

TECHNICAL SUMMARY

Cost-Effective Data Collection in Louisiana

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INTRODUCTION

Metropolitan areas with over populations of 50,000 are required to conduct transportation planning on a continuing basis to maintain a transportation plan that qualifies for federal funding. Data to support such planning is expensive to collect and can become outdated. This research was initiated to assist metropolitan planning authorities in Louisiana to acquire the necessary transportation planning data as cost-effectively as possible.

OBJECTIVE AND SCOPE

The objectives of this study were to investigate the transferability of data collected elsewhere for use in metropolitan areas in Louisiana, to consider updating such transferred data with local data, and to test the efficiency of collecting data using a day-planner activity diary and vehicular travel by means of a Geographic Positioning System (GPS).

The scope of this study was limited to data required for personal travel in metropolitan areas; freight movement or intercity travel were not considered. The data was also limited to current data and did not include forecasts of future values.

RESEARCH APPROACH

The research was directed at identifying how to make the maximum use of existing data, collect new data efficiently, and combine existing and newly-collected data as effectively as possible.

Maximum use of existing data

Considerable existing data are readily accessible to metropolitan transportation planners at little or no cost. Official sources of secondary, data such as that from the decennial census, National Personal Transportation Survey,

Bureau of Economic Analysis, and the Bureau of Labor Statistics, are good sources of free data. Commercial data providers such as Dunn and Bradstreet and Data Resources Incorporated provide data at a fee, but present the opportunity to obtain data quickly and with little personal effort. Comparing transportation planning data from secondary data sources with data collected in a recent travel survey in Baton Rouge, Louisiana, indicated that secondary data can replicate local values closely in most cases, but that certain idiosyncrasies of local data can result in differences.

A large number of primary data sources, data collected specifically for transportation planning purposes in other metropolitan areas, are available as transfer data to metropolitan areas in Louisiana. More than fifty metropolitan areas in the U.S. have conducted transportation surveys in the last decade, and many of these provide potentially useful transfer information. Tests comparing transferred data to that from Baton Rouge, indicate that transferred data are similar in certain cases and different in others. However, overall primary data from other metropolitan areas is a valuable source of information on the travel characteristics that can be expected in an area.

Collecting new data efficiently

Three means of improving the efficiency of data collection were investigated in this study. First, stratifying the population into groups of homogeneous travel behavior was investigated. The study found that approximately one-third of the variation in household trip rates could be captured by stratifying the population by household size and vehicle ownership. Collecting data within these strata provides an opportunity to get more accurate estimates of travel behavior.

Second, a new form of activity diary was tested in which activities were recorded in day-planner format. Data were collected from 108 households in Baton Rouge, and the study found that the new diary format functioned successfully among all socio-economic levels of respondents.

Third, vehicular travel was observed using a GPS instrument in the vehicles of a trial set of respondents and the study found that an accurate record of travel could be obtained in this manner.

Effective combination of transferred and local data

One of the problems associated with periodically collected data sets for use in metropolitan transportation planning is that the data soon become outdated. If local data is to be as useful as possible, then it should preferably be constantly up-to-date. To consider this possibility, a panel of respondents that could be surveyed on an annual or bi-annual basis was investigated. Initial findings suggest that a panel of 500 households would allow effective updating possibilities to transferred data. Maintaining a panel of this size and surveying it on an annual basis is expected to cost approximately \$25,000 per year.

Combining transferred and local data can be effectively achieved using Bayesian updating procedures. This procedure allows the transfer of data from two or more sources, before being updated with local data. Data such as trip rates, mode shares, time-of-day of travel, and trip length distributions can be updated with Bayesian updating methods. In tests using transferred data from the National Personal Transportation Survey of 1995 and the North Central Texas Council of Governments survey of 1996, transferred values updated with local data were found to be generally similar to the values obtained from a full-scale data collection exercise in Baton Rouge in 1997.

CONCLUSIONS

Considerable data exists that metropolitan planning authorities can access to fulfill their planning requirements. Much of this data is available free of charge and is readily accessible. Data can be used as is or it can be updated with local data to allow local characteristics to be reflected in the values. Bayesian updating appears to be an effective method of combining information from one or more external sources with local data. The use of a panel to provide current local data seems feasible and cost-effective, since an annual cost of \$25,000 per year is less than the cost of a full-scale cross-sectional survey of 2000 households. The use of GPS to capture vehicular travel appears promising, although certain problems such as the failure of the driver to turn the instrument on at the beginning of each trip remains a problem.

RECOMMENDATIONS

The research conducted in this study was exploratory and several procedures that promise to provide time and cost savings in providing metropolitan transportation planning data need to be investigated further. In particular, it is recommended that:

1. The features of a panel of household be established that specifically address the issue of panel size, panel maintenance, survey frequency, and the sample frame of the panel.
2. The use of GPS to collect vehicular travel needs to be extended. In particular, the retrieval of characteristics of the trip such as trip purpose and number of occupants in the vehicle from the driver of the vehicle in a subsequent interview needs to be tested and refined.
3. The methods investigated in this study should be applied to a metropolitan area on a trial basis. The application should be conducted in parallel to the conventional process, comparing the results.

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