

Data for Decisions

Requirements for National Transportation Policy Making

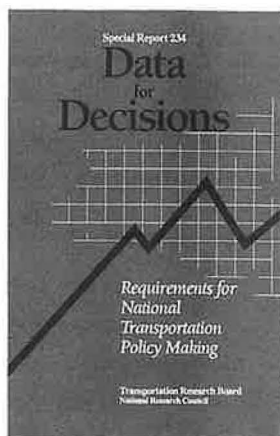
NAN HUMPHREY

Data provide critical input for informed decision making, but they rarely have a champion. Because they are viewed as support for other essential activities, data are often not accorded high visibility or priority in budget allocations (Figure 1). Transportation data are no exception.

When then U.S. Department of Transportation Secretary Samuel K. Skinner launched a strategic planning process in 1989 to assess the future direction of transportation activities, significant deficiencies in the data needed to characterize the use and performance of the nation's transportation system were found. This finding prompted the department to request an independent study by the Transportation Research Board of the data requirements necessary for national transportation policy making and the institutional changes needed within DOT to ensure a permanent data support capability.

The National Research Council convened a special TRB committee of 14 experts on transportation policy, data management, statistics, and information technology, representing a wide range of public and private providers and users of transportation data, to conduct the study. Under the leadership of Lillian C. Liburdi, Director of the Port Department of the Port Authority of New York and New Jersey, the committee reached consensus on the need for transportation data that are better structured to provide input about the strategic policy choices facing the department today, defined the elements of a data system to

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Special Report 234—Data for Decisions: Requirements for National Transportation Policy Making (price \$21.00), is available from the Transportation Research Board (telephone 202-334-3213 or 3214, fax 202-334-2519).

support national transportation policy making, and recommended changes in the organization of data activities at DOT to accomplish these objectives.

Role of Data in the Policy Process

The Secretary of the U.S. DOT has a broad mandate to develop and coordinate transportation policies and programs that provide for the safe and efficient movement of goods and people, support economic growth, serve the national defense, provide for the general welfare, and contribute to such other national goals as resource conservation. Most of the major modes of transportation—highways, rail, public transit, air, water, pipeline, and even emerging modes such as commercial space transport—are represented under the DOT umbrella. The department, however,

evolved as a decentralized, modally oriented group of operating administrations, reflecting the modal structure of DOT at its founding, the modal orientation of the transportation regulatory process, the initial focus of the department on the construction and expansion of the major modal transportation networks, and, not least, the modal orientation of the congressional committees that oversee the department's programs.

Globalization of the economy and deregulation of the major transportation industries have dramatically changed the context in which the department operates today. Passenger and freight travel are becoming increasingly intermodal as travelers and shippers search for the safest, most efficient, and reliable combination of transport modes. Strategic issues revolve around how well the U.S. transportation system performs and the modes interact to contribute to economic growth and competitiveness in world markets and the safety and mobility of personal travel. Transportation policies are also being shaped by other national objectives: environmental quality, energy efficiency, and national security, making it important to understand how transportation contributes to or detracts from these other national goals.

The data programs of the department have not kept pace with this changing policy environment. Crosscutting data programs, which involve multiple modes and provide basic information about the use of the system, such as national surveys of passenger and freight movements, were curtailed or eliminated during the 1980s. The

data programs of the operating administrations, which constitute the majority of the department's statistical programs, serve diverse purposes and, hence, lack a common policy focus. Moreover, definitions and key variables differ, making it virtually impossible to compare individual modes and evaluate systemwide performance. National assessments of the status of the transportation system are conducted sporadically; the recent strategic plan was the first comprehensive look at the entire system since 1979. Finally, in contrast to many other federal agencies, the department lacks a permanent entity whose responsibility it is to ensure that the data and analyses to inform decision makers on national policy issues are made available on a consistent, reliable, and continuing basis.

Deficiencies in the availability, coverage, and quality of data for national transportation policy making hamper the ability of the secretary to analyze and address fundamental questions that affect a wide range of regulatory and investment policies, such as the following:

- How well is the transportation system currently performing?
- Where are the critical problems?
- Who and what are most affected?
- How are changes in demographics, lifestyles, economic conditions, and busi-

ness activity likely to affect future demand for transportation services?

- How will these anticipated changes affect the overall safety, cost, efficiency, and quality of transport and such other national objectives as environmental quality and energy self-sufficiency?

Providing an improved data capability to address these issues, even if all the information could be gathered, will not provide answers to all of these questions or guarantee better policies. In fact, more data may lengthen and increase the complexity of the decision process, but without good data, decisions will be arbitrary, options overlooked, and solutions reactive.

Data Requirements

To provide the data needed for national decision making, the committee recommended that DOT establish a national transportation performance monitoring system (NTPMS) to track key indicators of the nation's transportation system and its environment. The system should be organized from the perspective of markets and users instead of individual transportation modes. NTPMS would provide (a) trend data for monitoring the impacts of past policies, (b) an early alert of transportation

system problems and opportunities, and (c) a framework for more in-depth analyses of policy options and programmatic responses.

The source data for NTPMS should be organized according to the major attributes of the transportation system, which fall into four broad categories (see Figure 2):

1. Supply and
2. Demand, which include basic information about the extent and capacity of the transportation system, activity levels and flows of passengers and freight, and characteristics of users;
3. Performance, which includes information on the value of the system to users, including its safety; accessibility; level, efficiency, and quality of service; and cost; and
4. Impacts, by which the contributions of the system to other national goals, such as economic growth, national security, environmental quality, and energy conservation, are measured.

Data alone, however, are inadequate. Analysis provides the means through which data are translated into useful information. Special studies to analyze key explanatory factors underlying trends, analytic models (e.g., for forecasting travel demand), and analytic tools, such as geographic information systems (GIS), which allow graphic display and analysis of spatially oriented modal data to enhance intermodal comparisons, must also be part of NTPMS.

Finally, the principal findings of NTPMS should be summarized in a congressionally mandated biennial report on the state of the nation's transportation system. This report would provide a regular assessment of the status of the transportation system, drawing on benchmark data from selected performance indicators organized by transportation markets.

Obtaining the data required for NTPMS would not involve supplanting existing modal data programs or amassing the detailed information on individuals and firms needed for economic regulation. Instead, it would draw on existing data or initiate data gathering that would complement existing data.

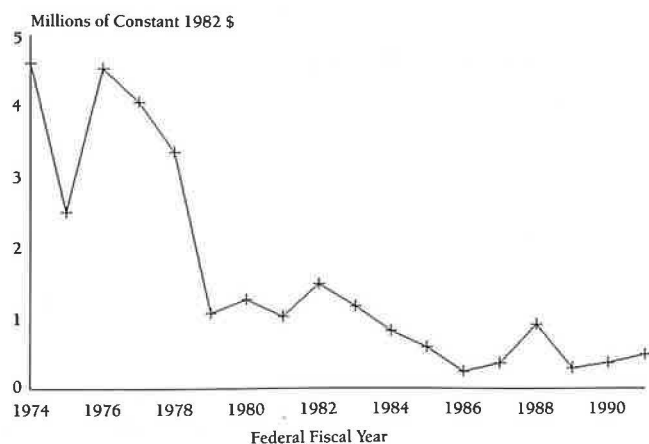


FIGURE 1 U.S. DOT funding of multimodal data programs during the 1980s has fallen prey to budgetary cutbacks.

Meeting Data Requirements

Developing the data for NTPMS requires (a) collecting missing multimodal data and (b) linking extensive existing transportation data programs and supplementing them to improve data comparability for systemwide analysis.

The biggest current data gap from a multimodal perspective is passenger and freight flow data. These data not only provide basic system information on who and what is moving, by what mode, and from what origin to what destination, they are also critical input to other key system indicators of interest.

Improving the comparability of existing data for analysis of system performance and impacts will require a long-term cooperative effort with existing data providers. Data on performance of the transportation system—the level of safety it offers, the extent of access it provides, and the service it delivers—are available for some modes. However, the coverage and comparability of these data are inadequate for making comparisons among the modes or drawing conclusions about the system as a whole. Specific improvements needed in these data are described in the report.

Gathering data on how the transportation system affects other national policy objectives will require joint action with other federal agencies and, in some cases, other levels of government. Priority areas are those for which DOT has primary responsibility: measures for calculating the contribution of the transportation sector to economic growth, use and condition of transportation networks essential to meeting national security needs, impacts of transportation activity—vehicle emissions, wetlands intrusion, noise, oil spills—on environmental quality, and measures of energy efficiency to calculate the impact of the transportation sector on national energy dependency and global warming. In several of these areas, more research is required to identify the appropriate data to measure and collect.

The private sector has become an increasingly important source of transportation data with the decline in economic regulatory reporting requirements. Oppor-

tunities for using data that are gathered by the private sector, or collaborating with the private sector in data-collection efforts, as alternatives to new data collection programs are examined in the report.

Advances in data-gathering and information-processing technologies have the potential to reduce costs and reporting burdens while improving the speed and reliability of data collection and analysis. Opportunities for applying new information systems technologies in the development of NTPMS by using automated surveying methods, linking records electronically (electronic data interchange), monitoring vehicles and traffic automatically (intelligent vehicle-highway system technologies), and integrating data into GIS for analysis are also examined.

Organizational Issues

Development of the data and analytic capability to support informed decision making on policies that are national in significance and systemwide in focus requires a fundamental change in the current organization of data activities at DOT. The committee recommended that the department establish a permanent institutional structure—a transportation data center (TDC)—to assume responsibility for the compilation and integration of systemwide transportation data and provide a key link among the op-

erating administrations, other federal agencies and levels of government, and the private sector to ensure that these data are made available on a consistent, reliable, and continuing basis. Specifically, TDC would be responsible for developing NTPMS, managing the department's multimodal surveys, and preparing the biennial state of the system report.

Many federal agencies have developed and sustained broad data programs to support agency mission objectives by establishing central statistical offices, such as the National Center for Education Statistics, the National Center for Health Statistics, and the Energy Information Administration. The committee recommended that TDC be modeled on the best elements of other federal statistical agencies, functioning as a separate office with a permanent staff and separate budget, commanding a strong measure of independence within the agency to ensure the impartiality and credibility of data products, and being committed to high professional standards.

Like many other federal statistical agencies, TDC would limit its new data-collection activities to broad data, such as the multimodal passenger and commodity flow surveys. Collection of data for operating and administrative purposes and mode-specific data acquisition should remain with the relevant operating administrations.

The specific functions of TDC should include

Committee Recommendations

- Immediate establishment of a transportation data center (TDC) within the U.S. Department of Transportation, preferably by legislative mandate, to provide a focal point for the compilation and integration of systemwide transportation data;
- Development of a national transportation performance monitoring system (NTPMS) by TDC to track key indicators of the nation's transportation system and its environment from the viewpoint of markets and users;
- Preparation of a biennial report by TDC on the state of the nation's transportation system, containing a summary and analysis of trends in system performance and impacts; and
- Annual funding of \$20 million initially to support a qualified director, full-time professional staff, and start-up for the activities of TDC, including national surveys of passenger and freight flows; and sustained long-term funding to ensure continuity of data for monitoring and policy analysis.

- Identification of the data needed to develop NTPMS;
- Data compilation, including electronically accessing summary data from existing modal data bases, supplementing modal data to improve comparability where necessary, and acquiring multimodal data (e.g., national surveys of passenger and freight flows);
- Standard setting to improve the quality, consistency, and comparability of source data and quality assurance of its own data products;
- Synthesis and interpretation of the data in a form useful for policy analysis; and
- Dissemination of the data to the secretary, Congress, and the transportation user community.

Coordination and cooperation with numerous existing organizations are essential to the success of TDC. For example, development of NTPMS will require close cooperation with the operating administrations to improve the linkage among existing modal data programs. Links also need to be forged outside DOT. For example, the Bureau of the Census could assist with such activities as developing a TDC policy on confidentiality and data access, designing a user outreach and data-dissemination program, and jointly sponsoring data-collection programs. Finally, the private sector could help TDC define data requirements from a user perspective and become involved in collaborative data-gathering efforts. In turn, TDC could provide support for many of these groups. With a permanent central data institution in place, the department should be better able to articulate deficiencies in transportation statistics and help build the case for obtaining the necessary resources to improve them.

Next Steps

A major recommendation of the committee—that DOT establish a permanent data center—was mandated with passage of the Intermodal Surface Transportation Efficiency Act of 1991. The act authorized creation of a Bureau of Transportation Statistics

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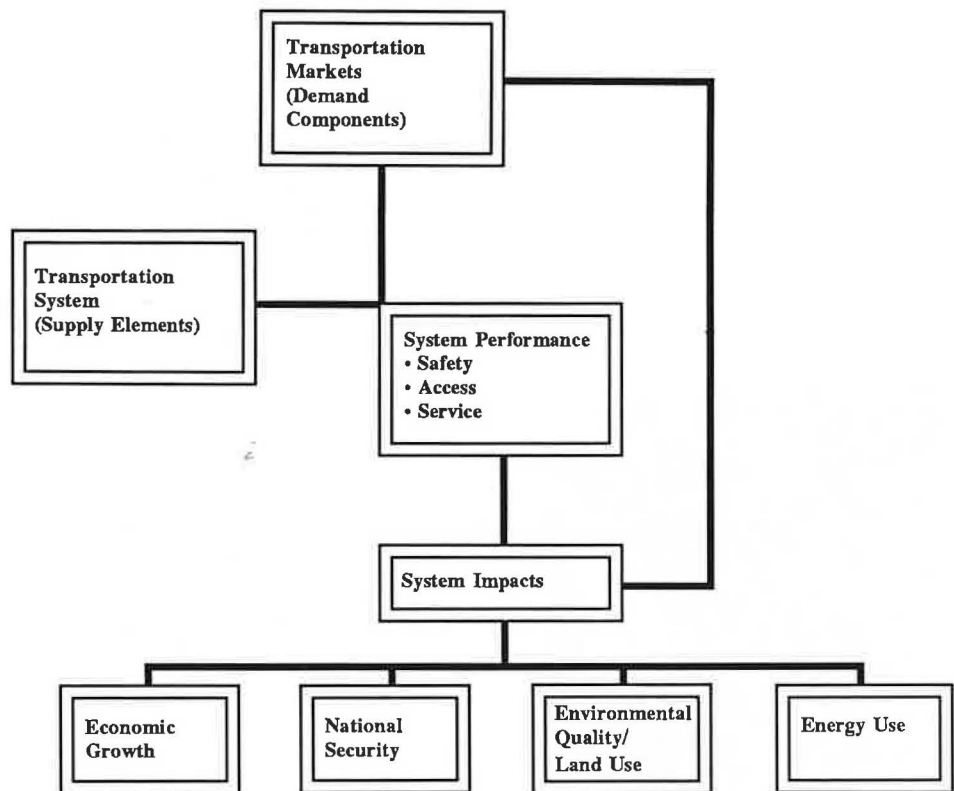


FIGURE 2 Structure of data system to support strategic transportation decision making.

Committee for the Study of Strategic Transportation Data Needs

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deed, changes can be expected in the structure of the activity system that gives rise to travel, allowing IVHS systems to operate even more effectively (7).

This also has enormous implications for land-use and settlement patterns. Controlling congestion means preserving the operational integrity of the publicly financed transportation system in order to preserve our individual private investment in metropolitan and rural lifestyles.

Unanticipated benefits from the new transportation information infrastructure are indeed likely, just as paving roads in the 1920s got us out of the mud and changed the face of prewar America, and just as the limited access highway allowed us to control access onto highway links and not throw away our highway capacity by allowing traffic friction from abutters. Now we anticipate that travelers will control their access onto and within the system so that we do not, for example, replace moving traffic with stopped traffic.

Smart choices made by informed travelers exercising freedom of choice is the goal. The time is right to make smart choices in exercising new technological options to improve the transportation system and the environment.

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allowing only vehicles that meet the occupancy requirements to use the facilities. Further, exploring methods to maximize the use of HOV lanes, through expanded use of supporting facilities, services, and programs, would be beneficial. Use of IVHS and other advanced technologies can assist in these efforts and enhance the operation of all types of HOV facilities. In addition, transportation professionals in all parts of the world would benefit from greater information sharing and the exchange of ideas and experiences with HOV facilities.

Transportation professionals and policy makers face a challenging time in attempting to address traffic congestion, air quality, and mobility issues. Creative and innovative approaches will be needed to meet the increasing demands being placed on the nation's transportation systems. HOV facilities, especially when implemented with supporting facilities, policies, programs, and advanced technologies, offer a promising approach for many areas.

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within DOT, to be headed by a director reporting directly to the secretary and funded from a \$90 million authorization over a six-year period. The director of the bureau is charged with the responsibility of "establishing and implementing, in cooperation with the modal administrators, the States, and other Federal officials, a comprehensive, long-term program for the collection and analysis of data relating to the

performance of the national transportation system" [Section 6006, 111(c)(2)].

The leadership of DOT has already taken steps to improve its data capabilities through the formation of two data committees to coordinate both the internal and interagency collection of data, preliminary funding of national surveys of passenger and freight movements that have not been conducted in more than a decade, and creation of a new Office of Strategic Planning to help define the long-term strategic issues and policy questions facing the department. DOT has an opportunity to build on these initiatives to create and sustain an institution dedicated to developing the knowledge base to inform policy makers about the strategic choices that will shape the transportation system of the future. The report provides a blueprint for carrying out this objective.

Corrections

In the 71st TRB Annual Meeting Highlights section of *TR News* 159, a participant was inadvertently misidentified in the photograph below. The correct identity of the person pictured is John E. Steward, U.S. Department of Agriculture Forest Service, who made a presentation at the session on Assessing Worldwide Low-Volume Roads: Problems, Needs, and Impacts.



John E. Steward, USDA Forest Service.

In the caption for another photograph in the same article, there was a typographical error in the name of Donn E. Hancher. We apologize for these errors.