Transit Planning and the Census: Experience with 1980 and Lessons for 1990

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The purpose of this paper is to document the experience of the transit planning community with census products with the intent of helping to generate suggestions for 1990. In order to accomplish this in an orderly way, transit planning will be broken down into the series of planning processes normally associated with public transportation. These are strategic planning, long-range regional system planning, project or corridor planning, site or subarea planning, and operations or service planning. Each of these will be addressed first by defining its technical content and then by giving an overview of the utility of census products for that particular type of planning. Finally, national experience in the varied types of planning will be synthesized into a series of recommendations for 1990.

It is important to note that the perspective that will be reflected in the analysis that follows is one that defines transit planning as the process of providing objective information to decision makers associated with the provision of public mobility. As will be seen, this can be quite different from the planning that is totally focused on the provision of conventional fixed-route, fixed-schedule public transportation services.

STRATEGIC PLANNING

In the context of public mobility (i.e., public transportation) strategic planning involves the analysis of long-term trends in those social and demographic factors related to public mobility need and public transportation use. Questions typically addressed include the following: What are the emerging (and declining) markets for public transportation in terms of location and character? What kind of services and facilities will be most appropriate and how should they be financed, developed, and operated with an emphasis on institutional structure?

The major analytical tasks facing public transportation strategic planners are (a) determining which demographic, socioeconomic, and transportation supply factors most closely influence long-term public mobility needs; (b) developing ways of forecasting change in these factors at aggregate levels (e.g., regional, state, and national); and (c) analyzing various investment and operations options in the face of future forecast needs.

To characterize the utility of census data to public transportation strategic planning as it was just defined is easy; without the rich data resources provided by the census both in terms of travel-impacting demographics and transportation use, the task would be impossible. Since 1970, virtually no transportation strategic planning has been accomplished by any governmental entity that did not utilize at least some transportation-related census product. In fact, a strategic planning study is now being carried out by UMTA with assistance from the Joint Center for Political Studies using almost all transportation-related census products. The study is based on an analysis of

nationwide demographic and travel trends shown in the half-percent public use microdata sample and relies heavily on results of previous Nationwide Personal Transportation Surveys. These nationwide trends will be arrayed against changes identified in a parallel analysis at the regional level for 16 sample cities. The regional-level analysis will utilize data from the Census of Population and Housing as well as the journey-to-work reports from the census.

REGIONAL SYSTEM PLANNING

Regional system planning is that process by which specific, long-term (20 to 30 years) transportation problems in a given region are identified and priority ranked. Long-range regional transportation system planning is usually multimodal in nature and is charged not only with the identification of the corridor problems requiring longer-term major investment solutions but also with the specification of a reasonable set of alternatives worthy of further study at a reduced geographic and temporal scale. Key analytical tasks associated with regional system planning are the development and application of travel demand and supply simulation models capable of sensitivity to large-scale transportation investments and operational changes. Both the development (i.e., calibration) and application of these models require demographic or socioeconomic data, the former for a base or calibration year, the latter for a forecast or analysis year. Base-year data are, of course, measured whereas future-year demographic data, though an input to travel simulation models, must itself be forecast. Base travel demand or use data are typically used for model development and as an aid in checking forecast-year results for reasonability.

Comprehensive home interview surveys were once the major source of disaggregate-level demographic and travel data useful for regional transportation planning. Since 1970, however, their cost has become so prohibitive that few, if any, have been taken. The census has become virtually the sole source of basic, home-end demographic data, with travel data supplied by both the census journey-to-work survey results and various small-sample supplemental surveys focusing on nonwork trips and other demand issues. Although metropolitan planning organizations (MPOs) are the keepers of the regional models and data bases, they are utilized by transit operators in addition to state and local governments.

PROJECT OR CORRIDOR PLANNING

Project or corridor planning, known in UMTA parlance as alternatives analysis, is that process in which the range of investment options identified as potential ways of solving long-term regional transportation problems during regional systems planning are studied in detail. The travel demand (and system supply) simulation models used in transit corridor planning are similar to those used in regional system planning but generally reflect increased geographic detail and a shorter analysis time frame (e.g., 15 years). Cost-effectiveness, financial impacts, high-occupancy-vehicle (HOV) demand, and station capacity and congestion are key analysis issues. These usually require both simulation tools developed and applied at a more disaggregate level of detail than regional planning and totally new, add-on procedures. Unfortunately, the requisite additional demand data for model development , application, and checking are not available from any census source and must be supplied by supplemental counting and survey programs. These data include information dealing with mode of access or egress and parking and travel by time of day, data that must be collected on a highly disaggregate basis.

In recent years, transit project planning has become synonymous with the UMTA-mandated alternatives analysis process. The financial and cost-effectiveness criteria produced during various alternatives analyses across the country are used to rate proposals for discretionary federal (Section 3) funding in terms of their relative investment worthiness from a national perspective. This national investment rating process requires that the requisite evaluation factors be produced in a consistent fashion. This cannot be accomplished without the common data base that the census provides.

SITE OR SUBAREA PLANNING

Site or subarea planning is the process by which engineers and planners assist in the overall design of well-defined, encapsulated urban developments. To the degree that travel demand and supply simulation tools are used at all in site planning, they focus on estimating pedestrian and vehicle flows and impacts at a relatively microscopic level for a time horizon that is usually quite short (less than 10 years). Required demographic and travel demand data most frequently deal with the nonhome end of trips, requiring augmentation of the traditional data bases and analytical tools developed with census data.

It is likely that the major site or subarea planning exercises for the rest of this decade and the 1990s will focus on areas that have become known as major nondowntown activity centers. These are suburban development nodes that contain regional shopping malls, office space, and residential units spread over the highly accessible area at the confluence of a number of regional transportation facilities (e.g., freeways, commuter rail lines). Because they are relatively small compared with central business districts (CBDs) (usually under 50,000 employment) and because large urban areas may have more than one, the travel and demographic data necessary to support traffic analyses must usually be obtained from ad hoc special-purpose surveys taken outside the home (e.g., at parking lots, roadsides, and workplaces).

OPERATIONS OR SERVICE PLANNING

In operations or service planning, information germane to the potential cost-effectiveness of existing or proposed public transportation services is generated on a route-by-route basis. In these analyses, the same horizon is extremely short (e.g., tomorrow) and the level of geographic aggregation, closely related to access or egress walking distances, is incredibly detailed.

Though UMTA and others have expended much effort on the development of route-level demand (and operating cost) models in support of operations planners, most existing operations analysis tools are limited in market identification as opposed to actual demand forecasting. These tools use census address reference files or some other network representation and block- or tract-level census data (or both) to determine the number and character of households within walking distance of the route or routes under analysis. These data in turn can be subsequently input to an actual demand model.

In recent years, operations planners have become increasingly involved in the specification and analysis of nonstandard transit services. These include door-to-door paratransit services for the elderly and handicapped, carpooling and vanpooling programs, employer-provided transportation, and so forth. The great detail required for conventional transit service planning in terms of geography and socioeconomic character is even more pronounced for these increasingly popular service options because of their market-focused rather than available-to-the-public nature.

SUMMARY AND SYNTHESIS

The foregoing discussion has outlined the technical content of the various analytical processes that make up transit planning in an attempt to specify the uses of and need for census data by transit professionals. If there is any single conclusion that can be drawn, it is that virtually no analytical aspect of transit planning can proceed without at least part of the rich data resources provided by the census. Whether the technical work to be accomplished is cost-effectiveness assessment, financial forecasting, or simple market identification, demographic data describing the full range of factors affecting travel behavior are required. The level of the geographic aggregation of the data may vary as a function of the type of planning being accomplished, as may the need for supplemental travel and socioeconomic information. Nevertheless, the need of every state MPO, transit operator, and local government for the same data speaks to the efficiency of its collection by a national entity. Moreover, the need for federal strategic planning and project evaluation points to the need for a consistent data format and base year.

It should be kept in mind, however, that as urban areas and transportation needs have evolved, so have transit and transportation planning. Whereas once the concern was with the planning and implementation of wholly new transportation programs and regional systems, now the concern is mostly with the maintenance and upgrading of existing ones, with only incremental new additions. Although urban transportation problems were once associated strictly with CBDs, suburban activity center access and egress and internal circulation problems and suburban public mobility are now increasingly dominant concerns. Finally, although level-of-service, demand, environmental, and energy impacts were once the key transit planning issues, financial feasibility and cost-effectiveness have become increasingly important.

The impact of these changes on transit planning data needs is clear if the resultant shift in the mix of required analytical activities is examined. Future stress will be on strategic and financial planning, operations planning, subarea planning, and project analysis. This means an increased emphasis on activities that, though well served by current census products, require demographic and travel data that are supplemental to the data currently available. The need for increased geographic presentation flexibility is an additional factor that must be accounted for in planning for 1990.

None of the foregoing suggests less of a need for the current census programs and products now available to the transit community. Nor does it suggest the need for a massive increase in the types (and amount) of data collected by the census. It does suggest, however, that evolutionary changes in the existing data set are required, as are flexible techniques for integrating census data with needed supplemental data resources. Developing or disseminating these flexible tools and providing assistance and training in their use must be an important objective of any transit planning technical assistance program.

The views expressed in the preceding are those of the author and do not represent a statement of policy by the Urban Mass Transportation Administration.