

I. PROBLEM TITLE

How Can Carpooling/Vanpooling Complement Transit Services, to Reduce SOV Travel?

II. RESEARCH PROBLEM STATEMENT

Energy consumption, tailpipe emissions, public transit costs, and demand for infrastructure expansion could all be reduced if more people shared rides rather than driving alone, yet car pooling is observed to represent only a small proportion of all potential car poolers. Li et al, 2007, asked: Who Chooses to Carpool and Why? Among Texas carpoolers they found that the ability to use high-occupancy vehicle (HOV) lanes is the most important factor in the decision to form a carpool, followed by ‘enjoying travelling with others’, ‘saving time’, ‘helping the environment and society’, and ‘sharing vehicle costs’. Matching programs, incentives, and preferred parking at work were found to be least important factors. While it is not the case in all jurisdictions, almost 75% of carpools in their sample were found to be ‘fam-pools’ consisting of family members.

A recent advertising campaign likened the flow of traffic on the highway system to a river and observed that the river is full of empty seats. Analysis suggests that many of the trips taken in single-occupant vehicles (SOVs) are ‘convergent’, meaning that they travel for at least some part of the journey on the same facility, in the same time slot, to a similar destination. Commuters are offered a range of choices, and from observation it would appear that all else being equal they prefer SOV, unless a range of specific factors exist. However, for a variety of reasons the societal cost of expanding capacity for SOVs is no longer acceptable and alternatives are being sought. While increased use of public transit is desirable, where services and spare capacity are not available a comparatively low-cost alternative is to encourage higher vehicle-occupancy rates. In the short term at least, traditional public transit services are constrained by shortages of capital and operating funds. Definition of facilitated car and vanpooling services as ‘transit’ and integration of them with transit services could expand transit’s reach and reduce SOV travel.

We hypothesize that mode choice decisions can be explained by the relative utility of different mode options, and seek to develop a greater understanding of the utility factors and their relative importance. A key departure that we propose from the existing literature is the recognition of segmentation in the market for mobility and the need to recognise this in making mode supply decisions. We perceive that many aspects of the utility equation have not been fully quantified or understood, and their relative importance for different psychographic segment groups has not been sufficiently explored. We would like to develop a predictive model that can be used to guide development of alternatives to SOV driving, with a focus on sharing rides and using transit and also incorporating all other modes including telecommuting, complementing the existing EPA Commuter Choice model.

III. OBJECTIVE

There are many technology based dynamic ridesharing and flexible carpooling solutions under development that are expected (by their developers) to result in an increase in the amount of ride-sharing. Policy makers have few tools to help them evaluate these alternative solutions. The proposed predictive model will provide such a tool and enable decision-makers to encourage development of solutions specific to the characteristics of their own transport corridors.

For the purposes of this problem statement the term ‘predictive model’ is intended to mean a model that can be used to predict the uptake of different transport modes in a transport corridor using as input data:

- the results of a survey of the population in the corridor that captures information about the utility factors for segmentation within the corridor,
- the available and potential modes in the corridor and their capacity
- uptake by segment of available modes in other corridors

The model would also enable more effective service/mode design by informing developers of latent and emerging needs and wants, especially in light of changing trends of oil prices and climate change imperatives.

IV. RESEARCH PROPOSED

Literature review of mode-choice models. including the EPA Commuter Choice model. and segmentation

Choice of segmentation methodology
Qualitative and quantitative research to identify factors and apply segmentation methodology
Model development
Model testing
Model refinement

V. ESTIMATE OF THE PROBLEM FUNDING AND RESEARCH PERIOD

\$350,000-500,000, over 18 months

VI. URGENCY AND PAYOFF POTENTIAL

It has been reported that at least a third of all public transit agencies in the US reduced services in 2009 due to constrained budgets. The most expensive services are those provided at peak, for while they might be full of fare-paying passengers they do not recover the full cost of providing the service. Reducing demand for expanded public transit provision, by better utilising the private car and van fleet through greater levels of ride sharing, will help to reduce demand for increased services and possibly enable reduction of existing highly subsidised services where such services are under-utilized. Provision of a model that enables development of more effective alternatives therefore has a potential payoff in the hundreds of millions.

With regard to urgency, excess emissions from SOV-congested roadways are contributing to the accumulation of greenhouse gases in the atmosphere, and most commentators characterise the reduction of such emissions as highly urgent in the very near time-frame.

There are institutional barriers to some proposed methods for increasing ride-sharing. The provision of this tool should enable more robust evaluation of the alternatives and help to reduce these barriers.

VII. RELATIONSHIP TO FTA STRATEGIC GOALS AND POLICY INITIATIVES and TCRP STRATEGIC PRIORITIES

While it might not appear to be the case on first reading, this problem statement fits under the first of the FTA's strategic goals: Support Increasing Transit's Market Share. Without pre-supposing the outcome of the research it can be seen that transit-linked car and van pooling, especially where the destination is a transit center and the participants utilize transit for some part of their full journey, (resolving first and last mile issues) will result in greater overall mobility at lower overall transit cost. Further, to the extent that a switch from SOV to HOV can be seen as a step in the transition from SOV to all shared modes, research that develops a greater understanding of mode choice decisions will enable better design of transit services to better encourage the transition.

The problem statement can be seen to talk to several of the strategic priorities, as follows:

1. Place the Transit Customer First: this research will better define the existing non-transit customer in the terms in which he or she could become a transit customer, whether through ride sharing as a transition, or directly.
2. Enable Transit to Operate in a Technologically Advanced Society: the solutions under development and deployed for dynamic ridesharing and flexible carpooling are technologically advanced, and can be integrated with transit to achieve the most effective complete system for moving people.
3. Continuously improve Public Transportation: If ridesharing systems can be redefined as public transportation, at least in the minds of administrators, then public transportation will be seen to be much more responsive and flexible, and their reach extended into markets that were previously seen as too costly to serve, most likely as feeder services to transit, or as lower cost to serve alternatives to existing underused transit services.
4. Flourish in the Multimodal Environment: integration with ridesharing is the essence of multimodal-ism. This research will help to maximise the effectiveness of the whole transportation system.
5. Revitalize Transit Organizations: By redefining transit through a greater understanding of the utility equation for non-transit users, and embracing ridesharing as a component of transit, overall costs will be lowered and opportunities for revitalization will abound.

VIII. RELATED RESEARCH

Some years ago (in an unreported study for a city council client) we surveyed commuters and spoke to people who travelled by car and those who used public transport. The public transport users gave higher overall value scores and many other higher scores, than did the car drivers. Most public transport users often had a choice of using a car or public transport. We concluded at the time that it was as much about them exercising their choice that gave them a higher perception of value as it was about using a different form of

But we didn't have enough information (or we didn't think) to explore a broader set of questions. Were the people in the two samples the same, or were they different. What was driving the public transport users to make their choice of PT when they had alternatives. Did they value their time differently (it is usually believed that public transport is a slower mode than the private car), or did they have a greater sense of community? Or had they come from a culture that encouraged greater use of public transport? Or were they more environmentally aware? We didn't apply segmentation thinking.

A number of pilot projects are now being planned or are under way to test new technologies and systems for increasing ridesharing. The proposed research will help with evaluation of the uptake of those systems for the benefit of the policy makers, as well as aid in the design of further services for the benefit of all commuters.

IX. PERSON(S) DEVELOPING THE PROBLEM

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And others.

X. PROCESS USED TO DEVELOP PROBLEM STATEMENT

This problem statement was initiated by Paul Minett, commented on by contacts from a recent workshop at MIT reported on at <http://ridesharechoices.scripts.mit.edu/home/> and others, and modified to take account of comments and suggestions.

The AP020 Committee, Emerging and Innovative Public Transport and Technologies, supports this problem statement.

XI. DATE AND SUBMITTED BY

Submitted by Paul Minett Co-Founder, Trip Convergence Ltd, Auckland, New Zealand, +64 9 524 9850, paulminett@tripconvergence.co.nz on 15 June 2009.

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