

Trade

From National Markets to Global Markets¹

■ Executive Summary

Increasing global integration of the U.S. economy has become a significant factor in the evolution of the nation's transportation network. Between 1970 and 1999, the share of U.S. gross domestic product attributed to trade in goods and services has grown from 10.7 percent to 26.9 percent. This growth is primarily a reflection of three major trends:

- Liberalization of world trade policies allows industries and nations to benefit from trade as a source of economic growth;
- Supply chains have become globalized as industries seek out the cost and market advantages that different parts of the world offer for different elements of the supply chain; and
- Advanced information technologies allow far-flung supply chains and distribution channels to be better integrated in time and space.

Globalization has major implications for U.S. transportation systems:

- Increasing pressure on trade gateways that already experience congestion, land use constraints, and operational deficiencies;
- Growing need for infrastructure investment along national high-growth trade routes;
- Increasing demand for "internationalization" of the freight transportation industry and freight transportation services; and
- Harmonizing trade policies and practices worldwide will be needed to avoid creating unnecessary trade barriers.

¹This paper was prepared by Cambridge Systematics, Inc., a member of the Battelle Team providing research and analysis support to the Federal Highway Administration (FHWA) Office of Freight Management and Operations. The paper is one in a series of papers providing initial analysis and discussion of the trends and issues affecting freight transportation productivity in the United States and North America. The paper was prepared under Contract DTFH61-97-C-00010, BAT-99-020. The opinions expressed in the paper are those of the authors, not the FHWA.

Given these implications, DOT and the transportation community will have to answer these fundamental questions:

- How will future capacity shortfalls at gateways and along trade corridors be addressed? How will improvements in these critical facilities be financed in a transportation decision-making process that has become increasingly local in focus?
- What more can be done to further harmonize U.S. and global regulatory practices, trade documentation paperwork, and customs procedures to facilitate more efficient trade transportation system?
- How will the volatility of international trade policies affect long-term transportation decision-making?

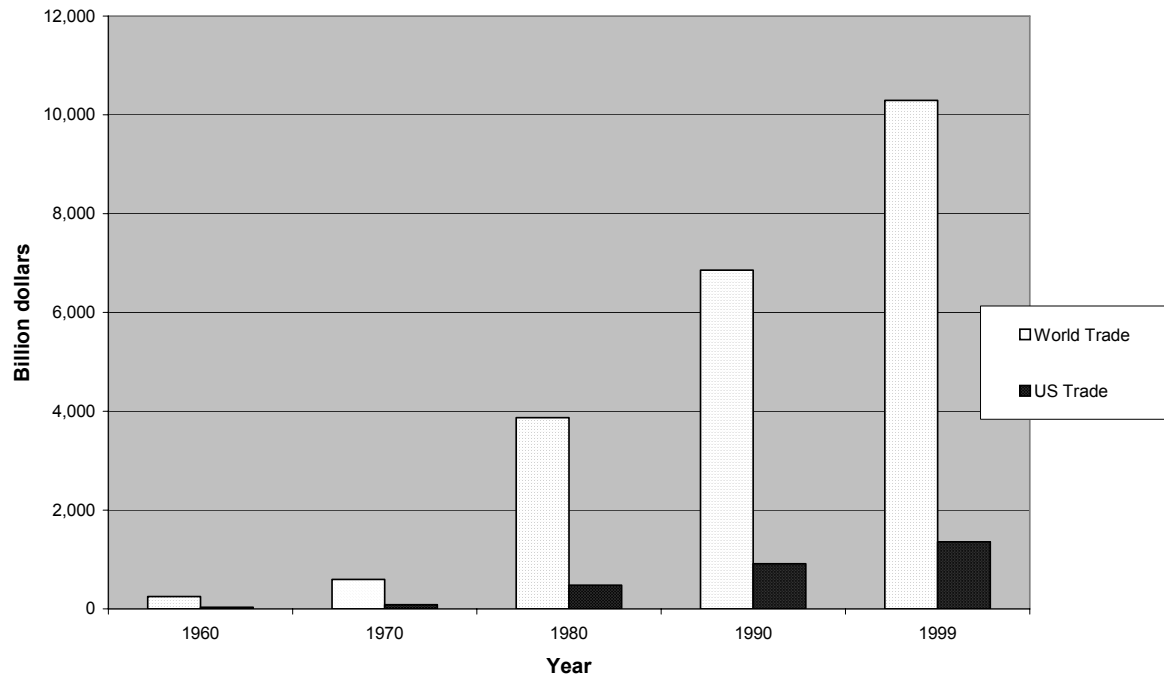
■ Trends in World Trade

Over the last several decades, a shift has occurred in the U.S. economic practice of relying primarily on domestic markets to focusing on global markets and trade to achieve long-term economic growth. The growing importance of trade in the U.S. economy is a reflection of world economic trends. Between 1960 and 1999, world merchandise trade (exports and imports) grew at an average annualized rate of over 10 percent (in current dollars) (see Figure 1). This trend toward globalization has contributed to U.S. economic growth. While the U.S. share of global merchandise trade has remained at around 12 percent to 14 percent between 1960 and 1999 on a value basis, trade grew as a share of the U.S. economy during this period. As a share of gross domestic product (GDP), nominal U.S. exports and imports grew from 9.1 percent in 1960 to 20.5 percent in 1980 to 24.3 percent in 1999. According to WEFA, U.S. trade will represent 27.1 percent of GDP in 2004 and 36.7 percent by 2025. This trend is illustrated in Figure 2.

The growth in world trade, its significance to the U.S. economy, and the changing characteristics of trade partnerships can be traced to a number of factors, including:

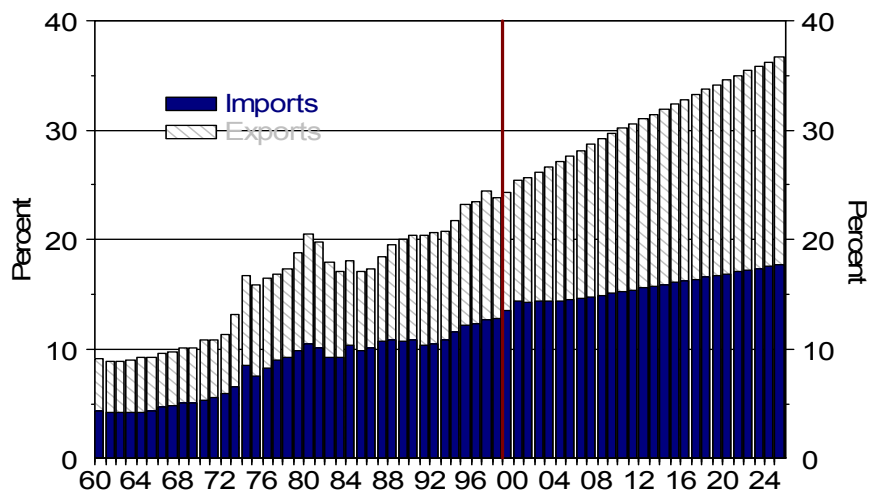
- Liberalization of world trade policies and increased emphasis on free trade as a solution for long-term economic growth;
- Increasing globalization of the supply chain and internal globalization of multinational corporations; and
- Accelerated adoption of advanced information technologies, facilitating the two previous factors.

Figure 1. World and U.S. Merchandise Trade



Source: Figures for 1960 to 1990 obtained from NCHRP Report 421 (1999), page A-14; figures for 1999 obtained from Merchandise Trade Section, Statistics Division, WTO

Figure 2. U.S. Trade Share of U.S. GDP



Source: The Trend Scenario in Detail, WEFA

In today's global marketplace, protectionist policies are yielding to strategies aimed at advancing economic development and consumer welfare through free trade. Historically, protectionism was a frequently used policy for encouraging U.S. industrial and agricultural development without competitive pressures from foreign businesses. Ownership laws, tariffs, and import restrictions limited foreign competition. With the growth of industrialization worldwide and increased access to global resources, business has sought overseas markets and the dismantling of protectionist policies. This trend has accelerated during the late 1980s and early 1990s with the end of the cold war and the collapse of communist regimes around the world. During the same period, less developed economies in the Asian Pacific and in Latin America entered into the global marketplace to take advantage of what trade offered their expanding economies. This change in the political landscape led to increasing political and economic cooperation among nations and opened up possibilities for a new set of trading relationships.

U.S. companies have realized significant growth through the opening of new consumer markets in the rapidly growing economies of the developing world. U.S. consumers benefit from the availability of lower cost goods, which, in turn, have helped transform perceptions of trade. In the late 1980s and the early 1990s, increasing interest in free trade agreements and global trade became a key component of U.S. government strategies for long-term economic growth. However, international trade policy can be fickle, as trade disputes continue, and in some cases, have escalated after new suppliers have entered into formerly closed markets.

One trend that developed as a result of increasing interest in global trade as a source of economic growth is the emergence of regional trade blocks. Supported by regional free trade agreements, many multi-national companies are developing regional production platforms and regional consumption strategies that tie national economies together to take advantage of growing consumer markets and each country's unique production and resource advantages. This trend is clearly evident in the Western Hemisphere. The world's largest trading partners, the United States and Canada, signed a free trade agreement in 1989, which was expanded with the inclusion of Mexico in the North American Free Trade Agreement (NAFTA) in 1993. Similar steps have been taken in Central and South America, including the Central American Common Market, the Caribbean Common Market, the Andean Pact, and the Common Market of the Southern Cone (MERCOSUR). A Free Trade Area of the Americas is also under discussion, with specific goals set by the leaders of all the countries to achieve steps towards integration by 2005. These regional agreements have significant implications for future trade transportation routes and supporting infrastructure.

Global trade growth and multinational trade blocks have also led to the integration of production and distribution activities across national boundaries through the growth of multinational corporations and corporate trade alliances. Companies seek competitive advantages by expanding their operations around the globe to take advantage of local low-cost labor market conditions, raw materials supplies, high-skill labor markets, infrastructure availability, and market accessibility. These factors have radically altered the characteristics of global trade in recent years. For example, in the past, global trade was thought to occur between nations, whereas today trade among worldwide subsidiaries of multi-national corporations is commonplace. To some extent this occurs because companies tend to organize the various elements of their supply chains around

the globe to take advantage of low cost suppliers, local resource base, and unique local labor market conditions. Globalization within corporate structures is also taking place to more efficiently serve diverse global markets with locally produced products. These regional production strategies also allow for product modification to suit the unique characteristics of each regional market.

The development and adoption of cellular communications, the Internet, computers, and other emerging communications technologies also were factors in the globalization of trade, facilitating information flow across global and corporate boundaries. In fact, the dual growth of infrastructure and communications technologies have served to link world markets in ways unimaginable thirty years ago.

■ Implications for Freight Transportation Systems

International trade-related transportation in the United States accounts for about ten percent of total tonnage moved on the domestic transportation system today. Trends suggest that international trade as a share of total U.S. traffic will continue to grow in the future. As global trade depends on an efficient, multi-modal transportation system, the growing significance of trade to the U.S. economy could focus increasing attention on bottlenecks in the system. The most significant effects of globalization on the freight transportation system include:

- **Expansion of world trade is putting new pressures on U.S. gateways.** Shifts in trading partners means that gateways serving these trading partners are experiencing growing pains. Explosive growth in Pacific Rim trade has put severe strains on West Coast seaports and airports. Growth in NAFTA and Latin American trade is affecting land border crossings and the Southeastern ports. The older gateways of the Northeast and Mid-Atlantic are experiencing different pressures as they continue to see growth in cargo volumes moving over deteriorating access infrastructure. A recent Federal Highway Administration report on intermodal freight connectors noted that between 12 percent and 15 percent of the pavement at truck and rail terminals and ports are in poor condition, compared to 8 percent for the NHS. Gateways are also under pressure as carriers seek to generate economies of scale through the creation of load centers funneling increased volumes through gateway facilities. While the cost reductions and efficiency gains from this approach can benefit shippers and consumers, the gateways are becoming more sensitive to disruptions that can then spread through the whole freight transportation system.
- **Changes in trade relationships affect domestic freight corridors that support world trade.** Historically, U.S. freight corridors have an east-west orientation, reflecting the westward development of the nation. As growth in Pacific Rim trade has occurred over the last 30 years, east-west corridors linking the major West Coast gateways with the rest of the United States have experienced growth in traffic. Many of these corridors are experiencing increasing congestion as trade transportation competes with domestic traffic in these high-growth regions. In the future, NAFTA trade and trade with Latin America will create increased requirements for north-south corridors and east-west corridors running through the northern and southern border regions.

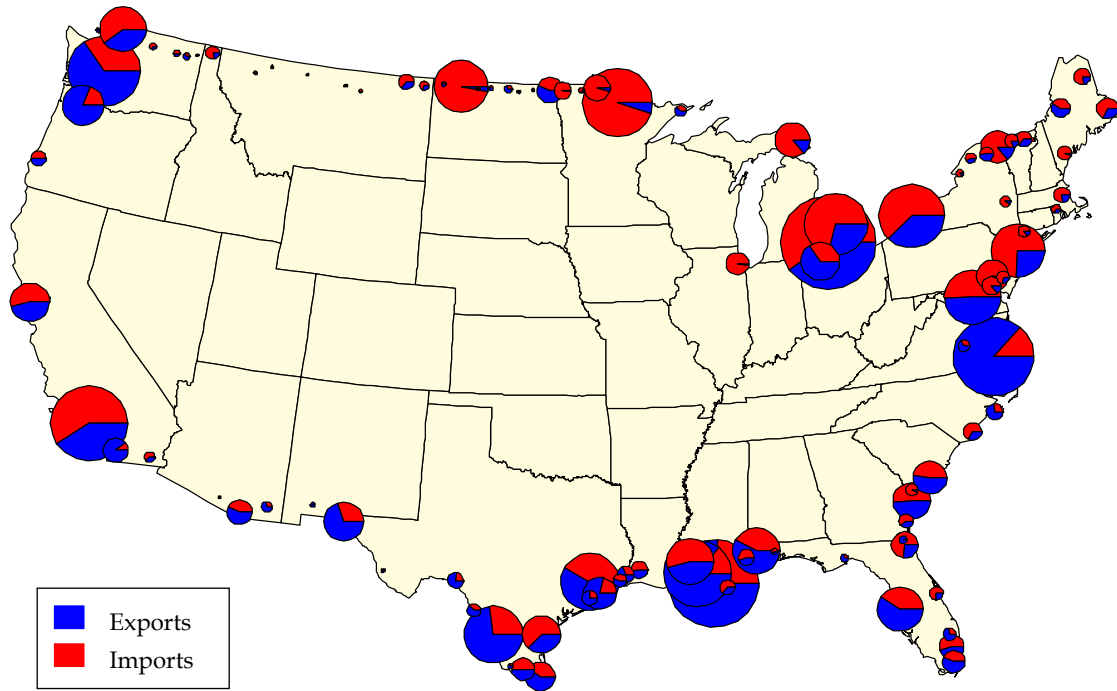
- **Increased outsourcing of business functions and the need to access global supply networks and markets have created far-flung supply chains for many industries.** Transportation services have steadily become more crucial, linking distant markets, functions, and supply sources into coherent commercial networks. This will lead to new demands for internationalization of transportation service providers.
- **As trade increases, export-import policies and procedures will need to be further harmonized in order to avoid trade barriers.** The process of harmonization is complex, time consuming and involves a myriad of political and diplomatic agreements that proceed at a pace that may frustrate further growth in international trade.

Trade Pressures on U.S. Gateways

Growth in international trade and changes in relationships with trading partners have created more freight traffic and congestion at ports, airports, and border crossings.

Relationships between the United States and its international trading partners have evolved over the past century and with this evolution have come significant changes in the domestic infrastructure that supports trade. In the first half of the century, trade was dominated by the relationship between the U.S. and European markets. This led to the continued development of eastern port facilities. In the aftermath of World War II, the United States began to see growth in trade in the Pacific, most notably with Japan, South Korea, and Taiwan. With the end of the Cold War and the liberalization of many Eastern European and Asian economies, trade began to shift to an even stronger relationship with the Pacific Rim and China. This influenced the development of the western port facilities. More recently, the adoption of NAFTA and the growing importance of the Latin American trade blocks recommend investment in resources in southeastern and Gulf Coast ports and land border gateways. Figure 3 illustrates the top U.S. gateways for international freight imports and exports.

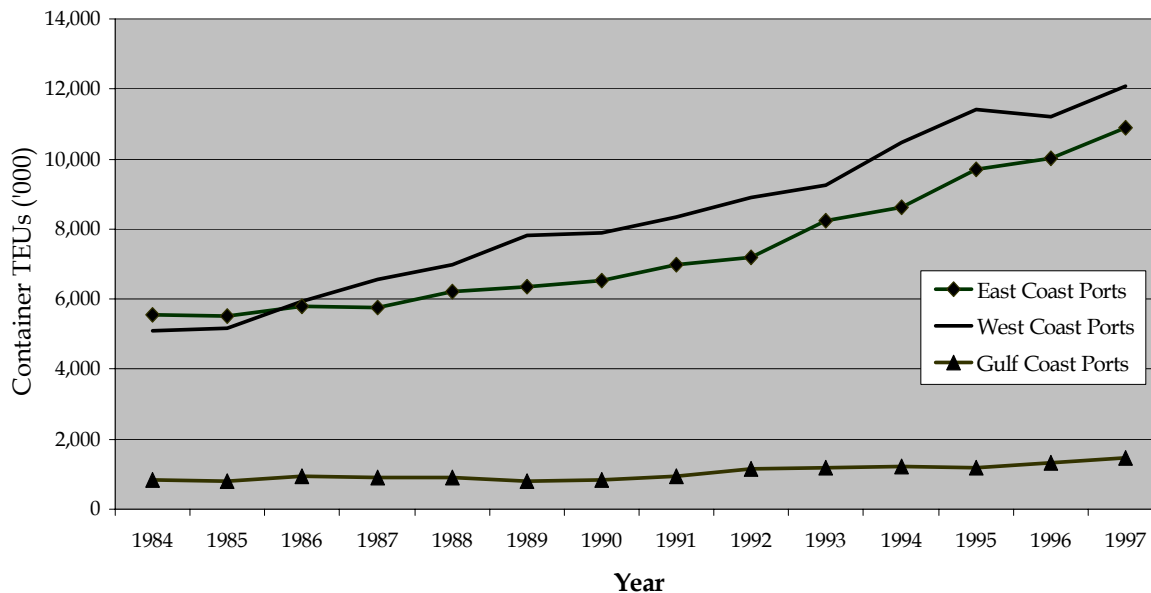
Figure 3. Top Gateways for International Freight



U.S. Ports

As noted previously, changing trade patterns and the growing importance of overseas trade to the U.S. economy has had significant repercussions for the nation's ports. During the 1970s and 1980s, the Far East became the largest foreign trade area for the United States. At the same time, container shipping emerged as the dominant method of moving many of the commodities traded along the east-west trade corridors. The use of containers allowed shippers and carriers more flexibility in terms of the transport mode used, and reduced cargo transfer times, expenses, and the need for additional handling of the contents between modes or intermediary warehouses. This resulted in a cost and/or time saving depending on the market served. As shown in Figure 4, between 1984 and 1997, growth in container shipping from west coast ports outstripped container traffic growth elsewhere in the United States. Even the growth in container traffic at east coast ports reflects a change in trading patterns, as over 35 percent of the growth in traffic at these ports occurred in Florida (primarily north-south trade with Latin America - an increasingly important growth market for the future). In 1984 the ports of Jacksonville, Miami, Port Everglades, and Palm Beach accounted for only 8.4 percent of container traffic at East Coast ports. By 1997 this had grown to 21.3 percent of East Coast container traffic.

Figure 4. U.S. Port Container Traffic



Source: American Association of Port Authorities, www.aapa-ports.org. (TEU-Twenty foot Equivalent Unit.)

The growth in containerized shipping and international trade in general has increased pressure on rail intermodal terminal connections at ports. Many ports have moved to increase on-dock rail options to handle increased demand and to deal with growing roadway congestion around terminals. Railroads and ports are finding it more difficult to marshal the necessary capital resources and to find available land to increase on-dock and near-dock rail capacity. One example of this problem exists at the nation's largest container port complex in Los Angeles/Long Beach. Even with the completion of the Alameda Corridor in 2002 and considerable expansion of on-dock rail capacity currently underway at the ports, on-dock rail facilities are projected to be operating near capacity by 2020. Off-dock intermodal terminals in the area are expected to exceed capacity within the same timeframe.

Although often receiving less attention than the growth trends at container ports, the movement of bulk cargoes is creating strains on gateway infrastructure. This is particularly true at Gulf coast ports, along the inland waterway system, and at facilities providing coastal shipping services. These facilities, in many cases, receive less funding for necessary infrastructure improvements than do container ports.

Port terminals face many challenges in balancing land use with terminal productivity. In addition to handling every larger volumes, U.S. ports are constrained in developing new or expanding existing facilities because of the acute shortage of land suitable for development or ecological sensitivity of the marine environment or simply the lack of available land not already used by others. Expansion of port facilities in existing locations also creates serious environmental justice concerns. Neighborhoods adjacent to ports and those that are most seriously affected by expanding port traffic are very often those

housing the poorest citizens in the community. Many ports are under pressure to resolve their access problems without creating additional disruptions to the local community. Improved port access, technological investments by carriers and gate operators and longer operating hours would reduce the dwell time of containers in terminals, and relieve some of the expansion pressure, but at a cost of investment in access routes and round-the-clock operations. Significant labor management issues will need to be resolved before longer operating hours can become a viable operational strategy at most U.S. ports. Another option that is being examined at ports around the country is the “inland port” concept. Inland ports provide a location for staging containers, which are then moved to/from the port by rail, water or truck, while also offering a variety of port services at these off-site locations. Potentially, these facilities can expand a port’s hinterland and reduce local congestion problems, although few successful examples exist at the moment.

Changes in freight transportation technology, such as increased use of containerized shipping, larger trailers, and post-Panamax ships, have also created new challenges at gateway transportation facilities. Larger trucks operating on older access routes often have to deal with short-signal cycles, inadequate roadway geometrics, and other local roadway conditions. As noted earlier, between 12 and 15 percent of the pavement at truck and rail terminals and ports are in poor condition. Larger container ships result in even greater peak demand for truck and rail access on already congested and poor access routes.

U.S. Airports

Airports have become increasingly important international trade gateways as import-export shipments shift towards higher value, small package deliveries that are highly time sensitive. The pressures at these gateways exist on both the land side and the air side. Of the major modes of transport, airfreight is more closely tied to its passenger counterpart than any other mode, simply because it often is an adjunct to passenger carriage. Belly cargo services provide considerable flexibility to freight forwarders and offer a reasonable cost alternative to freighters and charter services. However, the capacity and reliability of this alternative is suffering. A 1997 report by the National Civil Aviation Commission expressed grave concern about the ability of the aviation system – air traffic control and groundside facilities – to handle projected growth. Increasingly, cargo is being squeezed from passenger air carriage, forcing it to higher cost alternatives. Many combination carriers have moved to smaller aircraft in order to improve passenger space utilization. This often comes at the expense of belly space for cargo.

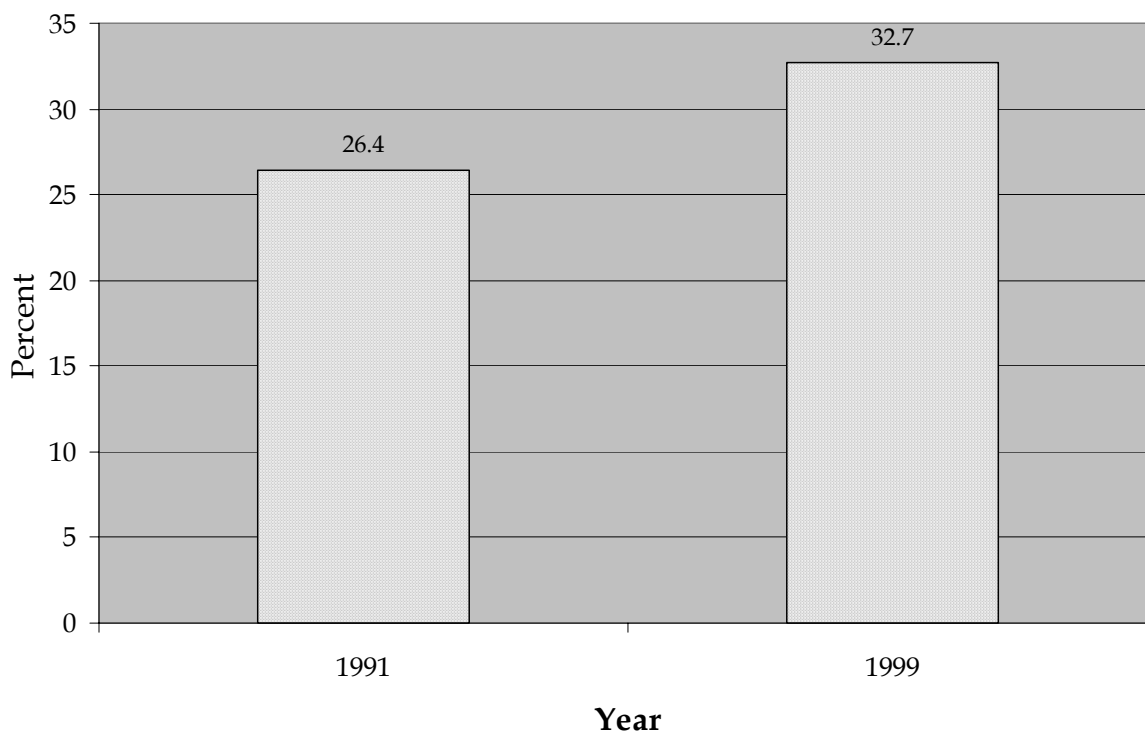
Additionally, the hub system is putting more people into fewer airports, concentrating the market for both passengers and air cargo. This has created enormous congestion problems. In 1999, the Federal Aviation Administration reported that about 28 percent of total departures were delayed. This congestion occurs on the landside, where, in many major markets, air couriers are pushing back cutoff times because of highway congestion. As in the case of seaports, lack of land for expansion is also a problem at most international passenger airports, where land costs tend to be high and community opposition to expansion is often a problem. This opposition has also led to operating hour restrictions in many areas, which further limits the ability of airports and carriers to expand operational capacity.

One solution being investigated is the conversion of former military bases to all-cargo airports. However, these facilities are often far from major shippers. Ultimately, the expansion of existing international airports with new runways, cargo warehousing, or freight handling facilities will be necessary. But the current system for financing these improvements may not be adequate for the need.

Border Crossings

Another growing area of concern is congestion at surface ports of entry. As noted above, the adoption of NAFTA is putting new pressure on land border gateways. Trade with NAFTA partners grew from 26 percent of total U.S. trade in 1991 to almost 33 percent in 1999 (Figure 5). Canada is the U.S. top trading partner, accounting for approximately 20 percent of all U.S. trade. Mexico is the U.S. third leading trade partner, accounting for approximately 10 percent of all U.S. trade. According to Texas A&M University, the number of northbound trucks crossing the Texas-Mexico border increased 88 percent while the number of southbound trucks crossing the border increased 30 percent from 1993 to 1997. Rail car volumes traversing the six rail bridges on the Texas-Mexico border also increased dramatically from 240,000 in 1994 to more than 500,000 cars in 2000.

Figure 5. Percentage of U.S. Trade to NAFTA



Source: U.S. Foreign Trade Highlights 1999 (Tables 6 and 7) for 1991 to 1999.

According to a paper² submitted to the Transportation Research Board, 14 of the 79 ports on the U.S.-Canada border and nine of the 26 major ports on the U.S.-Mexico border account for 95 percent of all cross border NAFTA truck shipments. Border crossings at Detroit, Michigan and Laredo, Texas account for the largest fraction of land trade by value (over 30 percent of total value). The concentration of origins and destinations for NAFTA traffic should continue to have significant effects on border crossings. In 2000, there were over 11.5 million commercial truck crossings into the U.S. from Canada and Mexico, up 26 percent since 1997.³ Highway congestion might have been more of a factor during the 1990s had the number of passenger crossings between the United States and Canada not declined, as compared to historic rates. While this may have created some temporary “breathing space,” projected growth in trade will eventually catch up with existing capacity.

Rail infrastructure is also experiencing pressure at the borders. Rail is a particularly important mode of transport for trade between the United States and Canada, accounting for approximately 24 percent of trade by weight. This reflects the more highly developed infrastructure of the Canadian railways and their integration with the U.S. transportation system. Recent investments in a new tunnel at the Port Huron/Sarnia crossing and enlargement of an existing tunnel at Detroit/Windsor have helped increase rail share of cross-border shipments by allowing double-stack trains to traverse these crossings.

Rail infrastructure problems at U.S.-Mexico crossings have been plagued with more significant problems, such as an increase in trade and deteriorating infrastructure. Three rail crossings in Texas (Laredo, El Paso, and Eagle Pass) accounted for 90.3 percent of the value of all rail trade between the United States and Mexico in 2000. In particular, traffic at Laredo grew from 40.6 percent of the U.S. total in 1994 to 74.4 percent in 2000. Currently, the rail bridge at the Laredo crossing is nearing capacity. Deficient conditions exist on segments between Corpus Christi and Laredo and between Houston and Brownsville.

Border crossings that serve important non-transportation functions are often not constructed or staffed and operated in a manner that provides for efficient goods movement, given the growing volume of vehicles using the facilities. In addition, the magnitude of the problem is not well documented and understood. A study by Parsons Transportation Group/Barton-Aschman⁴ concluded that delays to commercial traffic along the U.S.-Mexico border is almost always caused by constraints within the inspection facilities and not due to the road or bridge system. The report further noted that no existing U.S.-Mexico bridge or crossing road would ever reach its vehicular capacity before the U.S. inspection facilities reach capacity.

²“NAFTA trucks on U.S. Highway Corridors” by John P. McCray and Robert Harrison, submitted to the Transportation Research Board 78th Annual Meeting, January 11-14, 1999.

³*North American Trade and Travel Trends*, U.S. Department of Transportation, Bureau of Transportation Statistics, 2001.

⁴“Operational Characteristics of Commercial Border Stations Along the U.S.-Mexico Border” by Lisa Dye, Robert Eckols, and Brian Bochner, submitted to the Transportation Research Board 78th Annual Meeting, January 11-14, 1999.

Methods of determining border crossing delays associated with different aspects of the process (e.g., effects of inadequate roadway capacity, insufficient border staffing, etc.) are still being investigated. The application of automated procedures for border clearance is still in the early stages of deployment and the potential for use of these technologies to resolve current capacity and operational constraints is promising. As NAFTA evolves through different stages of implementation, the logistical process and routing of commercial traffic will continue to create new demands for connector facilities linked to the actual border facilities.

Trade Corridors

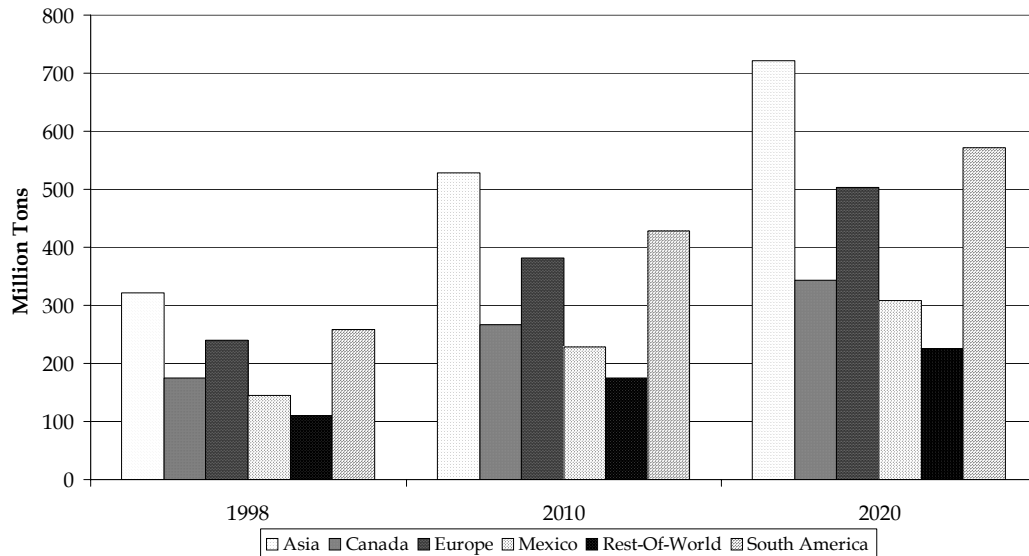
Inland trade corridors develop to link key gateway facilities with major population and industrial centers. In the past, the inland component of trade transportation occurred on rail and highway infrastructure developed to serve the east-west orientation of U.S. population growth. To a large extent, this east-west orientation of trade corridors is likely to continue, but over increasingly congested highway and rail facilities. Moreover, the future patterns of trade and domestic population growth could create the need for development of new trade corridors.

According to forecasts of international freight flows prepared by WEFA for the FHWA, imports from Europe and South America will show the fastest growth at 4.4 percent between 1998 and 2010, while Asia, Europe and Mexico experience faster growth rates between 2010 and 2020. In terms of exports, Asia and the rest of the world will show the fastest growth (4.2 percent and 4.6 percent, respectively) between 1998 and 2010, while the rest of the world and South America enjoy faster annual growth rates between 2010 and 2020. Figure 6 summarizes WEFA's U.S. foreign trade forecasts by partner region.

East-west trade is expected to continue to be an important element of U.S. trade growth over the next 20 years. This will put continued pressure on highway and rail infrastructure that links ports serving these trading partners with their hinterlands. Figure 7 illustrates the major east-west truck corridors that will be affected by increased international trade.

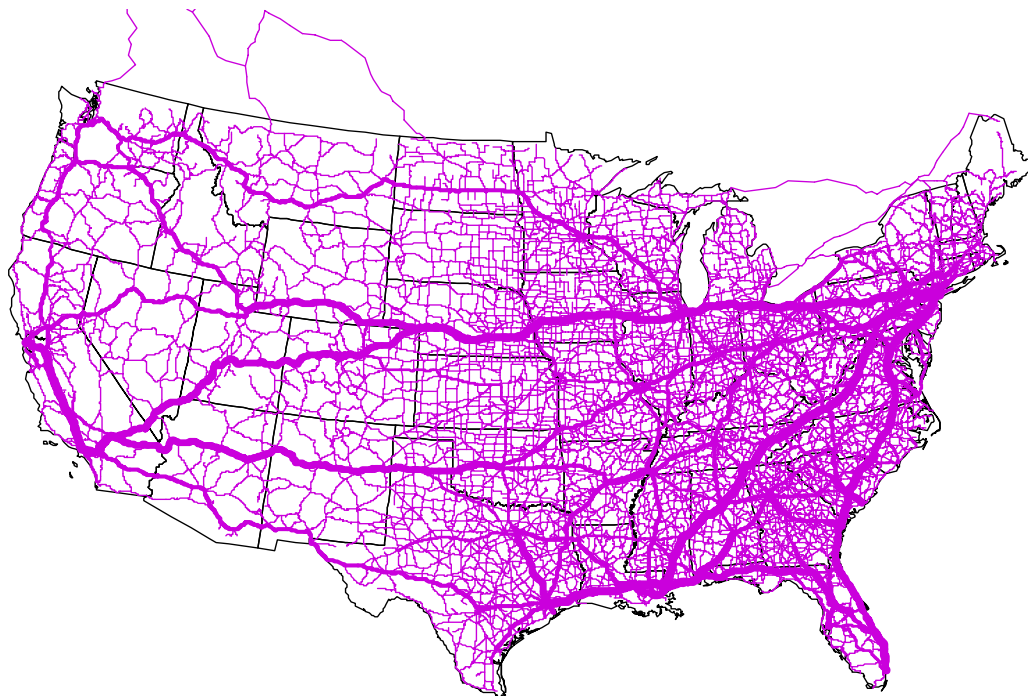
Figures 6 and 7 also show the growing importance of Latin American trade and the dependence on southeastern U.S. ports. These trends will create new pressures on east-west corridors through the Gulf coast states and on north-south links throughout the eastern United States.

Figure 6. U.S. Foreign Trade Forecasts by Partner Region



Source: A forecast of freight transportation within the multi-modal freight analysis framework, WEFA, Inc.

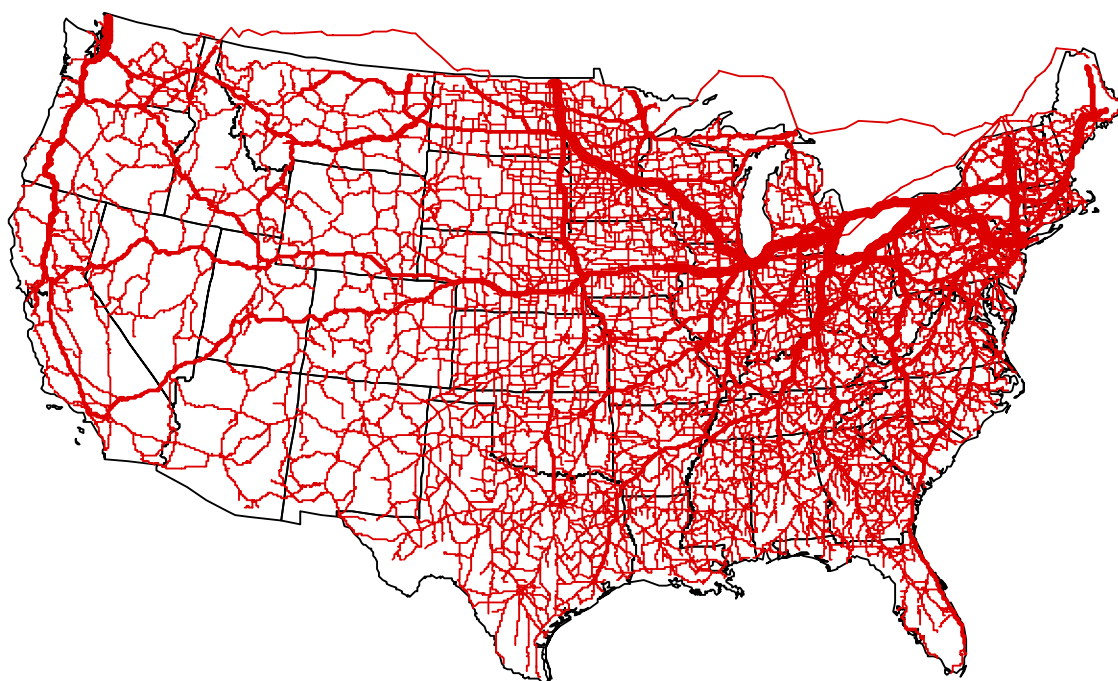
Figure 7. Overseas Inland Trade: Truck Traffic on U.S. Highway Network, 2020 (Tons)



Source: “National Freight Movements: Trends/Issues/Forecasts/Policy Implications,” Office of Freight Management and Operations, U.S. Department of Transport, FHWA.

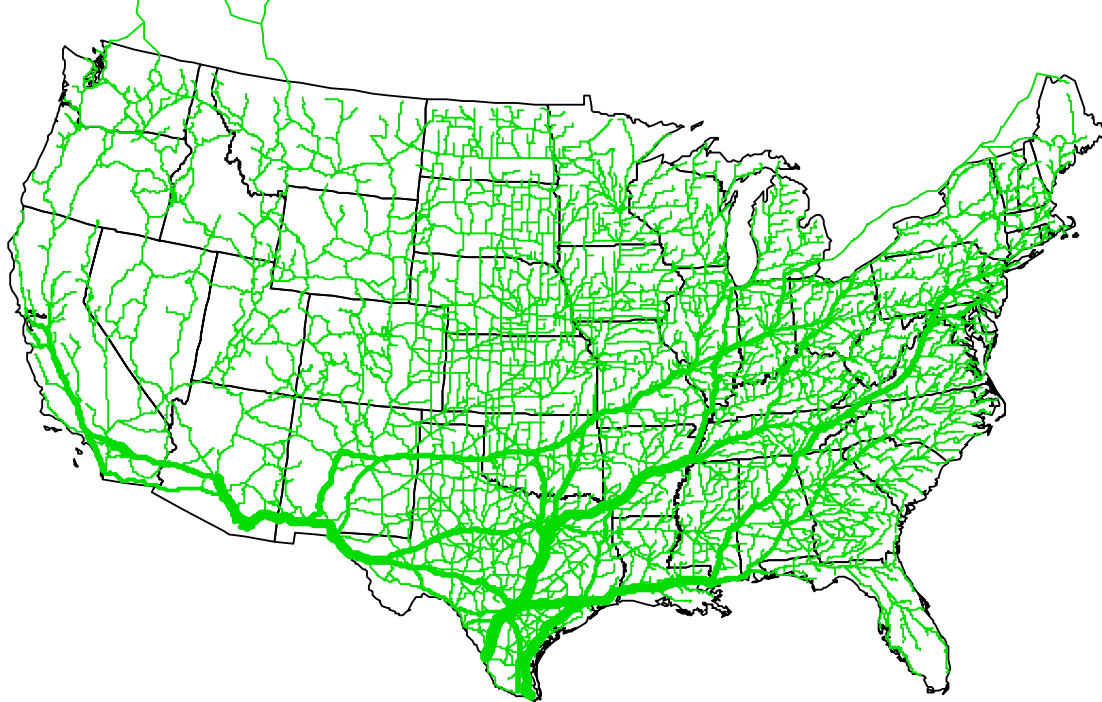
The North American Free Trade Agreement will continue to result in expanded trade with Canada and Mexico. It is also anticipated that most of the future NAFTA highway trade traffic will continue to move along existing U.S. highway corridors that connect major population and manufacturing centers in the United States with major ports of entry (Figures 8 and 9). Historically, U.S. trade with Canada and Mexico has often moved along different highway corridors than those that serve major population centers. As a result, these north-south trade movements have not benefited from the same type of highly developed infrastructure that has supported east-west trade. Increasingly, however, north-south trade will compete with passenger traffic on congested facilities in high growth corridors. Pressures on I-5 in the west (especially through Seattle, Portland, Los Angeles, and San Diego) and I-35 through Texas (San Antonio, Austin, and Dallas) are two examples of this trend. There could also be the need for new north-south or east-west corridors to alleviate NAFTA flows.

**Figure 8. U.S./Canada Truck Traffic on U.S. Highway Network, 2020
(Tons)**



Source: “National Freight Movements: Trends/Issues/Forecasts/Policy Implications,” Office of Freight Management and Operations, U.S. Department of Transport, FHWA.

**Figure 9. U.S./Mexico Truck Traffic on U.S. Highway Network, 2020
(Tons)**



Source: “National Freight Movements: Trends/Issues/Forecasts/Policy Implications,” Office of Freight Management and Operations, U.S. Department of Transport, FHWA.

Internationalization of Transportation Firms

Increased global interdependence of multinational companies has led to greater cooperation and integration among transportation companies. Globalization has affected the freight industry in an obvious manner by bringing growth to overseas operators, and to domestic carriers handling traffic to and from the borders and coasts. The effects are evidenced both by increasing demand for international freight services, and by an environment that stimulates alliances between United States and foreign transportation firms. Carriers traditionally in the domestic market have begun to internationalize, but more slowly and in limited ways.

The U.S. trucking industry has experienced a modest degree of internationalization with a few of the larger firms starting overseas operations. For example, Canadian and U.S. truckers operate on both sides of the border, and extensive alliances have developed between U.S. and Mexican truck lines. Downsides include the constraints imposed by immigration and cabotage laws and the delays and complications associated with border crossing. The bottom line is that trucking is still a domestic business, gradually moving into the NAFTA arena where networks may be enlarged to a degree but not migrating overseas unless drawn there by customers.

Class I railroads are maintaining their roles as domestic wholesalers to steamship lines, continuing international sales efforts but not offering overseas service. Short-line operators, often used to managing portfolios of disconnected properties and taking

advantage of privatization opportunities, have entered foreign markets. However, even in these cases, the companies operate more like multinational alliances than fully integrated international carriers. The NAFTA picture is very different, however, because of the possibility of joined networks. Both the Canadian National (CN) and Canadian Pacific railroads both have had a presence in the United States for many years, chiefly in Border States, and U.S. railroads still maintain a few routes into Canada. CN also expanded its presence in the United States and now provides service to New Orleans. Through the privatization of the state railroad in Mexico, several U.S. Class I carriers now offer a wider range of services within Mexican. While operations tend to be highly uncoordinated and physical connections are limited, network integration is likely to increase.

Ocean shipping is changing as well, as U.S. flag vessels have largely disappeared from international trade. In the past few years, U.S. carriers Lykes and APL, and more recently portions of SeaLand and Crowley, have been acquired by foreign carriers. The separation of SeaLand from CSX, and the spin-off of U.S. distribution services by APL, suggest that synergies between steamship and inland operations are not strong as first suspected. The future model of ocean shipping is still an unanswered question.

Airfreight plays a key role in the competitiveness of most global and industrial businesses. Air carriers have been among the quickest to internationalize, as evidenced by companies like DHL, linking more than 635,000 destinations in more than 220 countries. Still, internationalization of companies and services faces a variety of difficulties. FedEx and UPS invested heavily in information technology to bolster international service through foreign affiliates, after struggling with company-owned operations. Many corners of the world lack the modern roadways to support the rapid pickup and delivery efforts of the air carriers.

Harmonization of Trade and Regulatory Policies

Globalization of the international economy and the freight transportation systems that support it have focused attention on the need to harmonize trade and regulatory policies. At the highest level, the issue of ensuring fair trade practices in an era of greater global interaction is still an evolving element of world trade policy. Assuming continuation of general support for expansion of global trade, much work remains in the area of documentation and customs processing to facilitate rather than hinder trade. In North America, where the highest level of economic integration through trade is likely to be witnessed, a host of regulatory issues remain unresolved after NAFTA. The implications of these issues for freight transportation systems are considerable.

Trade Policy

Global competition in some industries has become fierce and the procedures for regulating this competition in a more integrated global economy are still evolving. Competitive and monopolistic practices are producing the same threat globally that once encouraged domestic regulation. As a result, trade agreements and organizations are developing to ensure fair trading practices and reduce unfair tariffs, regulation, and protectionism. Agreements like the General Agreement on Trade and Tariffs (GATT) and organizations like the World Trade Organization (WTO) are providing greater access to markets for transportation providers. However, concerns about the effectiveness and

intentions of trade agreements and their implementing agencies, as well as anxieties about the practices of international business conglomerates, continue in the United States and abroad. While these tendencies could threaten international freight providers in the future, the actual potential for such actions is remote.

Customs and Tariffs

Barriers to successful international business operations include the complexity of customs regulations, duty payments, and the time required for inspection and clearance of goods. Customs processing seriously slows the transit time that air shippers are paying to speed. Paperwork, inspections, duties, and limited hours of customs service combine to produce cascading delays. Trading blocks such as the European Community and NAFTA are, in part, a response to balancing customs processing with freight productivity.

In addition, the International Trade Commission is simplifying the Harmonized Tariff Schedule of the United States. The result should help shippers, as the vast number of classification errors are due to the complexity of the current code system, which subjects many of these shippers to failed U.S. Customs Service compliance audits.

Cabotage and Vehicle Standards

Implementation of NAFTA trucking provisions has been postponed for U.S.-Mexico trade, keeping Mexican trucks and drivers restricted to a 25-mile commercial zone along the border of the United States. After delivering a load to a final destination point in the United States, a Canadian trailer can legally haul a load en route to Canada, but the Canadian driver cannot pull it. Where cabotage rules have been changed to promote trans-border movements of goods, immigration laws have not. Integration over our borders is not yet realized, and this is creating inefficiencies in service and the cost of shipping.

■ Issues for the Future

Is the United States is to take full advantage of the economic benefits of participating in the global economy, it will need to infrastructure capacity shortfalls. All modes that serve international trade are experiencing growing congestion at key hub facilities. Many suggest that for much of the past 20 years the growth in international trade has been accommodated through growth in modal productivity. But this cannot be the only approach to dealing with future growth. As noted previously, ports are finding it difficult to obtain land for expansion, air traffic systems are already overloaded in many key international airports, on-dock rail and access for double-stack intermodal services needs to be expanded, and the surface access to these facilities for trucking almost always occurs over congested freeways and principal arterials. Border crossing facilities have seen increasing queues as NAFTA trade has expanded and the implementation of pre-authorization systems and electronic credentialing has not kept pace with demand.

Financing gateway and trade corridor freight infrastructure presents its own challenges. Most of the public funding that could be available through TEA-21 is programmed at the state and local level. Freight projects with regional and national significance, but with

local impacts, are often difficult to fund through the current metropolitan planning process. Targeted funding, such as is available through the National Corridor Planning and Development Program and the Coordinated Border Infrastructure Program, has begun to address some of the funding needs of gateway and trade corridor infrastructure. But eligible applications for funding have typically asked for more than ten times the amount of funding that has been available. Additional problems are posed by the fact that many of the facilities are owned and operated by private entities. Creative financing methods are being developed to address the capital needs of these entities but these have seen limited application.

The problem of true harmonization of regulatory practices, trade documentation paperwork, and customs procedures is one that will require considerable attention from the federal government. The increase in trade volumes and the introduction of Internet technology and other advanced communications systems are accelerating the need for paperless transactions among shippers, carriers, brokers, and customs agencies. This change in business at the border must be supported with appropriate harmonized legal structures to protect trade and ensure safe transfer of goods.

A final area of concern is the potential volatility of trade policy. There is no guarantee that the current atmosphere favoring free trade will continue. Historically, trade policies have moved in cycles. If the world economy experiences a significant slowdown, retrenchment may occur with respect to free trade. While some economists argue that the existence of advanced information technologies makes it more difficult for governments to protect their markets and businesses, there are also signs of distrust amongst various parties. Although a return to a more protectionist set of world trade policies could arrive at some point in the future, globalization of the world economy is, by and large, here to stay.