

Article

Rider Perceptions of an On-Demand Microtransit Service in Salt Lake County, Utah

Gregory. S Macfarlane^{1,*} 

¹ Brigham Young University Civil and Environmental Engineering Department, 430 Engineering Building, Provo, Utah 84602; gregmacfarlane@byu.edu

* Correspondence: gregmacfarlane@byu.edu; Tel.: +01-801-422-8505

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Abstract: On-demand microtransit services are frequently seen as an important tool in supporting first and last mile operations surrounding fixed route high frequency transit facilities, but questions remain surrounding who will use these novel services and for what purposes. In November 2019, the Utah Transit Authority launched an on-demand microtransit service in south Salt Lake County in partnership with a private mobility operator. This paper reports the results of a survey of 130 transit riders in the microtransit service area collected before and immediately after the service launched. There is not a clear relationship between current transit access mode and expressed willingness to use microtransit, though some responses from new riders indicate the novel service competes most directly with commercial transportation network company operations. The survey responses also reveal younger passengers express more than expected willingness to use microtransit, middle-aged passengers a less than expected willingness, and older passengers neutral or no expressed opinion. The effect of other user characteristics including income and automobile availability is less statistically clear and requires further research.

Keywords: on-demand transit; microtransit

1. Introduction

Transit ridership in the United States has been in decline over the last several years, with underlying causes ranging from service cuts to the advent of new mobility options [1,2]. These new mobility options – including bikeshare, e-scooters, and ridehailing through Transportation Network Companies (TNCs) – might also play an important role in supporting transit operations if the relative strengths of transit and modern mobility systems can be successfully partnered.

One particular area where a partnership between high-capacity, fixed-route transit and TNC operations has been desired is in supporting first mile / last mile operations in low-density suburban regions [3–5]. TNC operators are incentivized to operate in dense areas where many potential passengers are located [6], meaning they compete with transit where transit can be most successful. But regulations or partnerships that changed this incentive pattern could be highly beneficial to many transit riders [7,8]. For example, a transit agency might partner with a TNC to offer shared rides at a subsidized fare in low-density areas where fixed route transit services are ineffective or expensive. As these partnerships to offer microtransit services materialize through demonstration projects or permanent offerings, there is an important opportunity to observe and evaluate who is using the service and for what reasons. It is also valuable to understand how users perceive the effectiveness and convenience of these systems.

In this paper we report the results of a survey conducted immediately before and several weeks after the November 2019 launch of a microtransit service in south Salt Lake County, Utah by the

Utah Transit Authority (UTA). The surveys were designed to understand first the awareness of the on-demand system in the transit passenger community. The surveys also consider the stated and revealed likeliness of individuals to use the microtransit service, and how the characteristics of these individuals – particularly age and household size – influence these preferences.

The remainder of this section contains a brief review of previous and ongoing studies relevant to the question of demand for and use of microtransit services. We then describe the survey methodology for this study, including both the context of the UTA microtransit service as well as the survey instrument and collection strategy. The survey results in several dimensions are followed by a discussion of the limitations of the findings and associated opportunities for future research.

1.1. Findings from Other Systems

In the last few years a number of on-demand microtransit services have begun operations in many cities around the world. Given the dynamic nature of this space, the literature is not mature and numerous projects are under evaluation at the moment. However, some findings from early systems are available and are worthy of discussion.

A microtransit service in Helsinki, Finland known as “Kutsuplus” operated from 2012 to 2015 and has been the subject of a number of studies. Weckström *et al.* [9] and Haglund *et al.* [10] each conduct a comprehensive analysis of the system using rider questionnaires supplemented with GPS data points. The studies found that the system was used by a wide variety of individuals for a wide variety of trip purposes, and the typical trip length suggested it was being used less like a taxi service and more to supplement last-mile transit access. In many cases, it appeared as though Kutsuplus replaced walking and bicycle trips. The Weckström *et al.* [9] research also asked respondents why they continued or discontinued using the service, revealing strong differences in response among different income groups. High-income individuals were more likely to cite long response times, while lower income groups were more likely to cite the fare or difficulties understanding the service, or even not being aware of its existence.

Alonso-González *et al.* [4] examined a microtransit system in the Arnhem-Nijmegen region in the Netherlands. They develop a methodology to calculate the accessibility contributed by the microtransit system above and beyond that provided by the fixed route transit system, and their findings suggest the microtransit service substantively enhances the mobility of people in the region. In this study the authors use GPS trip data from the service and do not have access to the actual riders to understand their preferences or characteristics.

In 2016 Austin, Texas, introduced a TNC operated as a non-profit and called “RideAustin.” The unique corporate structure of this TNC encourages it to share data from the system with researchers, leading to a number of studies examining the trip patterns of its users. Komanduri *et al.* [11] show that a high proportion of trips (60%) taken on RideAustin could have been completed with a single-seat transit ride. Wenzel *et al.* [12] additionally used the same dataset to estimate the level of deadheading and concomitant energy expenditure on the system. Though these findings are important in terms of understanding the risks of microtransit services, it should be stressed that the RideAustin was not explicitly designed to support transit operations. And although the RideAustin dataset does identify unique individual riders through a persistent mobile device ID, it does not disclose any demographic information on the riders and therefore cannot support an analysis of their characteristics or preferences.

The literature to this point has been greatly aided by the use of so-called Big Data: GPS records, rider transaction data, and the like. These data are well-suited to important research questions such as where and when the services pick up and drop off riders, the wait times experienced by the riders, and in some cases even the ability to construct multiple trip tours. But the literature to this point is somewhat limited in its exploration of the actual users of these systems: who they are, why they are traveling, and why they chose to use this service.

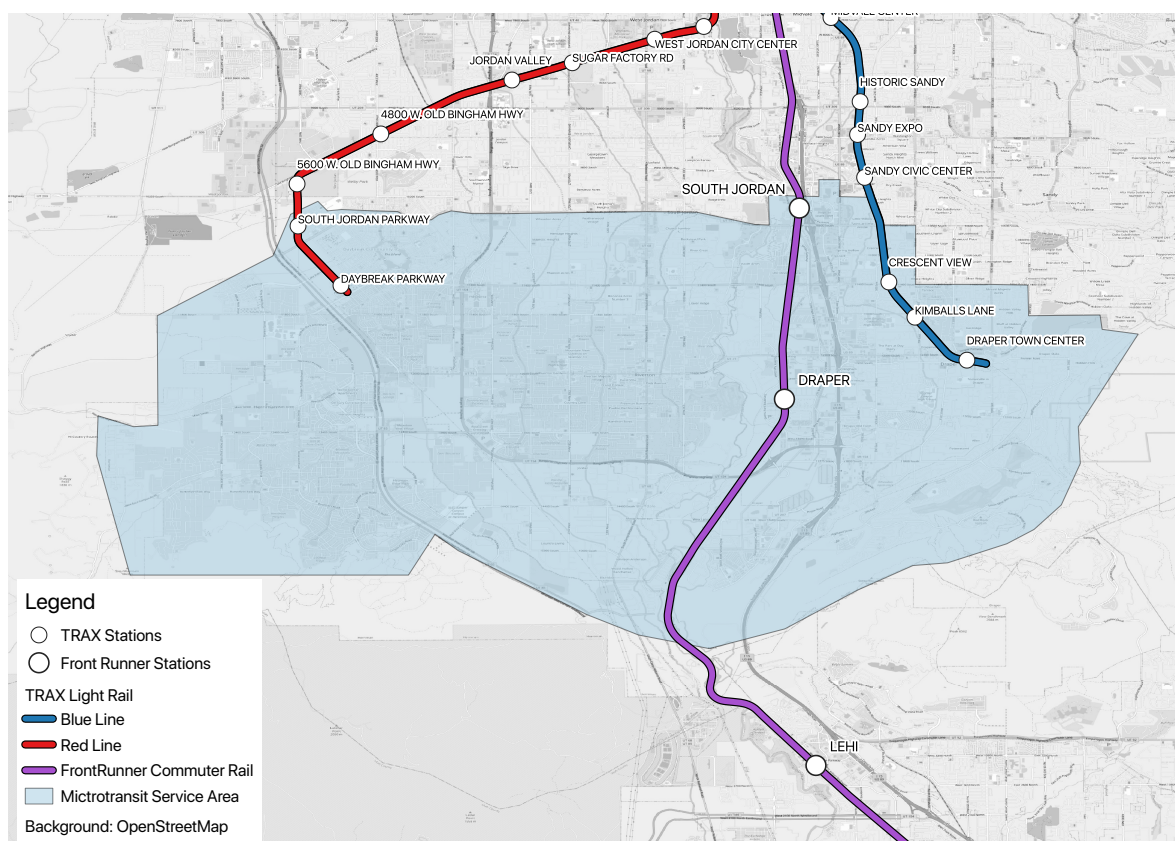


Figure 1. UTA on-demand microtransit service area. Image by the authors

2. Study Methodology

2.1. System Description

In November 2019, the Utah Transit Authority (UTA) launched an on-demand microtransit service in the southern part of Salt Lake County. This region – illustrated in Figure 1 – has primarily low-density suburban development but also hosts stations for UTA’s extensive rail transit network: the FrontRunner commuter rail operates between Provo and Ogden via downtown Salt Lake City on 30 minute peak headways; and the Blue and Red TRAX light rail lines connect to downtown Salt Lake City, the University of Utah, and Salt Lake International Airport (via transfer) on 15 minute peak headways. There are existing fixed route and route deviation services in the region, as well as park and ride facilities at most rail stations. UTA is interested in improving the quality of service for passengers in the region as well as reducing per-passenger operating costs.

```
knitr::include_graphics("images/service_area.png", auto_pdf = TRUE)
```

In establishing the on-demand microtransit service UTA partnered with Via, a commercial mobility provider with new and ongoing operations in several US cities. Passengers request rides using the VIA mobile application or calling a designated service line and await the vehicle at a pickup point near to their origin. Passengers share rides based on the availability of vehicles and the compatibility of paths, as determined by algorithms embedded in the VIA service. The vehicle will drop the passenger off near their destination or at TRAX or FrontRunner stations; both the pickup and drop-off points must lie within the service area shown in Figure 1. The regular adult one-way fare is \$2.50 and includes a limited transfer to the UTA fixed route transit system. By the end of February 2020, the microtransit system was carrying about 316 passenger trips per weekday with an average wait time of 11 minutes per trip uta [13].

2.2. Survey Design

UTA's primary goal in executing this survey was to understand the effectiveness of its marketing campaign to raise awareness and information of the new service. This survey also provided an opportunity to inform additional riders and to evaluate rider perceptions and characteristics both before and immediately after the service launch. As such the survey was administered in two tranches. The first tranche was conducted on November 6th, 13th, and 14th of 2019 through on-platform intercept interviews at the Draper and South Jordan FrontRunner stations as well as the Draper Town Center TRAX station. The second tranche was collected on several weekdays between January 10th and March 4th, 2020, and was collected through on-platform intercept interviews at the same stations in addition to the Daybreak Parkway TRAX station and at designated microtransit pick-up points near the aforementioned rail stations; a limited number of interviews were also conducted on board the microtransit vehicles. Interviews were conducted throughout the day, but with a focus on the PM peak commute period. The number of interviews conducted during each time period for each tranche is shown in Table 1.

Table 1. Surveys Collected by Time of Day

Day Period	Before Launch	After Launch
AM (6-10)	7	6
Mid-Day (10-4)	13	26
PM (4-7)	33	43
Evening (7-Midnight)	2	0
TOTAL	55	75

The surveys were administered via electronic tablet using a questionnaire developed in a web-based survey software. The survey questions were developed with the help of UTA staff and an external consulting team. The relevant variables and source questions for this study are shown in Table 2, in the order in which the questions were asked. After asking the respondent about their awareness of the system, the interviewer would give a brief explanation of the service before asking about the respondent's likeliness to use the system. The questionnaire for the second tranche included additional questions that were identified as being important after the first tranche was collected; for example, the questions about income and household size were added between the tranches. Further, questions in the second tranche for respondents on train platforms and either at or on board the microtransit service had slightly different wording to reflect the separate contexts. There was also a set of questions requesting general feedback on the UTA service that is not included in this study.

3. Applications

Some *significant* applications are demonstrated in this chapter.

3.1. Example one

3.2. Example two

4. Final Words

We have finished a nice book.

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Conflicts of Interest: The authors declare no conflict of interest.

Table 2. Survey Questionnaire Summary

Variable	Question Text	Response Type
Frequency	How often do you ride UTA?	Multiple choice with days per week
Purpose	Where are you headed today?	Multiple choice with purposes plus text "other"
Access Mode	How did you travel to your UTA stop/station today?	Multiple choice with modes plus text "other"
Awareness	Had you heard about UTA On Demand before today?	Yes / No
Likelihood	How likely are you to download the VIA app and use UTA On Demand?	Likert scale with five "likely" levels
Why Likely	Why did you choose that ranking?	Text response
Use Purpose	What types of trips do you think you could use it for?	Multiple choice with purposes plus text "other"
Auto Availability	How many vehicles (cars, trucks or motorcycles) are available in your household?	Multiple choice with 0 through 4+
Household Size	Including you, how many people live in your household?	Numeric
Race	What is your race / ethnicity?	Multiple choice allowing multiple selection
Income	Which of the following BEST describes your TOTAL ANNUAL HOUSEHOLD INCOME in 2019 before taxes?	Multiple choice in ranges
Smartphone	Do you have a smartphone?	Yes / No
Age	What is your age?	Multiple choice in ranges

Abbreviations

The following abbreviations are used in this manuscript:

TNC Transportation Network Company, e.g. Uber, Lyft
 UTA Utah Transit Authority

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