Marketing Mobility as a Service: Insights from the National Household Travel Survey

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ABSTRACT

The concept of Mobility as a Service (MaaS) is relatively new in transportation. MaaS provides travelers with bundles of transportation services that can be purchased together rather than relying on individually-owned transportation modes. Although MaaS is begin to grow in popularity, few if any prior studies have focused on the demographics of existing or potential MaaS users with a goal of targeting specific markets. Therefore, the objective of this paper is to evaluate potential shared transportation bundles that could be marketed as MaaS in the United States using the 2017 National Household Travel Survey (NHTS). The 2017 NHTS asked questions about usage of five shared transportation modes: bikeshare, carshare, online delivery services, rideshare, and public transit. Various shared transportation bundles were created using these shared transportation mode questions. For each shared transportation bundle, three binary logit models were run: one for those who live in urban areas, one for those who live in rural areas, and one nationwide. In total, 12 shared transportation bundles were evaluated for this paper, resulting in 36 models. While most of the models had similar trends, such as each bundle being used by those with fewer vehicles, there were key differences between urban and rural areas for each bundle, including gender and income level. By understanding the demographic trends of potential MaaS users, marketing can be targeted toward the people who are most likely to use MaaS in the future.

BACKGROUND

What is Mobility as a Service (MaaS)?

- A service that allows users to purchase a bundle/group of transportation services in one transaction
- Fairly new service (past 10 years)[1]

Data

- 2017 NHTS (collected March 2016 - May 2017)

	Question	Reason question was not asked	Potential Answers: Have used 1+ times in the past 30 days	Haven't used in the past 30 days	I don't know or I prefer not to answer
	**In the past 30 days, how many times did you use a bike share program (e.g. Bikeshare, Zagster, or CycleHop)?**	Respondent had not taken a bike trip in the past 7 days	1,276 4.5%	27,150 95.2%	74 0.3%
	**In the past 30 days, how many times did you use a car sharing service where a car can be rented by the hour (e.g. Zipcar or Car2Go)?**	Respondent was younger than 16	1,481 0.6%	234,595 99.3%	217 0.1%
	**In the past 30 days, how many times did you purchase something online and have it delivered?**	Respondent was younger than 16	134,794 57.0%	101,011 42.7%	488 0.2%
	**In the past 30 days, how many times have you purchased a ride with a smartphone rideshare app (e.g. Uber, Lyft, Sidecar)?**	Respondent was younger than 16	17,476 7.4%	218,613 92.5%	204 0.1%
	**In the past 30 days, how many days have you used public transportation such as buses, subways, streetcars, or commuter trains (do not include taxis)?**	Question was asked of all respondents	29,209 11.1%	234,667 88.8%	356 0.1%

Figure 1: NHTS 2017 Shared Mode Questions

METHODOLOGY AND RESULTS

Methodology

Binary Logit Models for the following bundles:

1. Online Delivery and Rideshare
2. Online Delivery, Rideshare, and Public Transit
3. Rideshare and Public Transit

Results

	Online Delivery & Rideshare			Online Delivery, Rideshare, & Public Transit			Rideshare & Public Transit		
	Model 1: Urban	Model 2: Rural	Model 3: Nationwide	Model 4: Urban	Model 5: Rural	Model 6: Nationwide	Model 7: Urban	Model 8: Rural	Model 9: Nationwide
Age^ (Reference: 18-24)									
25-34	-0.2584***	-0.6308***	-0.2812***	-0.6118***	-0.5883**	-0.6164***	-0.6118***	-0.4776*	-0.6094***
35-44	-0.7980***	-1.1802***	-0.8235***	-1.1682***	-1.5048***	-1.1869***	-1.1911***	-1.2971***	-1.1983***
45-54	-1.3921***	-1.3495***	-1.3910***	-1.6453***	-1.3583***	-1.6329***	-1.6402***	-1.1839***	-1.6169***
55+	-2.2815***	-2.0584***	-2.2654***	-2.4548***	-2.0084***	-2.4343***	-2.3680***	-1.9238***	-2.3512***
Female^ (Reference: Male)	-0.0940***	-0.1373**	-0.0972***	-0.1085***	-0.182	-0.1126***	-0.1547***	-0.1981*	-0.1565***
Race (Reference: White)									
Black or African American	-0.2079***	-0.1856	-0.1980***	-0.0165	-0.0893	-0.0008	0.2674***	0.6957***	0.2979***
Asian	-0.1196***	0.6538***	-0.0955***	-0.0516	1.0065***	-0.0208	0.0252	0.9135***	0.0516
Some other race+	0.0931**	-0.0388	0.0926**	0.2302***	-0.1287	0.2272***	0.2664***	0.1259	0.2696***
Hispanic or Latino (Reference: Not Hispanic)	0.1726***	0.2678	0.1829***	0.1145**	0.4499	0.1345**	0.1578***	0.6119**	0.1820***
Education (Reference: High School Graduate or Less									
Some College or Associate's	0.7683***	0.8171***	0.7764***	0.7827***	0.7861***	0.7851***	0.6038***	0.3209	0.5858***
Bachelor's Degree	1.3500***	1.4934***	1.3690***	1.4035***	1.6862***	1.4308***	1.1557***	1.2940***	1.1704***
Graduate Degree or Professional Degree	1.4057***	1.5655***	1.4267***	1.5888***	2.0341***	1.6263***	1.3183***	1.5934***	1.3417***
Employed (Reference: Not Employed)	0.4601***	0.4407***	0.4566***	0.3981***	0.2999*	0.3883***	0.3534***	0.1557	0.3373***
Has Medical Condition (Reference: No Medical Condition)	-0.3763***	-0.3106	-0.3741***	-0.2040**	-0.2032	-0.2049**	-0.1426*	-0.1991	-0.1448**
Household Income (Reference: Less than $25,000)									
$25,000 to $49,999	0.0567	0.1308	0.0565	-0.009	0.2767	-0.0088	-0.1657***	-0.2292	-0.1783***
$50,000 to $74,999	0.3531***	0.4196**	0.3509***	0.3119***	-0.2756	0.2770***	0.1355**	-0.7057**	0.0914
$75,000 to $99,999	0.6590***	0.8584***	0.6636***	0.6219***	0.5977	0.6033***	0.4310***	0.1619	0.4039**
$100,000 to $149,999	1.0515***	1.4020***	1.0669***	1.0547***	1.1375***	1.0393***	0.8662***	0.6031**	0.8366***
$150,000 or more	1.8970***	2.3413***	1.9204***	1.8490***	2.2608***	1.8557***	1.6747***	1.8035***	1.6704***
Household Size	-0.3447***	-0.3428***	-0.3498***	-0.2037***	-0.2622***	-0.2165***	-0.1891***	-0.2539***	-0.2021***
Number of Household Vehicles	-0.2575***	-0.1311***	-0.2429***	-0.6914***	-0.1438**	-0.6419***	-0.7073***	-0.1274**	-0.6547***
Urban (Reference: Rural)			1.0329***			0.9443***			0.9823***
Constant	-1.9854***	-3.6663***	-3.0538***	-2.4413***	-5.0127***	-3.4553***	-1.8710***	-4.1357***	-2.9064***
Number of Observations	169,813	52,057	221,870	169,679	52,016	221,695	169,843	52,072	221,915
Number who Use Bundle	13,427	914	14,341	4,985	281	5,266	5,843	324	6,167
LR chi^2	18668.43	1473.38	23216.66	8264.9	546.78	9971.7	8779.1	559.51	10721.62
Prob > chi^2	0	0	0	0	0	0	0	0	0
Pseudo R^2	0.1988	0.1601	0.2184	0.1837	0.1565	0.2003	0.1726	0.1421	0.1903
Log Likelihood	-37617.459	-3863.8687	-41538.423	-18363.058	-1473.9387	-19912.111	-21040.521	-1689.0365	-22816.562

** p<0.1; ** p<0.05; *** p<0.01; ^ imputed values; + Other race includes American Indian, Pacific Islander, Multiple Races Selected, and Other*

KEY FINDINGS

Below are the similarities of all bundles both in urban and rural models.
To the right are the differences between the urban and rural models for each of the three bundles.

Similarities between the urban and rural models for all bundles

1. YOUNGER
2. SMALLER HOUSEHOLD
3. FEWER VEHICLES

Online Delivery & Rideshare

Urban
- At least some college
- Income > $50,000
- Employed

Rural
- At least some college
- Income > $50,000
- Employed
- Male

Online Delivery, Rideshare, & Public Transit

Urban
- At least some college
- Income > $50,000
- Employed
- Male

Rural
- At least some college
- Income > $100,000
- Employed

Rideshare & Public Transit

Urban
- At least some college
- Income > $50,000
- Employed

Rural
- At least a Bachelors Degree
- Income > $100,000
- Male
- Hispanic

Figure 2: Differences between urban and rural models by bundle

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