as we continue.

We should consider other ways of characterizing trucking. A good start to this is given in Figure 5 Transportation Buying Behavior (circa 1994) on p 3 of 2. Transportation Basics.

The next table incorporates the information from this figure.

Characteristic	Truck
<p>Accurate ETA</p> <p>If the estimated time of arrival (ETA) is accurate then the consignee (the party receiving the shipment at the destination) can properly plan to receive the shipment. The accuracy of the ETA impacts arrangement and proper utilization of the consignee resources.</p>	
<p>Billing Accuracy</p> <p>Transportation services are provided at a price. These are agreed prior to the service being provided. After the service is provided a bill may be rendered. If the bill is inaccurate then there is a dispute resolution process that consumes time, money, and good will. Accurate bills make for happy customers.</p>	
<p>Claims</p> <p>Claims come about for two reasons.</p> <ol style="list-style-type: none"> 1. The bill may not be accurate and hence there is a billing claim. 2. There may be loss and damage occurring during transportation and hence a claim made for restitution. <p>Here the concern is chiefly about the processes for claims prevention and resolution.</p>	
<p>Customer Service</p> <p>Transportation is a physical service. Surrounding it are pre-transaction, transaction, and post-transaction services that connect the customer with the transportation system.</p> <p>Figure 9 The Order on p 7 of 2. Transportation Basics is an example of pre-transaction services.</p> <p>Figure 13 Tracking Information on p 11 of 2. Transportation Basics is an example of both transaction and post-transaction services.</p>	
<p>Ease of Doing Business</p> <p>Ease of doing business is, in my view, a compendium of a number of other characteristics. It is an overall feel the customer has for doing business with an</p>	

Characteristic	Truck
<p>organization. It reflects the degree to which the organization has an understanding of and empathy for the customer's business.</p>	
<p>EDI</p> <p>Electronic Data Interchange (EDI) has a long history in the transportation industry.¹ Since its inception the term has come to mean more of a system of structured messages to facilitate transportation and trade (at least in the context of this course) and less of a system based upon proprietary communication system (these have been replaced by the Internet).</p> <p>The characteristic is about the ease with which information can be passed from system to system without human intervention and with relevance to the transportation decisions that must be made.</p>	
<p>Equipment Quality</p> <p>By equipment quality we mean the state of repair and cleanliness of the equipment provided by the carrier.² Acceptable quality is, of course, a function of the commodity to be transported. The LCD television has a different requirement than municipal waste.</p>	
<p>Equipment Suitability</p> <p>Suitability, or purpose, is different from quality. For example, one would not haul newsprint in a gasoline truck; nor lumber in a covered hopper. However, substitutions can be made. The issue under consideration here is whether the equipment supplied is suitable for the commodity to be carried.</p>	
<p>Information Systems</p> <p>This is an interesting characteristic and is not so much concern with the specific components of the information system (e.g., Microsoft Windows), but, in my view, the underlying behavior of the information system.³ In particular, whether the behavior</p>	

¹ A search of the Internet using the phrase "the history of edi" will provide one with a number of articles describing not only the history, but the structure and benefits of EDI.

² When was the last time you saw a dirty UPS truck?

³ James Drogan, *A Note on Business Drivers, Business Configuration, and Information Technology Strategy*, July 19, 2005 2005, SUNY Maritime, Available: <http://jmsdrgn.squarespace.com/storage/A%20Note%20on%20Business%20Drivers%20Business%20Configuration%20and%20Information%20Technology%20Strategy.pdf>.

Characteristic	Truck
<p>of the system matches the customer's expectations for systems behavior.</p>	
<p>Loss & Damage</p> <p>This is concerned with the amount and frequency of loss and damage to the shipment.</p>	
<p>Price</p> <p>The price for the transportation service.</p>	
<p>Reliability</p> <p>Reliability is a measure of the degree to which the carrier delivers on its service commitment. Commitment, in this sense, should be understood to mean, not only what is to be delivered, but when it is to be delivered.</p> <p>For example, a carrier committed to completing a transportation service in 48 hours plus or minus one hour would be deemed more reliable than a carriers committed to completing a transportation service in 48 hours plus or minus two hours.</p> <p>Reliability is a significant determinant of the cost incurred by a customer to provide a certain level of service to its cusytomers.</p>	
<p>Sales</p> <p>In a classical sense sales is understood to mean selling the customer what you have in the sales manual. Sales, in a current sense, represents the ability of the carrier to modify its offering to meet the needs of the customer.</p>	
<p>Single Carrier Service</p> <p>Single carrier service, that is there is a single carrier who takes responsibility for the movement from origin to destination, will, in general, provide transportation of higher value to the customer than multiple carrier service. Fewer interfaces between dissimilar systems are required. Fewer dissimilar interfaces mean lower interaction costs and less likelihood for things to go amiss.</p>	
<p>Speed</p> <p>Speed has an impact on the amount of inventory required in the supply chain to mean the service requirements of the customer. However, a transportation service</p>	Faster

Characteristic	Truck
<p>that is faster is more expensive than one that is slower.</p> <p>We will take up this notion of the tradeoffs between speed and cost a bit later in this note.</p>	
<p>Timely Delay Notice</p> <p>The transportation service is subject to the vagaries of a number of external forces (e.g., weather, traffic congestion, force majeure). On occasion the potential impact of the force can be foreseen. This characteristic concerns notice that is given customers regarding impacts of the forces in order to allow for implementing a contingency plan.</p>	
<p>Volume</p> <p>The van shown in Figure 10 UPS Truck in 2. Transportation Basics p 8 has a limitation on volume. The volume that can be handled by a mode has a great deal to say about which mode is suitable for the required service.</p>	Low

Table 2 A More Complete Characterization of a Transportation Mode

Table 2 is an integration of ideas regarding characterization of a transportation mode. To this we can usefully add such things as:

Geography: considerations of the capability of a mode to cross geographical boundaries (e.g., oceans).

Length of Haul: the distance over which the mode is generally consider to effective.

One might now augment Figure 1 General Characteristics of Trucking on page 1 to begin to account for the general differences in modes.

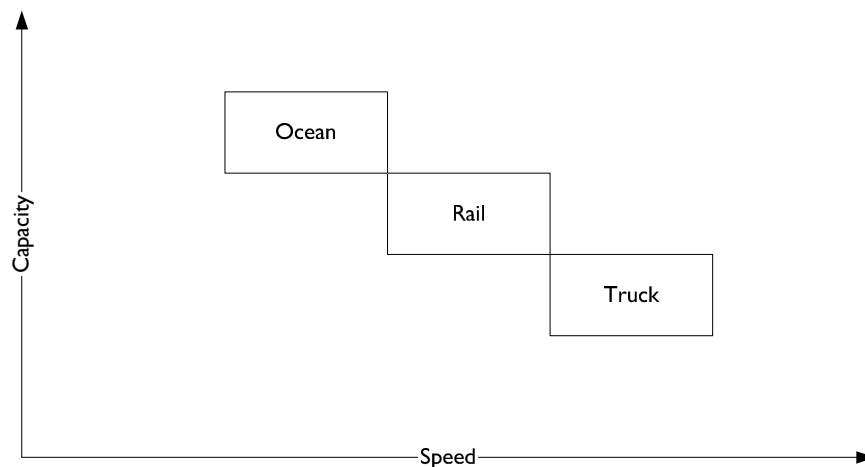


Table 3 General Characteristics of Ocean, Rail and Truck

In this course we consider pipeline and air transportation very lightly inasmuch as we are concerned, in general, about global intermodal freight transportation. This is not to suggest that air and pipeline

transportation are unimportant. Indeed, in certain cases, these modes are the only practical ones available to provide the required transportation service

Further to Place and Time Utility

In 2. Transportation Basics we take up the fundamental idea of place and time utility.⁴ here, we expand on the notion.

Stock and Lambert⁵ take up the notion that transportation is but one of the costs that determines place and customer service levels.

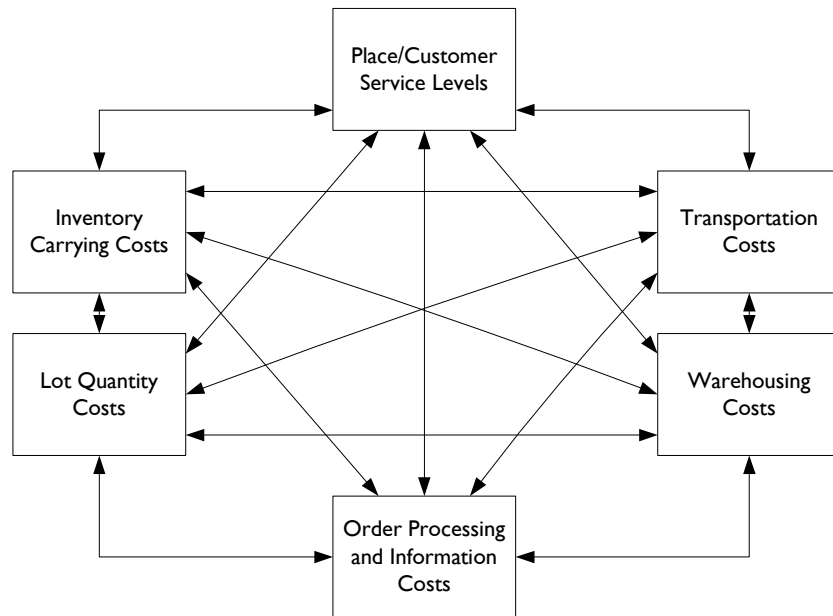


Figure 2 Transportation as a Component of Cost

2. Transportation Basics points out (p 3) the place/time utility is about "...putting the right product in the right place at the right condition and right price such that the customers prefer the product over a competing product."⁶

There is more to this than transportation. Figure 2 Transportation as a Component of Cost begins to make this clear.

Transportation is but one of the components of cost that needs to be considered in providing the level of service desired by the customer at a price the customer is willing to pay. One is especially directed towards Chapter 1 Logistics' Role in the Economy and the Organization of Stock and Lambert for more information.

⁴ James Drogan, "2. Transportation Basics," 2007. pp 2-3.

⁵ James R. Stock and Douglas M. Lambert, *Strategic Logistics Management*, Fourth ed. (McGraw-Hill, 2001). Figure I-3 p 8.

⁶ Drogan, "2. Transportation Basics.", p 3.

Transportation Costs Impact on →	Warehousing Costs	Order Processing and Information Costs	Lot Quantity Costs	Inventory Carrying Costs
Higher	Lower; less product is required in the warehouse to maintain the desired service level.	Higher; these costs are a function of order size. Higher transportation costs implies faster transportation in turn implying smaller order sizes.	Higher; these costs are a function of manufacturing volume. Higher transportation costs implies faster transportation in turn implying smaller manufacturing lots.	Lower; less product is required in the warehouse to maintain the desired service level.
Lower	Higher; more product is required in the warehouse to maintain the desired service level.	Lower; these costs are a function of order size. Lower transportation costs implies slower transportation in turn implying larger order sizes.	Lower; these costs are a function of manufacturing volume. Lower transportation costs implies slower transportation in turn implying larger manufacturing volumes.	Higher; more product is required in the warehouse to maintain the desired service level.

Table 4 Impact of Transportation Costs

Table 4 is a generalization and, as Stock and Lambert point out in their text, subject to considerable analysis.

One should not, therefore, think that the decision as to which transportation mode to use is simply based on transportation costs alone. It is more complex than that.

This suggests that transportation management, as meant to be the selection and management of transportation service, is critically dependent upon an understanding of the business of the customer.

The reader is directed to Chapter 3 (Motor Carriers), 4 (Railroads), and 8 (Global Transportation) of Coyle⁷ for additional, and highly recommended, readings.

James Drogan
February 12, 2007

Bibliography

- Coyle, John J., Edward J. Bardi, and Robert A. Novack. Transportation, 6e. Sixth ed: Thomson Southwestern, 2006.
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- Stock, James R., and Douglas M. Lambert. Strategic Logistics Management. Fourth ed: McGraw-Hill, 2001.

⁷ John J. Coyle, Edward J. Bardi and Robert A. Novack, Transportation, 6e, Sixth ed. (Thomson Southwestern, 2006).

