Census Journey-to-Work Long-Form Survey: Does It Support State and Metropolitan Transportation Planning?

William R. Loudon, *COMSIS Corporation*

The possibility that the journey-to-work questions, along with the other questions on the long form, might be eliminated from Census 2000 motivates the question, "Do the census journey-to-work data provide meaningful support to state and metropolitan transportation planning?" The collection, geocoding, and processing of the journey-to-work data are not inexpensive and so planners have to also ask themselves, "Is the information worth the money?" Numerous reports of its use will be heard during this conference, but the question is whether the availability of the journey-to-work data in combination with other census household data sufficiently improves the state and metropolitan transportation planning process to justify its cost. If the answer is yes and collection of this information is eliminated anyway, what are the alternatives? How would these data for state and metropolitan planning organizations (MPOs) be replaced throughout the country?

To help in structuring the collective thinking for the next three days of this conference, a perspective is provided here on how census data currently support the transportation planning process as well as a look at how data needs are changing and how the journey-to-work data might address these emerging data needs.

The Clean Air Act of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), in combination, significantly changed the process by which transportation improvements are planned and programmed in the United States. In a combination of subtle and not-so-subtle requirements, the role of technical analysis in the evaluation of project or program alternatives has been significantly increased. The Clean Air Act not so subtly mandated that nonattainment areas classified as serious or worse must formally model the mobility and air-quality impacts of long-range transportation plans, transportation improvement programs (TIPs), and projects sufficiently to demonstrate that the resulting emissions will be in conformity with the state implementation plan for air quality, that is, that the actions are consistent with the state plan for meeting the national air-quality standards.

Among the more subtle requirements are the following:

- For the first time, states must prepare statewide long-range plans to guide transportation investment;

- All long-range plans and TIPs must be fiscally constrained;
- In metropolitan areas, the long-range plan and the TIP must be developed in a process of cooperative consultation among the state, the MPO, and other participating agencies;
- Every metropolitan area of 200,000 or more must have a congestion management system to guide the programming of improvements; and
- All major new transportation investments that use federal funds must undergo a serious review of alternatives before being included in the long-range plan and ultimately in the TIP.

None of these requirements explicitly involve use of models or analytical procedures, but each is greatly facilitated by tools and data that allow a quantitative assessment of alternative projects, plans, and programs. Because of the fiscal constraint requirement, the selection of projects for the long-range plan and the TIP is now significantly more competitive, and good, hard analysis is essential to support the advancement of any particular project or sets of projects. This requirement is particularly significant for many of the states, which now must prepare a statewide plan but must also use more quantitative analysis to support their projects.

The Clean Air Act and ISTEA significantly broaden the definition of when and where analytical tools are needed to support transportation planning and programming, particularly for small and medium-sized metropolitan areas and state departments of transportation in their role of developing statewide plans and acting as a partner in developing plans and TIPs for metropolitan areas.

This increased need for analytical tools is relevant to the discussion of the census journey-to-work data because these data represent the major source of information for the analytical tools used by many metropolitan areas and states and the major source of supplemental data for the larger metropolitan areas.

To help assess the value of the journey-to-work data in meeting the new planning and programming requirements, one must examine the ways in which the data are used. The data can be used alone to provide descriptive analysis of work-trip patterns and, when compared with previous census-year surveys, of how those work-trip patterns are changing over time. In combination with other data, the journey-to-work data can support a region's travel demand forecasting package, providing input on workplace attractions, work-trip origin-destination distribution patterns, work-trip departure times, work-trip length distribution, and travel-time distribution. To smaller metropolitan areas with limited resources, the survey becomes a foundation on which to build a model system, and in larger metropolitan areas the survey is a useful data base on observed travel behavior with which to calibrate or validate the model system. Where other surveys such as home interview or workplace surveys are collected to support the modeling effort, the journey-to-work data provide a sampling framework for a home interview survey or an expansion factor for the home interview and other surveys.

Because of the importance of the work trip for much of transportation planning—the peak commute period being when capacity requirements are determined and work trips being the focus of much of the air-quality planning—the journey-to-work data also provide a valuable data base for specialized study within a region or within a specific corridor. When the journey-to-work data are used in the form of the Public Use Microdata Sample (PUMS), travel patterns and trip characteristics can be related to a valuable set of household characteristics for the trip maker. This relationship is particularly useful in the assessment of demand management approaches such as pricing strategies that have differing responses from different income levels and in the assessment of how a project might affect different socioeconomic groups. The new federal emphasis on environmental justice has spawned a new set of requirements for analysis of federally funded projects; census journey-to-work data can significantly enhance the specificity and quality of data used in these analyses.

ISTEA also significantly elevated the importance of performance measurements and performance monitoring as factors in determining the direction for transportation programs and projects. This emphasis is reflected in the requirement for a congestion management system (CMS) to inform the planning and programming process in metropolitan areas of 200,000 or

more. Although certainly not supplying all of the data required for a CMS, the consistently collected journey-to-work data provide a useful monitoring tool with national coverage. Not only can historical trends be examined for any particular metropolitan area, but also certain work-trip performance characteristics (trip length, trip travel time, and mode of travel) and stratification or population characteristics can be compared across metropolitan areas or geographic areas or within a metropolitan area. It is not hard to see how this monitoring can be useful at national and statewide levels and within specific metropolitan areas.

It would seem from this assessment and from the evidence provided by the case studies prepared for this conference that the census journey-to-work data can have a number of useful applications in state and metropolitan transportation planning. Now one must ask, "Is the information collected by the survey accurate and unbiased? Are the data of sufficient quality to be used in making long-range investment decisions?"

Clearly the journey-to-work survey is not perfect. It has flaws that limit its overall usefulness and that certainly require that it be supplemented with other data to correct these flaws or biases. COMSIS Corporation has just completed a handbook for the Bureau of Transportation Statistics (BTS) and the Federal Highway Administration (FHWA) that describes the ways in which the data from the survey are flawed and provides factors that can be used to adjust the data for use in planning. As most planners are aware, the most significant flaw is that the survey asks for the respondents' "usual" work-trip activities. If the survey data are used directly, unfactored, the data will overreport the most frequently used options and underreport the less frequently used ones. The person who normally drives to work but takes transit several times a month will report only that he or she drives to work. Similarly, the person who telecommutes once a week will be reported as if he or she traveled to the work site every day of the week.

In the handbook, correction factors are provided for four different sources of bias: absenteeism, multiple work trips, trip chaining, and "usual" mode to work. These correction factors were developed by comparing the census journey-to-work data with home interview survey data for a set of selected metropolitan areas and with the Nationwide Personal Transportation Survey (NPTS) data base.

Certainly the journey-to-work data would be more useful if these biases or flaws could be eliminated through more specific questioning about travel activities and work activities on a specific day. But even in their present form, the corrected data are useful in the metropolitan and statewide transportation planning process.

A second factor limiting the usefulness of the journey-to-work data is incomplete geocoding of workplaces. At least one of the conference presentations this week illustrates how geographic biases where the geocoding is incomplete can result in significant biasing of the journey-to-work data, particularly when the aggregated tables are used. As is illustrated by the case study from the Baltimore region, supplemental geocoding can significantly improve the overall quality of the data base for a region.

Finally, the journey-to-work data are frequently criticized for the format in which they are distributed. The unformatted and condensed files, although efficient in the use of storage medium, have required sophisticated knowledge of data storage and retrieval protocols. Fortunately this issue has also been addressed through the efforts of FHWA and BTS. Under contract to FHWA, COMSIS has developed standardized SAS programs to read and manipulate the data, and under contract to BTS, Caliper Corporation has produced a stand-alone Windows program called TransVU that will also read and manipulate the data sets. Under contract to FHWA and BTS, JHK & Associates will provide training on the use of TransVU and the Census Transportation Planning Package (CTPP) Urban Element files.

How are data needs changing? What are the emerging needs for data? In addition to the broader use of analytical tools described earlier, three significant trends relate directly to a better understanding of the household characteristics of any particular traveler on the system. The increasing complexity of travel patterns, the more and more common chaining of trips with different purposes, and the increasing number of options available—such as whether to work at home or on site for any particular day—are moving planners toward

- More use of personal and household characteristics in the modeling process,
- More reflections of household life-style as a determinant of travel, and
- Activity-based modeling that reflects all the needs and constraints of a household rather than treats each individual household member in isolation.

Although it is not clear how much these trends will permeate the modeling process, any significant increase in accuracy in modeling urban travel behavior will have to come by incorporating these trends into the modeling systems. The trends provide still further substantiation of the argument for continuing to collect journey-to-work data because of the depth of household characteristics that these data contain. Any alternative source of journey-to-work data might not carry the same richness of household information or would include it only with substantial increase in the cost of collection.

As a final point in this overview assessment of the usefulness of the journey-to-work data, what are the options for replacing the data if the survey is eliminated in Census 2000? What are the alternative sources for the data provided by the journey-to-work survey? The journey-to-work survey adds three types of data to what is already collected by the basic census form:

- Location of employment in the metropolitan area,
- Characteristics of those who commute to specific locations or between specific origin-destination pairs, and
- Specific commute travel patterns within a region: the origin-destination combination, the choice of travel mode, the departure time, the trip length, and the trip travel times.

There are alternative sources for employment location, but unfortunately none of them (including the census journey-to-work data) are 100 percent comprehensive and accurate. It is actually the combination of the journey-to-work data files and the other sources, whether they be commercial inventories or public-sector-sponsored inventories, that provides the best opportunity to obtain a comprehensive employment location inventory.

For the two other categories of data, which relate to commute travel patterns and the characteristics of the trip maker, there appear to be only two logical sources for replacement data: home interview surveys and workplace surveys. The traditional home interview survey is already used by many of the larger metropolitan areas in combination with the journey-to-work data. But for a smaller metropolitan area, a home interview survey of sufficient sample size for statistical reliability may significantly tax the region's resources.

The other alternative is to conduct a survey at the work site, which can be significantly less expensive but generally requires that the survey be more limited to be acceptable for implementation at a work site and therefore limits the ability to determine socioeconomic characteristics of the worker's household. There is also significant concern about the willingness of businesses to cooperate in more surveying of employees. Clearly, replacement of the journey-to-work survey with a home interview survey or a workplace survey would cost substantially more to implement nationwide, and it would be virtually impossible to ensure consistency in a way that would accommodate the development of a national data base and facilitate comparison across state or metropolitan areas.

To summarize, it would appear that the census journey-to-work survey provides data that are valuable to the planning and programming process for transportation projects in states and metropolitan areas. The data are becoming more valuable to a broader range of agencies as a result of the subtle and not-so-subtle influences of the Clean Air Act and ISTEA. The journey-to-work survey is not perfect, but supplemental data factors can be applied to correct the flaws. Emerging data needs would appear to also further underscore the need for a transportation survey connected with the Census of Population. Finally, replacement of the data on a consistent national basis with equal coverage of household characteristics would be enormously more expensive if done independent of the census.