Transportation A Global Supply Chain Perspective 8th edition Coyle Solutions Manual

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Chapter 2
TRANSPORTATION AND THE ECONOMY

Chapter Objectives:

After reading this chapter, you should be able to do the following:

1. Understand the importance of transportation to the economic vitality of the United States and countries or regions and why Transportation Is probably our most important industry.

2. Appreciate the role and contributions of transportation systems to the economic development of countries or regions.

3. Understand how transportation of goods and people impacts the social and political dimensions of an economy or region.

4. Appreciate the historical role of transportation from an economic, social and political perspective.

5. Discuss the impact that improved transportation has upon land values and economic development.

6. Understand how transportation affects the price of goods, services and market areas.

7. Appreciate the function and scope of transportation in advanced and developed economies.

Chapter Overview

Transportation plays a vital role in the development of the economy of a country and the ability to sustain this development depends upon continuing improvement of the total transportation system and the associated infrastructure. This chapter explores the role, contributions and importance of transportation systems to the economic political and social dimensions of a country or region. Special attention is paid to the impact of the improved transportation upon land values and the prices of goods and services.

The benefits of improved transportation are easier to comprehend when they can be viewed them from a macro perspective which is one of the objectives of this chapter. We can more fully appreciate the overall significance and impact of improved transport if we take this more holistic view.

Transportation is a pervasive and extremely vital function in all industrialized economies. Transportation systems provide the necessary critical links between producers and consumers both domestically and globally. It has long been recognized that one of the critical ingredients for underdeveloped countries to improve economically is the need to invest in transportation infrastructure. This investment is frequently referred to as social capital, that is, society as a whole is the beneficiary of such investment because of the economic benefits associated with new businesses, higher wages, more jobs, etc.

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Transportation is one of the requirements of a developed economy because it can bring order out of chaos. The more complex life becomes and the more developed the economy, the more indispensable are the elements of transportation. Unfortunately, our transportation system is frequently taken for granted, and we do not consider the benefits that accrue to us and the need t continually improve the system, especially the infrastructure..

Historical Significance

The growth of civilizations is directly associated with the development of transportation systems. A transportation system can help create a social structure and a political system with more unified political opinions, cultural ideals and educational methods. The economies of the world tend to grow in tandem with their transportation networks. Transportation has also played a major role historically and still does currently in National Defense. As we look to the future, the transportations systems of the world will be economically, socially and politically challenged.

Economic Significance

Transportation systems have a major impact upon population patterns and urban economic development. The transportation services of a city are the "life support system" of the citizens. The transportation service adds value to the goods shipped and expands the potential market areas as demonstrated on pp. 44-45. Transportation systems help determines the economic value of products. Transportation also plays an important role in the movement of people.

Transport Measurement Units

Transport demand is essentially a request to move a given weight or amount of cargo orr freight a specific distance between two points. The demand for transportation is usually measure in weight-distance units for freight and passenger distance units for people. For freight, the usual demand metric is the ton-mile and for people the metric is the passenger-mile. Both measurements are two dimensional which can present some challenges for modal comparisons, but they are the best measures of the macro importance of freight and passenger movements or macro demand for comparison or modal split purposes .

The freight intercity modal split is dominated by motor carriers which carried about 45% of the total ton-miles in 2011. The railroads declined in relative importance after World War II with the improvement in the highway system and the increased recognition of the importance of service to the total cost of transportation to the shipper. The relative share for motor carriers of the total ton-miles moved has remained relatively stable since 2000, but the competition between rail and motor carriers has intensified with changes in fuel prices and improvements of the service of railroads and intermodal movements. Air transport of freight has become more visible but they still only carry a small percentage of the total ton-miles.

As stated previously, transportation can spur economic development by providing mobility and lower landed cost to production factors which in turn can provide economies of scale and increased efficiency. The overall importance and significance of improved transportation needs to be understood and appreciated.

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Demand Elasticity

Demand elasticity refers to the sensitivity of customers to changes in price. If demand is elastic or sensitive to changes in price, a decrease in price or rates will increase demand or sales of a product or service, but an increase in price will have the opposite effect on demand or sales. Conversely, if demand is not sensitive to price changes, it is described as inelastic. On an aggregate basis, the demand for transportation is usually inelastic since freight costs are usually a small percentage of total landed cost. However, in specific market areas between specific shipping points where there is intermodal competition, the demand for each of the carriers competing for the traffic tend to be elastic or sensitive to price changes. This phenomenon is not unusual even for the demand for products. It should be noted that changes in service levels of carriers, especially transit time and reliability, can impact demand even when there is no change in rates because the improved service level impacts inventory holding cost and other logistics costs.

Freight Transport Demand

The demand for freight transportation is usually dependent on the demand for a product in another location which can be described as a derived demand or secondary demand. Derived demand is not unique to transport since the demand for many raw materials and product parts are dependent upon the demand for a finished product. Figure 2-1 on page 43 illustrates the basic nature of derived demand. Value of the service is an important consideration for product demand which considers the impact of transportation costs and service on the demand for the product in a market area since it impacts landed costs. If the landed cost for a product is lower than the landed cost of other sources it will impact the demand for the product and consequently, the demand for the related transportation service (see Figures 2-2 and 2-3). The landed cost also impacts the extent of the market area (potential sales) for a product.

Service Components of Freight Demand

As indicated above, service demands affect the cost of the service provided and the landed cost. The transportation service characteristics that are usually most important and discussed in this chapter and the modal chapters include transit time, reliability, accessibility, capability, and security:

TRANSIT TIME can impact the inventory levels held by sellers and buyers. Usually, the longer the transit time the higher the inventory levels required and the higher the related inventory carrying costs and potential stock out costs.

RELIABILITY refers to the consistency of the expected transit time of carriers. It impacts safety stock levels and stock out costs. Safety stock increases the level of inventory required and consequently, inventory holding cost. Sock out cost is the cost of not meeting customer demand which can be the profit on the sale of the proct or the longer run cost associated with losing the customer.

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ACCESSIBILTY refers to the ability of a carrier to move freight between a specific origin and destination. If the carrier cannot provide that direct service it will affect inventory cost with longer transit times and higher total transportation costs usually associated with additional transportation services(pick up and/or delivery charges). The motor carrier usually has the advantage in providing direct point-to-point service and is frequently the complementary service required by other carriers for complete point to point service.

CAPABILITY usually refers to the ability of the carrier to provide effective service for specific products and/or to meet the special service characteristics of the freight and market needs. Typically, this is the first step in evaluating the potential for using a particular mode of transportation for a movement and in many instances is intuitive, e.g., livestock cannot be moved via pipeline.

SECURITY is concerned with the safety of the freight while it is in-transit or what is commonly referred to as loss and damage. Security also impacts inventory or safety stock and stock out costs.

Value of Goods

Transportation plays a role in determining the value of goods or products. Figure 2-4 illustrates this concept and is a useful method for explaining the concept to students.

Place Utility

The reduction in transportation costs gives a commodity with additional **place utility or place value**. In a less efficient system, the goods will have no value if they could not be sold at the market price. The more efficient method of transportation creates place utility; since the goods can now be sold at point B for a competitive price (as illustrated in the text).

Reductions in transportation costs permit market areas to purchase products from more distant suppliers that might otherwise only be produced and sold locally at a higher price. The reduction in transportation cost is actually greater for longer distances than for short ones because of the fixed charges. If a supplier can cover the transportation cost in his or her price range, an increase in the distance over which this given amount will cover the transport of goods will increase the market area of the product in an even greater ratio. Dionysius Lardner referred to this phenomenon as the **Law of Squares** in Transportation and Trade (also known as **Lardner's Law p. 49**).

Time Utility

The concept of **time utility** is closely aligned to that of place utility. The demand for a particular commodity may only exist during certain periods of time. If a product arrives in a market at a time when there is no demand for it, then it possesses no value.

Quantity Utility

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Transportation gives goods **quantity utility** through the assurance that the goods will arrive without damage in the right quantity. This utility has increased in importance in recent years with the high level of importance placed on minimizing safety stock inventories for both shippers and receivers. Transportation adds utility to goods because efficient transportation systems promote geographic specialization, large-scale production, increased competition, increased market areas and increased land values.

Geographic Specialization

The concept of **geographic specialization** assumes that each nation, state, or city produces products and services for its citizens with its capital, labor, and raw materials. The concept is closely aligned to the principle of **absolute or comparative advantage**. This principle assumes that an area will specialize in the production of goods for which it has the greatest advantage or the least comparative disadvantage.

Geographic specialization is complemented by large-scale production or **economies of scale** which are the result of more efficient operations. The raw materials for production need to be transported to a manufacturing facility, and the finished products must be transported out of an area at reasonable costs to markets and consumers at acceptable prices. Geographic specialization assumes that the large-scale production of goods is demanded at distances away from the production site. Obviously, one area cannot rely upon its comparative advantage and large-scale production without the use of efficient transportation systems. The more efficient the transportation, the larger the potential market area and the possibility of increased scale economies.

Efficient transportation can also provide the consumer with the benefit of increased **market competition**. Transportation can increases the market area for a product; thus, goods must be produced in the most efficient fashion, or distant competitors will enter the market and capture market share.

Transportation improvements which enhance an area's economy also can increase the **value of land** that is adjacent to or served by the transport improvements. It is important to note that transportation may not always have a positive impact on land values. Noise and air pollution accompanying some networks can decrease adjacent land values.

Transportation Patterns

Transportation patterns reflect the flow of people and commerce. The world's major water routes for transporting merchandise traditionally go to and from Europe, the United States, and the Far East (Japan, Korea, Hong Kong, and Taiwan).

In the United States, routes link the major metropolitan areas and represent the existing rail trunk line, interstate highway, and inland waterway patterns. The Canadian pattern links the major cities that are in a narrow population band along its border with the United States. Mexico's major commerce routes are strongly tied to its economic center, represented by Mexico City.

Gross Domestic Product (GDP)

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Transportation plays a major role in the overall economy of the United States and transportation accounts for about 10.5 percent of gross domestic product. **Passenger transportation** has been growing in relation to the GDP until recently. **Freight Transportation** which traditionally accounted for between eight and nine percent of GDP have decreased due to the more efficient use of transportation equipment and better network scheduling. It is interesting to note that overall transport expenditures as a percentage of GDP are slightly less than food expenditures and more than education expenditure

Good transportation spurs economic development by giving mobility and lower **landed cost** to production factors, which permits scale economies and increased efficiency. Good transportation enlarges the area that consumers and industries can draw on for resources and products. Good transportation expands the area to which a given plant or warehouse can distribute its products economically, and the resulting specialization and scale economies provide a wider choice of products for consumers at a lower cost.

Environmental Significance

Transportation sometimes pollutes the environment and exploits natural resources, although many citizens feel that the overall benefits provided by transportation exceed these costs.

The Environment

There has been growing concern over the impact of transportation on the environment in recent years, with particular emphasis on air quality (pollution), noise, and water quality. Increasing pressure from the environmentalists has resulted in legal restrictions that help govern the balance between a sound and efficient transportation system and a safe and clean environment. The term, **Green Supply Chains**, has become a part of our vocabulary. Transportation is an important part of all supply chains and will receive increasing attention in enviornmental analyses and discussions.. The major change which has occurred since the previous dition of this book was published is the growing acceptance by businesses and other organizations that they have an important role to play in helping to make improvemenyts in this area. Perhaps, even more important a growing recognition that it does not have to be a "zero sum game." In other words, reductions in an organization's carbon foot print, for example, can be accomplished along with reductions in the cost of transortation operations with careful planning. Many companies are looking at their transportation operations from this "win-win" perspective.

There is already a growing challenge in the 21st century to ensure efficient transportation facilities and mobility by maintaining the present system and developing alternatives to meet the growing needs of individuals and organizations.

Air Quality and Acid Rain

Pollution is an external side effect of transportation because of the widespread use of internal combustion engines. Transportation is a major contributor to air pollution. Reductions have taken place in motor vehicle emission rates because of governmental requirements, but economic and population growth makes it a persistent problem especially oa global basis. Essentially, **acid rain** is a pollution-related phenomenon that causes falling rain to be much more acidic than normal because of the addition

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of sulfur dioxide, nitrogen oxides, and volatile organic compounds to the atmosphere causes acid rain. The acid deposits have an adverse impact on aquatic systems, crops, forests, human health, and visibility. An important issue facing the United States and the rest of the world is the so-called "greenhouse effect" and the related climate changes. **Ozone reduction** in the stratosphere is a big concern and we can expect worldwide concern and the development of protocols to reduce the risks in this area.

Maritime and Water Quality

The protection of the marine environment from the adverse effects of oil spills, garbage dumping from ships, hazardous material losses, and so on is a growing concern shared by many federal and state agencies.

Noise

Another type of pollution is noise, which can emit from many sources, including airplanes and motor vehicles. Noise emissions are governed by the Noise Control Act of 1972, which allows the setting of operational standards for aircraft and trucks and even rail equipment operated by interstate carriers.

Safety

One of the more disturbing by-products of transportation is injury and loss of life. In 2006, a total of 44,912 persons lost their lives in the United States while engaged in transport. Approximately 95 percent of those fatalities occurred in highway vehicles.
Train accidents, oil spills, and the threat of gaseous explosions while in transit have increased. With an increasing variety of products being shipped and an increasing volume of transportation, these problems require greater attention.

Social Significance

A well developed transportation system also contributes improved health and education delivery systems and effective communications among regions of a country. Overall, transportation plays a major social role in our economy that is not always fully appreciated nor understood by the citzenry.

Political Significance

The origin and maintenance of transportation systems are dependent on the government as its intervention is needed to design feasible routes, cover the expense of building public highways, and develop harbors and waterways. The government is responsible for aiding all passenger and freight transportation systems in which the costs cannot be covered reasonably by a central group of users. One outgrowth of regulation is the **common carrier**. The common carrier has a duty to render service without discrimination based upon set rates for specific commodities. The government's role as a regulator of transportation services may entail certain drawbacks for the public. The government's right of **eminent domain** may require individuals to move and sell their land, even though they might not wish to do so. Although families might be displaced, the government's role is to act in the best interest

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of the public by designing routes that help the citizens of the nation efficiently conduct their business and meet their social needs. Closely connected with transportation's political role is its function as a provider for national defense. Although it is accurate to say that the American transportation system has been shaped by economic factors, political and military developments have also played important roles.

Overview of Modern Transportation

The transportation system influences many aspects of our life. For example, the location of transportation facilities has effects on the surrounding communities. Railroads and superhighways can divide towns and neighborhoods, and the location of highway interchanges can determine the location of manufacturing, retailing, and distribution operations. Factors can be identified correlating network changes to changes in neighborhood characteristics. Regional shopping centers, higher-income commuter enclaves, and resort, vacation, and amusement districts can grow as the result of available transportation networks, and the appropriate conbination of economic and social factors.

Market area decisions are dominated by the ability of the transporter to get the product to market at a low cost. Decisions about whether to purchase parts, raw materials, supplies, or finished goods for resale must reflect transport costs and decisions about where plants, warehouses, offices, and stores should be located all take transportation requirements into consideration. Lastly, pricing decisions are strongly affected by the transportation system. Overall, **transportation interacts** with three groups of our society: users, providers, and the government. Thus, transportation decisions makers are expected to consider all aspects of society in one form or another. The role of the user is to make decisions that will maximize the relevant consumer- oriented goals.

Overview of Transportation Trends

The transportation industry is in a continuing state of change. It is intertwined with the social, political, and economic forces in a society and economy. Since deregulation in the late 1970s and early 1980s carriers have organized, priced, sold their services, and managed operations based on this new environment.

The Transportation Market

- Customized services and equipment to meet specific shipper/receiver needs
- Increased concern about equipment utilization
- Increased global commerce with longer shipping distances
- International transactions made faster and easier with improved information technology
- Shift from heavy industrial, production-oriented transportation to fast, service-demanding finished goods transportation
- Transportation becoming more integrated with production, sourcing, labor, distribution, and marketing factors in a supply chain context.
- Greater marketing orientation by carriers
- Higher fuel charges causing shifts in modal split
- More international transportation

Transportation Supply

- Increased use of third-party services
- Consolidation in air, rail, and motor modes

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- Increased use of public transportation in urban and suburban areas
- Integration of modes via joint ownership or special arrangements
- Continued technological advances in most modes
- Less private carriage use for reasons of cost savings; still present where special services are involved
- More international alliances of carrier
- More concern with security and terrorism

Operations and Management

- Operations in closer link with marketing and sales of the carrier
- Leasing of containers, aircraft, terminal facilities, and other assets on increase
- Information-driven organization and structures
- Decision making and accountability being pushed lower in the organization

Government Policies and Regulation

- Increased noneconomic regulation (environmental, substance abuse, safety and security)
- Government funding not keeping up with the deterioration of transportation infrastructure
- Increased concern about the financial viability of some modes of transportation, e.g., air transport.

In the 21st century, our transportation system faces significant challenges and problems because of global competition, governmental budget constraints, and increased demand from special interest groups such as senior citizens and especially, the threat of terrorism.. The patterns of trade that help to drive transportation are changing more quickly and becoming more complex because of the dynamic global environment that we now live in and the changing economic base in the United States and the increased competitiveness or previously undeveloped countries such as China.

Study Questions

1. There is much discussion on the local, state and federal levels about the need to repair ans improve the Interstate Highway System. Provide rationale for meeting this need.

Investing in an improved transportation system would have an overall positive impact on multiple sectors of society. With transportation acting as a key ingredient to economic stimulation, improved infrastructure would improve businesses ability to produce and sell products and services. It would ensure more efficient versatility in transportation opportunities, providing flexibility to determine best routes and costs. Having the right products in the right place at the right time enables companies to maximize their revenue opportunities by adding extra value to their process. Transportation also plays an influential political role in national defense by providing the flexibility to move domestically and international in an efficient manner. This is most prominently reflected throughout the transportation of military supplies. Improved infrastructure reassures that our national defense is able to attain the

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supplies they need in a timely matter in order to protect our country. Furthermore, improved infrastructure is necessary for the world to continue their push towards a more environmentally friendly society. When companies can save costs on transportation, they are able to invest in areas that reduce their environmental impacts. Finally improved transport system results in social benefits. Socially, good transportation system can enhance health and welfare of a population. Though it not a significant problem in the United States, having the ability to transport food and life necessities throughout the country in an efficient manner can influence poverty and famine levels. Well developed transportation also contributes improved health and education delivery systems and effective communications among regions of a country.

2. "Transportation is the most important economic factor for economic development". Defend this statement.

Transportation systems provide the necessary critical links between producers and consumers both domestically and globally. The citizens of industrialized countries are dependent upon transportation systems to move products from distant locations where they are produced to markets where they are needed, can be sold and consumed. It has long been recognized that one of the critical ingredients for underdeveloped countries to improve economically is the need to invest in transportation infrastructure. This investment is frequently referred to as social capital, that is, society as a whole is the beneficiary of such investment because of the economic benefits associated with new businesses, higher wages, more jobs, etc.

3.The opening of the Erie Canal and the building of the transcontinental railroads in the 19th century were described as significant milestones for economic development in the United States. Explain their importance individually and collectively.

The Erie anal provided a link from the East Coast, specifically New York to the Upper Great Lakes Region which provided access to the Mid-West which was a bonanza for the manufactuers of the East to have access to those market areas and a pipeline Mid-West agriculture and mineral resources. While the Erie Canal was a "man-made" pulic works, it was built at avery low cost, mostly with prison labor, and the tolls were minimal. The success of the Erie canal spurred intgerst in other Canal but as pointed out in the text none of them were as successful as the Erie Canal and the railroads soon provided a more efficient and effective alternative to canals. The transcontinental railroad had essentially the same imact connecting the eastern manufacturers with markets for their products and a supply of food and other resouces for the more densely populated Easter Seaboard. It was a classic win-win but had some "bumps and bruises" with politial and individual greed leading to excesses.The Transcontinental rail system had a much larger impact when completed in 1866 than the Erie canal, but both were monumantal stepping stones for the Economic development and growth of the United States along with social and political impact of connecting the citizenry of the country.

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4. The highways and other metropolitan transprtation services are frequently described as the lifelines of the metropolitan area. Do you agree with this statement? Why or why not?

Transportation systems have a major impact upon population patterns and urban economic development. A city would not be able to survive without its internal transportation system and the connecting transportation system to external markets and producers. Even the suburban areas surrounding the city are dependent on the transportation systems. Transportation services add value to the goods shipped from the urban areas to markets and provide the economic livelihood of the urban areas. On the other hand, the urban areas need food and other supplies to sustain the population of the urban area. The cities could not exist without the efficiency of transportation systems into the city and outbound from the city.

5. Compare and contrast time and place utility, and explain how they contribute to the value of products what is the imprtance of time and place utility in our global economy?.

Place utility is created when a product is moved from a point where it is produced to a point where there is dmand for the product and the buyer is willing to pay a price that covers the landed cost of the product and sufficient profit for the producer. The more efficient the method of transportation the greater the potential market area and the greater place utility. Reductions in transportation cost permit market areas to purchase products from distant suppliers that might otherwise only be produced locally at a higher price. Time utility is aligned with place utility. The demand for a particular commodity may only exist during certain periods of time. If a product arrives in a market at a time when there is no demand for it, then it possesses no value. Effective transportation can create time utility by ensuring that products arrive WHERE(place utility) and WHEN(time utility) they are needed needed. The increased emphasis upon just-in-time and scheduled deliveries as well as lean inventories has heightened the importance of time utilityespecially for high value products and emergency shipments. Time and Place utility are even more important for gloal supply chains which face many challenges and more uncertainty because of the greater distances.

6. Adam Smith stated the specialization of labor was limited by the extent of the market and that transportation helps to expand the market. Explain the meaning and importance of this statement.

The concept of geographic specialization assumes that each nation, state, or city produces products and services for its citizens with its capital, labor, and raw materials. Since most areas cannot produce all of the needed products for its citizens, transportation is necessary to exchange(buy and sell) the goods that can be produced more efficiently at another location in return for different goods produced locally. Gain from the specialization of goods will be mutually advantageous when the cost ratios of producing two commodities are different in different areas. The development of specialization usually leads to lower prices and increased productivity (read greater output). If there is insufficient demand for the increased output, the producer will have excess supply which will have no value. The availability of efficient transportation networks to move the poducts/output to other geographical markets justifies the specialization and the advantages of scale economies. In other words without the transportation system the production efficiencie from specialization wouldould be lost. The raw materials for production need

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to be transported to a manufacturing facility, and the finished products must be transported out of an area at reasonable costs to markets and consumers at acceptable prices.

7. Economists often point to the impact of improved transportation on land values and related economic development. What is the nature nd significance of the transportation impact?

Transportation improvements can enhance an area's economy and increase the value of land that is adjacent to or served by the transport improvements because the land becomes more accessible and potentially more useful. Suburban centers provide excellent examples. The value of the land in these areas has increased to reflect the advantageous life-styles that the new or improved transportation systems have made possible. The land values within the city are obviously also enhanced by the economic development. Another good example is along the major interstate highway systems the pass through remote, undeveloped areas. However, when you reach an interchange area you usually see evidence of commercial establishments such as hotels, restaurants, service stations, shopping centers and even industrial activity. The land at those interchange greatly increased in value when the highway was developed and the interchange established.

The Erie Canal and the Transcontinental railroads mentioned previously had a major impact on land values in areas contiguous to these transportation systems. This was particularly true of the transcontinental railroad which opened up the Western States as market areas and the source of many agriculture and mineral products.

8. While improved transortation systems provide economic benefits, there may be some associated environmental costs. What are the major environmental costs associated with transport systems and what are their potential negative impacts?

Noise, air quality, and polution are most frequently mentioned as potentail negative impacts form transportation systems. If these impacts are too negative, they can negate he economis benefits of the improved transportation. Sustainbility and Green systems are frequently mentioned terms today and thee is no question that transportation and related supply chain activities have a major impact here. There is much effort underway to reduce the carbon footprint of transportation and supply chain related activities through reduced truck miles, less packaging materials, etc. While not usually consdered as an environmental factor, transportation safety is also an issue and can be a negative impact of modern transportation systems

Transportation systems can pollute the environment and exploit natural resources. The debate of the overall benefits provided by transportation exceed the costs contiues. The environmental challenge of the future will be to accurately assess the relationship between industrial and consumer benefits compared to and their construction and external, societal costs associated with transportation improvements. Green Supply Chains, the balance between a sound and efficient transportation system and a safe and clean environment have become part of our vocabulary. Pollution from internal combustion engines, acid rain which contains more pollutants from industrial and commerical

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processes as well as vehicle emissions, oil spills, and ship generated garbage all have and will continue to have adverse effects on the environment.

9.Omproved transportation systems can also have social and political significance. Why are these important considerations for evaluating existind and/or proposed additions to the transportation?

A good transportation system can enhance the health and welfare of a population, offer educational opportunities and effective communications among regions of a country. Adequate transportation is needed to create national unity; the transportation network permits the leaders of government to travel rapidly to and communicate with the people they govern. Information technology has enhanced the opportuities to communicate and help unify a nation, but transportation also plays a role in bringing people together and exposing them to products and services from other regions of the country which helps reduce regional social and political barriers.

10. The service considerations of carriers are considered by some shippers to be as important or even more important than the freight rate. Discuss the various service characteristics for freight demand. Do you agree with the statement? Why or why not?

There in question that service characteristics of carriers have become much more important to shippers over the course of the last thirty years as they have recognized the cost trade-offs for improved service such as lower inventory costs, reduced warehousing cost, lower loss and damage, lower landed cost, fewer stock outs and better customer service. In effect, the freight rate had to be evaluated along with the service provided to determine the best alternative. Three modes of transportation usually have an advantage in terms of the lowest line-haul rates between two points—rail, water carrier and pipeline but general thinking, they are at a disadvantage with respect to service. Whereas, the motor carrier and air carrier have some advantage for service, but their rates are higher than the other three, especially the air carrier. As the value of the products increase, the importance of the service characteristics increases because the trade-offs are greater for inventory cost, warehousing, customer service, etc. When he product values are low, e.g., coal, crude oil, ag products, etc., the freight rate gets the most attention.

Case Questions

Case 2.1 Opportunity Knocks

1. You have recently been hired by HOG, Inc. and Mr. Edwards has asked you to develop a set of discussion points that would point out the economic and perhaps, social benefits from a new highway link in central Pennsylvania.

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Disccusion Points

- *Can reduce travel time, which will increase business cycle time, and save transportation costs. By saving costs in transportation, companies would be able to invest the money in alternative areas that could improve their business from a efficiency and/or environmental standpoint.*
- *PA emphasizes on dairy and agricultural products that rely on freshness and therefore benefit from more efficient routes of transportation to get to their necessary locations.*
- *Federal Highway Administration has estimated that total freight volume moved in the U.S. is expected to triple by 2035, therefore needing a better route for transporting products. Also, reflects an incresed number of transportation units on the roadways in which congestions throughout existing routes will be reduced with more efficient roadways.*
- *Beneficial to general public as a general transportation resource and overall economic development.*
- *Penn State would have an easier connection to their branch campuses to develop more research opportunities, and improve the overall quality of the university reflecting.*

Case 2.2 The Sustainability Team

1. You have been asked by the Green Team to critique their pilot program pointing out strengths and weaknesses as well as the addition of new initiatives for them to consider.

Strengths

- *"Green friendly"*
- *More efficient for each individual location*
- *Ensure availablity of product by baking bread on site and reducing chance of stockouts*
- *Reduce long run costs in transportation*
- *Build stronger supplier relationships*

Weaknesses

- *Reduce expertise and specialization*
- *Require more time a labor to bake on site.*
- *Entirely new process therefore have a lot of details to be determined*
- *Repetitive processes – same procedure occuring at multiple facilities.*
- *Increased fixed costs for necessary equipment at multiple facilities.*
- *Limits suppliers by location by procuring locally.*

Suggested Internet project

Have the student research current U.S. freight expenditure by mode. In addition, find statistics for accident rates and fatalities in the U.S. for each mode.

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Have the student locate current total ton-miles by mode for freight and rank the modes from highest ton-miles to lowest.

Some addresses are:

United States Department of Transportation http://www.dot.gov/DOTagencies.htm

Federal Highway Administration http://www.fhwa.dot.gov/

Federal Motor Carrier Safety Administration http://www.fmcsa.dot.gov/

Federal Railroad Administration http://www.fra.dot.gov/

National Highway Traffic Safety Administration http://www.nhtsa.dot.gov/

Maritime Administration http://www.marad.dot.gov/

Pipelines and Hazardous Materials Safety Administration http://www.phmsa.dot.gov/

Research and Innovative Technology Administration http://www.rita.dot.gov/

National Transportation Library http://ntl.bts.gov/

Bureau of Transportation Statistics http://www.bts.gov/

Transportation Safety Institute http://www.tsi.dot.gov/

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