Information for Transportation Decision Making: Institutional Challenges

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To initiate a discussion of the appropriate institutional forms that a comprehensive transportation information program might take, the purpose and scope of such a discussion are delineated, some of the institutional forms and types now operating in this sphere are surveyed, and the functions that these institutions will have to perform in order to be effective are examined. First, an overview of the scope and character of national transportation data development is given. Second, the major transportation data-collecting institutions—federal, state, local, and private—are examined, with particular emphasis on those federal entities within the U.S. Department of Transportation. Third, the institutional functions to be performed in the development of a National Transportation Statistical System (NTSS), including assembly of data needs, program design, funding, program coordination, and product delivery, become the focus. In a brief concluding section preliminary observations are presented, not to draw definitive final conclusions and recommendations but rather to help guide further discussion. Fundamentally these observations examine the argument that the present national transportation data program needs new institutions and institutional arrangements to give structure to the scope and scale of its activities.

This paper is part of an overall effort to assess the capabilities and needs of a transportation information program to support better transportation decision making, in general, and the U.S. Department of Transportation's (DOT's) policy planning requirements, in particular. The study was undertaken because the Secretary's Strategic Policy Study discovered, early in its activities, that there was a serious lack of effective information to support the policy planning effort. Although it was not possible in this study to develop the information in time to meet the needs of the Secretary's initiative, it was decided to begin the process of forming an effective transportation information program to facilitate future applications. This is appropriate to the conception of the policy planning effort as a continuing activity. Perhaps more significant, the programs and policies proposed as part of the new policy are data intensive compared with past policies. Emphases on strategic assessment and system monitoring, policy evaluation, etc. will demand more of the national transportation data system than it is presently capable of delivering.

OVERVIEW OF A COMPREHENSIVE TRANSPORTATION DATA PROGRAM

Institutional Framework for an Information Program

The components of a comprehensive transportation information program are varied and complex. They include (a) the technical skills required to design, assemble, and produce information; (b) the software and hardware and other logistical capabilities to collate, store, and manipulate data; and (c) the financial resources to support ongoing activities.

This description neglects the more intangible elements that are often the main ingredients of success for a large-scale public activity program. These elements include the public and institutional support that ratifies a public program and substitutes for the market success that justifies a private endeavor, and the public and private institutions that design, manage, ratify, and sustain the program over time. This paper focuses on these elements and their role in the success of transportation information programs.

The following elements are crucial to a workable transportation information program:

- Technical skills must be assembled and organized.
- Effective program designs must be created or adopted.
- Financial and other resources must be acquired.
- Public support must be developed and sustained.

All of these elements must be assembled, focused, and managed for a program to be launched successfully and to sustain itself over time. The history of transportation information programs has shown otherwise. Technical skills have not been lacking, program designs have been generally responsive, and resources and support have been weak but usually adequate. Rather, it has been the lack of an institutional framework to give permanence to the ad-hoc efforts that has precluded the prospect for long-term effectiveness.

An effective transportation information program must focus primarily on the development of continuing data series—monitoring trends in supply, demand, and system performance rather than squandering resources in ad-hoc projects and responses to perennial "fire drills." Continuing programs require the application of common definitions and procedures employed uniformly over time. Although it could be argued that it is possible to accomplish this definitional permanence with different organizational entities coming and going, the most likely opportunity for success will be produced by a permanent institution that can operate and sustain a continuing process over time, particularly one with a resource base that does not fluctuate erratically.

Scope of Data Coverage

It is appropriate to be more specific about the nature and scope of the data activities to be included in this assessment. First, it should be clearly recognized that there is no definitive

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delineation of the data set that is the object of such an undertaking. This is not to criticize the current effort; rather, it is to establish that there has been a need for such delineation since the inception of national programs of transportation information development. The only serious effort at explicit delineation is *The Red Book* (*1*). Although never receiving formal support from DOT or Congress, this document has served as the informal bounding of the appropriate scope of a national transportation information program for 20 years (*2*).

The general focus of the types of data programs of interest are those engaged in meeting data requirements for policy and planning. Of course, this can be interpreted broadly to include almost every activity of DOT, other public agencies, and the entire transportation industry. For this paper, it is more narrowly defined to include data that permit a broad assessment of the current and prospective supply, demand, and performance characteristics of the transportation system. The Canadian program in transport statistics refers to this data set as statistics "in support of policy, legislative, planning, regulatory, forecasting and monitoring functions" (*3*). A key concept in defining the scope of this data set is that its focus is most often on the relationship of transportation to broader economic and social factors in the nation.

To help establish the scope of the data of interest, more generic criteria include general purpose statistical data on transportation, i.e., information applicable to more than one program and more than one application. This typically focuses on the development of a recurring data series that provides time series trend information as opposed to one-time, ad-hoc issue coverage. More specifically, it includes

- Facility inventory, condition, and performance data;
- Equipment inventory, condition, and use data;
- Carrier performance and condition data;
- Passenger and freight flows data;
- Demographics and general economic activity data;
- Safety and security data; and
- Finance and program administration data.

It is useful to define certain data and related activities out of the scope of interest of this assessment. These areas include (a) engineering data on structures, facilities, and vehicles; (b) administrative data on departmental, state, local, and private firm operating accounts and personnel matters generally characterized by the label of Management Information Systems; and (c) regulatory data that support day-to-day departmental, state, and local regulatory functions such as licensing and inspections. There are occasions when these sources are valuable in meeting the information needs of the policy planning process, but fundamentally they represent secondary applications.

The defining concept regarding the data set that is the goal of these efforts concerns whether the data are those necessary for DOT to meet its internal needs and support its mandated programs, or whether the data needs should be extended to meet the needs of DOT and other agencies linked to DOT programmatically, such as states and localities. Further, should the data needs be extended to meet general policy needs regarding all of the transport industry, and yet additionally extended to meet industry needs for marketing and competitive analyses? How DOT and Congress construe the requirement will be crucial for program development.

GENERIC INSTITUTIONAL TYPES

The array of institutions and institutional arrangements associated with transportation information is formidable. It is appropriate for the purposes of this assessment to review those institutions and arrangements, not with the intent to inventory every entity in the transportation data field but to identify the generic institutional types that are involved. Thus, it is a typology of institutions, functions, and activities that is intended rather than a comprehensive listing.

Federal Institutions

The federal system for the production of all statistics, not just transportation statistics, is a decentralized system. Many agencies engage in the production, use, and dissemination of statistics. There have been numerous discussions about the merits of shifting to a more centralized system (*4*). In some other countries, such operations are more centralized with a single ministry or statistical office managing the nation's statistical efforts. In that ministry, there would typically be a Transportation Division that is the recognized center of national transportation statistics. Staffing would consist of people knowledgeable in all areas of transportation. Most, if not all, appropriations for statistical activities would go to that division, which would have charge of delineating the national transportation information program. The Canadian approach is somewhat of a hybrid between a centralized system and the far more decentralized U.S. approach. The Transport Division of Statistics in Canada is the source of most of the significant national statistical transport measures. However, while 60 percent of its funding is directly appropriated, the remainder is cost shared with other federal agencies and provincial governments. A memorandum of understanding between agencies structures these arrangements.

In the United States, a multipurpose system with multiple masters is responsible for the production and dissemination of national transportation statistics. Generally, the national system contains at least three elements:

1. A System of National Accounts (SNA),
2. A regulatory system, and
3. A transport system.

This is paralleled in other countries as well. A synoptic description of these elements follows.

The System of National Accounts basically amounts to the accounting "books" of the nation—the accounting of goods and services produced and received, the gross national product system, and the foreign trade statistics. The indexes of prices and the statistics of employment can also be considered part of this system for functional purposes. In the United States, as in other countries, these statistics are the most rigorously defined and formal, and they usually have the longest continuous history. These systems are planned and managed by the Bureau of Economic Analysis (BEA) and the

Bureau of Labor Statistics (BLS), and data collection is predominantly conducted by the Bureau of the Census from major funding provided by the using agencies. In support of these programs, "nation defining" statistical systems such as the Standard Industrial Classification and the Classifications of Occupations and Industries are developed.

The existence of a regulatory system in the United States can be questioned given the recent deregulation at the federal level. The Canadian program defines its system in two parts: an SNA and a regulatory/transport system. With deregulation, the U.S. system may soon be best described in the same way. In the past, the statistical systems of the Interstate Commerce Commission (ICC) and the Civil Aeronautics Board (CAB) were a central and critical element of the nation's statistical knowledge about air, rail, bus, pipeline, and trucking modes. Although these systems are basically gone, the current national system is a residue of this regulatory past. Significant user groups developed around these systems with both regulatory and nonregulatory applications. The CAB system, missing some of the more arcane statistical elements of regulation, has been carried over into DOT's aviation statistical program. ICC's program has diminished significantly in scope and coverage. Other government activities, such as foreign trade and customs reporting, and income tax data sources can be construed as part of the regulatory system. (In Europe, this system has been the centerpiece of the transportation statistical system. In particular, the customs system permitted the extensive organization of freight and passenger flow data. The decline of regulation as part of the Europe '92 program will challenge the systems of many nations.) The regulatory statistical system also can include the data gathered by FAA, FRA, NHTSA, and the Federal Maritime Commission (FMC), as part of their regulatory roles.

The transport system can be briefly, and inadequately, defined as the data developed by DOT and other transportation-related agencies, such as the Corps of Engineers and the Department of Agriculture, to meet their policy, economic analysis, planning, and monitoring needs. The above-referenced regulatory elements of DOT agencies can also be included here.

The hallmark of this system is that DOT is a late arrival on the statistical scene. Therefore, it has sought to make do by adopting and adapting the statistical products of the other systems. DOT's history only extends about 25 years, while the SNA and regulatory systems have almost a century of background. This has proven detrimental in a number of ways. First, the concepts and modes of expression of the SNA, while entirely appropriate to it, are often imperfect or even misleading for transport purposes. Second, the regulatory system was characterized by explicitly, and sometimes arbitrarily, defined reporting criteria that constrained possible analyses. Third, the depth and power of coverage in the regulatory system have been a function of the degree of government regulatory involvement, which can differ sharply from other policy needs. Fourth, changes in the systems, most particularly the demise of regulatory reporting in the 1980s, were often made without consultation with DOT or other transport data users and left nonregulatory users without information support. (This was particularly important because alternative duplicating data collection activities were precluded by law.)

One of the predominant institutions in the area of federal transport statistics has been the Office of Statistical Policy at the Office of Management and Budget (OMB). This organization, which has had various names and has functioned from various locations in government over the years, reviews applications by agencies for statistical undertakings based on statistical and political grounds and concerns for public reporting burdens. Due to lack of staffing and appropriate expertise, its program coordination functions have never been able to fully develop. At one time, OMB sponsored an interagency transportation statistics coordinating group, but it was suspended due to lack of available staff support. A recent Bureau of the Census group oriented to coordination of services-oriented statistics has partially filled that role.

State/Local Institutions

While individual states and local governments will undertake active statistical programs to meet their own needs, the national statistical system contains few data series produced by states that are designed to be comprehensive national data sets. There are many state-generated data sets of value when summed nationally, particularly in the highway area (e.g., highway traffic, spending, and fuel consumption reporting).

For the most part, state and local reporting consists of reporting programs mandated by DOT agencies as part of funding requirements. The Highway Performance Monitoring System (HPMS) of FHWA is the best example of such a program. This program, along with additional summary reports, is an effective summary tool of the status and condition of the federal-aid highway system. The process of reporting is required by Congress on a biennial basis. Similar reporting activities exist in UMTA's programs for program assistance recipients, generally transit properties. FAA has similar reporting requirements for aviation properties. None of these activities truly represents a joint undertaking of state or local agencies with federal authorities. It should also be noted that these systems are victims of their original genesis in program reporting. Thus, the HPMS does not represent non-federal-aid local roads, and UMTA reporting does not provide data on private transit facilities.

Increasingly, these agencies or their public interest group representatives, such as AASHTO, the National Governors Association, the National Association of Regional Councils, and the National Association of Counties, are recognizing the importance of improved data for their organizational policy and planning functions, and those of their members, and have moved to respond to these needs. They represent a powerful potential force for effective data program development. One particularly significant activity may represent a model for future actions. In 1980, DOT and the Bureau of the Census developed a package of special, uniformly defined transport-oriented tabulations of the decennial census. Over 160 metropolitan areas and states purchased this jointly defined tabular package, with federal assistance. This approach saved time and money and increased uniformity. For 1990, the approach is being expanded to include all states and metropolitan areas under DOT program eligible assistance. There are other examples of joint state undertakings to produce national data sets. Most recently this has been stimulated by

the AASHTO 2020 process. This Record includes a paper by an AASHTO committee describing the data difficulties observed in the 2020 process.

Intra-DOT Institutions

It is almost impossible to characterize the diverse number of organizations within DOT that are engaged in data development activities. A review of the DOT organizational structure regarding information programs reveals the lack of a central statistical organization. A number of organizations in the Office of the Secretary play elements of a central statistical role. The Office of Information Resource Management, under the Administrative Secretariat, performs the OMB statistical policy liaison and data collection review functions as well as other oversight functions in its Information Requirements Division. The Transportation Systems Center, no longer in the Office of the Secretary, contains the Center for Transportation Information within its Office of Information Resources. This center performs department-wide statistical reporting functions. Elements of the Policy Secretariat perform statistical overview functions as well.

In the administrations, offices involved with the production of statistics are widely distributed and are given names that may or may not signal their data-related functions. There is no simple way to identify the key statistical office in any administration or to determine any functional equivalence between offices of the different administrations. No administration has a central statistical coordination office or function other than for paperwork management. Fortunately, informal coordination and an exchange of experience occur between professionals in the various programs, but this is not supported by any formal structure. The following list identifies those offices in DOT that have significant information functions as defined in this paper:

- Office of the Secretary
  - —Office of Economics,
  - —Office of International Aviation,
  - —Office of Aviation Analysis,
  - —Office of Information Resource Management, and
  - —Office of Intergovernmental and Consumer Affairs.
- Coast Guard
  - —Office of Law Enforcement and Defense Operations,
  - —Office of Navigation Safety and Waterway Services, and
  - —Office of Command Control and Communications.
- Federal Aviation Administration
  - —Office of Management Systems,
  - —Office of Aviation Policy and Plans,
  - —Office of Planning and Programming,
  - —Office of Air Traffic Evaluation and Analysis, and
  - —Office of Aviation Safety Analysis.
- Federal Highway Administration
  - —Office of Policy Development,
  - —Office of Information Management,
  - —Office of Planning, and
  - —Office of Motor Carrier Information Management and Analysis.
- Federal Railroad Administration
  - —Office of Policy,
  - —Office of Freight Services, and
  - —Office of Passenger Services.
- National Highway Traffic Safety Administration
  - —National Center for Statistics and Analysis,
  - —Office of Market Incentives,
  - —Office of Alcohol and State Programs, and
  - —Office of Defects Investigation.
- Urban Mass Transportation Administration
  - —Office of Capital and Formula Assistance,
  - —Office of Planning, and
  - —Office of Mobility Enhancement.
- Maritime Administration
  - —Office of Information Resource Management,
  - —Office of Trade Analysis and Insurance, and
  - —Office of Policy and Plans.
- Research and Special Programs Administration
  - —Office of Aviation Information Management,
  - —Office of Research and Technology,
  - —Office of Program Management and Information,
  - —Office of Emergency Transportation,
  - —Office of Pipeline Safety,
  - —Office of Hazardous Materials Transportation, and
  - —Office of Information Resources (TSC).

Private Institutions

The increased involvement in data development programs by some private sector organizations has been one of the bright spots in transportation data systems since deregulation. The process of establishing more active programs has varied from organization to organization, and it is unclear what stimuli have resulted in effective programs in some cases but not in others.

Some of the more active programs have been initiated at the Association of American Railroads (AAR) and the American Trucking Association. These programs reflect the greater need for data among their constituents stemming from the market-driven effects of deregulation on competition within and between these industries. On the other hand, organizations such as the American Bus Association and the Air Transport Association have seen declines in their data-oriented activities. One of the casualties of deregulation was the Transportation Association of America (TAA), which was heavily focused on regulatory issues. Its information programs and perspective on the industry were important elements in the transport data picture.

The residual effects of regulation and deregulation are still apparent. Many private sector firms still have fears about government reporting based on years of unpleasant experience with ICC and other regulatory organizations. They resist individually, or through their associations, any attempts at expanded industry reporting, even reporting that would be held confidentially within the industry. At the same time, deregulation has made the marketplace more data intensive, engendering strong interest in marketing data to serve the industry but not in reporting about the industry itself. One of the major changes generated by deregulation was the increasing importance of segments of the transportation industry that had been minor players before and for which data reporting was minimal, such as package express carriers, freight forwarders, brokers, private carriers, and short line railroads.

In some cases, new institutional approaches have evolved. In the public sector, the Bureau of the Census has moved to fill important data gaps regarding transportation industries previously covered by regulatory reporting. The confidentiality rules of the Bureau appear to help calm the fears of some deregulated firms about individual reporting.

In the private sector, AAR has developed a contractual relationship with FRA and ICC to manage and assist in the development of data concerning its industry. This has proven to be an effective new data development instrument.

Another innovation has evolved from the TAA program that produced *Transportation Facts and Trends*, a national summary of transportation activity. When that association declined due to deregulation, the document was continued privately by former TAA staff on an interim basis with the new name *Transportation in America.* It has now been adopted and given new status and support by a private foundation—The Eno Foundation for Transportation, Inc.

The role of private firms in data development pertinent to transportation has been limited for the most part to niche filling. In the passenger sphere, most data are developed by organizations oriented to the intercity travel and tourism industry, focusing on magazine advertising marketing. Primary data of value are produced by these organizations, most notably the US Travel Data Center. The most extensive surveying of intercity travel in the United States that has been performed since the demise of the National Travel Survey in 1977 was conducted by the Canadian government to assist its tourism planning. In the freight data sphere, a mixture of economic consulting firms and ad-hoc data development firms have sought to meet industry needs as a result of increased demand and reduced supply for data resulting from deregulation. The recent TRB/Transportation Research Forum (TRF) conference on freight data needs documented those limited developments. It is important to recognize that transportation data vendors are value-added operators—manipulating, modifying, and supplementing public data sources. They enhance but do not replace these sources.

Two developments may affect private sector data development capabilities. One is the growing interest in Geographic Information Systems (GISs) stemming from new developments in computer processing and geographic base files. This may stimulate greater interest in the data sets appropriate to GIS systems. A related technological development is the growing use of computers for electronic data interchange (EDI) in managing freight shipments. This could expand opportunities for private and public data development but with complex institutional ramifications. The means will soon exist for an industry to assemble its automated working files, purge them of individual identifications, and produce nationally useful vehicle, commodity, or passenger flow statistics on a current and continuing basis.

INSTITUTIONAL FUNCTIONS OF A TRANSPORTATION PROGRAM

There are a distinct set of functions associated with the effective development and operation of a comprehensive information program that generate special institutional requirements. These requirements are discussed below.

Assembling Data Needs

The assessment and determination of information needs is a critical professional function of an effective program. The needs assessment function has many facets.

A Center of Comments

Transportation data users lack a mechanism through which to express their information needs. Users from all sectors—federal, state, and local agencies; private establishments; and private and public operators—have disparate information needs and no useful institutional entity to which they can express their requirements and see those requirements collated with others into a comprehensive statement. In some instances, private operators may be able to collect the information themselves. When this is beyond the capability of an individual or an entire industry, or is more appropriately a public program, the private sector has no public source to which it can express its needs. One example of an approach to this problem is Canada's Federal-Provincial Committee on Transportation Statistics, which was established in 1976 to provide a forum for discussion of transport statistics issues.

One aspect of this function is linked to the ability to locate needed information. Often organizations will assume that data must exist somewhere to meet their needs but that they have just failed to locate the source. They may waste valuable resources in a fruitless search for nonexistent data.

Certain distinctions about the character and scope of this function differentiate it from others. First, the value of the function is its ability to act as a collector and collator of information requirements. This is distinct from the function of the action agency, which might actually collect data to respond to deficiencies. Second, it is also distinct from the function of a data repository, which may serve users as the prime source of information about a topic. These functions may be well served by combining them in a single institution, but they need to be recognized as discrete functions.

Needs Identification

Aside from the value of an assembly point for expressions of public and private information needs, there is a further needs-related function. This is an analytical function that includes evaluation of existing available sources and identification of key gaps and deficiencies. While the first function may be seen as best performed by a secretariat-type institution, it must be the province of transportation analysts and statistical professionals. It may also serve to discover opportunities in the statistical system for beneficial changes as well as identifying deficiencies.

Not the least of the professional functions involved is the construction of appropriate typological nomenclature for the description of information and information requirements. Many elements of the transportation industry suffer from the lack of commonly accepted, detailed definitions of terminology. Transportation is a complex and fascinating mix of engineering, economics, sociology, and other disciplines. This expands the range and scope of data requirements and adds to the semantic and definitional problems involved. The recent pub-

lication of an urban public transportation glossary by the TRB Committee on Public Transportation Planning and Development is one example of the kind of work that is needed.

Secondarily, an institutional entity engaged in assembling and organizing information needs may become a locus of concern for better transportation information.

Comprehensive Program Design

An important function allied to the identification of needs and gaps is the program design function. Fundamentally, this function involves both analysis and synthesis: analysis of future data demands based on long-term policy trends and synthesis of existing needs and resources into a comprehensive needs statement as input for design.

Comprehensive program design is perhaps the most challenging professional task in an information program. It must be a prospective activity, taking into account future transportation trends and the likely directions for policy and analytical focus.

A current issue serves well as an example. Departmental interest and support for intercity passenger travel surveys declined in the 1970s. The demise of the Census Bureau's National Travel Survey after 1977 was permitted, without concern for a substitute. The element of the 1983 National Personal Travel Study (NPTS) focused on long-distance travel and was limited in scope and depth. Even with the presence of this minimal element in the 1990s, the NPTS has been threatened by funding troubles. At the same time, the national policy trend is toward extensive consideration of intercity travel congestion problems and ways to solve them, either by traditional means or by consideration of prospective opportunities for private or public high-speed rail operations and new air technologies. Soon it will become clear that the kinds of data needed for the sophisticated analyses required are lacking. The development of intercity passenger data surveys will require a number of years to create, thus delaying the analytical and decision process. This demonstrates the clear need for the development of a design function that can anticipate future data requirements and link together disparate needs in an overall comprehensive program.

Funding

Lack of adequate funding and erratic variations in funding availability have damaged the effectiveness of some transportation data programs important for policy decision making. A critical function for any data program will be the assessment of resource needs and the building of a funding mechanism to sustain the program on a continuing basis. As noted elsewhere, interest in data programs suffers peaks and valleys. The weakness of past programs has been the inability to establish stable funding mechanisms during periods of peak interest that can sustain project efforts during periods of declining concern. This has resulted in a cyclical funding process—peaking when data subjects are in vogue (during the energy crises of the 1970s, for example), then trying to reconstruct viable programs after periods of disinterest.

A number of funding mechanisms have been employed at various times to sustain programs or individual projects. All of them can be considered options for future funding. The institutional variations involved in these funding alternatives are important to consider.

Centralized Funding

The most evident funding approach for public national data programs is congressional appropriations. There has never been a centralized DOT line item for data. From time to time, individual programs have become line items, especially in the modal administrations and not on a department-wide basis. Other agencies concerned with transportation data, either as using agencies or collectors (such as ICC, the Corps of Engineers, and the Bureau of the Census), have rarely given transportation data the status of a budget line item on a sustained basis. This is important beyond the funding effects it implies because it contributes to the lack of congressional focus on the subject.

A number of variant forms of centralized funding are worth noting. These include

- DOT budgeting of data programs through specific data-related line items;
- DOT funding of data programs as part of program funding, generally when data are highly related to and justified by a specific program; and
- Funding from within the budget of a data collection agency as part of its overall program.

Each of these approaches has been used from time to time in the evolution of a national transportation program. A chief issue in such a decentralized approach is whether an agreed-to program, e.g., a national travel survey, should be funded at DOT and contracted to the Bureau of the Census or funded directly at the Bureau by Congress. There are pros and cons to each approach, not the least of which is determining which path is most likely to produce the needed funding. The Canadian system formalizes this process with a memorandum of understanding between the Ministry of Transport, the National Transportation Agency, and Statistics Canada in which the functional and funding obligations of each agency are spelled out. A base program, funded within Statistics Canada, is acknowledged and a cost recovery program, funded by the other agencies, is identified.

Consortium Funding

One of the effects of a lack of centralized funding, or the lack of a single, large-scale program funding source, has been the tendency to develop consortia of interest around individual projects or programs to provide needed funding. In this approach, a lead agency, usually self-defined, determines a need and establishes a project to respond. It seeks agencies with similar needs and interests that will contribute financially to support the effort. This approach has all the positive and negative aspects inherent in joint activity. It can be negatively characterized as "pass the hat" financing, in which programs engage in a scavenger hunt for would-be financial supporters, wasting time and money on endless meetings and coordination. Its positive side is that it represents something of a system of checks and balances where related interests must be sought out and properly represented to gain needed funding. Many

of DOT's major data programs have been funded in this way. Of particular importance, as a case in point, is the 1990 NPTS.

Pooled Funding

Pooled funding may be considered a special case of consortium funding. It is akin to subscription funding, which is often used in the private sector. In this approach, an idea for a project is advanced by sponsors who permit prospective users to "buy in" for a fee. These users are not sponsors and have no management responsibilities. This is most notably used in data collection programs developed jointly by the federal government and state and local governments. In 1980, this method was used by local government agencies (metropolitan planning organizations) working with states to purchase special tabulations of DOT-developed decennial census data related to transportation. A variant form will be used to develop the 1990 decennial package of census reports.

Cost Recovery Funding

In federal statistical programs, the question of cost recovery has been a major issue. To reduce costs, programs have been required to try to recover components of their costs from users. Problems of pricing policy then become significant. For example, should the full costs of collection be recovered or only those of processing, printing, and dissemination? (This is akin to issues of average versus marginal cost pricing.) Another problem is the time value of data, i.e., whether to price early reporting higher than second- or third-hand distribution. Because the government does not copyright its statistical products, extensive recovery of costs is highly unlikely.

These issues are a product of the differing goals of private and public data collection programs. Private programs developed for profit rarely care about the broad use of their data except in a marketing sense. In fact, they have a strong interest in curtailing uncompensated use, whereas public programs collect data they deem to be in the public interest and are almost always concerned with the broadest public use of their data. Charging fees can conflict with this goal.

There are a few examples of user fees covering a major share of data collection and processing costs in the transportation sphere. One successful approach was that used by the CAB program of aviation statistics to handle data requests. CAB contracted out its statistical reporting process to firms that provided data processing services to requestors for a fee. The approach was apparently successful in the highly data-oriented aviation industry.

Private Funding

The private sector has been active in recent years in developing transportation statistics in certain sectors. Much of this has been a result of losses in public data reporting and the increased demand for information among carriers caused by deregulation. These private programs have enjoyed varying degrees of qualitative and financial success.

In private data collection, an important dichotomy needs to be made between the limited number of primary source data collection efforts and the more typical value-added private efforts that market enhanced versions of publicly produced primary sources. In the latter case, where the firms are highly dependent on the public system for their sources, little is contributed to actual funding of data collection. In fact, the effects may even be deleterious as users become remote from the information sources. Where private industry is the primary source of data collection, a key question is whether public agencies, federal or otherwise, are the major source of the revenue supporting the private venture. In many cases, they are. As a result, the public funding question remains a problem: whether to do a project or to buy it from a vendor. There have been cases in which private funding supported public data collection efforts (usually on a partial basis), but these efforts are rare.

Program Coordination and Monitoring

The funding process often serves as a monitoring and coordination system for information programs. Program sponsors, often working in a consortium, will meet regularly and receive reports on program status as part of their fiscal management responsibilities. Program coordination and monitoring needs go beyond this indirect tool. There are dozens of federal agencies with the responsibility and means to collect data of transportation interest. For instance, the Department of Agriculture tracks arrivals and departures of farm product shipments at major freight terminals, and the customs and passport agencies obtain information pertinent to international travel monitoring. No mechanisms currently exist to ensure coordination of decisions about data collection efforts among interested agencies.

One of the key events in the history of federal transport statistics was the dramatic change in federal reporting as a result of the deregulation of air, rail, truck, and bus travel. In many instances, significant data requirements were met by the regulatory reporting in these modal sectors outside of the needs of the regulatory agencies themselves. Large public and private user constituencies grew up depending on these sources, particularly because the general-purpose statistical agencies, such as the Bureau of the Census, were precluded from duplicating regulatory efforts. When regulatory reporting requirements declined, the agencies took different perspectives with regard to meeting the needs of outside users. CAB recognized an obligation to be responsive to outside users; ICC did not. Varying degrees of coordination resulted in varying degrees of data availability.

No formal or serious informal mechanisms exist in transport data collection to make public or private user/producer agencies aware of changes in reporting systems, publications of data, etc., unless covered by federal register reporting requirements.

Delivery Systems

An important function of a comprehensive transportation information program is maintaining and improving the relationship between the producer and user of statistics. Any institution engaged in this function must recognize user needs and organize the institutional framework to be responsive. Among the key elements in the interface are the needs for timeliness, appropriate design, and product availability.

One of the major weaknesses of publicly provided transportation data programs is the lack of timely reporting, which is often a product of inadequate resources. Data are collected infrequently and, when they are collected, they take too long to process and prepare for release. This latter problem may be due to inadequate staff resources, financial limitations, or lack of priority given to these needs.

Part of the concern regarding responsiveness to users is in the process of developing user products. Some data programs exist only to the internal needs of an agency. Even here, the ability to prepare requested tabulations in a fast, cost-effective manner is important. But in the majority of cases, data programs, especially those producing general-purpose statistics, must think as a wholesaler/retailer and consider the needs of clients in terms of data content, quality, timing, and costs.

The question of user costs for work products generates a number of policy issues. In some cases, a program with limited resources can damage itself by providing products to users at below cost fees or at no cost, reducing funds for other applications. In some programs, even where user products are properly priced, the program agency may not be permitted to receive funds. As a consequence, responsive user products that "sell" well may be a net drain on resources. A further question arises over pricing policies that may retard the distribution of important survey results obtained at substantial public expense. An argument can be made that these cost recovery approaches are not cost effective. If substantial public funds were warranted to obtain information, a small incremental increase in public costs would typically be warranted to ensure the broadest dissemination of the results.

All of these questions are part of building strong support for data programs among prospective constituents. No public transportation information program in the United States has actively engaged in identifying and building rapport with these prospective constituents.

Interrelated with this question of user support are the mechanisms by which data programs are justified. Fundamentally, these mechanisms are reduced to being a function of the persuasiveness of the program officials involved. There are no objective data needs tests, no measure of data adequacy in a program, and no cost-effectiveness tests that prove the value of additional information. Data program officials can assemble lists of users that have requested certain information, appeal to the reason and objectivity of public officials and legislators, or use the arguments of professional judgment. Development of a better means of assessing and proving data needs is required. This is particularly true given the dramatic costs involved in large-scale data programs.

CONCLUSIONS

This paper has attempted to initiate a discussion of the appropriate institutional forms that a comprehensive transportation information program might take. It has delineated the purpose and scope of such a discussion, surveyed some of the institutional forms and types now operating in this sphere, and examined the functions that U.S. institutions will have to perform to be effective.

Observations at this stage are preliminary but can perhaps guide further discussion:

- The current national transportation data program needs new institutions and institutional arrangements to give structure to the scope and scale of its activities.
- It is too easy to suggest that a centralized institutional arrangement is needed for a transportation information program to succeed. This is usually the reflex response to statistical program problems in transportation. It may, in fact, turn out that centralization is desirable, at least for certain functions, but much more discussion and analysis are required before arriving at such a conclusion. The transport sector is so multifaceted that a distributed system of statistical development that reflects that diversity may be more appropriate with some centralized coordinating elements. At a minimum, discussion should focus on what program elements are appropriate to and benefited by centralization.
- A national transportation statistical system (NTSS) needs to be explicitly defined. A context-setting document that explicitly includes and excludes the scope of data and data programs of interest is needed.
- The forms and content of possible memoranda of understanding between producer and user agencies, following the Canadian model, should be explored.
- Mechanisms for providing opportunities for input and assembly of expressions of data needs are required. Institutional mechanisms to accomplish this must be explored.
- Separate intra-DOT and interagency institutions are needed to coordinate data programs and plans.
- An assessment of alternative institutional mechanisms to produce and manage data employed in other sectors of the economy and in transportation statistical systems abroad would be valuable.
- Private/public mechanisms for data development need to be assessed. The ability of the private sector to produce data and the ability of the public sector to purchase it needs to be better defined.
- The opportunities for new forms of data development based on emerging technologies need to be seriously evaluated. The institutional structures necessary for their implementation are a key to their prospective utility. Public actions needed to facilitate these institutional arrangements should be identified.
- Congress must be engaged in this discussion. Congressional requests for information, particularly for recurring reporting such as the HPMS, have caused the initiation of most of the existing effective programs. On the other hand, the disinterest of Congress in transportation data needs, as manifested by congressional response to the *Red Book* 20 years ago, instilled a similar disinterest within DOT, which has been the cause of most of the national transportation data program weaknesses.

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