

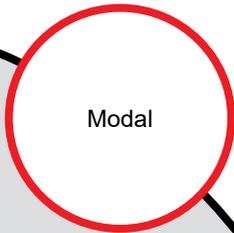


Caltrans Division of Research,
Innovation and System Information

Research



Results



Modal

MAY 2019

Project Title:

Comparing Modes of On-Board Transit
Passenger Surveys: Assessing Trade- Offs
Between Data Quality and Cost

Task Number: 2629

Start Date: October 28, 2013

Completion Date: June 15, 2015

Task Manager:

Fouad Ziaullah
Transportation Engineer (Electrical)
fouad.ziaullah@dot.ca.gov

Comparing Modes of On-Board Transit Passenger Surveys: Assessing Trade- Offs Between Data Quality and Cost

This project will investigate the relative costs, response rates, survey completion rates, and respondent demographics for several different modes of implementing transit rider surveys.

WHAT IS THE NEED?

Transit agencies invest tremendous financial and time resources into surveying their customers. These efforts are justified as the data collected are fundamental inputs for a range of purposes including “travel modeling, long-range and areawide planning, route planning and scheduling, service design, marketing, and customer communications”. In addition, these surveys are, as of Fall 2012, required by a new Federal Transit Agency circular to ensure participation from minority and low-income populations who have historically under-participated in such efforts.

Despite the critical value of transit surveys, they are also very costly to agencies, easily running \$500,000 to a \$1 million for a large agency. Thus, there was a need to identify the lowest cost survey mode options that can still produce quality results.

WHAT WAS OUR GOAL?

The study results actively transmitted to both transportation professionals and academics. Presentations will be made at the annual meetings of the Transportation Research Board (TRB) and the Association of Collegiate Schools of Planning (ACSP). The results were of interest to other meetings on transit planning and survey methodologies, such as the National Transportation Applications Conference and the International Conference on Transport Survey Methods.

The National Transit Institute (NTI) was briefed on the findings to inform their course offerings for transit professionals. A seminar



Caltrans provides a safe, sustainable,
integrated and efficient transportation
system to enhance California's
economy and livability.

was given on the project to the Travel Survey Interest Group (TSIG), a working group of public sector transportation planners in Chicago, Illinois. Finally, an article was prepared for publication in a peer-reviewed journal such as *the Journal of Public Transportation* (preferred, as it is open-access) or *Transportation Research A: Policy and Planning*.

WHAT DID WE DO?

This project investigated the relative costs, response rates, survey completion rates, and respondent demographics for several different modes of implementing transit rider surveys. The three modes compared were determined as part of the project, but were highly likely to be: (1) a paper-based, self-administered survey, (2) a paper-based self-administered short survey followed by a computer assisted telephone survey, and (3) a paper-based self-administered short survey on a postcard followed by an internet survey.

For each survey mode, this project analysis:

1. Identified the cost per completed survey.
2. Derived response and completion rates.
3. Quantified any statistically significant demographic differences in participation.
4. Described associated logistical challenges and pitfalls.

WHAT WAS THE OUTCOME?

In terms of the return and completion rates, the survey modes' relative performance depends a great deal on whether one is interested in response rates or completion rates, as well as how one defines completion and return rates. The online survey is perhaps the simplest case. It generated by far the lowest return rates for all definitions, as well as very low completion

rates. Comparing the paper and tablet modes, the paper survey had a much better return rate - 18 percentage points better - if the return rate is calculated as the percentage of passengers approached by a surveyor who returned a survey. Similarly, looking at complete surveys, paper performed at least 11 percentage points better than the tablet mode by all five definitions of completeness tested as a percentage of passengers approached. Both tablet and paper performed well in terms of complete responses as a percentage of returned surveys, with tablets marginally better at obtaining responses to all questions, or no more than one question skipped.

Next, the report analyzed the relative performance of the survey modes in terms of how often respondents answered particular questions or types of questions. Key findings are that:

- One key finding is that the tablet and online surveys performed better than paper for almost all questions, with the notable and important exception that the paper outperformed the tablet on the income question by 6 percentage points. However, the magnitude of the differences was minimal for most questions, with no difference greater than 11 percentage points and 5 percentage points or less in three-quarters of the comparisons across modes for any question.
- When questions were grouped into types, by either format or subject matter, the most striking finding was that the questions rating Muni service, which also uniquely appeared in a matrix format on the paper and online surveys, had the highest missing rates.
- An analysis of the usability of the geographic data that respondents provided found that all three survey modes generated similar percentages of geocodable trip origin address data (Q18), but the online and tablet surveys generated modestly more usable home zip

codes (a 5 percentage point improvement).

One survey question asked respondents to estimate their time on the travel vehicle. The online survey obtained a higher proportion of responses from short-trippers than did the paper surveys. (There was no statistically significant difference between the proportion of short-trippers from the tablet mode and either of the other two survey modes.)

An analysis of the four stated preference questions explored the variation in service quality ratings across the three survey modes. For every question, the mean service quality rating was higher for the tablet surveys than for either of the other survey modes, and these differences were statistically significant.

Turning to the socio-demographic characteristics of the people who responded to each survey type, the tablet and paper surveys performed within five percentage points of each other at representing all population groups. In a few cases these differences were statistically significant for population groups particularly important for equity analyses, with the paper survey capturing lower proportions of African-American and LEP passengers, but a higher proportion of very low-income and Asian passengers.

Finally, the report compares the cost of the three survey modes in terms of the on-board surveyor and data entry time required to generate each complete. The paper surveys required the fewest labor hours per complete by all definitions of completeness. The tablet surveys required from 50% to 100% more labor hours, depending on the definition of completeness, and the online surveys required considerably more labor.

WHAT IS THE BENEFIT?

The study results were of primary interest to transit agencies, which are now required to survey their passengers at least once every five years, and the transportation and market research consultants who carry out these surveys on behalf of the transit agencies. The results of this research directly informed the selection of survey mode by quantifying the cost and quality tradeoffs. Furthermore, this work assisted in the design of the chosen survey mode to ensure appropriate response rates and the inclusion of environmental justice populations.

This work was very useful to transportation planners at municipal and regional agencies, such as metropolitan planning organizations, which undertake travel surveys for the purposes of informing their travel demand models. This work provided tools for assisting these agencies to be critical consumers of surveys conducted by their partners as well as for informing their own travel survey methodologies. Since these agencies often provide the key funding for transit passenger surveys, it is essential that they are aware of survey mode tradeoffs.

More broadly, this work expanded the understanding of innovative surveying methods. This work specifically assisted in the design of mixed survey modes that incorporate intercept and follow up elements. In addition, this work was of particular use to those interested in surveying populations, which have historically demonstrated low participation rates in such efforts, including minorities and LEP populations.

Final Report Link: <http://transweb.sjsu.edu/PDFs/research/1206-transit-passengersurveys-quality-and-cost-comparison.pdf>