Understanding Collaborative Consumption Business Model:
Case of Car Sharing Systems

Li-hua WU
School of Information Management,
Beijing Information Science & Technology University, Beijing, China

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Abstract. Collaborative consumption models are increasingly prevalent across the world due to their environmental, social and economic benefits. To understand how collaborative consumption models run in practice, this paper performs an investigation on five car sharing systems which are successful startups built on collaborative consumption. A comparative analysis framework including service pattern, convenience, revenue stream and reputation system is developed. Then the business models of car sharing system are shaped along these four dimensions. The insights gained in this study can help car sharing operators to promote their services further through considering key issues of various business models and constructing a reasonable business model portfolio for their car sharing systems.

Introduction

In recent years, collaborative consumption as an important socio-economic model has been experiencing a rapid growth across the world in virtue of digital and social networking technologies. One of well-known examples of successful startups built on collaborative consumption is car sharing service. In car sharing, consumers access cars owned by companies or private car owners for short-term periods by paying per use. A number of professional vehicle rental networks like Zipcar, Turo, Buzzcar, Getaground et al. demonstrated how speedily new collaborative ventures were able to grow up by meeting members’ temporarily leasing needs. Also, car manufacturers have started to develop and commercialize their own car sharing systems, such as Car2go by Daimler, DriveNow by BMW and Mu by Peugeot. These well-known examples illustrate how traditional manufacturing enterprises can adapt and expand their business models from selling products to selling the use of products in order to take advantage of the collaborative consumption economy.

Given the new trend of sharing goods or services, this study tries to examine collaborative consumption model in the context of car sharing systems, with the aim to understand the business implications and have a thorough insight on the collaborative consumption. The paper is organized as follows. Section 2 briefly describes the literature research carried on the collaborative consumption and car sharing. Section 3 outlines the car sharing systems studied and the research framework. Section 4 discusses the car sharing business models and their implications. Major conclusions and future work follow in Section 5.

Related Work

In a broad sense, “sharing” can happen to anything to which access is enabled through joint use of resources, products or services. According to Botsman and Rogers [1], collaborative consumption systems can be divided into three categories–product service systems, redistribution markets, and collaborative lifestyles. In product service systems, consumers can share products owned by a company or private. In redistribution markets, used or pre-owned goods are redistributed to places where they are needed. Not just physical goods, intangible assets such as time, space, skills and money can also be shared and exchanged by people with similar interests, which is the case of collaborative lifestyles. Car sharing services is exactly the first kind of product service systems.

One stream of research on car sharing has focused upon quantifying the environmental, social and economic benefits from car sharing activities. Car sharing has been widely recognized to be
environmentally friendly. Some previous studies have shown that car sharing can reduce CO₂ emissions [2-5], energy consumption [5], and private vehicle ownership in cities [2,5]. At the same time, car sharing improves access to services such as employment, training and key services for people in areas of geographic isolation [3]. Car sharing also has a considerable effect on the member’s behavior and cost. Most of studies regarding car sharing and travel behavior find that car sharing membership influences mobility patterns. Compared with non-car-sharers, car sharing members show higher trip frequency, a better trip management and are more intermodal and multimodal in their behavior [5,6]. Car sharing members also could make significant cost savings through travelling predominantly on alternative sharing modes [4].

Another stream of research has put emphases on the optimization and performance evaluation of car sharing networks. The planning of car sharing systems involves a host of strongly interacting decisions regarding the number, size and location of stations, as well as the fleet size [7]. Several mathematical models were proposed to determine the optimal relocation strategy [7-9], fleet size [7,10,11] as well as the optimal configuration in terms of station locations, vehicle inventories, and station capacities [12] to satisfy the vehicle demand from customers with the minimum system cost or maximum system revenue. Possible parking space reservation strategy for car sharing system was also explored to solve the problem of finite capacity in each station [10]. In addition, to increase company revenue and customer satisfaction, a simulation method was developed to evaluate the performance of the one-way car sharing service [13]. The simulation result showed that the total number of cars, number of one-way reservations and station size have an impact on one-way performance and hence company profit and customer satisfaction can be maximized by optimizing these factors.

Apart from the above two mainstream researches, some work has attempted to model the factors determining the decision of an individual to participate in car sharing activities [14,15], investigate the transport policies dedicated to sustainable car sharing systems [16,17] and assess the market potential of future development of car sharing [18].

Irrespective of all these corresponding literature on car sharing, to the best of our knowledge, few studies have provided a comprehensive analysis on emerging car sharing practices. Therefore, in this study, we advance our understanding of collaborative consumption through a comprehensive study of currently running car sharing systems. This research makes two contributions. Firstly, it provides a systematic analysis framework that integrates the service pattern, convenience, revenue stream and reputation system to characterize current car sharing practices. Secondly, it compares and contrasts existing car sharing systems with the analysis framework and manifests possible business model development of car sharing systems through discussing all analyzed elements. These contribute to a better understanding of what the collaborative consumption looks like and how collaborative consumption systems work in practice.

Methodology
To understand the deployment status of car sharing systems worldwide and characterize them, information on car sharing systems was collected. We performed an in-depth literature study and brought the most popular car sharing systems over the world to light. Afterwards, we conducted an analysis of companies’ secondary data, including company websites, promotional material, newsletters, videos, and interactions with customers through their social medias.

Case Selection
Through the above study and investigation, we oriented five most popular car sharing systems across the world as the study subjects. They are Uber, GoCarShare, Turo, Zipcar and Car2go.

Uber. Uber (http://www.uber.com/) started its private car ride service in San Francisco in 2009 and is currently available in 531 cities worldwide. It provides private car ride service by using mapping data to connect a driver who owns a car to a rider who wants a lift. The rider gets their lift anytime and anywhere, just setting their location and choosing a driver with their smartphone via
Uber system. After each trip, both the rider and the driver can rate each other and give anonymous feedback about the trip. In addition, Uber is trying its UberPool service in some cities which enables a rider to share the ride and the cost with other riders heading the same way through carpooling.

**GoCarShare.** GoCarShare (http://www.gocarshare.com) is also a car ride service system to help a driver look for a ride and a passenger get a spare seat. When passengers need a lift, they create a GoCarShare request by simply entering the details about the journey that they are planning on making. Drivers suitable for the journey will be searched. Then the counterparts contact and negotiate to decide whether the journey sharing is feasible or not. Once the journey is done, leave each other feedback to help future GoCarSharers.

**Turo.** Turo (http://www.turo.com), formerly RelayRides, is a car rental marketplace where travelers can rent any car they want from local car owners. Essentially, Travelers enter their travel date and location to search available locally-owned cars in Turo system. Then travelers select the appropriate car to book. The car owner will confirm or decline the trip request within eight hours or much sooner. Once the deal is closed, Traveler pick up the car by themselves or owners offer delivery in most cases. At the end of the trip, travelers need replace the gas used and meet the owner to drop off the car. Rates and reviews can be given each other to help keep the marketplace strong and honest.

**Zipcar.** Zipcar (http://www.zipcar.com) is the largest car sharing systems established in 2000. It provides car rental services oriented to citizens, businesses and universities to facilitate their trips. Members receive a Zipcard, which serves as an automatic key to unlock the door of each car, enabling members to have automated access to any Zipcar they reserve. Members can reserve Zipcars online or by phone in minutes or up to a year in advance for as little as 1 hour or as long as 7 days. Zipcars are typically located close to the user’s residence or work place and are returned to their reserved spot at the end of the rental period.

**Car2go.** Car2go (http://www.car2go.com), the global car sharing business using Mercedes-made Smart Cars, started its car rental service in the German city of Ulm in 2008. Once registered, users can take any of the car2go vehicles they find distributed around them, or can reserve an available vehicle 30 minutes before they want to drive. Then users can open the door of any car2go with the mobile app to start their trips. After reaching their destination, users simply leave the car in any approved parking space inside the home area without any further involvement.

**Analysis Framework**

Car sharing is a membership-based service that offers the user short term vehicle access. Although there are commonalities within existing car sharing practices, it is probable that most operators will make unique strategic decisions in framing their specific shared mobility business models. According to car sharing operation practices and customer service philosophies, this study here shapes each car sharing system with four business model building blocks: service pattern, convenience, revenue stream and reputation system.

**Service Pattern.** Provides the insight about how a car sharing initiative serves its customers in terms of different sharing patterns and demand-supply matching patterns. Service pattern provides significant value to meet customers’ car sharing needs. In line with the sharing pattern, car sharing systems are categorized into two groups: ride sharing and car rental. Also, they fall into two camps, peer to peer (P2P) service and business to customer (B2C) service, when their matching patterns are considered.

**Convenience.** Measures how easy a customer can get access to car sharing services and here is delineated by car return and reservation requirement. Traditional car sharing systems are based on limited and fixed stations, whereas today’s car sharing models allow users to access on-demand transportation with great convenience and flexibility through integrating with location-based service via mobile technology and GPS-based real-time information.

**Revenue Stream.** Accounts for a company’s economic value acquisition from car sharing systems. While conventional business models generate profit from selling goods to customers, car sharing systems do gain their revenue by selling the use of cars.
**Reputation System.** Provides interactions between customers and companies or private car owners and motivates customers to rate for their consumptions. Reputation system provides a good protective measure for drivers and riders in car sharing service. Basically, each car sharing system builds trust among users with online rating system and/or social media system.

Below, these four dimensions are applied to emerging five car sharing systems to perform a comparison analysis and develop a summary of car sharing business models (See Table 1).

<table>
<thead>
<tr>
<th>Car Sharing System</th>
<th>Service Pattern</th>
<th>Convenience</th>
<th>Revenue Stream</th>
<th>Reputation System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uber</td>
<td>Ride sharing (Taxi)</td>
<td>P2P</td>
<td>N/A</td>
<td>Reserved</td>
</tr>
<tr>
<td>GoCarShare</td>
<td>Ride sharing (Carpooling)</td>
<td>P2P</td>
<td>N/A</td>
<td>Reserved</td>
</tr>
<tr>
<td>Turo</td>
<td>Car rental</td>
<td>P2P</td>
<td>Two-way trip</td>
<td>Reserved</td>
</tr>
<tr>
<td>Zipcar</td>
<td>Car rental</td>
<td>B2C</td>
<td>Two-way trip</td>
<td>Reserved</td>
</tr>
<tr>
<td>Car2go</td>
<td>Car rental</td>
<td>B2C (manufacturer initiated)</td>
<td>One-way trip</td>
<td>Instant access</td>
</tr>
</tbody>
</table>

**Car Sharing Business Model**

**Service Pattern**

**Ride Sharing vs. Car Rental.** Ride sharing satisfies the sharing requirement of customers who just want a lift. It allows car owners to pick up other passengers to ride in their cars to expected locations. As shown in Table 1, Uber provides a Taxi-based ride sharing service and GoCarShare supports the carpooling ride sharing. The difference between the two lies that the former is profit-driven while the latter is nonprofit. Car owners use Uber as a tool to make money and take ride sharing service as their real business. But car owners who provide carpooling services seek to subsidize their trip costs while contribute to reduce traffic congestions and pollutions, without the expectation of financial gain. By contrast, car rental is the other kind of car sharing scheme where car owners or car sharing service providers rent their vehicles to renters at a price mutually agreed. Car renters, in this case, are drivers and control the trips by themselves. Two differences that most distinguish the emerging car rental service from the traditional ride or car rental service include private car involvement and a location-based real-time accessing vehicle network supported by web and mobile technology. Especially the involvement of private car forms totally new types of mobility business models like P2P Taxi (e.g., Uber) and P2P car rental (e.g., Turo) emerged based on the idea of sharing a car.

**P2P vs. B2C.** The car owners in car sharing systems fall into two groups: one is private individuals, and the other is companies. When private individuals use their own cars to provide car sharing services (e.g. taxi-based riding, carpooling and car rental) to customers, peer to peer (P2P) sharing service model forms. In this case, the car sharing systems such as Uber, GoCarShare and Turo merely play a role of intermediary service provider who uses web and/or mobile technology to offer and operate a platform to connect car owners with potential car riders or renters. In business to customer (B2C) car sharing business models, customers access cars owned by a company. The
company supplies vehicles at key points throughout a city. Two examples of B2C car sharing services, namely Zipcar and Car2go, are provided in Table 1. While Zipcar and Car2go belong to the same business model, the specific service they have made with respect to car rental differ slightly. For example, Car2go was initiated by the automaker Daimler and so it uses its private label Smart as the uniform car model to provide one-way, free-floating car rental service.

**Convenience**

**One-Way vs. Two-Way.** The car sharing systems can offer one-way or two-way services. One-way systems allow users to return a vehicle to any approved parking spaces which are scattered around a city and easily accessible. Two-way systems mean that users must return a car to the same location as they pick it up at the end of their trip. Obviously, one-way systems gives more flexibility to users. However it involves a number of complexities arising from the interacting decisions regarding the number, size and location of stations, as well as the fleet size[7]. Therefore, despite the promise of more flexible services, one-way system is rare today. The only current example is Car2go which provides not only one-way but also free-floating service for users. Since consumers using Uber and GoCarShare services are just riders, they needn’t consider such a problem as returning a car. The other car rental systems allow two-way trips mainly, though Zipcar are currently testing out their one-way reservations in Boston, LA and Denver.

**Reserved vs. Instant Access.** Two types of reservation mechanisms are used in car sharing systems: reserved and instant access. The reserved car sharing systems require users to book a car in advance, while the instant access systems do not require a reservation and users can spontaneously take any of the vehicles they find distributed around them in the street. Usually, car riding (e.g. Uber, GoCarShare) and two-way car rental (e.g. Turo, Zipcar) services are inclined to use reservation configuration to allow an efficient control over the demand flow and a better forecast of the system’s future state. By contrast, one-way system (e.g.Car2go) intends to provide users a high level of flexibility and convenience with no reservation, similar to a private car. Certainly, users can also make a short-term reservation (e.g. 30 minutes in advance) in a one-way system if they want. In fact, many car sharing systems support fast reservation service through robust mobile and web technologies. For example, Uber responses to users as quickly as minutes.

**Revenue Stream**

The revenue of car sharing systems stems from two sources: one is commission charged from the car sharing trips, and the other is a fixed membership fee. For P2P car sharing systems, it’s totally free for both car suppliers and demanders to list information on the system’s platform. No membership fee is needed to be paid. However, once the deal between private car owners and consumers is done, P2P car sharing systems will extract commission from the car owners in term of a certain proportion of trip fee paid by consumers. For instance, Uber charges 20 percent commission on a trip and the ratio amounts to 25 percent for Turo.

For B2C car sharing systems, members have to pay a running fixed cost including one-time sign up fee and sometimes monthly or yearly membership fee in addition to car usage rate based on time and distance travelled. For example, Zipcar charges at least monthly $ 7 or yearly $ 70 membership fee besides hourly $8-10 driving rates. Deifferent from P2P model, B2C car sharing service covers gas, parking and insurance for users. The fixed cost is considered as a kind of risk compensation and a mechanism for improving users’s stickness.

Both the revenues of P2P systems and B2C systems are related with their pricing strategies. To guarantee the balance between car supply and demand, as well as attract members, most car sharing systems employ dynamic pricing mechanism. Uber created its surge pricing system where the increase in price is proportionate to demand, e.g. the price rises in the rush hours or poor weather days. GoCarShare and Turo set an elastic price range during which car owners can set their own service rate accordingly. Zipcar and Car2go also have a floating pricing structure based on service areas and car models. Members of these two systems can select daily, hourly even by-minute rate to use cars.
Reputation System

One of the hurdles that impact belief in the collaborative venture is security and trust [1]. When users consider that purchase on a sharing platform carry a certain level of risk, they will never make a deal with it. Well established brand reputation and word-of-mouth therefore became crucial in this case. A well-designed reputation system enables users to get knowledge-interests, whom users know, personal preferences, past actions-about strangers [1], offering the right tools and environment for familiarity and for creating trust between buyers and sellers in car sharing systems.

In P2P car sharing programs, there exist two levels of trust - users’ trust on car sharing service providers and the trust between car owners and users. P2P car sharing systems develop the two-way rating system and social media system to build these two kinds of trust. Positive ratings or reviews become a firsthand reference for users to select their car suppliers. For B2C systems, social media system is the main communication tool since P2P rating is unavailable here. By connecting users to social media systems, e.g. Facebook, Twitter or self-built blog, it is more easily for companies to find out what users truly want and improve their car sharing strategies accordingly.

Summary

This paper undertakes an analytical investigation into access-based collaborative consumption business models by examining five popular car sharing systems. The contribution lies in identifying the four dimensions on which various types of car sharing systems differ from one another and opening doors for car sharing operators to combine different business model elements to build up their unique car sharing service. Further research would benefit from addressing key issues faced by car sharing systems further such as government involvement, pricing strategy, security and trust and so on.

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