

A Concept for a National Freight Data Program

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With the growth of global markets and international trade, goods travel longer distances than they did 20 years ago. In addition, patterns of goods movement have changed as trade has increased with the Pacific Rim nations and among the North American Free Trade Agreement partners.

Other changes in the business environment—notably the shift from a manufacturing to a service economy, the effects of deregulation, and the advent of freight logistics—also have altered production, distribution, and freight management requirements. The potential for terrorist attacks on the United States via the global transportation logistics network has raised awareness of the need for effective security.

Much of the nation's transportation infrastructure was built to accommodate different patterns of goods movement and passenger travel. As a result, the transportation system today faces challenges in providing the necessary levels of efficiency and reliability in goods movement to ensure international competitiveness for U.S. products and services and to sustain regional and local economies and quality of life.

Because cities are the locations for most major freight nodes—ports, airports, and railheads—and are the origins and destinations for most shipments, freight must compete with passenger traffic for transportation facilities. Limitations of the transportation infrastructure affect the movement of goods and people—for example, road congestion around New York's John F. Kennedy Airport makes access difficult for cars carrying passengers and for trucks carrying freight.

Data for Decision Making

The effectiveness and efficiency of the freight transportation system depend on reliable data to inform a range of decisions at all levels of government and in the private sector. Policy issues affecting freight transportation include

- ◆ Alleviating congestion in suburban and inner-city areas;
- ◆ Developing regulations for safer and more cost-effective approaches to the shipment of hazardous materials; and
- ◆ Enhancing security without impeding the timeliness of goods movements.

The private sector uses freight transportation data to identify underserved and emerging markets, as well as potential improvements in efficiency. Data that help match loads to empty capacity, for example, can allow shippers to increase capacity use at low marginal rates, reducing shipping costs. Because much of the nation's freight transportation infrastructure is privately owned, and private firms carry almost all of the freight, private-sector investments have an important influence on the transportation system as a whole.

Federal agencies and other public- and private-sector entities that monitor or analyze transportation and trade activities on a regional, state, national, or international level collect data on goods movements. These data collections, however, are not coordinated, so that the resulting data sets vary in quality and reliability and provide an incomplete picture of the universe of freight movements.

Difficulties in combining data from diverse sources limit the usefulness of the data sets for freight transportation analyses. The disjointed patchwork of freight data sources not only is costly to generate and maintain but does not provide adequate information for decision makers.

Guiding Data Collection

The pressing need for reliable freight transportation data within the context of the changing U.S. economy and business environment was the subject of a November 2001 conference, Data Needs in the Changing World of Logistics and Freight Transportation, organized by the New York State Department of Transportation (DOT) and the Transportation Research Board (TRB) in Saratoga Springs, New York. Conference participants called for the development of a strategic freight data business plan to guide data collection.

The Bureau of Transportation Statistics (BTS) of the U.S. DOT asked TRB to conduct a study to recommend a framework for the development of national freight data. The framework was to identify

- ◆ Data requirements for the various users of freight data in the public and private sectors; and



TRB Special Report 276, *A Concept for a National Freight Data Program*, is available from TRB (see Publications Order Form in this issue; to view the book online, go to www.TRB.org/publications/sr/sr276.pdf).

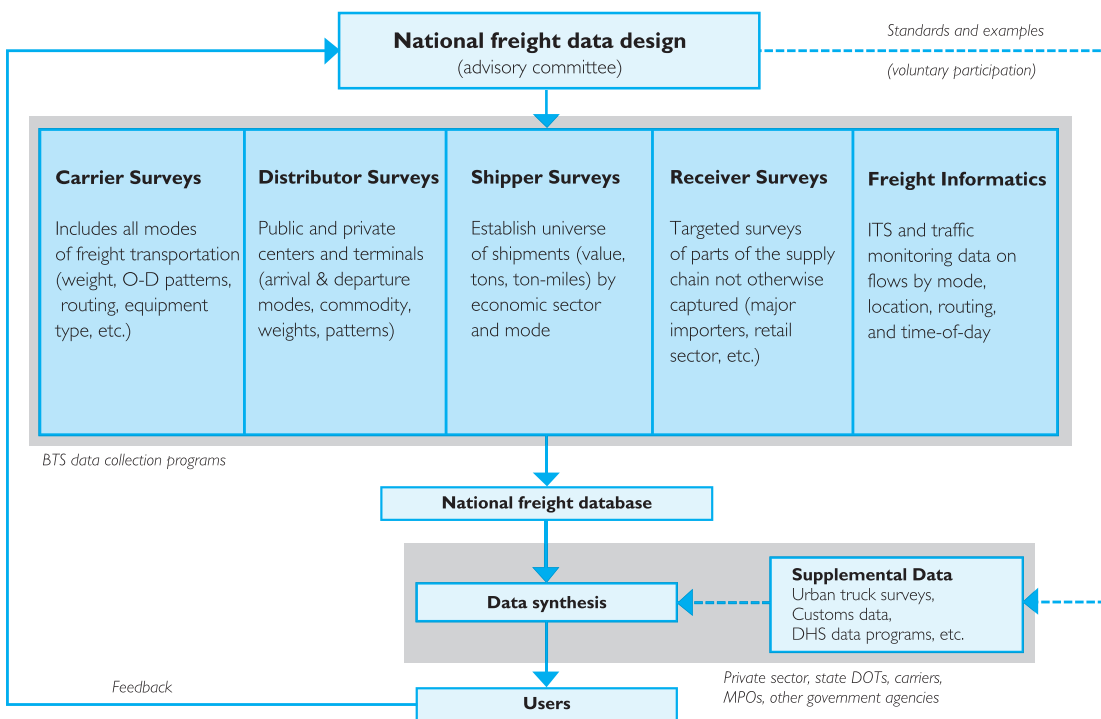


FIGURE 1 Proposed framework of a national freight data program. (O-D = origin–destination; DHS = Department of Homeland Security; MPO = metropolitan planning organization; DOT = department of transportation. Source: Rick Donnelly, PBCConsult, Inc., Albuquerque, New Mexico.)

Committee on Freight Transportation Data: A Framework for Development

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◆ Appropriate roles for federal and state governments and for the private sector in developing and disseminating freight data.

The framework was to be conceptual, not a detailed plan for data collection. The framework would articulate the types of freight data needed by users, as well as the roles of the data providers.

Under the auspices of the National Research Council of the National Academies, TRB convened a 10-member study committee of experts in freight transportation planning and logistics, transportation policy and infrastructure, freight transportation data and modeling, and survey methodology and data collection (see box, above).

Conceptual Framework

TRB Special Report 276, *A Concept for a National Freight Data Program*, presents a framework to guide the development of a national freight database and the related data collection and synthesis activities. This conceptual framework, illustrated schematically in Figure 1, focuses on increasing the links between different data sources and on filling gaps to develop a comprehensive source of timely and reliable data on freight flows.

An advisory committee would oversee the design and implementation of a multifaceted data collection program. The data to populate a national freight database would come from an integrated program of

freight surveys and from a freight informatics initiative that gathers data from electronic data streams—for example, from intelligent transportation systems (ITS) and electronic data interchange.

Data from other sources—such as urban truck surveys—and synthesized data would be supplementary. The resulting databases would be available to the user community, which would provide comments and feedback to inform development of the framework.

The national freight database aims to fulfill the major needs of a variety of users by capturing the important characteristics of freight movements: shipment origin and destination; commodity characteristics, weight, and value; modes of shipment; routing and time of day; and vehicle or vessel type and configuration. Many of these are already available from different sources, but combining the data is a challenge.

Some gaps are difficult to fill except through data synthesis. The most significant gap in modal coverage is in motor carrier flows—a growth area that has not yet been covered well in data collection. Data sets also sparsely cover routing and time of day, which are important for assessing congestion mitigation strategies, for evaluating system capacity, and for ensuring the security of shipments.

Generating Benefits

In assembling a comprehensive picture of the flow of freight, a national freight data framework can present opportunities to enhance the security of goods movement by identifying vulnerabilities. For example, data on routing and time of day for bulk shipments of hazardous materials could be used to identify high-risk scenarios and to initiate appropriate security measures. In the longer term, an improved understanding of normal freight flows would serve as a baseline for identifying anomalies that indicate possible terrorist activity.

The improvements to freight data from the framework approach also could increase the international competitiveness of U.S. products and services by indicating more effective ways to use the nation's transportation system. In addition, the data could help sustain the strengths of regional and local economies and stimulate development through informed decisions that account for freight transportation needs and opportunities.

Although many of the issues in freight transportation are well known, comprehensive high-quality data may be useful in pinpointing underlying causes and in prioritizing policy and investment decisions. The data also may enable research aimed at solving freight transportation problems.



Federal Leadership

No single organization has the resources and expertise to develop and implement a national freight data framework. The interest and cooperation of a range of public- and private-sector organizations will be essential to the success of the framework initiative.

Strong leadership will be needed to coordinate the data collection by diverse entities within the context of an overall strategy. The federal government is uniquely positioned to provide this proactive leadership, because the proposed framework will have a nationwide application; because some of the public benefits are diffuse; and because a systemwide approach is necessary, involving all levels of government and the private sector.

Program Implementation

The report's recommendations offer specific guidance to the U.S. DOT and BTS on the initial organizational and technical steps to implement a national freight data program.

Advisory Committee

A freight data advisory committee of stakeholders and experts would play a key role in guiding program development and implementation. The advisory committee should reflect the spectrum of freight data users and providers and should include representatives of federal, state, and local jurisdictions, as well as a range of private-sector stakeholders.

The private-sector group should include consulting companies, representatives of different modes of transportation (air, marine, pipelines, railroads, and trucking), shippers and receivers, third-party logistics companies, and academic researchers. The committee

also should include an expert in defense logistics, because national defense activities—such as those of the U.S. Army's Surface Deployment and Distribution Command—could benefit from improved freight flow data.

Low-Cost Data

Large amounts of data are required, and some of the information that decision makers need has not been collected before in the United States. Because the costs of surveys are relatively high, implementation of the framework must take advantage of nonsurvey data streams. Low-cost, passive data collection appears promising. For example, ITS roadway surveillance data, generated continuously and in detail for real-time control strategies, also could be used to monitor congestion and to plan intermodal facilities.

Confidentiality

The confidentiality of individual firms must be protected, to avoid a potentially fatal flaw in the framework. Data providers will not participate in framework activities if they perceive any risk of competitors gaining access to commercially confidential information. In encouraging private-sector participation, U.S. DOT and BTS will need to recognize that much of the proprietary data collected for legitimate business planning and investment cannot be converted readily to public-use data.

Continuity

The proposed national freight data program will require a sustained effort and funding over many years and will involve many technical and organizational challenges. Therefore, some form of institutional structure, such as a program office, will be needed to coordinate activities, support the freight data advisory committee, and provide a focal point for the framework initiative.

A program office also would facilitate continuous feedback and refinement of the framework, identifying data collection opportunities, encouraging related research investigations, and ensuring the sustainability of data collection to expand and update the national freight database.

The focus of program activities is likely to shift over time from feasibility studies and concept development to the updating and maintenance that ensure long-term viability. The institutional program structure will need to be flexible to accommodate this evolution.

The author, Senior Program Officer in TRB's Division of Studies and Information Services, served as Study Director for this project.