CRITICAL DATA ISSUES and Opportunities in Transportation

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Most of the critical issues in transportation as identified by the Transportation Research Board have corollary issues of data collection, dissemination, and use. Many of the forces behind the critical transportation issues also affect the quality and quantity of data needed to understand and ameliorate those issues.

These forces include deregulation, public finance, and information technology.

Deregulation has radically changed both data needs and resources for the transportation community. Many data-collection programs of public agencies have been thrown out with the regulatory bathwater on the assumption that the need for such data no longer exists. Yet carriers, shippers, brokers, and individuals need more—not fewer—cost and other data to cope with the increased diversity and competition in for-hire transportation.

Public agencies also continue to have interest in basic data since deregulation. Residual public responsibility has remained, and continued data collection is needed for continued monitoring of the deregulated sector. If data on an industry are collected only when it is regulated, then, by definition, the decision to regulate will always be made in ignorance. Obviously, specific types of data requirements have changed, but not the need for publicly available data.

Data resources for the transportation community have also suffered from the increased pressure on public finance. Increasing costs of data collection and declining or stagnant budgets for federal statistical activities have contributed to reductions in coverage, reliability, and utility of many surveys. Some activities such as the National Travel Survey have been cut completely.

A major objective of the TRB Committee on Transportation Data and Information Systems is to explore the cross-cutting issues of determining data needs and collecting, processing, and disseminating data that affect the entire transportation community.

The increasing costs of data collection are being countered in part by the current explosion in information technology, which is in turn increasing the demand for more and better transportation data. The popularity and affordability of microcomputers, turnkey computer graphics systems, and similar technology have put data-hungry machines in schools, businesses, and agencies of all sizes. As the new technology becomes increasingly "user friendly" and a common element of liberal education, more executives and managers are becoming active and perceptive users of transportation and other data.

The new technology, coupled with significant improvements in the cost-effectiveness of automatic monitoring and communications equipment, has created a potential for major improvements in the timeliness, the accuracy, and the cost of data collection and access. The result is an ability to generate a flood of potentially useful data for an increasingly data-hungry community of transportation planners, analysts, and executives. The same technology also has the potential to alter significantly the way in which consumers of transportation choose their frequencies, directions, and mode of travel and shipments. The technology has affected the operations of carriers, often creating significant improvements in output or productivity. Indeed, the "information age" may affect the supply of and demand for transportation as much as the supply of and demand for transportation data.

These forces, which affect both transportation and transportation data, are a major focus of the TRB Committee on Transportation Data and Information Systems. A major objective of the committee is to explore the cross-

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cutting issues of determining data needs and collecting, processing, and disseminating data that affect the entire transportation community. This interest is usually sidetracked, however, by the need to address a growing number of specific issues involving transportation data resources.

The most often recognized institutional problem involving transportation data is the lack of a stable, official organization to inventory transportation data resources, monitor changes in those resources, and provide the data user community with a forum for expressing its needs to the providers of transportation data on a comprehensive basis.

CROSSCUTTING ISSUES

Virtually all committees and task forces in TRB face data collection issues. The Committee on Transportation Data and Information Systems shares the concern for specific data requirements and specific data collection methods. However, the committee differs in its efforts to identify and address the methodological and institutional issues that are common to the entire transportation community. The committee has found that, in most instances, the methodological issues are minor compared to institutional and financial concerns.

Institutional Mechanisms for Monitoring and Feedback

The most often recognized institutional problem involving transportation data is the lack of a stable, official organization to inventory transportation data resources, monitor changes in those resources, and provide the data user community with a forum for expressing its needs to the providers of transportation data on a comprehensive basis. A few organizations assume some of these functions for individual data programs, but comprehensive reviews of data resources and problems are attempted only on occasion (most recently by a DOT-sponsored TRB task force in 1981, as reported in *TRB Circular* 257).

The need for a comprehensive forum for monitoring data resources and obtaining feedback from the users is exacerbated by two factors. First, many data programs are threatened with or are experiencing significant change. Although many of these changes are positive, a large number of changes are made without adequate feedback from the data user community (often with detrimental consequences to the users).

Second, the lack of a forum to articulate data issues leads to the isolation of many users from their data sources, thus hindering the development of effective constituencies to maintain and improve the data resource. For example, a surprisingly small portion of the transportation community rose to defend the Commodity Transportation Survey (CTS) in 1982, in part because commodity flow data are available from a host of private vendors. The reliance of virtually all private vendors on the CTS to calibrate their commodity flow estimates was generally unrecognized, and the CTS experienced significant cutbacks.

Even if data users recognize an issue, they rarely have the incentives or means to deal with a data issue effectively. In most settings, the transportation analyst is rewarded for answering questions from a client or decision maker who is not interested in the data behind the answer. Few clients or decision makers are willing to provide time or funds to collect substantial data beyond that which is readily available. As a result, the analyst must make do with current data resources, and is unlikely to highlight the weaknesses of the data and thus shoot down the credibility of his own findings.

Benefit-Cost Evaluation of Data

An organization that provides comprehensive monitoring and feedback cannot be entirely effective without adequate methods to develop effective justifications and priorities for providing transportation data. Such justifications and priorities are essential, because the appetite of public agencies, corporations, and academic institutions for data cannot be satiated economically.

Transportation data must be seriously justified to survive in either public or corporate environments, yet most benefit-cost analyses of data programs are cursory efforts that point to the existence of a data gap and to cost-effective ways to fill the gap. The benefits of filling the gap are not quantified, largely because such analysis raises very difficult questions. What are the benefits of a good decision versus a bad one? What share would better data have in reaching a better decision? Who would benefit from the informed decision making (or be hurt by ignorance), and who would pay for the information? How can the benefits and costs be organized into a rational and acceptable list of priorities?

The benefits and costs of data must be quantified by public agencies in non-

monetary measures as well as in dollars, particularly because data collection activities are being held to a shrinking temporal budget in addition to a declining financial budget. The Paperwork Reduction Act of 1980 (PL 96-511) includes the requirement for faster public response to federal questionnaires and forms. How can paperwork burdens be measured so that priorities among data collection activities can be met?

Decentralization and Privatization

Proposals to reduce public involvement in transportation and in data activities usually entail a shift of responsibility from the federal government to state and local governments or from the public to the private sector. This is a quick, and perhaps a deadly, way of finding out how much local entities and private firms really care about adequate information. Too many researchers and data managers have found it easy, and very convenient, to justify their programs based on federal reporting requirements. It is not clear how readily the profession will be able to make its case for data programs based on local needs. Even when the need is clear, it is not easy to shift from a reactive role (the federal government is making us do what we secretly desire) to a role of active advocacy. The magnitude of this problem is difficult to assess because the secret desires of public officials and private executives are rarely documented.

The problems of private and local data development also raise questions of completeness and comparability—or at least compatibility—of data from place to place. Local and private data development also increases the importance of researching what others have done and how they have done it.

In addition to the problems of data coverage and comparability, the private sector is also limited in its ability to provide needed information by economic incentives and credibility. Economic incentives are a problem because information often has the attributes of a public good. In other words, the use of the information by one party does not "consume its value" so that other users cannot consume it as well.

Moreover, the benefits of producing information rarely can be fully captured by the producer, and significant economies of scale are frequently possible in producing or assembling the required information in a centralized activity. These economies of scale are so large that private vendors, who are in the business of manipulating and tailoring public (usually federal) data for clients, could not survive if they had to pay their share of the cost of data collection. There are also response-rate problems in many areas in which public authority, or at least public sponsorship, is essential to a useful product.

Finally, credibility, or at least acceptability, is an important issue, especially when the private sector provider is self-interested (such as the data provided by associations). For example, the energy crisis revealed the dependency of the federal government and the rest of the country on the data provided by the petroleum associations.

The shift from a manufacturing-based to a service-based economy, the substantial realignment of government regulation, and the emergency of new technologies have profound consequences for the economy in general and for transportation in particular.

Cost Recovery and Public Agencies as Data Vendors

An alternative to reducing or privatizing data programs is to pay for the program through user charges. Indeed, some metropolitan planning organizations (MPOs) have become very aggressive vendors of census and other public data to other public agencies, private firms, and the public. Several questions are raised by such activity: How are costs allocated among data users, and how are prices set? How are priorities established between data services requested by a sponsor of the MPO and those being purchased by a cash-paying customer? Can public agencies establish proprietary rights over data services and resources that are partially funded by the public? What are the political and legal problems of competition between public agencies and private data vendors?

Social and Political Impacts of Data and Information Technology

Most transportation analysts would concur with the economic theory that the world is better off with perfect information. The availability of extensive and well-presented data may improve the effectiveness of a free-market economic system, but it can inhibit the political process. As any lobbyist knows, information is power in the political arena. Many transportation policies, programs, and projects have been stopped dead by environmental impact statements and other collections of data. More than one onerous policy has survived in the absence of effective information on its consequences. On frequent occasions, public decision making has become

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mired down by an inability to digest conflicting information. How can transportation data be obtained and disseminated to all concerned parties in a way that enhances political processes without interfering with the ability of the data to respond to conflict and change?

The political ramifications of data also extend to information technology. Issues such as invasion of privacy, respondent burden, and data security are an inherent aspect of the collection and the use of data. These issues have become more intense with the increasing use of computers and unobtrusive measurement devices (such as automatic vehicle identification equipment).

Improved Efficiency of Data Collection and Management

In contrast to the institutional issues, significant progress is being made in improving the efficiency of data collection and management. The Committee on Transportation Data and Information Systems has sponsored TRB papers on sampling techniques to obtain accurate traffic count, origin-destination, and other data from as few observations as possible. Even bigger gains in efficiency are possible with the use of interactive computer systems and automated monitoring systems. The transportation community can learn much from the experiences with these technologies in other fields.

SPECIFIC ISSUES

The crosscutting issues involved in transportation data underlie many specific issues that have reached the front burner of public policy. Fleeting but significant opportunities are now available to provide user input into several data collection and related activities. Many of these opportunities have been under discussion at meetings of the Committee on Transportation Data and Information Systems and its subcommittees held during the TRB Annual Meetings.

Standard Industrial Classification Codes

The Standard Industrial Classification (SIC) Manual provides the framework by which the federal government and many public and private organizations collect and analyze economic data. As a consequence, this document has a subtle and pervasive effect on public policy analysis and on the nation's perception of the structure and health of its economy.

The Committee on National Statistics of the National Research Council has analyzed the deteriorating ability of the SIC Manual to reflect the emerging structure of the national economy, which is undergoing a period of major change. The shift from a manufacturing-based to a service-based economy, the substantial realignment of government regulation, and the emergence of new technologies have profound consequences for the economy in general and for transportation in particular. These consequences are difficult to understand, however, because the economy is being viewed through an outmoded classification system.

The Office of Management and Budget has begun the process of reviewing and revising the SIC Manual so that it better reflects the emerging structure of the economy. This issue will be discussed at the meetings of the Subcommittee on Information Resources for Freight Transportation and the Subcommittee on Information Resources for Passenger Transportation and Tourism to be held during the TRB Annual Meeting in January.

In order to provide the Census Bureau with adequate feedback from the transportation community for its 1990 plans, the TRB Subcommittee on Urban Transportation Data and Information Systems organized the "Nationwide Conference on Decennial Census Data for Transportation Planning: 1980 Experiences and 1990 Needs," Orlando, Florida, December 9-12, 1984.

Commodity Flow Data

A principal source of commodity flow data by all modes is the Commodity Transportation Survey (CTS), which is conducted every 5 years by the U.S. Bureau of the Census. The 1982 CTS was drastically altered after serious funding and methodological problems could not be completely resolved. Plans for the 1987 CTS are now being formu-

lated, and will be discussed in the January meeting of the Subcommittee on Information Resources for Freight Transportation.

Truck Activity Data

TRB, the U.S. Department of Transportation, several state agencies, a number of trade associations, and numerous motor carriers have become very interested in the automatic monitoring of truck activity. Several states are considering systems to improve data bases for highway planning, enforcement of restrictions on highway use, and collection of taxes. Carriers are interested in using similar technology to uncover inefficient aspects of their operations. Even the railroads are interested in this technology to counter arguments that weight-distance taxes on trucks cannot be reasonably administered.

Recent discussions of automatic monitoring have focused on available technology and its potential applications, and have not dealt extensively with the institutional and information systems questions raised by this technology:

- What institutional conditions are prerequisite for this technology to meet the data needs of transportation planning, enforcement of motor vehicle operating restrictions, and taxation?
- Can this technology's inherent invasion of privacy be ameliorated?
- Can this technology reduce reporting burdens on carriers and shippers?
- Can standards be established so that interstate carriers are not saddled with different transponders or other equipment for each state in which they operate?
- What must public agencies do to turn the resulting flood of data from monitoring stations into useful information?

These questions will be the focus of lively panel discussion sponsored by the Committee on Transportation Data and Information Systems during the TRB Annual Meeting in January.

In addition to the regular session, the committee is sponsoring a "user's forum" on truck activity data collected by or for the Census Bureau and the Federal Highway Administration (FHWA). This special session is an opportunity for users of federally collected truck inventory and activity data to meet with the designers of the Truck Inventory and Use Survey (TIUS), the Nationwide Truck Activity and Commodity Flow Survey (NTACFS), and the Truck Weight Study (TWS) of the Highway Performance Monitoring System (HPMS). The session is designed to maximize audience discussion of:

- Current and planned user products from TIUS, NTACFS, and TWS;
- Strengths, weaknesses and comparability of TIUS, NTACFS, and TWS;
- Specific suggestions for continued, revised, or new tabulations and user products to meet current and future needs of the user community; and
- Needs for nationwide truck inventory and activity surveys in 1987 and beyond.

Passenger Travel Data

The major issues involved in passenger travel data include the potential demise of the National Travel Survey (NTS) and the status of other data collection activities that supplement and may possibly replace the NTS. A regular session to be held during the TRB Annual Meeting in January on data resources for nationwide and international passenger travel will highlight the NTS, the origin-destination data that survived the sunset of the Civil Aeronautics Board, the U.S. Travel Data Center's surveys, and the Nationwide Personal Transportation Survey (NPTS). This session is quite timely because deregulation, federal budget reductions, and growth in private activities have brought these data resources to decisive junctures in 1984 and 1985. A "user's forum" will also be held on the NPTS to discuss:

- Current plans for the development of user products from the NPTS;
- Comparability of the 1983 NPTS with previous editions and with other passenger travel data sources such as the Decennial Census;
- Strengths and weaknesses of user products from the previous NPTS that should be considered in the design of user products from the 1983 NPTS;
- Specific suggestions for continued, revised, or new tabulations and user products to meet current and future needs of the user community; and
- Needs for nationwide personal travel surveys in 1987 and beyond.

Urban Travel Data

The Decennial Census is a perennial data concern of urban transportation planners, and is particularly important at this time because products from the 1980 Census are finally available and plans are moving forward for the 1990 Census. In order to provide the Census Bureau with adequate feedback from the transportation community for its 1990 plans, the Subcommittee on Urban Transportation Data and Information Systems has organized the "Nationwide Conference on Decennial Census Data for Transportation Planning: 1980 Experiences and 1990 Needs." The findings and recommendations of this conference, held in Orlando, Florida, December 9-12, 1984, will be summarized during the subcommittee's meeting in January.

The subcommittee will also deal with other issues of ongoing interest during its January meeting, including:

- An update on efforts by the National Association of Regional Councils and the Urban and Regional Information Systems Association to develop a network of data users and vendors in regional agencies;

- A discussion of the project to compare journey-to-work patterns from 1970 and 1980 Census data; and
- A presentation on trip-monitoring surveys.

Highway Monitoring and Inventory Systems

Although its January agenda will be dominated by institutional issues and by concerns with national surveys, the TRB Committee on Transportation Data and Information Systems remains vitally interested in the hardware and methodological aspects of data collection and use. This interest is reflected by a committee-sponsored session, to be held during TRB's 64th Annual Meeting, on data collection methods and information systems for monitoring highway inventories, conditions, and use for statewide transportation planning. During its regular meeting, the committee will also consider establishing a Subcommittee on Information Systems for Statewide Transportation Planning and Administration.

Perhaps then, a broader constituency of researchers and decision makers will develop to help close the gap between information needs and resources in transportation planning, administration, and research.

CONCLUSION

The most commonly recognized cross-cutting institutional issue is the need for an official forum in which providers and users of transportation data can share needs and experiences. Because an official, comprehensive, stable forum has yet to be established, the TRB Committee on Transportation Data and Information Systems and its subcommittees attempt to serve as a place where the diverse issues of data collection, processing, and dissemination can be discussed among professionals in all levels of government and in the private sector.

Although the committee's agenda is filled with discussions of specific surveys, methods, and so forth, it also attempts to provide a comprehensive perspective on the problems of supplying adequate information resources for the transportation community. The problem is not a lack of data items to be treated symptomatically on an ad hoc basis; it is a generic problem that requires systematic, institutional resolution. Transportation analysts can contribute to this resolution by determining the degree to which the validity of their products is dependent on existing data, and by exposing the subsequent vulnerability of their products to their clients. Perhaps then, a broader constituency of researchers and decision makers will develop to help close the gap between information needs and resources in transportation planning, administration, and research.

PRIVATE SECTOR ROLE IS TOPIC OF BIBLIOGRAPHY

A comprehensive bibliography of the role of the private sector in providing transportation services for the public has been produced by the Urban Mass Transportation Research Information Service (UMTRIS). UMTRIS is operated by the Transportation Research Board under contract to the Urban Mass Transportation Administration of the U.S. Department of Transportation. Special Bibliography: Public Transportation and the Private Sector contains abstracts of more than 200 technical reports and journal articles published in the past decade. These citations demonstrate the roles of such modes as taxicabs, subscription buses, vanpools, employer-sponsored paratransit, and fixed-route privately operated transit that promise to be of increasing importance in an era marked by limitations on public funding for transportation services. *Special Bibliography: Public Transportation and the Private Sector,* a 55-page publication, is available from TRB at $6.50 postpaid.

In addition to its special publications, UMTRIS publishes semiannually the *Urban Transportation Abstracts* containing the abstracts and the summaries added to its data base during the preceding 6 months. As in the *Special Bibliography,* technical reports and journal articles are covered. *Urban Transportation Abstracts* is characterized by worldwide coverage of the full spectrum of transit information ranging from technology to operations, management, economics, and government involvement. A separate section contains summaries of current transit research.

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