- Can the existing electronic data collection system and data bases be better integrated?

- How can disaggregated data now being collected from the states by FHWA be made more available to researchers and policy analysts? Currently, most of the data is only available in an aggregated format in Highway Statistics.

- Does there need to be standard definition of some of the terminology used to ensure that the interpretation of the data is valid? For example, the definitions for types of improvements vary from one data system to another, the term "project" has no clearly defined parameters, etc.

- How often does the data base need to be updated?

Future Federal Legislation

In view of the changes in emphasis under ISTEA, the reporting requirements for systems or programs of lesser Federal interest should be examined. How much data are required to provide the necessary program or system evaluations to the Congress and other decision makers and policy makers? What data are needed to supply the information required to determine the effects of ISTEA? Can the data be sample based? What level of statistical reliability is required?

What is ahead for future Federal legislation? How well we monitor the effects of ISTEA may well affect the course of future legislation. While the Federal role is changing, the need to monitor and track the effects of program efforts are extremely important for future legislation, including adjustments to existing legislation.

- Will surface transportation modes work closer together?

- Will they merge into a single surface transportation agency at the Federal level?

- Will there be a growth of funding? From what sources? How will the effective use of ISTEA funding flexibility affect future legislation?

- What changes will there be in fuel tax or other transportation taxes? How will use of ISTEA programs and the added flexibility of funding applications influence future tax rates and sources?

- What program performance measures will be available? The amount of dollars obligated or number of bridges rehabilitated are not enough. What did these expenditures and rehabilitated bridges do for us?

Those are some of the issues to be faced by this forum and by all leaders in the transportation field--at the Federal level, the state level, and at the local level. Increasingly, "funds utilized" is not seen as an adequate measure. The focus is now on "service delivery" which depends not only on physical capacity but also on quality of operation and level of service demand. Quality measurements typically include accessibility, reliability, safety, and congestion. Additionally, measures of economic performance, such as employment generated and contributions to productivity, are gaining in significance. The indicators for measuring ISTEA achievement must include both service oriented features, and economic efficiency and productivity measures. While today will not provide all of the answers, we hope that we will be able to suggest issues for further consideration and approaches to the solutions we are all seeking.

DATA NEEDS FOR TRANSIT POLICY, FINANCE, AND EVALUATION

Richard P. Steinmann, Federal Transit Administration

INTRODUCTION

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) presents transportation decision makers with wide-ranging new flexibility in the allocation of Federal surface transportation assistance. As a result, the analysis of transportation policy options has taken on added importance. Transportation decision makers now may allocate funds to the "best" project or program, with much less in the way of strings attached in terms of categorical program restrictions. The issue then becomes defining what is the "best" use of these flexible resources. And this is where policy analysis comes in -- to provide decision makers with information on the impacts of alternative policies, in order to allow them to make these decisions.

This paper will outline a number of areas in which improved information is needed to guide transit policy decision-making. The transit policy analyst needs information and data in at least the following five areas: 1) system condition, 2) system performance, 3) the

impact of past investments and policy choices, 4) finance and 5) a variety of strategic issues.

In the past, the transit policy analyst could focus attention on the transit aspects of each of these issue areas alone. Today, with the enhanced flexibility of funding provided by the ISTEA, and the increasing emphasis on intermodal planning and on policies which effect more than one mode, it is becoming increasingly important to view these issues in multi-modal terms.

Transit System Condition

A basic set of information for transit policy analysis is a physical inventory of the transit infrastructure. The analogy from highways is the data collected for the Highway Performance and Monitoring System (HPMS). The system is comprehensive and includes both an overall inventory as well as information from a sample of highways on the physical condition and operating performance of the highway system. A key feature of HPMS is that physical condition and operating performance are reported on the basis of consistent definitions (i.e., pavement ratings and level of service). At the present time, data on transit system condition is not as systematic.

Section 15 data, collected from each publicly-sponsored transit operator, includes counts of the number of vehicles by age and their cumulative and annual usage. In addition, it includes counts of maintenance facilities and the quantities of other physical assets, such as track and stations.

While state and local governments can use Section 15 data, supplemented by their own inventories, to track the amount of transit infrastructure in place, these data include no information on the physical condition of these assets. As noted, data on vehicle age are collected, and age is a reasonable surrogate for the condition of these vehicles (and the need for their replacement). However, for a complete picture of transit system condition, more information is needed.

For rail transit systems, the Rail Modernization Study, conducted for the Urban Mass Transportation Administration (UMTA - now Federal Transit Administration, FTA), included detailed surveys of the physical condition of these systems. These surveys were conducted on a 15 percent sample basis and were based on consistent definitions of conditions. This study thus forms a useful basis for estimating the overall condition of the rail systems.

The Rail Modernization Study surveys were conducted in 1983-84 and are clearly dated. As a result, FTA is now conducting an update of this study. New engineering inspections are not included. Rather, transit operators have been asked to provide updated estimates of the conditions of their systems based on the improvements actually made since the study surveys were first conducted. We expect the results of this analysis shortly.

This information will be available to state and local governments for their own use. However, while we find data at this level to be adequate for national policy analysis purposes, there may be a need for state and local agencies with an interest in rail modernization to conduct more detailed, or more recent, inspections of the physical conditions of the rail systems of interest. We are aware of a number of such efforts now underway.

Data for bus system conditions are not as systematic. As noted, vehicle age data are available and can be used as a surrogate for fleet conditions. We have found this to be adequate for national level policy analysis purposes. However, at the state or local level, additional detail may be useful, and actual physical inspections of vehicle conditions may be in order in certain circumstances.

Data on bus maintenance facilities are even less readily available. While Section 15 data exist on the number of such facilities, the data do not provide any information on the size or conditions of these facilities. FTA is now undertaking a study to provide additional information in this area. The study should be complete by the end of 1992. This should provide a good snap-shot picture for maintenance facilities. However, at the state and local level, additional detailed information may be useful, as would continuing collection of data in order to track facility condition over a longer period.

Transit System Performance

A second basic set of information for transit policy analysis is data on current transit system performance. Again the analogy from highways is the data collected for the Highway Performance and Monitoring System (HPMS) which includes extensive data on highway system performance in the form of data on highway level of service. Level of service for highways is well defined, the result of years of research on the relationship between traffic volume and highway physical characteristics of vehicle speed and ride quality. In addition, years of research are available on the effect of changes in traffic volume on a variety of economic and other impacts of highway travel.

Transit system performance itself has several dimensions. These include economic performance (cost, patronage, service levels and their interrelationships), service quality, and user characteristics. Each of these dimensions is discussed below.

Economic Performance

The information on transit performance which is most readily available is on economic performance.
Section 15 data are available on the amount of transit service provided (e.g., revenue vehicle miles and hours), the amount of transit service consumed (passenger miles and unlinked trips) and on the cost to provide the service. These data permit computation of a wide variety of measures of transit economic performance. In the national reporting of economic performance contained in the FTA reports to Congress required by Section 308 of Title 49, United States Code, economic performance has been defined in terms of efficiency (cost per revenue vehicle hour), effectiveness (passenger-miles per revenue vehicle hour) and cost-effectiveness (cost per passenger-mile). Many other similar measures can be calculated using Section 15 data.

While this information is readily available at the system-wide level, it is not readily available outside transit operators themselves at disaggregate levels. Recent analysis for FTA, which will be reported on in the forthcoming Section 308 report, confirms the view that there are substantial variations of economic performance between various types of transit service and that these variations are masked by use of system-level performance measurement. The FTA analysis breaks down transit services into the following types: 1) local, 2) radial, 3) express/limited, 4) crosstown, 5) feeder and 6) suburban. Other typologies may make more sense in specific local cases. The wide variation in performance between these service types suggests the need to continue efforts to look at transit economic performance more closely, and for state and local policy analysts to develop more detailed disaggregated data.

Another way to look at transit service is by the market it serves. In the forthcoming Section 308 Report, FTA identifies three primary markets for transit: 1) general mobility for residents of central cities with intensive transit systems, 2) work trips with one end in the central cities and 3) general mobility for people with limited access to automobiles. Again, there may be other ways to structure the transit market. Transit services are likely to have the same sort of variations in economic performance in serving these varied markets as they do for various service types. While it is sometimes difficult to match the service provided with the markets served, it is clear that attention to the markets served would provide a more accurate picture of transit economic performance than does analysis at the system-wide level. state and local analysts may find it useful to assess their services in market terms, and to collect the data needed to support such analyses.

Service Quality

While data on economic performance is readily available, at least at the system-wide level, much less information is available on service quality. In addition, while the analogous factor on highways is clearly defined using level of service concepts, no similar concept has the same long-standing basis in transit.

Service quality is important because it defines one of the key features of the attractiveness of transit to the potential user and thus has an effect on the amount of transit use that will be achieved by investments in transit capacity. In addition, in the absence of information on service quality, analyses of transit performance have tended to focus exclusively on economic performance, overemphasizing this aspect of performance.

The factors which go into an analysis of transit level of service include things like waiting time, ride quality, the availability of a seat, the number of transfers required, safety, and the relative travel time compared with other modes. The 1990 Nationwide Personal Transportation Study (NPTS) included a number of questions which related to the quality of transit trips taken. The forthcoming Section 308 Report relies on this information for an aggregate picture of transit service quality. However, the number of questions related to service quality is limited and the relatively small sample of transit trips means that the analysis is limited to only national level aggregation.

For analysis of transit service quality at the state or local level, data on these factors are generally available at the transit operator, sometimes on a route-level, basis. However, this data is not based on standardized definitions nor is it generally available in any more aggregated form. For analysis at the state or local level, additional data would be needed. Clearly additional work is required in the area of transit service quality, at all levels of analysis.

User Characteristics

A key issue in assessing transit performance is information on the characteristics of transit's users. This includes information on demographic characteristics (income, race/ethnic origin, age, gender, etc.), the purpose of the trip being taken, auto ownership and availability and other such factors. Information in this area helps categorize transit's users in order that the markets for transit can be better understood. In addition, such information can also be helpful in providing support for transit in terms of its social function.

For national policy analysis purposes, the 1990 NPTS

provides information on many of these demographic characteristics. The forthcoming Section 308 Report relies on NPTS for an overall picture of the transit user. Again, the size of the NPTS sample prevents its use for analysis at a lower level of aggregation. State and local analysts will require data collected at the operator level in order to provide an accurate picture of user characteristics at specific operators or for operators within a state or urbanized area as a whole. Transit operator on-board surveys can provide this information fairly readily. However, to be useful at any level of aggregation beyond a single operator, uniform definitions and, even, uniform survey questions would be useful.

Multimodal Performance

The preceding discussion has focused exclusively on the performance of transit itself. However, in the current environment of ISTEA and the Clean Air Act Amendments, urban transportation must be and is increasingly being viewed as a multimodal system. Thus, measures of performance which cross modal boundaries are becoming more useful and necessary. Transit policy analysts must be aware of highway system performance. In addition, new measures need to be developed which are multimodal in nature. FTA is now in the initial stages of investigating how a multimodal urban transportation performance monitoring system could be structured. Similar efforts should be undertaken at the state and local level to assess performance broadly and intermodally.

Investment Impacts

Transit system condition and performance relate primarily to the status of the system as it currently exists. A key aspect of transit policy analysis is estimating the impact of alternative investments and policy options. In order to do so, methods and the information needed to support them must be available which can produce reasonable estimates of these impacts. Travel demand forecasting research over the last several years has developed a wide range of models which are designed to forecast the effect of various policy and investment alternatives. Data are needed to support these models and such data are collected in support of the transportation planning process although better information is always helpful.

One area in which much more could be done is in the evaluation of previous investments and policy changes. The Department of Transportation sponsored a major study of the impacts of the Bay Area Rapid Transit System (BART) in the late 1970's. UMTA sponsored more modest analyses of the impacts of the new rail systems in Washington and Atlanta. However, these studies ended in the early 1980's. Since that time, there has been limited efforts to assess the impacts of the investments made later. In addition, the BART, Washington, and Atlanta studies were conducted fairly quickly after the opening of these systems. Thus, they focused on the early impacts of the investments. No real systematic effort has been undertaken to assess the longer term impacts of these systems.

This lack of follow-through on these impact studies is unfortunately the norm rather than the exception when it comes to the evaluation of previous transportation investments. Good investment decision making needs better information on the impact of prior investments. State and local policy analysts should consider the need for collection of such information. Issues which are addressed as a part of these analyses should include 1) quantification of the change in the transportation system due to the investment or policy change, 2) the primary impact of the investment which are the resulting changes in travel patterns (mode choice, time of day distribution of travel, etc.) and the 3) secondary effects of the investment in terms of changes in the impact of the transportation system on the urban environment (noise levels, air quality, congestion, land use patterns, etc.). Continuing efforts are needed to evaluate impacts, and additional resources applied in this area will go a long way to improving our understanding of the transportation system and the impacts on it of investment and policy alternatives.

Finance

Transportation policy analysis is increasingly becoming tied to financial questions. Issues include forecasts of the revenue generated by the sources of funding available for transit operations and capital investments as well as the availability of new financing mechanisms for transit.

The ISTEA changes to the urban transportation planning process and major transit investment criteria add further impetus to this trend. The requirements for a Transportation Improvement Program (TIP) which is financially constrained will make accurate forecasts of the availability of revenues to support the TIP all the more important. In addition, a key part of the transit major investments process is the requirement for a financial plan. The ISTEA changes to the Major Investments Criteria contained in Section 3(i) of the Federal Transit Act provide more specificity on what is required to demonstrate that the project is in fact supported by an adequate degree of local financial commitment.

In essence, transit policy analysts will be called on to make forecasts of a variety of economic conditions in a region in order to forecast revenue. Data will be needed on trends in the tax base and on the factors which affect that base. For example, if a dedicated sales tax forms the basis of a financing plan for a major investment or the TIP, the analyst must be able to make adequate forecasts of retail sales in the region on the basis of changes in population, average income, and other factors. Similarly, each revenue stream in the financial plan will have to be estimated on a similarly well-supported basis. State and local policy analysts will need data on all of those factors which have an impact on these revenue streams.

Transit finance is becoming more complicated with the introduction of a variety of innovative financing approaches. more and more operators are considering alternatives to traditional grant supported pay-as-you-go approaches. In general, these approaches involve use of borrowing to spread the capital costs over the life of the asset. Examples include use of capital leases (rather than up-front purchases) of equipment and facilities, increased use of bond financing and a variety of public-private financing including joint development. Transit policy analysts will need information on the costs and benefits of these methods in order to assess the viability of alternative financing schemes.

Strategic Issues

Transit policy analysis must be conducted with knowledge of the factors in the environment which affect transportation demand. Data is needed on a wide range of such environmental factors and trends. Suburbanization, changes in employment characteristics, improvements in telecommunications, changes in overall income patterns, the aging of the population and other demographic factors all have longer-term impacts on transportation demand. Data are needed by state and local policy analysts on these trends. Such data are generally available from sources like the decennial census. In addition, forecasts of these factors are made by a variety of analysts at the national level. State and local policy analysts need to keep up with information available on such forecasts.

A key issue in transportation policy analysis is the relationship between land use and transportation. While much has been written about these interactions, additional information about the land use impacts of transportation investments would provide analysts with a better basis on which to estimate the overall effect of a number of broader policy options.

As noted earlier, the focus of transportation planning is becoming increasingly multi-modal. Transit policy analysts will need to be more aware of trends in other modes in terms of condition, performance and system growth. Data on highway condition and performance will become an increasingly important element in understanding the effect of transit policy alternatives. In addition, the effect on the transportation system as a whole of certain highway policy alternatives, particularly those related to highway pricing and potential improvements in highway technology (such as Intelligent Vehicle Highway Systems - IVHS) will also become increasing important to transit policy analysts.

Finally, transit is being called on to deal with a number of broader societal goals, such as clean air and accessibility for disabled persons. Transit policy analysts will need information on the costs and other impacts of measures needed to meet the requirements of the Clean Air Act Amendments (such as alternative fuel vehicles) and Americans with Disabilities Act. State and local policy analysts will also need to collect data on the impact of these measures as they are implemented. Continued analysis will be needed to provide information on how to manage continued compliance with these and similar requirements.

CONCLUSION

The environment in which transit policy analysis must be conducted is becoming increasingly complex. Enhanced flexibility of funding from the Federal government, the need to meet requirements such as the Clean Air Act, and growing urban congestion require transportation decision making to be multimodal. Thus, transit policy analysis must have the data and information available to provide the basis on which to assess the impact of a broad range of transportation policy and investment alternatives. Some of these data are already available. Much more could be gathered to support these increased needs.

DISCUSSANTS

Patrick J. McCue, Florida Department of Transportation, and Ronald F. Kirby, Metropolitan Washington Council of Governments

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Patrick J. McCue

Currently, the State of Florida is gaining in population at the rate of 800 persons per day. The immigrants from other states are living all over the state. There are now 27 urbanized areas in the state. The smallest and newest is Spring Hill Lake which is located on U.S. 92. This area does not have a local government available to discuss a cooperative planning process.