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Free-Floating Carsharing: City-Specific Growth Rates and Success Factors

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Abstract

Free-floating carsharing, a relatively new market segment within carsharing, is expanding through Europe and North America. This type of system allows users to book a car at any point and any time within a specified area. This type of carsharing currently exists in about 34 cities across nine countries, in cities of highly varied demographics and urban form. Shared vehicles could be part of new mobility services that foster inter- and multimodal travel and serve as an essential part of energy and climate strategies in the transport sectors. However, empirical data on use of free-floating carsharing is usually unavailable for research purposes. New data collection methods have to be developed to evaluate the effects of carsharing systems. For five years, InnoZ (Innovationszentrum für Mobilität und gesellschaftlichen Wandel) has been using web mining to acquire a robust set of data about free-floating carsharing vehicles and movements. Since 2011, about 50 million movements have been recorded by using a web-mining script. This paper provides a first look at this dataset, showing that use of the services is generally increasing over time. It also confirms previous research that household size and residential density are key drivers of free-floating carsharing use.

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Keywords: carsharing; free-floating carsharing; mobility services; shared mobility; urban mobility; urban transport; regression analysis

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1. Introduction

Carsharing is the rental of vehicles by the hour or by the minute as opposed to traditional day- or week-long rentals. Members of the system have access to a fleet of vehicles that they can rent on an as-needed basis. The fee charged is based on the length of the rental in hours or minutes and covers maintenance, insurance, fuel, and often parking as well. Carsharing began with vehicles in assigned parking spaces; the vehicle rental could only be considered complete when the vehicle had been returned to the same assigned parking space where the rental had begun.

As this type of "traditional" carsharing began to take hold in Europe and North America, new operators created variations on the original business model. In the newer iterations, known as free-floating carsharing, vehicles do not have home parking spaces but are instead can be parked anywhere within a city's operating area, which can be as large as 100 km^2. Because the vehicles do not need to be returned to their starting point to complete a rental, this service is also known as one-way carsharing.

Ideas for a "second generation" one-way, open-end car sharing service go back to the 1990s. First pilot tests were conducted in the early 2000s (Schwieger 2004). The first one-way carsharing provider was Daimler Inc, through its subsidiary car2go. In 2008, car2go began with a pilot program in Ulm, Germany, providing a fleet of 200 diesel-powered Smart ForTwo vehicles for Ulm residents to use. Vehicles could be picked up or dropped off anywhere within the operating area, which encompassed most of the city center. The service uses GPS technology to track the location of each vehicle. While the vehicles can be driven outside of the operating area, the rental period can only be ended when the vehicle returns to the operating area.

Since 2008, car2go has expanded around the world, with operations throughout Europe and North America. In certain cities (Amsterdam and San Diego, California, for example), the fleet is entirely composed of electric-drive Smart ForTwos; in other European cities, the fleets are diesel-powered, and in North American cities, most fleets are gasoline-powered. As of January 2016, car2go operates in 32 cities and is the largest carsharing program in the world (PR Newswire 2014).

A second carsharing program that is operating worldwide is DriveNow. The DriveNow fleets are mainly composed of Mini Coopers and the BMW 1-series, both of which are manufactured by BMW. DriveNow began in Munich in June 2011 and is now operating throughout Germany and in several neighboring countries (Kopp et al. 2013). Free-floating carsharing services are further evolving and new players, often operated by local organizations, are also entering the market. These systems are often operated by local organizations. Examples are Communauto in Montreal and Quebec, Enjoy in four Italian cities (Milan, Rome, Turin, Florence) or flow>K in Osnabrück.

Free-floating carsharing services allow greater flexibility than traditional carsharing providers, as the user does not need to return the vehicle to a certain point. This flexibility is one of the factors fueling the growth of the services, along with a worldwide focus on increased sustainability of transport systems and variety of travel options.

This paper uses web-scraped data from free-floating carsharing service providers to consider the growth of free-floating carsharing services across the European and North American continents, providing a comparative description of service growth rates across cities, regions, and continents. It also analyzes factors that may be having an effect on these various growth rates, with an eye toward clarifying what makes a free-floating carsharing service particularly successful.

Our objective is to explain the variation in free-floating carsharing service diffusion rates and saturation rates among cities using a variety of city-specific data sources. This includes demographic data (age distributions, gender ratios, education levels, household structure, vehicle ownership levels), economic data (average incomes, unemployment rates, employment by sector, cost of living), and land use data (residential density, employment density, transit availability, availability of other transportation services). In particular, we examine differences between European and North American cities. We expect to find that using the robust set of web-scraped data to analyse carsharing use over time will confirm results found previous literature about factors determining carsharing use, such as user age, income, and household size and density. We also expect that these determinants will vary from city to city.