

2016 UDOT RESEARCH PROBLEM STATEMENT

*** *Problem statement deadline is March 14, 2016. Submit statements to Tom Hales at tahales@utah.gov.* ***

Title: Return on Investment for Bus Stop Investments

No. (office use): 16.06.09

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Select One Subject Area

Materials/Pavements

Maintenance

Traffic Mgmt/Safety

Preconstruction

Planning

Public Transportation

1. Describe the problem to be addressed.

Public transportation providers have limited capital investment budgets and large service areas. Providers, like UTA, understandably have a many choices when deciding where to focus their capital investments. Cultivating ridership on existing bus routes through facility improvements is a relatively inexpensive option. Enhancing current routes with capital improvement projects such as shelters, benches, sidewalks may not initially be high on priority lists. When assessing research about how transit amenities impact ridership, the cost benefit analysis should be considered to see if these improvements help yield a return of investment. Our problem will be to measure quantifiable returns on bus stop amenity investments through increased ridership, reduced dependence on paratransit service, a reduction in vehicle maintenance costs, increased customer satisfaction, and other measures associated with UTA's recent investment in bus stop enhancements along its #41 bus line. During 2014-15, UTA upgraded every stop along the 41's route – 3900/4100 South – between Meadowbrook Station and Redwood Road. The upgrades included creating ADA-compliant concrete pads and installing a variety of fixtures, including trash cans, benches, shelters, better connections to sidewalks, and (at a grocery store) a shopping cart corral. We plan to analyze qualitative and quantitative data along this corridor to determine whether, and the degree to which, the investments can be associated with changes in both traditional effectiveness measures (e.g., ridership and customer satisfaction), as well as less traditional measures (e.g., possible reductions in paratransit demand, vehicle maintenance costs, customer complaints, and liability claims). In an anticipated second phase of the research, we will assess similar data from other corridors in which UTA has made similar concentrated bus stop investments, e.g. 200 South in Salt Lake City. By adding additional corridors across a range of development conditions (e.g., suburban vs. urban), we anticipate getting more variation in the data, which will likely increase our understanding of the associations between investment and outcome.

2. Explain why this research is important.

The goal of this research is to help substantiate a return on investment for bus stop infrastructure implemented by public transportation providers. Amenities like shelters, seating, universally accessible bus stop platforms, trash receptacles, bike parking, signage and lighting are all popular with riders and local government partners, but do they lead to measurable improvements in ridership, customer satisfaction, and administrative cost reduction? Positive gains in these metrics would help inform investment decisions associated with "first-mile/last-mile" improvements, which have been the subject of substantial interest in the Salt Lake region and are currently prioritized in UTA's annual performance goals. In addition, increased ridership, to the degree observed, is associated with reductions in per passenger operating and congestion costs, and air quality impacts.

3. List the research objective(s):

The research will assess before treatment and after treatment data to address the following questions:

1. Ridership Increase: Do enhanced bus stop amenities (seating, shelter, signage, trash receptacles, bicycle parking, universally designed sidewalks) facilitate a rise in bus ridership?
2. Reduction in Paratransit Expenses: Do universally accessible bus stops reduce dependence on Paratransit or other customized transportation needs? Are deployments reduced, increased or remain neutral? Is congestion along this corridor relieved or redirected?
3. Liability and Insurance impact: Do expanded bus stop facilities and amenities reduce the prevalence of incident reports and/or insurance claims?
4. Safety: Are enhanced bust/transit stops "safer" for users? (incident reporting, vandalism, fear, sense of security, ridership surveys?)
5. Cleaning and Maintenance: Are vehicle and/or bust stop cleaning/maintenance costs impacted by enhanced facilities? (i.e.

mud, vehicle maintenance, cleaning, salt, dirt, trash)

- 6. Public/Rider Perception: Are bus stops impacting the perception of utilizing transit? Do the stops increase the reliability and timeliness of buses? (i.e. onboard or rider surveys, ease of use reporting, customer/rider reviews)

4. List the major tasks:

- 1. Review and synthesize existing academic and professional literature on how bus stop amenities impact ridership, customer perceptions, and administrative costs.
- 2. Collect before/after data for the categories listed above in section 3.
- 3. Collect data for full construction costs on improvements in the corridor.
- 4. Multi-factor statistical analysis to control for independent variables that can have impacts on transit ridership (fuel prices, fluctuations in area median income, weather, fluctuations in local job markets, variations in transit service). This analysis will test hypotheses that the incorporation of bus stop amenities is associated with bus ridership.
- 5. Determination of full-cost/full-benefit return for stop amenity investments in the corridor.

5. List the expected results:

- 1. Preliminary review of the data show increased ridership, lower costs, and higher customer satisfaction after the stop improvements, suggesting a causal link. Our research will explore those links and determine the degree of their validity.
- 2. The research is also expected to produce a measurement of return on investment reflecting the capital cost of stop amenities in terms of their associated benefits in ridership, customer satisfaction, and system and administrative cost reductions.

6. Describe how this research will be implemented.

- The outcome from this research will be disseminated through the following outlets:
- 1. A research report for the National Institute for Transportation and Communities.
 - 2. A report for the Utah Transit Authority.
 - 3. A paper for the Transportation Research Board Annual Meeting.
 - 4. An article in a professional or academic journal.

7. Requested from UDOT: \$40,000 Cost: \$80,518 (or UTA for Public Transportation)	Other/Matching Funds: \$40,518	Total
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8. Outline the proposed schedule, including start and major event dates.

- August 15-30, 2016: Project startup; hire graduate research assistant
- September 1 – December 31, 2016: Literature review & synthesis
- January 1 – February 28, 2017: Data collection and preparation
- March 1 – April 30, 2017: Data processing & analysis
- May 1 – July 31, 2017: TRB paper writing
- August 1 – December 31, 2017: Final report and journal article writing and distribution