

TRANSPORTATION PROCESS IN GLOBAL SUPPLY CHAIN

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Abstract: The paper presents transport process in situation of global integration of supply chains. The Author notices declination of transportation costs as a driving element of the global supply chain. The Author points also on the logistics aspects in supply chain of transport activity. The outsourcing activity and thirty party logistics are also important part of the work. Finally, some threats in transport development are shown.

Keywords: transportation, globalisation, supply chain

1. Introduction

Globalization represents the cross-national functional integration and coordination of spatially dispersed economic activities. As globalization is becoming the norm in an increasing range of economic sectors, the resulting worldwide coordinate on of production and supply emerges as a complex harmonization process -- across differing cultures, various economic systems, shifting government regulations, and a host of international rules and agreements.

Globalization is not new, though. For thousands of years, people—and, later, corporations—have been buying from and selling to each other in lands at great distances, such as through the famed Silk Road across Central Asia that connected China and Europe during the Middle Ages. Likewise, for centuries, people and corporations have invested in enterprises in other countries [1]. Undoubtedly, globalization intensification in the last decades makes that this phenomenon cannot be ignored. The benefits estimation of the globalization and comparing them to expenses, requires to illustrate how the globalization is influencing various areas. Cognition of real globalization benefits and expenses can be the critical factor of the economic growth of countries and it is contributing to creation the desired image and determining the country position in the world [2].

Globalization is fundamentally changing the environment of business decisions. Corporate decisions have to be increasingly taken in the new context where business operations are subject to worldwide forces of fierce competition. Firms have to respond strategically in order to stay competitive in this arena. Decisions in logistics area seem to be crucial because of time, space, value and even social gaps between various parts of the world.

However there are many elements in efficient logistics—for example, the capture, storage and retrieval of information on goods, materials management, design of manufacturing strategies and the like -- a reliable, cost effective transportation system is fundamental to the integrated logistics system.

There are innovative ways in which firms are combining transportation and supply chain to increase its efficiencies in the globally competitive environment. Though the transportation logistics systems vary with type of product and geographical scope of the market for raw materials, components and finished products, there is a common objective underlying the various strategies.

2. Transportation process role in supply chain integration

Technological change in the transportation and the information technology (IT) sectors is ushering in a period of low cost / high value transportation services. Indeed, the combined effects of changes in transportation and the complementary information technologies are not only visible in the offer of traditional transportation services with more speed and reliability and lower costs, but also in the introduction of new classes of transportation services.

The transportation industry is more dependent on information technology today because it allows customers to maintain very low inventory levels to further reduce costs. Electronic Data Interchange (EDI) is used by freight management services to improve delivery times and reduce costs. The success of information technology depends upon data standardization among shippers and carriers. Information should go beyond the typical shipment tracking, proof-of-delivery, and on-time delivery reports as shippers also want to track trends within these data. Some transportation industries still need to add additional IT to better support JIT processes. Companies which have integrated the information technology advancements such as satellites, computerized tracking, and bar coding are able to respond to customer needs and schedule changes more quickly. Due to the increased competition in the transportation industry, electronic communications and computer software for tracking loads is a necessary condition to compete in the industry. EDI is one such tool able to link suppliers and manufacturers with the transporter and provide immediate communication. It is being used by transporters to improve delivery schedules and reduce the costs of excessive inventories [3].

Land and water transportation costs have steadily declined in the post war years. The average ocean freight and port charges per U.S. import and export cargo decreased from \$95 to \$29 per short ton between 1920 and 1990 [4]. Air cargo rates have not only fallen in the last 30 years; jet air travel, and refrigeration have made trade possible in previously nontradable perishable goods such as cut flowers and live lobsters. Air express cargo routinely carries high volumes of high value added goods and mail packages across continents (compare Figure 1).

The ratio of c.i.f trade value (measured as cost to the importing country) to f.o.b. trade value (measured as it leaves the exporting country) is the common measure of shipping costs. Using this measure, the margin for U.S. trade declined from 9.50% to approximately 6% between 1950 and 1990. Frankel [4] claims that this understates the true decline as the composition of trade has changed and c.i.f costs vary widely across commodities and trading partners. Across commodities, the c.i.f. margin varies from .8% for aircraft to 25.1% for low value added commodities.

The objective of transportation logistics, one component of integrated logistics management, is to compress time along the whole supply chain. This involves not only reducing delivery time in shipments from suppliers of raw materials, intermediate goods and components to factories, but also the distribution of final products from factories to wholesalers, retailers and end users. It also includes distribution of spare parts to repair establishments for after sales service. As the JIT (Just-in-time) production system is increasingly the norm in many industries, shipments have become time dependent. Firms gain value from reducing stock keeping units (SKU's) and from being able to respond rapidly to changing market conditions

[6]. For example, in 1998, Dell Computers carried only 8 days of inventory – less than 25% of its 1995 inventory pattern [7]. Dell Computer in Ireland produces in direct response to customer orders via the internet—an example of the current trend toward pull logistics where orders for shipments are pulled to meet demand. Another service improvement offered by transport logistics providers, namely the reduction of order cycle times, confers productivity gains on industrial producers and shippers. The reduction in order cycling times is based on cost tradeoffs between production, stockholding, marketing and transportation with the goal of minimizing overall costs. In transportation, logistics information substitutes for inventory. Information technology has fueled the logistics revolution by linking the shipper and customer through information flows and analyses. Logistics can reduce overstocking, eliminate costly shipment bottlenecks and delays in delivery schedules, and offer time and cost savings to the supply chain participants. By providing necessary timely information on the freight on the move, the requirements of the production processes to all relevant actors in the supply chain. While transportation is only one component of integrated logistics management, the current trend is toward increasing its contribution, and thereby, its critical importance. Transportation, in the knowledge economy, is not limited to just movement of goods across space. It no longer only performs a mere pre production (moving inputs) and postproduction (delivering outputs) linkage function. It is a value-adding component that is incorporated into strategic management and operational decisions of firms through transportation logistics [8].

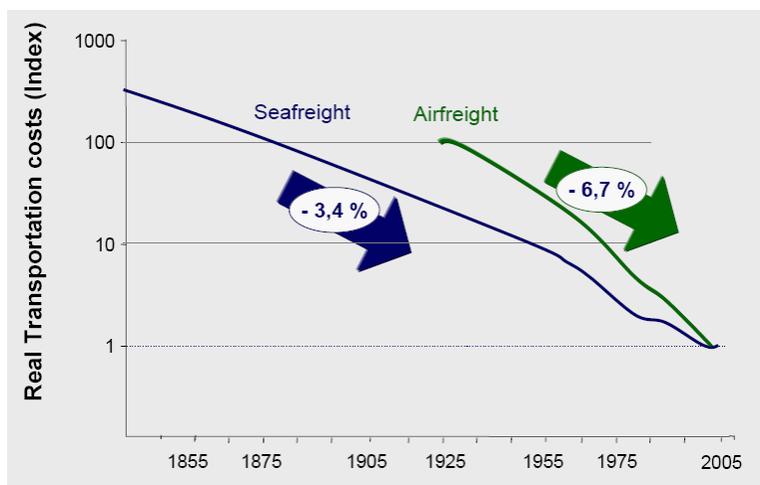


Figure 1 Development of international transportation costs [5]

In early stages of transportation and distribution logistics, the focus was on local optimization, that is, optimizing inbound logistics or outbound logistics for particular shipments. The current trend is toward global optimization, that is, across the whole value chain. The objective of integrated logistics is to synergize delivery while reducing shipment costs and cycle time. It includes adding of flexibility and accuracy of shipments. Agility or flexibility is important as inventories are to be kept at a minimum and logistical firms must be able to respond to shifting production and customer needs. Accuracy is important as shipment errors mean loss of time by not getting the right goods at the right time. This is important as inventories are kept at a minimum and the goal of supply chain management is to increase efficiencies by minimizing costs of holding inventory at every stage – including after sales service. Information technology and electronic data transmission are critical for

harmonizing order shipments – such investments are crucial for realizing efficiencies at the warehouse. The link between supply chain and one part of it, namely, transportation. The inbound network affects the interrelationship between vendors and production centers. The outbound network links distribution centers, which can be centralized or decentralized, with customers who can be wholesalers, retailer or end users. There are considerable variations in these networks between countries, and even, between regions within a country. Logistical decisions, such as transportation mode or fleet composition for example, have to be made in the context of these geographical variations in physical, communication and institutional infrastructures. Transportation logistics is, thus, affected by the environment for logistical operations. The logistical operating environment refers to region specific characteristics such as quality of the infrastructure, including communication infrastructure, availability and sophistication of software, skilled personnel and like variables. Logistical strategies have to be crafted in the context of a logistical operating environment defined in this fashion. Other considerations are the level of infrastructure modernization, particularly, the coordination between physical and electronic systems. For example, tracking of shipments is dependent on incorporation of electronic technologies, such as scanners and transponders, with evolving, newer scanning technologies of physical infrastructure.

Logistics has both strategic and operational components, as it relates to manufacturing and marketing strategies, in which information management is a key to organizational change. For instance, the design of distribution networks or decisions regarding third party logistics are strategic issues; while transportation mode choice and optimal fleet size are operational issues. In Table 1 the supply chain, decomposed into strategic, tactical or operational components are shown. For example, the location of a new factory or warehouse, which is a strategic decision, is increasingly being taken in the context of logistics where procurement and marketing concerns readdressed. Capacity of an assembly operation, or its geographical siting, are strategic decisions based on efficiencies of inbound and outbound logistics. While the coordination of sourcing with production and marketing is a strategic decision, where to source components is a tactical one. There are many alternative locations for sourcing. Strategic, tactical and operational issues are important for transportation, shipment and warehousing. As noted earlier, warehouse layout or fleet composition are strategic transportation issues. Frequency of deliveries – monthly, weekly, or daily - are strategic shipment concerns. On the other hand, routing strategies depend on load size and shipment location and thus are tactical decisions.

Table 1. Transportation process: Supply Chain Issues [8]

	Supply Chain	Transportation	Shipment	Warehousing
Strategic	Site/Location Capacity Sizing Sourcing, Production & Marketing coordination	Warehouse Location Fleet composition Fleet forwarding decisions	Internal/Outsourcing Dispatch centers Fleet sizing Delivery frequency	Warehouse Layout Level of automation Material handling design & equipment
Tactical	Production Planning Sourcing	Routing Strategy Network alignment Information Technology	Mode Choice Zone alignment Load size	Storage Retrieval IT infrastructure
Operational	Enterprise Resource planning (ERP)	Transit Time Minimization Storage & stocking	Vehicle Dispatch Communication	Order Handling Order pickup

Transportation logistics is still in its developmental stage. However, its evolution is on a rapid growth path due to the increasing capacity of, and increased merging of, information systems and transportation technologies.

3. Outsourcing and Third Party Logistics

According to Harry Haney, Fleet Manager for Kraft Foods, Inc., a supply chain efficiency strategy can involve combining private and dedicated fleets. Haney explained how knowing fleet costs helps management spend transportation dollars wisely. For example, the strategy can identify which activities are best handled by fleet and which are more efficiently to be outsourced. By identifying and quantifying the costs, a company can manage them [9].

With the emphasis on cost control, outsourcing is a growing trend, particularly among retailers. Outsourcing trucking operations to a third-party provider can reduce transportation costs by 15% and with the growth of logistics information systems and the Internet, shippers have access to the most current information.

Harrington [10], in a classic article on outsourcing, confirms most companies start small with fleet outsourcing, usually by leasing their drivers before fully outsourcing all transportation operations. Benefits derived from outsourcing include 1) ability to focus on core competencies, 2) increased capital, 3) improved customer service, 4) reduced labor problems, 5) reduced costs, 6) transferred responsibility to a third party, 7) decreased risk for the company, and 8) ability to avoid inflexible union rules. Also with current rising fuel prices, shortages, and difficulty finding a reliable trained labor pool, outsourcing also makes more sense to companies without time or expertise to vertically integrate into transportation.

Many companies are searching for one firm to manage all their logistics needs. These shippers are moving to a third-party logistics (3PL) provider who can satisfy a wide range of logistics needs on a global basis supported by integrated information technology. The ability to link all the logistics partners and provide real time status updates anywhere in the world is the greatest strength of a good third-party provider because shippers demand seamless worldwide shipping. While there is an increasing trend toward third party providers, at the same time there is consolidation of the number of providers. In order to provide a complete line of services, even the biggest providers often enter into alliances with other shippers, particularly for overseas situations. General Motors has even added a fourth-party logistics provider to manage their entire supply chain and integrate over 2,000 3PL suppliers into a single large information system. GM hopes the new supply chain will cut vehicle order cycle time from 85 days to between 15 and 20 days [11].

4. Summary

Globalization of the supply chain has created new opportunities and challenges. The strategy of developing open borders, combined with generally favorable economic conditions, has resulted in substantial increases in passenger and freight movements. This increased economic activity has resulted in increasing traffic volumes, especially in truck movements. Not surprisingly, congestion on the road network and access to intermodal terminals/ports has become a critical issue, especially in urban areas and at critical natural geographic barriers.

Moreover, after more than 20 years of declining transportation costs, recent spikes in fuel prices and tightening carrier capacity are combining to drive shipping costs up again. Companies have benefited greatly from this historical decline, but it is no longer a buyer's market. Capacity constraints across most modes of transportation (ocean container shipping being the notable exception) have shifted to favor the carriers, and many shippers are

struggling to find any available transportation, regardless of price. For example, railroad customers, especially boxcar users, often find that only half of their daily or weekly car requirements are met. Motor carriers struggle to find enough drivers due to issues with long hours, low pay, and an aging work force.

Government regulations are also impacting transportation costs adversely. New limits on drivers' hours of service are impacting dwell time, facility service hours and utilization of labor and space. EPA diesel fuel and engine standards are driving up operating costs. Additionally, infrastructure projects, such as increasing highway capacity or improving rail lines, remain on planning boards because of local opposition and lack of funding.

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