Travel Behaviour and Society 13 (2018) 88–104

Contents lists available at ScienceDirect

Travel Behaviour and Society

journal homepage: www.elsevier.com/locate/tbs

What influences travelers to use Uber? Exploring the factors affecting the adoption of on-demand ride services in California

Farzad Alemi[a,*], Giovanni Circella[b], Susan Handy[c], Patricia Mokhtarian[d]

[a] Institute of Transportation Studies, University of California, Davis, 1715 Tilia Street, Davis, CA 95616, United States
[b] Institute of Transportation Studies, University of California, Davis, and School of Civil and Environmental Engineering, Georgia Institute of Technology, 1715 Tilia Street, Davis, CA 95616, United States
[c] Department of Environmental Science and Policy, and Institute of Transportation Studies, University of California, Davis, One Shields Avenue, Davis, CA 95616, United States
[d] School of Civil and Environmental Engineering, Georgia Institute of Technology, 790 Atlantic Drive, Atlanta, GA 30332, United States

ARTICLE INFO

Keywords:
On-demand ride services
Uber
Lyft
Ridehailing
Ridesourcing
Millennials
Shared mobility
Lifestyles

ABSTRACT

On-demand ride services, such as those offered by Uber and Lyft, are transforming transportation supply and demand in many ways. As the popularity and visibility of Uber/Lyft grow, an understanding of the factors affecting the use of these services becomes more important. In this paper, we investigate the factors affecting the adoption of on-demand ride services among millennials (i.e. young adults born between 1981 and 1997), and members of the preceding Generation X (i.e. middle-aged adults born between 1965 and 1980) in California. We estimate binary logit models of the adoption of Uber/Lyft with and without the inclusion of attitudinal variables, using the California Millennials Dataset (N = 1975). The results are consistent across models: we find that highly educated, older millennials are more likely to use on-demand ride services than other groups. We also find that greater land-use mix and regional accessibility by car are associated with greater likelihood of adopting on-demand ride services. Respondents who report higher numbers of long-distance business trips and have a higher share of long-distance trips made by plane are also more likely to have used these services, as are frequent users of smartphone transportation-related apps, and those who have previously used taxi and carsharing services. Among various attitudinal factors that were investigated, individuals with stronger pro-environmental, technology-embracing, and variety-seeking attitudes are more inclined to use ridehailing. These findings provide a starting point for efforts to forecast the adoption of on-demand services and their impacts on overall travel patterns across various regions and sociodemographics.

1. Introduction

Transportation is changing at a fast pace. Information and communication technologies, which among other roles facilitate the availability of locational data and smartphone applications (apps), provide unique opportunities for the introduction and widespread deployment of new transportation services. Among these technology-enabled options, modern shared-mobility services merge the advantages of mobile communications and instant reservations with the principles of the so-called sharing economy. In doing so, they separate access to transportation services from the fixed costs of auto ownership and provide cheaper options compared to driving one's own car for large groups of travelers (Davidson and Webber, 2017). These technology-enabled services can affect travel behavior in multiple ways, such as by increasing the number of available options for a trip, reducing travel uncertainty, and potentially replacing the use of other travel modes.

The range and availability of shared-mobility services are continuously evolving as the market introduces new services and related smartphone apps. Shared-mobility services range from *carsharing* services, including *fleet-based round-trip* and *one-way services* such as Zipcar and Car2Go or *peer-to-peer services* such as Turo, to *ridesharing* services, including *dynamic carpooling* such as Carma and *on-demand ride services* such as Uber and Lyft, to *bikesharing* services (Shaheen et al., 2016a). Reviewing the availability of 11 technology-enabled transportation services in 70 U.S. cities, Hallock and Inglis (2015) found that 19 U.S. cities (with a combined population of 28 million) already had access (at the time of that study) to nearly all new mobility options included in the study. In addition, 35 other cities had access to most emerging transportation options (but not all), leaving only 16 of the 70 cities where few technology-enabled transportation options were available.

* Corresponding author.
E-mail addresses: falemi@ucdavis.edu (F. Alemi), gcircella@ucdavis.edu (G. Circella), slhandy@ucdavis.edu (S. Handy), patmokh@gatech.edu (P. Mokhtarian).

https://doi.org/10.1016/j.tbs.2018.06.002
Received 14 July 2017; Received in revised form 17 June 2018; Accepted 19 June 2018

One of the most rapidly growing – and controversial – forms of shared-mobility services is on-demand ride services, also known as ridehailing, ridesourcing, or transportation network companies (TNCs), such as Uber and Lyft in the U.S. market. A recent study of on-demand ride services showed that the share of total trips made with Uber and Lyft can exceed 15% (170,000 trips per day) of all trips inside the city of San Francisco on a typical weekday (SFCTA, 2017), equivalent to 20% of total vehicle miles traveled (VMT) inside the city of San Francisco, and 6.5% of total VMT including both intra- and inter-city trips. If these services continue to grow in availability and popularity, as investors and others widely expect them to do, the implications for future travel patterns are substantial.

Transportation researchers so far have had a limited ability to assess the potential impacts associated with the growth in the use of on-demand ride services. One reason is the dearth of data about users themselves, the ways they use ridehailing services, and the changes in travel behavior that ridehailing use produces. Another reason is the high level of uncertainty over the evolution and eventual maturation of on-demand ride services. A third reason is the heterogeneity in the potential impacts owing to differences in the local context and the characteristics of the users. Without a clear understanding of how these services will be changing travel patterns, policy makers and transportation planners face a significant challenge in their efforts to move the transportation system toward goals for sustainability, equity, and safety.

The goal of this study is to investigate the factors affecting the use of on-demand ride services and the circumstances under which individuals are more likely to adopt these services. In particular, this study plans to address the following questions: (1) Is the adoption of on-demand ride services consistent across different segments of the population, and if not, how does the use of ridehailing services vary? (2) How does the adoption of on-demand ride services vary with respect to built environment variables after controlling for socio-demographics? (3) Do the early adopters have different attitudes than those who have not yet used these services? The answers to these questions can help policy makers and transportation planners to anticipate changes in travel demand over time and to better plan for the future.

To address these questions, we analyze data from the California Millennials Dataset. We collected these data in fall 2015 as a part of a larger research project investigating emerging travel patterns and residential location decisions among selected segments of the population. A sample of more than 2400 residents of California, including both members of the millennial generation (18–34 years old in 2015) and the preceding Generation X (middle-age adults, 35–50 years old in 2015), completed a comprehensive online survey. The survey collected a wealth of information on, among other topics, the awareness, adoption, and frequency of use of shared-mobility services and the many factors that are potentially behind their use.

The remainder of this paper is organized as follows: after a brief literature review in Section 2, Section 3 discusses the data collection and methods of analysis. Then, Section 4 discusses the estimation of two binary choice models and the model results, followed by a discussion of the impact of on-demand ride services on the use of other modes of transportation in Section 5. Finally, conclusions and perspectives for future research are presented in Section 6.

2. Literature review

Transportation in the United States is going through an era of rapid transformation, including the disruption of long-standing patterns and the emergence of new ones. Among other trends, total vehicle miles traveled (VMT) and the total number of privately-owned vehicles have started to rise again in the U.S. after a steady decrease in the mid-2000s (FHWA, 2017). The percentage of zero-vehicle households also increased during the period, even as the total number of trips by private vehicle in the country continued to rise (Sivak, 2014). Despite the continued reliance on private cars, at least some segments of the population are apparently becoming more multimodal (Buehler and Hamre, 2014). In general, people are more open to the use of information and communication technologies (ICT) and the adoption of technology-enabled transportation alternatives, such as new shared-mobility services. On the other hand, the impacts of many of these emerging trends are confounded with other factors affecting travel patterns, including generational differences, changes in household compositions and lifestyles, and the temporary changes associated with the recession that began in 2008. For example, it is not clear whether the increase in the percentage of zero-vehicle households will slow or even reverse now that the economic recession has ended, or whether other factors will sustain it.

The combination of ICT and the so-called sharing economy has contributed to the emergence of new transportation services, thanks to increased online connectivity and associated changes in individual lifestyles (Shaheen et al., 2016b). Modern technologies increase the success rate and the potential market for emerging transportation services by improving the convenience of arranging travel or making a reservation, providing online pay-for-service methods, collecting and disseminating online customer feedback, and offering better platforms for the efficient and dynamic management of resources (Taylor et al., 2015).

The rise of on-demand ride services exemplifies these factors. Uber and Lyft, the two largest providers of ridehailing services, launched their so-far most popular offerings, UberX and Lyft Classic, in direct competition with local taxi services, in July 2012. Ridehailing services are similar to taxi services in that they connect travelers requesting a ride with the network of available drivers – in the former case through a smartphone application, whereas in the latter case (historically) through a human dispatcher. They are different from dynamic ridesharing services such as Carma in the U.S. or BlaBlaCar in Europe – whose drivers only offer rides to other travelers along the route of a trip the driver would be taking anyway – because Uber/Lyft drivers chauffeur passengers to their destination independently from the drivers' own mobility needs. In fall 2014, Uber and Lyft launched their ride-pooling services, UberPOOL and Lyft Line, in San Francisco and few other markets, serving as a carpooling application by providing travelers with the opportunity to decrease the travel fare by sharing a ride with other users (Mcbride, 2015). The availability and popularity of on-demand ride services are growing quickly: according to new statistics released on November 2016, Uber and Lyft operate in more than 500 cities, with pooled services available only in selected large cities and metropolitan areas, such as San Francisco, San Diego, and Seattle.[1]

To date, knowledge of the characteristics of the users of on-demand ride services and the potential impacts that these services have on other components of travel behavior and other travel modes is limited. Much of the existing knowledge about these services is anecdotal, disseminated by the popular media. This is particularly true for studies about the potential impacts of these services. Overall, the behavioral studies about shared-mobility services follow one of these two distinct paths: (1) studies that investigate the factors associated with the adoption and frequency of use of on-demand ride services; and (2) studies that discuss the potential impacts of on-demand ride services on components of travel behavior, such as mode choice, vehicle ownership, and activity patterns. The goal of this study is to investigate the factors affecting the adoption of on-demand ride services and provides insights into the impact that the adoption of these services has on the use of other means of transportation.

Previous research about the early adopters of shared-mobility services (e.g. carsharing, bikesharing and on-demand ride services)

[1] https://uberexpansion.com/lyft-vs-uber-side-by-side-comparison/ (last accessed on January 28, 2018).