# Chapter 4
# Governing Carsharing as a Commercial or a Public Service? A Comparison Between France and Japan


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**Abstract** Based on case studies in Japan and France, this chapter analyzes the conditions needed for station-based carsharing to take off. Using the Japanese perception of transportation as a commercial service, and the French perception of it as a public service, this chapter shows that round-trip and one-way services are two different markets. These systems, in which use, operating costs, vehicles, and impact on car dependency are not the same, developed quite differently in each country. Although commercial round-trip services have grown fast in Japan, France relied more on electric vehicles one-way services supported by local public authorities. Social, institutional and regulatory contexts, and user demand explain the differences, but the roles of private and public actors also matter.

**Keywords** Carsharing · Round-trip · One-way · France · Japan

## 4.1 Introduction

The concept of carsharing first appeared in the 1950s as a means to avoid high costs of car ownership (Communauto, n.d.; Shaheen and Cohen 2007). In the late 1960s, Friedman (1972) identified advantages of sharing the use of a car in terms of reducing traffic congestion, parking space needs, travel costs and air pollution in peak periods, and promoting public transportation (PT) in regard to public or societal issues. This still appears relevant today. Feedback from the first experiments showed that carsharing services encouraged individuals to change their travel habits and reduce driven mileage (Shaheen and Cohen 2013).

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The idea of shared goods, rather than individual ownership, spread worldwide in the 2000s. Sharing cars, which are parked 23 h a day, became an even more relevant choice, opening new business opportunities. Studying Carlink in the US, Shaheen (1999) stated that carsharing can "*reduce traffic congestion, air pollution, and government spending*," while the broad development of information and communication technologies (ICTs) made carsharing less inconvenient and smart thanks to intelligent registration and reservation systems. This might explain why apart from many environmental associations which were and still are promoting carsharing, diverse companies are entering the sector. This might also have contributed to renewed interest of local and national public bodies in supporting carsharing as a more sustainable mode of mobility.

Based on empirical observation and interviews, this chapter aims to analyze the development of station-based carsharing in France and in Japan, which both came into the carsharing business relatively late. Carsharing is defined as a short-duration rent-a-car system, through membership and pay-as-you-go pricing (including insurance, fueling, maintenance, and cleaning). It differs from car rental, which needs a contract for each rental and a face-to-face contact at an office. It also differs from carpooling, in which individuals share the same car for the same trip, thanks to platform managers who just organize matching people. Carsharing can be station-based, in which cars are picked up and returned at on- or off-street stations. It can also be free-floating, in which cars can be picked up and returned anywhere in the city. While free-floating carsharing is a one-way service, station-based carsharing can be either round-trip, when cars have to be returned at the station they were picked-up, or one-way when cars can be returned at a station different from picked-up one. Given that free-floating carsharing is just starting in France and does not yet exist in Japan, this study only focuses on station-based carsharing.

In the recent years, Japan experienced a huge increase in membership, whereas the number of users in France stagnated. Therefore, comparing France and Japan is interesting, although station-based carsharing still remains niche markets in both countries. The development of round-trip and one-way systems is quite different in each country, due to differences in societal, policy, and regulatory contexts. For historical reasons, Japan considers passenger transportation a commercial activity, mainly relying on private companies for implementation, funding, and operation. France mainly views it as a public service, organized and partially funded by a public authority, which often entrusts a private company to operate it. Observing the respective evolution of round-trip and one-way markets in France and Japan, this chapter intends to address the following question: *Should station-based carsharing develop as a commercial or a public service, and what are the conditions required for it to take off?*

This chapter is organized as follows: Part 2 will briefly present the literature on carsharing and the theoretical framework relevant to analyze its development, before introducing its evolution in France and Japan. Parts 3 and 4 empirically discuss what happened in each country. Part 5 analyzes the reasons for differences between the countries, as well as their possible impact for future prospects. In Part 6, the conclusion will briefly summarize findings. Unless specifically referenced, all

the empirical data and information was collected through interviews (listed in the references section) conducted with different actors within the carsharing sector in France and Japan.[1]

## 4.2 State of the Art and Carsharing Evolution in France and Japan

Inspired by the sharing economy and the development of ICT, the literature on carsharing is abundant. Based on surveys conducted in numerous countries, it mainly questions the emergence of this new mobility system. On the one hand, its characteristics are analyzed using traditional, transportation study approaches, through users' profiles (Loose 2010; 6t-bureau-de-recherche 2016), or type and frequency of uses (Cervero et al. 2007) to estimate the potential market and its impact in terms of complementing or substituting for other modes. On the other hand, some studies are more concerned with the sustainability or smartness of the system, so demonstrate how carsharing might reduce car ownership, congestion, or other car-related negative externalities (Martin and Shaheen 2011). Finally, other studies are concerned by the market potential and its associated business models (Steininger et al. 1996; Shaheen and Chan 2015; Boston Consulting Group 2016; Shaheen and Cohen 2016).

In Japan, academic literature on carsharing is less important. Survey reports of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) or consultancies provide most of the data on experiments. Some scholars are studying the best location for stations through demand simulation (Nakamura et al. 2017), while others are looking at stakeholder strategies involved in urban transportation or carsharing to see if there is cooperation (Kato et al. 2015). However, most papers focus on e-carsharing, with special attention on micro-mobility e-carsharing (Mizokami et al. 2015).

The transition toward sustainable or smart mobility is often discussed from a socio-technical system and multi-level perspective (MLP) approach (Geels 2012). Such papers look at the conditions for the emergence of a new product (such as electric vehicles—EVs) or service (such as navigation systems) to see how these innovation niches can generate change at the regime level, and/or how the landscape level may impact or be impacted. Although the evolution of carsharing in France and Japan could be explained by changes in technology, socioeconomic norms, and regulation, such an approach probably underestimates the role of the demand side. At the opposite end, transition can also be seen through behavioral studies in terms of modal choice and incentive (information, experimentation, or price signal) to encourage each individual to choose more sustainable or smart behaviors. However, as past experiments or incentives have shown, it does not

[1]This study benefited from a two-month invitation to Kansai University during the fall of 2017.

work that easily. Behaviors are the observable expression of social phenomena (Spurling et al. 2013), rooted in cultural values and world vision, previous learning and routines, and former policies and institutions. This means that access to resources, new technologies or services is important, but that history and path dependencies also matter. The theories of practice, which put practices (action of doing) instead of individual behavior or technological systems at the core of the analysis, seem better able to take into account the different dimensions of the issue. Practices are defined (Spurling et al. 2013) as socially recognized activities in which people engage in consuming resources to accomplish actions (practices as performance), such as bathing, skiing, driving, or cycling. According to Watson (2012: 492): "*Systems persist and are transformed only through the flow of practices—of action and doing—which comprise them*."

The approach through practices (as entities) that "*integrates both behaviors and their material, social and cultural contexts*" (Spurling et al. 2013: 19), but also addresses the systemic change dimension (systems of practices), can better grasp the conditions for services' attractiveness, whether round-trip or one-way, and the innovations or interventions to support their takeoff or sustainability. Indeed, technology matters, but as it will be shown in this chapter, the actions of actors throughout the system explain the different development and governance of carsharing systems in France and Japan.

Due to climate change, energy transition, or congestion in cities, policies since the 1990s tend to intervene in the car driving practice, experimenting to make mobility more sustainable. Carsharing, which relies on the same elements as car driving, in terms of material (vehicle and road infrastructure), competence (driving), and meaning (mobility), occupies a singular position. If "*re-crafting practices focuses on making driving less resource intensive, but does not seek to change patterns and volumes of private car use*" (Spurling et al. 2013: 27), then carsharing must be considered a new practice aimed at substituting car ownership. In that sense, it competes with (private) car driving. However, similar to car driving, it also competes with alternative mobility solutions. As practice theories show (Spurling et al. 2013; Watson 2012), a practice needs defection from other practices to develop. In promoting carsharing, policy-makers expect to recruit members among car owners, abandoning car purchasing or at least not using private cars under certain circumstances or at certain times.

During the 1990s, carsharing started in France and Japan, developing through local initiatives from individuals, but also through several projects from governmental support. Linked to the development of EVs, these projects were often launched under the leadership of carmakers. Building on progress made in the ICT field, many applications for real-time information (booking, vehicle location and follow-up, pricing, and access cards) were then available to help operate such systems. These experiments, as a test bed for developing EVs and demonstrating ICT technological components, lasted only a couple of years in France (TULIP Project by PSA, PRAXITELE Project from Renault) and Japan (Honda ICVS, Toyota Motor Company [TMC] Crayon System). Grants were provided by the government, but could not recruit enough practitioners, so it appeared impossible to

continue once the grants ended. These experiments were also a learning process for public authorities and companies, in that they showed the difficulties to overcome for the market to take off. Until the mid- to late-2000s, France and Japan lagged behind other countries, when looking at the number of members compared to their population.

Statistics on carsharing membership are difficult to compare. In Japan, an annual survey by the Foundation for Promoting Personal Mobility and Ecological Transportation (Eco-Mo Foundation) gives, since 2002, a precise idea of the carsharing evolution, in terms of members, stations, vehicles, and carsharing service operators.[2] In these surveys, individual and corporate members are all registered drivers. In France, there is no annual survey. Data about carsharing membership comes from a research and consultancy office (6t-bureau-de-recherche 2017) that gives numbers in terms of registered members or active members (members renting a car at least once a month). Considering that approximately 50% of members were active in several of the carsharing systems according to the definition given by 6t-bureau-de-recherche, numbers for France were estimated from that ratio.

Although these numbers must be taken cautiously, the comparison clearly shows different evolutions. Between 2006 (the first year of available data for France) and 2010, the number of members continuously increased in both countries. However, France had 3500 members in 2006 and 28,000 in 2010, while Japan had 1712 and 15,894 during the same time period. Since 2010/2011, the number of members dramatically increased, reaching a much higher level in Japan than in France. There were nearly 200,000 members in France in 2016, and 846,240 members in Japan (1,085,922 by 2017).

The social context and user demand partially explain these different evolutions, but as case studies will show, the types of intervention by public and private actors were the first drivers for change in both countries, although leading to quite different results.

## 4.3 Carsharing in France

As the concept of sustainable development has been imported within French legislation, the government has begun promoting carsharing, thanks to the national energy agency (ADEME) which financially supported the first initiatives (APUR 2008). Since transport regulations are based on the notion of public service, carsharing has been considered as a form of rental service. This made it impossible for municipalities to promote carsharing by providing financial grants or reserved on-street parking spaces, which is required to make the service visible to people. It did not prevent some initiatives to be taken. In 2007 for example, Paris decided to create a label (APUR 2008) specifying the level and quality of carsharing service:

[2]Available in Japanese at http://www.ecomo.or.jp/environment/carshare/carshare_top.html.

access to stations, type of vehicles, availability of cars, and the structure of fares. The label also gave the operator an obligation to transmit all information on users and usage to the municipality. In return, the city offered some advantages to the operators: a 20% reduction on paid parking, reservation of on-street parking spaces, and communication support. However, apart from such specific cases, the legal framework hampered larger development of carsharing.

This is why local officials put pressure on the government to modify the legislation. In 2010, the Law on the Environment (Law No. 2010-788 July 12, 2010, art. 54) created a national label legalizing reserving on-street parking spaces. Citing the use of parking spaces reserved for disabled people on public streets, the law referred to the notion of public utility to justify this legalization. Moreover, the last law on the modernization of public action (Law No. 2014-58 of January 27, 2014) transformed the Public Transport Authorities (PTA) into the Public Mobility Authorities (PMA), giving the new structure extended competences to all modes of transportation. Such a PMA can take the responsibility of creating a carsharing public service, in case of private initiative failure. A part of the revenue of the local transportation tax can then be used to fund investment and operation, as is the case for any PT.

### *4.3.1 Round-Trip Carsharing in France: Stagnant Demand*

Round-trip started in Paris, in the late 1990s with Caisse Commune (which became Mobizen, and was bought by Communauto in 2012), in Strasbourg with Auto'trement, and in La Rochelle under the Liselec project with EVs (now Yélomobile). The number of services quickly extended to 19 in 2008 (CERTU 2008), and to 31 in 2016 (6t-bureau-de-recherche 2017). However, after rapid growth during the first few years, the number of users seems to have reached its limit, at less than 40,000 members, for 1846 vehicles, and 780 stations throughout France (6t-bureau-de-recherche 2017).

From 2002, operators outside Paris started collaborating through the Company France Auto Partage (FAP), which had 10 operators (85 stations, 177 vehicles, and nearly 3000 members) in 2008. This was an opportunity to exchange experiences and know-how between very different operators (associations, cooperatives, and semi-public companies). Moreover, some resources were pooled, such as management software, a call center, and a central purchasing body for vehicles (APUR 2008). In 2013, this cooperative network was renamed Citiz and in 2017 had 15 operators in 50 French cities (300 stations, 750 cars, and 16,000 members; *LPA Magazine* 2017) including Lyon Parc Auto service, used as an illustration below.

Citiz, Lyon Parc Auto (LPA)

The first carsharing system in the Grand Lyon Urban Community was created in 2003 as an association of volunteers (*La Voiture Autrement*). As such, it temporarily benefited from small, indirect, financial support from the public authority. Due to financial difficulties, LPA, a semi-public company in charge of managing public parking, acquired the service (24 cars) in 2007 and progressively increased the fleet to 107 cars (January 2018). At the beginning, stations were limited to a dozen of underground parking buildings managed by LPA. However, thanks to legislation change, since the early 2010s, small on-street stations (two to three cars) were developed, mainly in the central area. The service now has 42 stations, 24 of which are on-street (January 2018).

After a relatively rapid increase in membership during the first few years (Fig. 4.1), the number of users has stabilized or even slightly decreased, due to the launch of competing services such as Bluely. Since 2015, membership is growing again to reach approximately 2500 drivers, thanks to a communication campaign and more diversified, attractive tariffs. The average rental duration remains stable at 7–8 h, for a distance of 65–70 km per trip, with respective medians of four to four-and-a-half hours and 20 km. Longer-duration rentals are for weekends. Corporate membership is progressively increasing and represents 27% of the total (2017). The small size of the service is one of the reasons for its lack of a business model, but the turnover increase and the financial improvement suggest profitability could be achieved within a few years.

The service is mainly used for visits and leisure (particularly outside the city), or carrying goods. The average occupancy of vehicles is 2.1 people, which is 65% more than for private cars. While only 39% of subscribers did not own a car before joining LPA carsharing service, 41% abandoned car ownership after becoming member. In total, 80% of LPA carsharing users do not own a car. This reduction of car use in favor of walking, cycling, and PT not only concerns private car use, but also car rental and taxis.

### *4.3.2 The Attractiveness of EVs' One-Way Carsharing Systems*

There are still only a few one-way carsharing systems in France. Outside of the Paris region with Autolib, EVs one-way carsharing is slowly developing. The city of Nice implemented the Auto Bleue service in 2011 (140 cars, 68 stations, and 2500 active members in 2016), while the Bolloré Group developed its service in 2014 in Bordeaux (Bluecub: 200 vehicles, 80 stations) and Lyon (Bluely: 250 vehicles, 100 stations) at its own initiative. For example, Bluely has no public

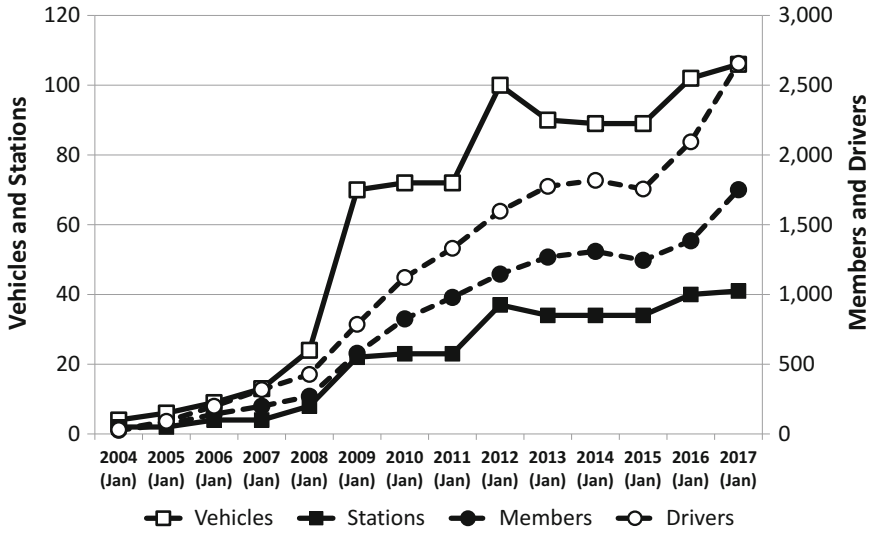


**Fig. 4.1** Lyon LPA Citiz service main characteristics. *Source* Based on data from LPA unpublished document, 2018

financial support in Lyon. However, as a service labeled by the Grand Lyon Métropole, it benefits from a contract to rent on-street parking spaces.

Autolib

Imagined as a technological showcase for a new mobility service aimed at complementing the PT network, this EV one-way system came from a group of 19 municipalities, including Paris, which created the Autolib Intercommunal Association. In 2013, it became the Autolib Metropole, with about 30 municipalities. In 2016, after integrating management of the Velib bike-sharing system, it was renamed Autolib Velib Métropole. A call for bids was issued in 2009, suggesting large development over a wide territory. Due to the size of the expected service and the need for charging stations, the municipalities thought that a private initiative would fail. Therefore, they decided to develop it as a public service under the responsibility of public authorities, but entrusted a private company with operation through a Public-Service Delegation Contract.

Several consortiums of companies involved in transportation services made bids. Bolloré, an industrial group specializing in high-capacity storage systems, was interested in using carsharing as a showroom for its Bluecar and, more precisely, its battery technology. It won the bid, created a subsidiary (Autolib Company), and started operating with 250 cars and 250 stations at the end of 2011. It had a final objective of 3000 cars and 1000 stations.

Today, the Autolib Velib Metropole association covers 98 municipalities (665 $km^2$) and generates 5.76 million rentals per year. This is partly due to the extension in the service area, which increased the number of vehicles to almost 4000 (33% higher than the initial objective, see Fig. 4.2). Obviously, stations located far from the city center do not work as well as those in the city of Paris, leading to financial difficulties.

According to the technical specifications of the call for bids, the investment was estimated at €200 million, with an annual operating cost of €80 million and a turnover of €95 million. The city of Paris committed to contribute €35 million, and the other municipalities agreed to pay €50,000 per station. Considering that profitability would not be achieved before the number of members reached 200,000 for 3000 cars because of the high cost of EVs, the 12-year contract provided that the public would cover cumulative losses exceeding €60 million, attributable to Bolloré. Over the past two years, Autolib had negative gross operating profit of more than €20 million each year, and the public authority is concerned about the risk of bearing a high financial burden in the coming years. Some municipalities are even considering leaving the system.

Annual ticket individual holders grew from 18,775 in 2012 to 40,974 in 2013, and to 111,331 in 2016, whereas there are still only a few corporate members (pro and Utilib), at 2443 in 2016 (Autolib Métropole 2017). Monthly, weekly, and daily tickets are also available, but sales are decreasing over time for the benefit of annual tickets. A survey conducted in 2014 (6t-bureau-de-recherche 2014) shows that one-way user profiles were similar to those for round-trip users, but 57% of one-way users accessed the service more than twice a week. The average rental lasted 40 min, for a distance of only 9 km. Most trips were done within Paris; 62% of members used the service for trips related to work (32% regularly); 66% considered Autolib more convenient than private cars, due to reserved parking spaces; and 25% stated it was more convenient than PT. Substitution also concerned motorcycles or taxis. One-way service replaced on average, compared to private car use, three cars and two parking spaces. However, overall mileage was only reduced by 11%, which is much lower than round-trip systems.

Even if part of the difficulties might be attributed to the public-service design, leading to a lack of supply optimization, this does not explain why the number of one-year season tickets is now slightly decreasing. This seems partly due to lower user satisfaction (notably due to lack of cars' cleanliness) and that carsharing companies are now competing with Transportation Network Companies (such as Uber).[3]

[3]http://www.lepoint.fr/automobile/autolib-en-perte-de-vitesse-14-11-2017-2172121_646.php. Accessed 6 February 2018.

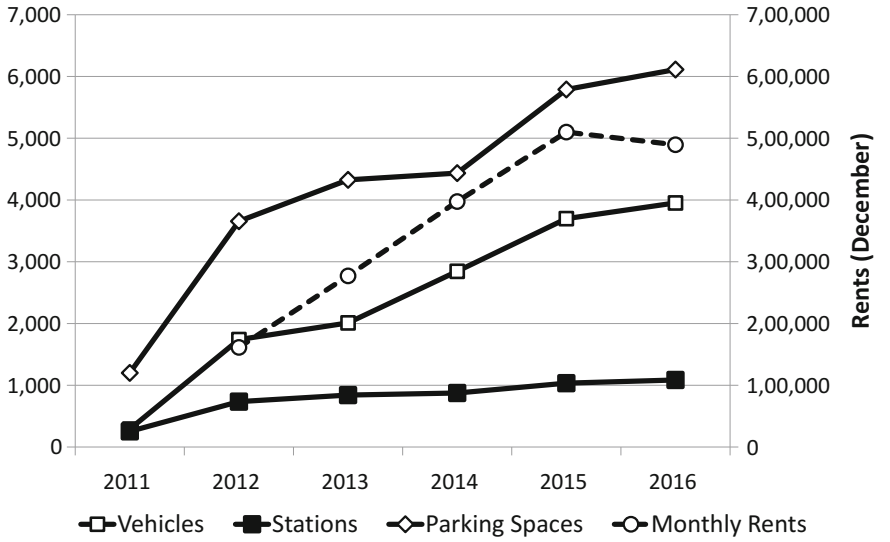


**Fig. 4.2** Autolib service main characteristics. *Source* Based on data from Autolib Métropole 2016 activity report

## 4.4 Carsharing in Japan

The carsharing business is classified as a car-rental business in Japan, requiring a car-rental license. This is why companies other than car-rental businesses could not easily offer such services, or had to do so in association with a car-rental company. This was the case for Park 24, which started the business after integrating Mazda Rental. In addition, all vehicles in Japan must be preregistered with a fixed parking slot, as on-street parking is not authorized, as stipulated in the Road Transport Vehicle Act (Act No. 185 of 1951, Article 7) and the Parking Lot Act (Act No. 106 of 1957, Article 3). This applies to individuals, companies, and car-rental, and carsharing businesses. The law also requires that car-rental companies carry out all matters (lending, vehicle preparation/maintenance, driving license checks, and payments) face-to-face at an office. Moreover, this office must be located no more than 2 km from the rental vehicle's pre-registered fixed parking slot. This has long been a real barrier to the development of carsharing in Japan, partially explaining its late takeoff.

However, these provisions eased from 2004 to 2006, first in relation to the Special Zones for Structural Reform law (Cabinet Office 2003), promulgated in December 2002 (launched in April 2003), and then extended to all of Japan (2006). Through the MLIT enforcement rule,[4] the carsharing type of rental (out of a

[4]See www.mlit.go.jp/report/press/jidosha03_hh_000176.html (in Japanese).

car-rental business) can accurately handle lending vehicles by utilizing ICT. Accordingly, if all operations are done through ICT, carsharing can be exempted from face-to-face management. The unmanned off-road parking slot is then considered an office where the car is registered, fulfilling the prerequisite of the pre-registered fixed parking slot.

These changes did not abolish the 2-km distance requirement between the office and the parking slot. So while easing the development of round-trip systems, this was not the case for one-way systems, in which the car was not returned to the same "office." Therefore, MLIT issued an official notification in 2014,[5] making clear that the off-road parking slot to which the car was returned was its office, even if it differed from its pick-up slot. This aimed to help one-way services take off, especially those using EVs.

### *4.4.1 Round-Trip in Japan: A Market Dominated by One Company*

Like in France, some Japanese NPO entered round-trip carsharing early, but on a very small scale. What differs from the French case is the involvement of parking management companies since the early 2000s. This is due to a very different context in terms of transportation and mobility. The first element comes from the regulation described above, which means that paid parking is the rule. This is why parking management is an important sector in Japan. This sector involves big companies that have often also developed car rental as side business like most carmakers have done. Real estate companies are another category of actors in the sector, which are also absent in the French case. These companies include parking lots in their condominium construction. However, because of space or environmental issue (and probably both jointly), such companies recently shifted from numerous parking slots to offering carsharing. This is the case for Mitsui Fudosan, the third largest carsharing provider in the Japanese market. Another difference lies in the fact that PT networks (private and public railways) are widely developed in Japan, especially in the three main urban areas. A large majority of home-to-work trips are done with PT. Private cars are not used for commuting or everyday activities. This means that carsharing seems well adapted to an urban population whose need for cars is limited to unusual or special trips.

In 2002, Orix Auto Lease Corporation was the first to start a carsharing system in the framework of a city of Yokohama pilot project. In 2005, the company became Orix Auto Corporation by integrating seven companies involved in car leasing and rental activities. The system that the company started, which progressively transformed into a commercial service in 2005, was first proposed with EVs.

[5]Issued March 2014, entering into force in September, See www.mlit.go.jp/report/press/jidosha03_hh_000176.html (in Japanese).

However, people did not rent them because they were afraid of the lack of range and the charging duration. Over time, the electric fleet disappeared in favor of gasoline cars.

As we have seen, the size of the carsharing market has drastically increased since 2011. Eco-Mo Foundation (2017) identified approximately 30 carsharing providers in Japan, but only six had more than 10,000 members at the end of 2016. The offensive strategy of the Park 24 group explains this takeoff.

Times Car Plus: Park 24 Group's Carsharing Service

Park 24 started its activity in the late 2000s, some years before carsharing became fashionable. With the integration of Mazda Car-Rental to the group, commercial activity began in 2009 (1030 vehicles and 746 stations in October 2010), with a strategy to rapidly increase the fleet. After several reorganizations, Times 24 Co. was created in 2010 to take charge of the carsharing service, renamed Times Car Plus (TCP) in 2014. Mazda Car-Rental was renamed Times Mobility Networks, while the parking business was transferred to Times 24 in 2011.

Times 24 developed an original strategy, giving it a competitive advantage over other parking-management companies. The group has its own underground or elevated parking buildings, but it also opened small street-level car parks by continuously looking for vacant land parcels within cities. These small car parks, in which one or two spaces could easily be reserved for carsharing, can be considered as on-street stations. The vacant parcels are leased under two-year renewable contract with their owners. Investment is low, and if one parking lot closes, another can be opened since vacant land parcels are always available.

As Fig. 4.3 shows, TCP totaled more than 20,000 cars, more than 10,000 stations, and more than 900,000 members by October 2017. A 2016 company survey of 5616 respondents showed that the average frequency of use was two to three times per month for 3.75 h, to travel 40 km. Shopping was the main purpose for trips (70%), but also for pleasure driving (35%) or carrying goods or people (33%). Fourteen percent of members owned a car, while 53 had given up their car. As fares are fixed to be close to PT prices, such services attract many young Japanese drivers who don't wish owning a car, or are not yet able to buy one. User satisfaction came from the possibility to use a car only when necessary (79%), not paying for fuel or parking (66%), the proximity of stations (54%), and the 24/7 availability of the service (52%).

With a 70% share, TCP dominates the market. Its main competitors Orix Auto Corporation (170,000 members; 2600 vehicles; 1531 stations) and Mitsui Fudosan Realty (Careco: 57,000 members; 1760 vehicles; 1159

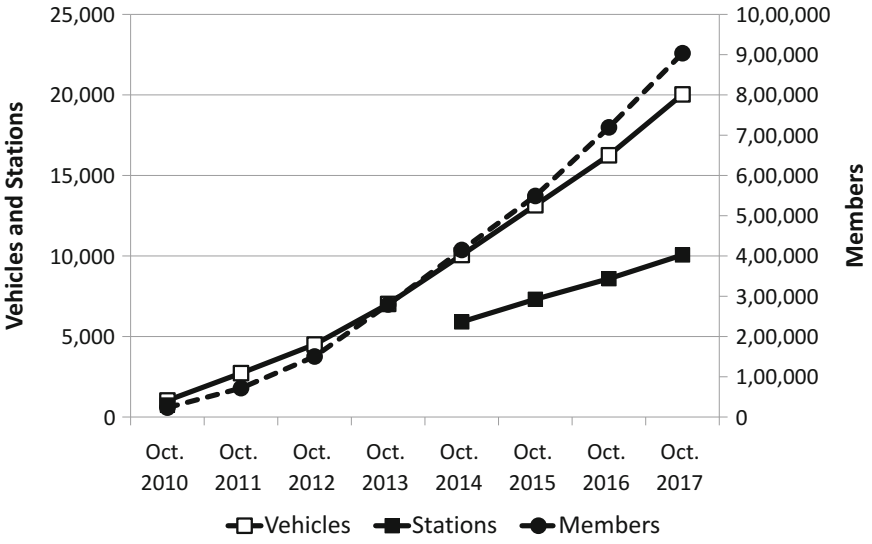


**Fig. 4.3** Development of Time Car Plus service. *Source* Company data

stations) remain far behind. TCP was first mainly developed in the three largest urban areas, and then expanded to all of Japan. It was particularly established at each Shinkansen Railway station, as a last-mile service for companies, which represent 35% of members. TCP's quick expansion was facilitated by the financial capacity of the Park 24 Group, which could easily invest in cars and stations, as it was highly profitable in its parking-management activity. By 2014, the carsharing system generated profits for the company, which engaged in a long-term strategy (Fig. 4.4).

However, Times 24's strategy must be linked to other elements to explain its success. Apart from the looser regulations in 2004–2006, another element happened as a consequence of the 2008 financial crisis. Companies tried to cut costs, and discovered that carsharing could be a better solution than increasing or keeping a fleet of company cars. Another element came from the younger generation's attitude toward car ownership, which is no longer considered a visible sign of social success. Instead, as Bardhi and Eckhardt (2012) have showed for Zipcar, carsharing gives a smarter image to users.

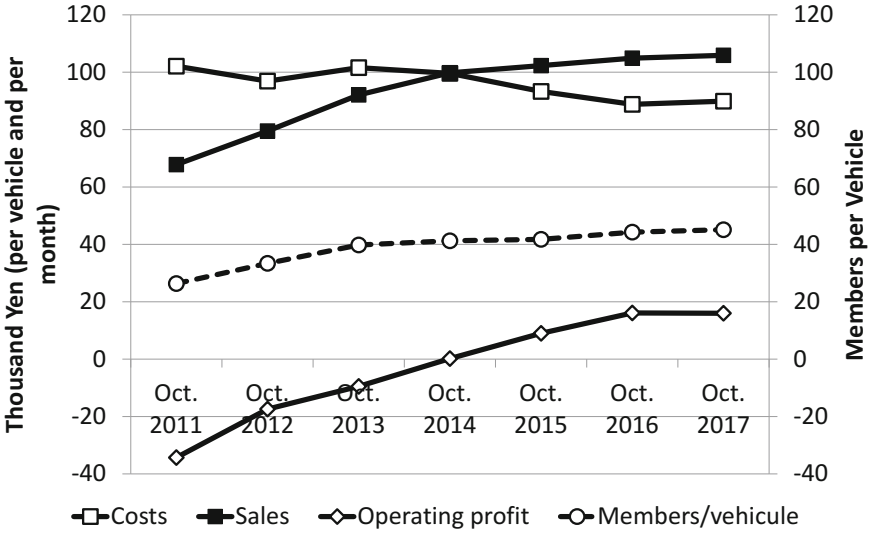


**Fig. 4.4** Financial results of Time Car Plus service. *Source* Company data

### *4.4.2 Japan: Experimenting with EVs One-Way Carsharing Systems*

Japanese carsharing companies were not reluctant to introduce EVs into their fleet, but they seem very cautious about one-way systems. Therefore, public-policy measures have pushed for EV one-way carsharing in a two-part, specific context.

First, the Ministry of Economy, Trade and Industry (METI) launched the Next-Generation Energy and Social System Program (Faivre d'Arcier and Lecler 2014) in 2010 to experiment with smart-grid technologies, promote renewable energies, and further address the question of lifestyle changes. The issue of transportation and mobility was one of the elements taken into account in so-called "demonstrators of smart communities." Among the four selected projects, two tested one-way e-carsharing in relation to energy consumption and lifestyle changes: Ha:mo (Toyota city) and Choi Mobi (Yokohama). Second, both services used micro-vehicles and benefited from MLIT subsidies under a program opened in 2012 to experiment with micro-e-mobility. Surveys showed that there were no passengers for 75–80% of weekday trips, and 50–60% of nonworking day trips (MLIT 2016), so one- or two-seater micro-EVs appeared suitable for most local trips. Such micro-vehicles are likely to reduce traffic congestion and parking problems, while also reducing the impact of accidents with pedestrians, due to their lower speed and weight. Moreover, their reduced energy consumption might make it easier to charge them with renewable electricity. According to MLIT, micro-mobility is well adapted for several types of users, such as the elderly or tourists (Lecler 2017). In 2012, ¥380 million (€3.1 million) was devoted for experiments jointly developed

by localities and private companies. This was renewed up to ¥200 million (€1.6 million)/year (Lecler 2017). Among the 42 projects funded by the MLIT between 2013 and 2016, nine were one-way carsharing experiments, although most were very small. Other subsidies might have been obtained from other ministries or agencies by companies in different activity sectors. One example was a case in Kobe, which launched a service called Sea:Mo.[6] However, to our knowledge, experiments did not last after subsidies were terminated, with the exceptions of Choi Mobi and Ha:mo, which were both launched by car makers.

The Ha:mo Ride Experiment

TMC developed the concept of Harmonious Mobility Network (Ha:mo), including a multimodal information system (Ha:mo Navi) and a one-way carsharing service (Ha:mo Ride) aiming in addition to energy issue, to solve the last-mile problem from railways stations. Launched in 2012 in Toyota city with 10 vehicles (Coms), the service had 100 vehicles at 22 stations by October 2013 when it became a paid service. It also offered the possibility to use some i-Roads (only for round-trips) or rent electric bikes (100 bikes). The number of users increased from approximately 500 to 3710 in March 2015 with 35 stations. During the weekdays, the carsharing service's main purpose was commuting (45%), followed by professional trips (25%). The reasons for using Ha:mo were ease of use (64%), proximity to stations (60%), and saving time (33%). Walking and cycling (40%) were the main modes of transportation before using the one-way system, followed by private car (32%) and motorbike (13%) (Lecler 2017).

In a relatively small city (420,000 inhabitants), with low density in peripheral areas, and most people working in the car industry, the attractiveness of a carsharing system does not have the benefit of ideal conditions for its development. However, TMC led the firms' consortium of the smart community demonstrator and saw an opportunity to showcase the concept of urban micro-vehicles, promote Toyota Autobody Coms and its own i-Road, and test the business model of one-way carsharing. TMC does not consider carsharing as part of its business, but the carmaker did not terminate the service when the experiments ended in April 2015, even though a business model did not exist since operating costs were too high and the number of customers was too small.

Rather the service was extended and enlarged to 51 stations (21 without chargers). In addition, new experimental projects were launched in other locations, such as Times Car Plus × Ha:mo in Tokyo, which is the first Japanese experiment with one on-street station and the first one-way experiment for Times 24.

[6]This experiment was done in cooperation with Mitsubishi Heavy Industries (MHI), Nihon Unisys, Unitech, and Rokko Sangyo.

## 4.5 Analysis: Carsharing as a Public or a Commercial Service?

As these case studies show, the carsharing expansion in both countries followed quite different paths. Considered a car-rental service in both France and Japan, legislation required amending to allow for carsharing's commercial development, apart from experiments benefitting from special exemptions. How laws were modified, according to each country's vision of transportation, can be regarded as a path dependency and greatly influenced how carsharing evolved between round-trip and one-way systems with different uses and customers that corresponded to two distinct markets.

### *4.5.1 Round-Trip Versus One-Way*

In the **round-trip-based system**, the attractiveness of the service depends on the proximity of stations to home and work locations, and implies 24/7 operation and enough fleet diversity to satisfy a variety of needs (small car for urban trips, family car for leisure, van for goods delivery). Round-trip is not designed for daily home-to-work trips, as the user would also pay for the parking time. The fully automated carsharing process for registering and picking up cars offered operators the ability to dramatically reduce labor costs compared to car rental. This was achieved with ICT development over the last 20 years. On average, the frequency of travel is low (one or two trips per month), for distances of 50–60 km and a rental period of 3 or 4 h. As trips are often in the late afternoon or on weekends (Lecler and Faivre d'Arcier 2014), operators tend, perhaps to a greater extent in Japan than in France, to prospect the companies whose trips take place during the day.

Round-trip is well adapted for people who do not own cars and can satisfy their daily mobility needs by alternative modes of transportation (PT, walking, cycling), that is to say living in dense urban areas. The high population density in Japanese cities, the correlated huge development of PT, and the prohibition of on-street parking are among the reasons why carsharing services meet a high demand in Japan. Conversely, high densities and well-developed PT alternatives in France are limited to city centers. On-street parking is possible and almost unrestricted in peripheral areas. Therefore, upscaling carsharing services, which is a condition for profitability, remains difficult as the LPA case showed. This explains why round-trip, which relies on conventional cars in both countries, is expanding faster in Japan than in France.

In a **one-way carsharing system**, members really appreciate paying for the service only when they are driving. According to public-policy objectives, one-way carsharing systems appear to be a new, complementary mobility service widening possibilities for inhabitants. However, some surveys show (6t-bureau-de-recherche 2014) that Autolib competes with PT, rather than strongly reduces private car

ownership (Lecler and Faivre d'Arcier 2014). One of the main advantages of using carsharing is to avoid wasting time looking for parking, as a space is booked at the destination. However, one-way is much more costly and complex for operators to manage than round-trip, and even more so with EVs. Unlike round-trip systems, the frequency of use for one-way trips is higher (one or two trips per week, per user on average), but the duration of the rental is short (30 min) and the driving distance is limited (less than 10 km). Therefore, even more than for round-trip, conditions for one-way to be attractive must first include a large network of stations close to demand, in terms of origin-destination. Second, there must be guaranteed car availability at any time for all users. This means there must be a well-managed balance between empty and full stations, leading to additional labor costs to move cars from one station to another. These costs cannot be passed on to customers. Therefore, the one-way business model should be based on a greater number of rentals per vehicle, per day. More so than with round-trip carsharing systems, one-way systems are restricted to dense urban areas in which the size of the potential market offers hope for more users.

However, the different types of actors involved in each country also presumably played a part. In Japan, the main round-trip actors are companies engaged in parking and car-rental activities. Because these actors have parking spaces at their disposal that can easily be reserved for carsharing, implementation is less costly, especially if many of these spaces are at street level. Having experience managing car-rental businesses also helps these actors develop carsharing, especially round-trip, which is a rather similar business. If, as Japanese companies predict, car rental and carsharing will merge to offer a single membership service, even though fares differ between long- and short-term rentals, it may seem surprising that French car-rental companies do not engage more in carsharing. Times 24 recently developed Times Club, in which members can, with a unique card, choose between car rental and carsharing, depending on if the duration is longer than 10 h. The vision of carsharing as individual PT or commercial business might be part of the explanation, but the corporate structure is also at stake. Car rental and parking operations are not integrated in France as they are in Japan. Therefore, French car-rental companies, penalized by their limited office locations, seem as considering carsharing less attractive since margins are lower for short-term rentals. Public and private parking-management companies, with some exceptions (as shown by LPA Citiz Lyon), are also not involved in carsharing services, since they lack experience in car rental.

One-way is not following the trend of dynamic, private development of round-trip in Japan. Publicly subsidized experiments of one-way e-carsharing were performed, but they were so small that no positive network effects were found. These experiments often lasted no more than a year and couldn't attract many regular or active members. Apart from a willingness to test the system or the vehicles, most potential users were not willing to change their mobility behavior just for several months. As a result, these experiments all came to the same conclusion: There is no business model for one-way carsharing. Carmakers interested in promoting EVs, and ICT companies needing to gather data and test their models,

engage in experiments for a short time. However, companies such as Times 24 or Orix, which are willing to develop carsharing as a commercial business, are not really enthusiastic. Although recognizing that clients might be interested in a one-way system, neither company intends, in a near future, to offer such systems. The MLIT sprinkling of funds to serve the largest number of localities ultimately does not allow for attracting enough practitioners to support the development of the services.

Even if station-based carsharing is expanding more in Japan than in France, the impact in terms of EVs diffusion, promoted by both governments and welcomed by cities to reduce $CO_2$ emissions and gain an environmentally friendly image, seems to work better in France. So, Autolib or Bluely in Lyon contributes to EV visibility and promotion. These services also give the opportunity to create a large network of charging stations for private EV owners, as one parking space at each station is reserved for such purpose. Although it is difficult to know for certain, as one-way in France is only proposed using EVs and only with micro-e-vehicles in Japan, it seems that EVs are better accepted by one-way users. One-way rental durations and driving distances are shorter, but at least a four-seater EV's range could also suit round-trip needs (average distance of 60–70 km). The conditions for an EV market to take off (battery capacity, charging infrastructure, and charging time) seem to similarly apply to carsharing for round-trip. For example, Times 24 had integrated some EVs into its round-trip fleet for a while. These EVs were replaced by conventional or hybrid cars for the following reasons: there were very few rentals, as customers did not want EVs; the purchasing or leasing cost of EVs is still much higher; EVs cannot be easily sold (or are too depreciated) on the underdeveloped second-hand EV market; and recharging needs also increased the investment burden, even though Times 24 installed charging devices in some of its car parks. Orix made some attempts as well, but finally also stopped for the same reasons. These examples confirm that for the diffusion of e-carsharing, cost is clearly an issue, but demand also matters.

French operators of round-trip, which is still not profitable, also do not seem to be considering introducing EVs into their fleet. Investing in purchasing (or leasing) higher-cost vehicles and charging devices, whether on-street or inside car parks, would further increase the financial burden. Therefore, holding and developing one-way e-carsharing services would require a partnership with cities and financial support, for example through public-service delegation contracts, as is the case for Autolib in the Paris region.

### *4.5.2 Two Visions of Transportation Between Public and Commercial Services*

In France, collective transportation is considered a public service, so allocating public funds to guarantee a minimum of accessibility to all is accepted by

populations and provided for by law. Since carsharing is defined as an individual public transportation, municipalities can design the service they need in relation to other locally available alternatives. The private operator must fulfill all requirements under the public-service delegation contract, but can limit financial risks either because part of the investment is covered by public funds or running costs are shared as long as the service is not profitable. Two French cities, Belfort and Pau, decided to manage a multimodal supply offering access to a PT network, a bike-sharing system, and round-trip carsharing. Belfort did so through its in-house operator, while Pau decided to operate its system through a public-service delegation contract (won by Keolis, a major PT operator). This can be related to the recent creation of the PMA, in charge of managing all mobility services in the urban area. Such a fully integrated system is justified as a means to offer a package of alternative services to car use and encourage reduced car ownership. Nevertheless, the risk of this public management lies in the vision that a public service should be available to all, leading to more stations in areas with low demand, resulting in low performance, and then in difficulties finding a business model.

In Japan, transportation is perceived as a commercial business that private companies operate for profit.[7] Using taxes to subsidize these businesses is not publically accepted, so is not provided for by law. This particularly applies to carsharing, which remains a car-rental service, even if regulations have relaxed to some extent. Therefore, public action to support new systems takes the form of experiments under government policy programs. However, it is difficult for cities, if not impossible, to financially support operators engaging in the business, or take over from national subsidies at the end of the experiment so that the service can be maintained on behalf of its social utility.

Therefore, changes do not address the same issues. In France, they aim to facilitate partnerships between cities and private operators, and in Japan to ease conditions for new services to be launched by private companies. In France, cities define suitable new mobility packages, which are operated under contract by private operators. In Japan, private companies engage in such packages by themselves, or through inter-companies partnerships, provided that a new demand or an expected future demand is high enough to ultimately be profitable. Developing carsharing in condominiums illustrates this enlarged vision of urban mobility. For example, Japanese real estate companies are soliciting carsharing companies to manage one to two cars as a means to compensate for the lack of parking spaces. It shows the interest of an integrated vision between transportation and city planning, but also environmental and energy issues. Therefore, although a demand exists, one-way carsharing, which does not appear able to become profitable within an acceptable time frame for private companies, has not yet taken root in Japan. However, the Japanese market-oriented approach avoids situation like that of Autolib in France, in which financial difficulties are partly due to underperforming stations that were

[7]It would be beyond the scope of this paper to explain this difference, rooted in each country socio-economic history.

requested by public authorities. It also has the advantage to overcome the problem of silo organization of public authorities, which penalizes new mobility services such as carsharing. Motivations for carsharing that are justified by environmental issues come from cities' environment departments, while PT is managed by transportation departments. Developing a new framework for the governance of smart, sustainable mobility (rather than transportation) implies breaking traditional frontiers based on technical competences within city departments. The perspective of Mobility-as-a-Service should be the opportunity to also think about reorganizing mobility management.

## 4.6 Conclusions

Carsharing appears to be a smart transportation system because it consumes less resource and copes better with individualized mobility needs. However, for it to develop as such, carsharing needs alternative modes of transportation (especially for home-to-work trips) performing well enough to encourage households to reduce car dependency. This is a condition for getting carsharing out of its current niche market, as it presently only satisfies a small percentage of mobility needs.

Let's come back to our research question: *Should station-based carsharing develop as a commercial or a public service, and what are the conditions required for it to take off?* It appears that the answer might depend on what is expected from the re-crafting or substitution to, the car driving practice. If reducing car ownership or use in densely populated cities is the only issue, then commercial services are probably the best means to recruit numerous "practitioners," as in Japan. However, it will be limited to round-trip, as one-way is too costly for companies to find a suitable business model. However, if one of the issues for carsharing is to promote environmentally friendly technologies, such as EVs, focusing on the last mile is necessary, which requires the use of one-way. If so, making carsharing a public service, allowing financial support from the public authority, is not only the best but in fact the only solution, as the French case has shown.

Moreover, even if station-based carsharing benefits from a certain defection from private car driving practice, it remains spatially limited. Indeed, whichever system is implemented or vehicles are offered, private initiatives will focus on areas with the highest potential market and best chances for profitability. This means low-density areas will not be attractive, while they are the source of high household car dependency. From a public-policy perspective, this means that reducing car use in France, or solving the aged population's mobility problem in Japan, will require public authorities to get involved in also defining a clear, financially bearable strategy for peripheral areas. It will probably take another form than market-mediated, station-based carsharing, unless autonomous car fleets develop fast enough to solve the problem of station proximity and unbalance.

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## List of Interviews

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Nissan Motor (Choi Mobi): 2014/6/10, 2015/1/13
TMC (Ha:mo): 2013/3/13, 2015/1/21
Bluely: 2014/2/11, 2015/6/16
Lyon Métropole (urban mobility service): 2013/4/15, 2015/10/2, 2017/10/3
LPA Citiz: 2014/2/2, 2017/10/6
Times 24 (TCP): 2014/6/13, 2017/12/13
Rokko Sangyo (Sea:mo): 2017/11/29
MHI (Sea:mo): 2017/10/27
Orix Auto Corporation: 2017/12/11
Kobe City: 2017/11/10
Toyota City: 2013/3/13

MLIT (environment policy division and transport bureau): 2015/1/19
Osaka City (transport department and city planning department): 2017/11/13

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