

Measuring Personal Travel and Goods Movement

A Review of the Bureau of Transportation Statistics' Surveys

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In the late 1980s, a strategic planning initiative concluded that the transportation data available to the U.S. Department of Transportation (DOT) had major gaps and deficiencies for policy making. The report to the Office of the Secretary noted that the data did not readily support cross-modal, systemwide analyses; that definitions and quality standards varied; and that nationwide data on household travel and on the shipment of goods across modes were out of date (1–2).

The 1991 Intermodal Surface Transportation Efficiency Act established the Bureau of Transportation Statistics (BTS) within U.S. DOT, as a focal point for

the activities necessary to provide high-quality, systemwide transportation data for policy making, planning, and research. The purpose of BTS was to bring greater coordination and comparability to transportation data, to improve quality standards, and to fill gaps in the data.

The Transportation Equity Act for the 21st Century (TEA-21) authorized BTS at an annual funding level of \$31 million for 1998 through 2003. In 2001, with reauthorization of TEA-21 impending, BTS asked the National Academies to review the agency's current survey programs in light of (a) transportation data needs for policy planning and research and (b)

PHOTO: PORT OF LOS ANGELES



The Commodity Flow Survey, conducted by the Bureau of Transportation Statistics and the Census Bureau, is the only federal government data source for comprehensive information on freight flows—an essential tool for public- and private-sector decision makers. (Above, multimodal terminal in Port of Los Angeles.)

the characteristics and functions of an effective statistical agency. In response, the Transportation Research Board and the Committee on National Statistics of the National Academies established a 12-member study committee with expertise in transportation policy and planning, transportation data, and survey methods and statistics (see box, page 31).

The committee reviewed BTS's three major surveys—the National Household Travel Survey (NHTS), the Commodity Flow Survey (CFS), and the Omnibus Survey Program—and issued a letter report on each, providing guidance on approaches for improving future versions. The committee's final report, published as *TRB Special Report 277: Measuring Personal Travel and Goods Movement: A Review of the Bureau of Transportation Statistics' Surveys*, addresses major themes identified in the reviews of the surveys and offers crosscutting guidance on the BTS portfolio of transportation surveys.

Flagship Surveys

BTS's statistics support transportation decision making by all levels of government and by transportation-related associations, private businesses, and consumers. Many of these statistics derive from the agency's flagship surveys—the NHTS and the CFS. These major, multiyear survey programs, with budgets of \$10 million to \$15 million, serve a broad constituency of organizations and individuals interested in transportation and provide essential data that are not available from other sources.

NHTS

The NHTS is a personal travel survey conducted by BTS, the Federal Highway Administration, and their contractors. Aside from the information on journey-to-work trips reported in the Decennial Census and the American Community Survey, the NHTS is the only national source of information on the typical travel of U.S. residents. The survey provides data on the type and amount of travel; the use of various modes; the time and miles spent traveling for various purposes; ownership and use of the vehicle fleet; and relationships among household composition, life stage, and travel.

The 2001 NHTS data were collected by telephone interviews in two stages. A recruitment interview obtained demographic information and rosters of household members and vehicles. Map and diary packages then were mailed to recruited households to keep track of their travel. The subsequent data-gathering interview obtained information on household travel on a preassigned travel day, as well as on longer-distance travel over a 28-day period.

CFS

The CFS provides information on the flow of goods by mode of transport within the United States. The survey, conducted by BTS and the Census Bureau, gathers data on shipments of goods from a sample of business establishments in selected industries—mining, manufacturing, wholesale trade, and some retail establishments.

Data are provided on tons, miles, ton-miles, value, shipment distance, commodity, and weight. The survey covers all major modes of freight transportation—air, motor carrier, rail, water, and pipeline, as well as intermodal combinations. Despite gaps in shipment and industry coverage, the CFS is the only federal government data source that recognizes the need for comprehensive information on freight flows.

The CFS has been conducted three times—in 1993, 1997, and 2002. For all three editions, data were collected by mail. Survey questionnaires were sent to a sample of establishments drawn from the Census Bureau's Business Register. Respondents reported total outbound shipments and information about the value, weight, commodity, domestic destination or port of exit, and mode or modes of transport for a sample.

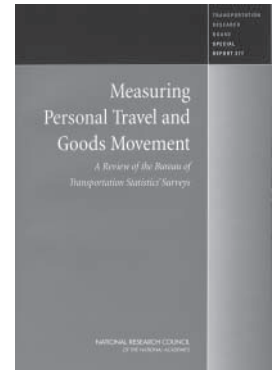
The flagship surveys are essential to BTS's mission of providing statistical information to support transportation decision making. Therefore, the committee's analyses and recommendations focused on opportunities for BTS to improve the two major surveys.

Responding to Users' Needs

To develop cost-effective, high-quality surveys that are responsive to the needs of data users, BTS must communicate effectively with its customers. With a better understanding of the types of questions and analytical problems that users address, BTS could increase the relevance of the data products. Moreover, a dialogue about the agency's development and design of the surveys would allow users to suggest improvements in data concepts, methods, and products.

In general, however, BTS's outreach activities for communicating with users of its personal travel and freight surveys have been sporadic. Some initiatives, such as the 1999 conference on the then-proposed NHTS, have been valuable in facilitating discussions of specific issues.¹ Nevertheless, the agency does not have a rigorous, systematic strategy for interacting regularly with its customers.

¹ The 1999 conference, *Personal Travel: The Long and Short of It*, addressed issues associated with merging the Nationwide Personal Transportation Survey and the American Travel Survey to form the NHTS. Papers from the conference are available on the web in TRB Transportation Research Circular E-C026, <http://gulliver.trb.org/publications/circulars/ec026/ec026.pdf>



TRB Special Report 277, *Measuring Personal Travel and Goods Movement: A Review of the Bureau of Transportation Statistics' Surveys*, is available from TRB. View the book online, www.TRB.org/publications/sr/sr277.pdf.



The National Household Travel Survey focuses on the typical travel of U.S. residents, including type and amount of travel and use of various modes. (Above, Metrorail station in Alexandria, Virginia, is a personal travel nexus of light rail, buses, automobiles, cycles, and pedestrians.)

BTS's efforts to develop the flagship surveys are complicated by a lack of clearly defined survey objectives. For example, the development of a cost-effective sampling design for the CFS requires a decision about whether the survey should provide data on state-to-state flows in addition to national flows. For transportation surveys in general, parameters such as sample size must be determined on a rational, statistical basis that reflects user requirements for reliable data at specified levels of geographic detail.

Without clear objectives, the statistical foundation to inform the quality, quantity, and cost trade-offs in the survey design is lacking, and the survey scope may be ambiguous. As a result, the available resources may not be used effectively to meet the needs of data users.

Institutional Issues

From a user's perspective, stability is important for the NHTS and the CFS. Users rely on the regular, periodic release of the data products, and expect that the quality and content at the least will match those of preceding surveys. Nonetheless, variations in budgets, along with changes in survey ownership, have threatened to undermine the stability and quality of the flagship personal travel and freight surveys.

Budget variations have led to irregularity in survey frequency and to reductions in sample size. Irregular

frequency limits the ability to measure trends, and the reduced sample is likely to have adverse effects on the usability of the data.

Both flagship surveys now are funded and conducted by BTS in conjunction with survey partners.² BTS depends on the institutional memory of these partners to provide continuity and to build on experience with previous surveys.

Ensuring the stability and quality of major national surveys such as the NHTS and the CFS requires long-term planning and technical development, as well as a clear and timely commitment by the survey partners to provide the necessary funding. Considering the importance of the flagship surveys to a range of data users, the committee believes that measures are necessary to prevent a repeat of what happened in 2002, when delays in funding eliminated most opportunities to improve the CFS and almost resulted in cancellation.

The purpose of BTS's portfolio of survey programs is to provide transportation data products that meet customer needs, are relevant to policy and investment decisions affecting transportation, and are appropriate to a federal statistical agency. The development of the CFS and the NHTS should be guided not only by statistical considerations but also by a broad understanding of the nation's transportation system and by a sensitivity to related policy issues.

The reviews of the survey programs led the committee to conclude that BTS lacks the balance of expertise to guide the development of data products for informing transportation decision making. A better understanding of transportation issues could have produced a better survey design and better implementation decisions. For example, the reduced budget for the 2002 CFS led to halving the sample size to 50,000. More informed insights into the uses of freight flow data and into the need for reliable data at specific levels of geographic detail could have highlighted the importance of seeking additional funds or investigating creative ways to maintain the sample size at the 1997 level.

Survey Methods

The continuing provision of useful, high-quality survey products requires researching and implementing more effective survey methods. Because of social and technological changes, survey methods that yielded good data 15 or 20 years ago may no longer yield satisfactory results.

² The NHTS is funded by BTS, the Federal Highway Administration (FHWA), and the National Highway Traffic Safety Administration, and is conducted by BTS, FHWA, and their contractors. The CFS is funded and conducted by BTS and the Census Bureau.

For example, with consumers deflecting telemarketing calls and with the number of cell-phone-only households growing, the effectiveness of many telephone surveys is reduced. The 41 percent response rate for the 2001 NHTS raises concern because of the potential for significant nonresponse bias in the results.

At the same time, technical developments may offer opportunities for more cost-effective data collection—an important benefit as BTS seeks to fulfill users' data needs despite the pressures on survey budgets. For example, the 2002 CFS data were collected by mail, but the Census Bureau investigated electronic reporting as part of the 2002 Economic Census and plans to provide the option of a web-based questionnaire for the 2007 CFS. This approach can reduce data entry costs, as well as improve data quality through automated editing, which assists respondents in completing the questionnaire.

As a relatively new statistical agency, BTS does not have a tradition of research into survey methods. Nonetheless, many of the methodological issues the agency faces in developing the NHTS and the CFS are common for surveys, and much of the extensive technical literature on survey methodology is pertinent. By leveraging findings on survey methods, BTS can focus its limited research budget on solving particular survey problems and investigating topics specific to transportation surveys.

According to the committee, improvements in the effectiveness of BTS's survey methods could enhance the quality and usefulness of the data products in five main topic areas:

- ◆ Response rates for household travel surveys,
- ◆ Data collection,
- ◆ Sample design,
- ◆ Questionnaire development and testing, and
- ◆ Data dissemination.

Recommendations

Recommendations 1 through 7 identify actions BTS could take to make the flagship surveys more effective in meeting the needs of a wide range of data users.

1. BTS should continue to conduct and enhance the NHTS and the CFS, its flagship surveys on personal travel and goods movement in the United States.

2. BTS, together with its CFS and NHTS partners, should establish a formal process for (a) eliciting and responding to the needs of the community of data users on a regular basis and (b) consulting these users about key decisions affecting future surveys.

3. BTS should use clear and explicit survey objectives (e.g., scope and scale), developed in conjunc-

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tion with its survey partners and users, to inform the design and implementation of future editions of the NHTS and the CFS.

4. BTS should establish institutional procedures and long-term financial plans that help ensure the stability and quality of its flagship personal travel and freight surveys.

5. BTS should work with its survey partners to establish a clear understanding of respective roles and to define clear lines of organization and management.

6. BTS should enhance and maintain the transportation expertise of its staff to achieve a balance between statistical and transportation knowledge.

7. BTS should address technical problems associated with its major surveys by making those problems a focus of its applied research program.

References

1. *Special Report 234: Data for Decisions: Requirements for National Transportation Policy Making*. TRB, National Research Council, Washington, D.C., 1992.
2. Citro, C. F., and J. L. Norwood (eds.). *The Bureau of Transportation Statistics: Priorities for the Future*. National Research Council, Washington, D.C., 1997.

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