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Ridesourcing, the sharing economy, and the future of cities

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ABSTRACT

As an integral part of the emerging sharing economy, ridesourcing refers to transportation services that connect community drivers with passengers via mobile devices and applications. The spectacular growth of ridesourcing has sparked a burgeoning literature discussing how it affects the future of cities. This paper presents a systematic review of the existing literature concerning the impact of ridesourcing on the efficiency, equity, and sustainability of urban development. Ridesourcing has a positive impact on economic efficiency. It both complements and competes with public transit, but its influence on traffic congestions near city centers is still unclear. Regarding urban equity, ridesourcing further amplifies the issue of the digital divide and raises concerns over the issues of discrimination and data privacy and security. It is also hotly contested whether prosumers (producers/consumers) are exploited by the sharing economy platforms, whether ridesourcing drivers are reasonably compensated, and how to better protect on-demand workers' rights. Even though ridesourcing has been promoting a green image, its true environmental impact has not been thoroughly investigated. According to the evidence reported in the literature so far, it is unlikely that ridesourcing will reduce private car ownership. Ridesourcing's impacts on energy consumption and greenhouse gas emissions are uncertain based on existing research. This paper outlines the danger of conceptual confusion and the methodological issues in the existing literature. Further research is sorely needed as the future of cities is indisputably tied to the sharing economy and its impacts on shared mobility.

1. Introduction

The explosive growth of ridesourcing has sparked heated debate over its impacts on future urban development (Rayle, Dai, Chan, et al., 2016). Ridesourcing refers to transportation services that connect community drivers – people who drive private cars instead of commercial vehicles - with passengers via mobile devices and applications. There are many different terms used to describe this emerging transportation option. Academic transportation researchers use ‘ridesourcing’; practitioners describe themselves as ‘transportation network companies (TNCs) or mobility service providers (MSPs)’; the popular press calls it ‘ride-sharing’ or ‘ride-hailing’ (Shaheen & Chan, 2016). Ridesourcing services have been expanding rapidly across the world, with a number of successful TNCs, such as Uber and Lyft in the U.S., Didi Express in China, Ola in India, and even UberMOTO (for motorcycle rides) in Thailand.

Ridesourcing is a particular form of shared mobility. Shaheen and Chan (2016) offer a classification of shared mobility based upon what is being shared (Fig. 1). Carsharing, motorcycle sharing, scooter sharing,

and bikesharing facilitate the sharing of a vehicle; whereas ridesharing, on-demand ride services, and microtransit enable the sharing of passenger rides. Ridesharing, including carpooling and vanpooling, allows drivers and passengers with similar origins and destinations to share a ride. Traditional ridesharing on a personal, organizational, or ad hoc basis has existed for decades. There are also mobile apps based ride-sharing, such as BlaBlaCar in France and Didi Hitch in China. On-demand ride services involve the adoption of mobile technology to request and dispatch vehicles upon passengers' requests. There are three major forms of on-demand ride services. Ridesourcing is the largest segment in on-demand ride services. Ridesplitting is a variation of ridesourcing, which allows passengers with a similar route to share a ride and split the fare. Many TNCs operate both ridesourcing and ridesplitting. For instance, Uber has UberPOOL and Lyft has Lyft Line. E-hail is taxi service equipped with mobile apps. It is different from ridesourcing as the vehicles are taxicabs instead of private vehicles. Lastly, microtransit is a form of private transit enabled by mobile technology. It mainly provides commuting services that connect residential areas with urban and suburban working and commercial areas, such as

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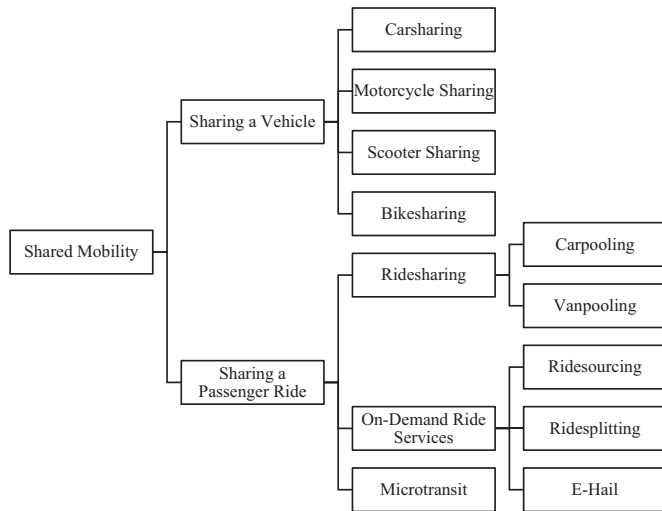


Fig. 1. Categories of shared mobility. [Source: modified from Shaheen & Chan, 2016]

Chariot in the U.S.

Shared mobility is a fast-growing sector of the emerging sharing economy. The sharing economy has a number of different names such as on-demand economy, gig economy, collaborative consumption, and collaborative economy. This paper uses “the sharing economy” to describe the economic activities and “on-demand work” to describe the type of jobs provided by the sharing economy. There have been an increasing number of studies discussing the social, economic, and environmental impact of the sharing economy (e.g., Cockayne, 2016; Frenken & Schor, 2017; Martin, 2016). Undoubtedly, the sharing economy is quickly becoming an important component of the economy, penetrating a growing number of economic activities (such as Airbnb, TaskRabbit etc.) in both developing and developed countries. The sharing economy is transforming business operations and models in many profound ways.

With accelerated urbanization in the developing world, more and more people will be living in our crowded cities worldwide. How to make our cities more efficient, equitable, and sustainable has been the focus of interdisciplinary research during the past half century (e.g., Graham & Marvin, 2001; Vasconcellos, 2001). The rapidly growing sharing economy will inevitably exert its due impacts on the future of cities, and yet we have seen little work linking the sharing economy explicitly with urban studies, although most of the sharing economic activities are implicitly taking place in cities. More importantly, most studies examine the sharing economy in general, even though different types of sharing economy platforms or shared modes of transportation exhibit distinct characteristics and impose diverse impacts on cities. By focusing on one aspect of the sharing economy – ridesourcing – this

Table 1
Uber’s impact on urban efficiency.
[Source: Compiled by the authors]

	Transportation efficiency			Economic efficiency
	Congestion	Accessibility	Safety	
Ridesourcing vs. taxi	(?) Reduces or increases congestion in the city center?	(+) Reaches poor neighborhoods with insufficient taxi services	(+) Drivers and passengers feel safer than when in taxis (-) Insufficient driver training and insurance gap	(+) Better matching demand and supply (+) Reduces transaction cost
Ridesourcing vs. public transit	(-) High-density area: competes with public transit	(+) Temporal: complements public transit at night and weekends (+) Spatial: serves as feeders for public transit		(+) Low-density area: cost efficient to substitute certain transit routes with ridesourcing

Note: “+” denotes positive impact on urban efficiency, “-” denotes negative impact, and “?” denotes uncertain impact.

paper contributes to a better and clear understanding of ridesourcing, as a first step to comprehend the convoluted relationship between the sharing economy and urban development.

More specifically, this paper will conduct a systematic review of the existing literature concerning how ridesourcing affects the efficiency, equity, and sustainability of urban development – three key goals that urban scholars and policy makers aspire to achieve for our future cities. In addition to academic literature, this article also reviews a variety of materials such as news and magazine articles, blogs, websites, and reports produced by non-academic sources, considering that research on the sharing economy is in its infancy, and not many studies have been done specifically about ridesourcing. Given that Uber is the most successful TNC, it is used as an example by most literature analyzed in this paper. It is worth mentioning that, even though we didn’t intend to limit our review to any specific country, the majority of the literature written in English focused exclusively on the U.S., which in turn constrained the scope of our review. That said, the goal of this paper is not to draw a broad conclusion on how ridesourcing may impact urban development, but rather to synthesize current understanding, identify problems, and point out directions for future research.

The rest of this paper is organized as follows. Section 2 discusses how ridesourcing affects urban transportation efficiency and economic efficiency. Section 3 examines the impact of ridesourcing on urban equity. Section 4 analyzes how ridesourcing influences urban sustainability through altering private car ownership, energy consumption, and emissions. This is followed by a discussion section that outlines problems in existing research and prospects of future urban development influenced by ridesourcing and the sharing economy. The last section offers a summary and points out future research directions.

2. Urban efficiency

To assess how ridesourcing changes urban transportation efficiency and economic efficiency compared to the status quo, it is essential to identify what mode of transportation ridesourcing is replacing – known as the modal shift (Light, 2017). Ridesourcing is most conspicuously competing with taxis. From March 2012 to July 2014, the number of taxi trips per month in San Francisco decreased by more than a half (San Francisco Municipal Transportation Agency, 2014). In Manhattan of New York City between April to June in 2015, taxi pickups dropped by 3.83 million compared to the same period in 2014 (Fischer-Baum & Bialik, 2015). Many scholars and the popular press made comparative studies on taxi and ridesourcing (Anderson, 2014; Bialik, Flowers, Fischer-Baum, et al., 2015; Glöss, McGregor, & Brown, 2016), all of which seemed to confirm this significant modal shift. Another major modal shift caused by the emergence of ridesourcing is from public transit (Rayle et al., 2016), even though there are also situations in which ridesourcing complements public transportation networks (American Public Transportation Association, 2016). In this section, we will examine these two modal shifts in detail and discuss how they

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