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Final Report

Project Title:

The Influence of Real-time Rural Transit Tracking on Traveler Perception

Project Number:	Project End Date:	Submission Date:
UCNR22-13	03/31/2013	03/19/2013

Introduction

Public transportation systems require accurate and reliable information as part of their day-to-day operations and are increasingly engaging their customers through a variety of online services and smart phone applications, such as real-time vehicle tracking. This technology requires a significant investment on the part of the operators. The objective of this study was to evaluate whether transit agencies can expect to reap benefits from their investments in technology. Zhang et al. (2008) examine this question using ridership characteristics and found that bus tracking technology does not necessarily lead to increased ridership, but does lead to improved perceptions of nighttime safety and overall satisfaction with the transit service. This study examines additional attitudes towards a bus service that recently deployed a real-time tracking technology. The University of Connecticut bus system was utilized in this study.

Background

There are many studies outside of the transportation literature that investigate the perceived value of technologies and service (e.g., Kuo et al. 2009). Studies of previous generations of real-time bus arrival information have shown significant, positive impacts on the attitude toward the service, perception of reliability and ridership. Riders tend to value the micro-attributes of transit, the comfort, reliability, and quality of service. Henscher et al. (2003) estimate the impacts of service information at the bus stop – in this case, a system map and schedule. Interestingly, the study found that presence of a timetable and map did not significantly improve the perceived service quality – though the lack of these had a significant negative impact.

Survey Development

The survey instrument was constructed to make possible the estimation of the impact of enhanced, real-time information on the attitudes and perceptions of value of transit service. Perceived quality was measured on a 7-point Likert scale, using question format consistent with studies of perceived value. A statement was presented to the respondent and their level of agreement with the statement requested from "1 = strongly disagree" to "7 = strongly agree". The survey was constructed using open-source software and access to the survey was made available through desktop and laptop computers in addition to mobile devices. 281 valid responses were collected from University of Connecticut students, staff and faculty.

Results

The results of basic statistical analysis on the survey responses are shown below. The comparison of means below classifies respondents as "tracker users" and "tracker non-users". Demographic and socioeconomic variables are not controlled in this analysis; it is a direct comparison of means using a two-sample *t*-test assuming unequal variance.

Discussion

The darkly shaded cells in the table below indicate a difference in means significant at the 5% level. A single-tailed test was conducted. The results agree with those of Zhang et al. (2008) in that overall satisfaction is higher for real-time tracker users. Furthermore, real-time tracker users tend to have a more favorable attitude toward many of the aspects of transit service, some of which have nothing to do with information availability. This suggests that the benefits of technology, such as real-time tracking, may spill over beyond the elements of the service one

would expect an improved attitude towards (such as on-time performance) to areas that have no logical connection (the cleanliness of buses).

t -Test: Two-Sample Assuming Unequal Variances		
	Tracker user?	
	No	*Yes*
	Observations	
	94	187
Overall I am satisfied with the bus system		
Mean	4.27	5.21
P($T \leq t$) one-tail	0.000	
The buses arrive on-time		
Mean	4.00	4.30
P($T \leq t$) one-tail	0.066	
Route/schedule information is easily accessible		
Mean	4.50	5.70
P($T \leq t$) one-tail	0.000	
Bus stops are located conveniently		
Mean	4.64	5.35
P($T \leq t$) one-tail	0.000	
The bus travels where I need to go		
Mean	4.51	5.45
P($T \leq t$) one-tail	0.000	
The Buses are clean		
Mean	5.38	5.90
P($T \leq t$) one-tail	0.001	

	Tracker user?	
	No	*Yes*
Route/schedule information is easy to use		
Mean	4.73	5.82
P($T \leq t$) one-tail	0.000	
Adequate shelter is provided at the bus stops		
Mean	3.89	4.19
P($T \leq t$) one-tail	0.084	
Buses begin to run early enough in the morning		
Mean	5.18	5.90
P($T \leq t$) one-tail	0.000	
Buses continue to run late enough at night		
Mean	4.74	4.68
P($T \leq t$) one-tail	0.397	
Buses run frequently enough on the weekend		
Mean	3.62	2.95
P($T \leq t$) one-tail	0.001	

This could be a product of an overall improved perception of the transit system by technology users that impacts most aspects of the service, even if there is no rational connection. This study was conducted using a university transit system and the results above do not control for demographic or socioeconomic factors: generalizing to other systems will require a more robust data set and additional analysis.

References

Hensher et al. (2003). Service quality—developing a service quality index in the provision of commercial bus contracts. *Trans. Res. A*, 37, 499–517.

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