D 2.1

Car sharing in Europe

A multidimensional classification and inventory

The world of car sharing is evolving rapidly and the need for a broad overview of the current state of the European car sharing scene is becoming increasingly apparent. Public authorities, from local to supranational governments, want to be informed about the evolutions in the car sharing sector in order to initiate new legislations or to eliminate existing barriers. Mobility actors and companies are looking for new opportunities, including car sharing, and want to be aware of the current playing field before making large investments. Citizens, for their part, want to be correctly informed about this relatively new mobility solution.

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Work package 2, and more specifically the deliverable 2.1, is the starting point of the STARS-project and will serve as the basis for many tasks that will follow. In order to gain insight into future business models for car sharing, into the travel behaviour of car sharing users or into policy barriers and opportunities for car sharing, it is necessary to have a clear picture of the current state of car sharing in Europe. That's why this deliverable takes off with a descriptive analysis of the main characteristics of the car sharing market in Europe. As many organisations as possible are screened through desktop research, in order to construct a database with basic information for every service. The grouping of this individual puzzle pieces resulted in a detailed report on car sharing in Europe, which includes 186 cases from 25 countries.

A lot of results found during this research support earlier studies and confirm some common knowledge about car sharing (in Europe). Still, it is interesting to make this overview since car sharing has emerged in new regions in Europe and new technologies have changed the way we look at (shared) mobility, compared to the last similar report. Concerning the geographical dispersion of car sharing organisations, a large concentration of services can be found in Western Europe. Almost 60% of all organisations under research are located in the West. These systems are among the oldest on the continent and belong on average more to the category of roundtrip systems. One evolution that probably strikes the most is the rising of car sharing schemes in Eastern Europe. A small number (8% of the total) of young organisations, more free floating than roundtrip systems, are active there. Northern and Southern Europe have an almost equal share in the total number of car sharing organisations, respectively 15% and 18%, but the average age of the organisations and the car sharing category where they belong to most, differs a lot. The organisations in Southern Europe are among the youngest and opt on average more for a free floating system with an operational area than organisations in other parts of Europe. In Northern Europe, at last, car sharing has already come a long way and we see that, compared to the other regions, peer-to-peer car sharing has a strong position in the North. Still in three European Union countries no car sharing services were found (Greece, Cyprus and Malta), although some signals indicate that organisations will start there soon.

Where the focus in the first part of the deliverable is very broad and attention is payed to all car sharing schemes, the second part opts for a narrower view on a selected number of cities and organisations. There is also a clear shift in the research method. The first results are based on public data which can be found on the websites of the car sharing services. For the second part of the study, an online questionnaire was presented to car sharing organizations that are active in 20 specific cities in Europe. This in-depth study has a limited number of cases, but it can gauge more thoroughly to the current state of car sharing. New information about the shareholders, the financing and the service dimensions of the organisations came to the fore. Eventually 56 car sharing organisations out of 12 different countries participated to the online survey.

Throughout the information collected in both data-sets (the desktop research and in-depth survey) a good number of key variables are identified to describe and define car sharing organisations. Three business models of car sharing have been detected: car sharing providers with an own fleet, peer-to-peer car sharing and car sharing among neighbours. Since the two latter models have in common the sharing of private vehicles, and we only found three cases that belong to the last model, we decided to combine both models in further analyses. In addition, also

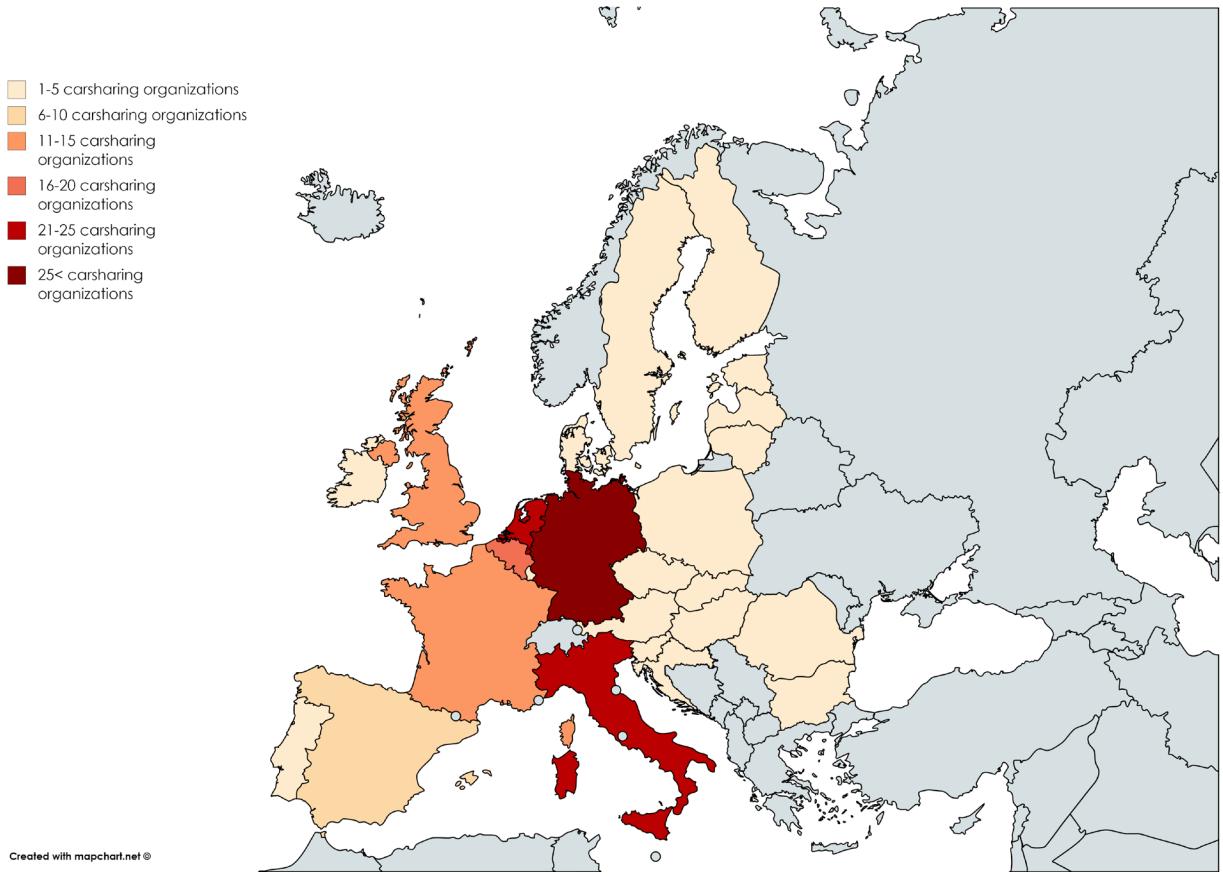

Figure 1: Number of researched car sharing services per EU country.

four operational characteristics were distinguished, including two roundtrip systems (station based or homezone based), and two free floating systems (with an operational area or with pool stations). Both variables, the business model and the operational characteristic, are of equal importance when analysing car sharing schemes. However, two different independent variables, that need to be used for every single analysis, would make the already large variable even more extended. That's why we opted for one newly assembled independent variable, namely the "categories of car sharing", which forms a mix between both variables (Figure 2). It contains the four operational characteristics, which are all linked to an organisation with an own fleet, and peer-to-peer car sharing, where the organisations always use a homezone based operational system. In this way, all important variances between car sharing organisations can be measured and still the amount of tables and analyses stays limited.

Concerning the operational characteristics, a lot has changed since the MOMO study was launched, when free floating car sharing operators were taking their first steps in Europe. Both in the desktop research and in the sample for the in-depth study, free floating systems account for 30% of the total car sharing organisations population. Most of them started operating quite recently. Free floating systems on average started in 2013, station based organisations in 2004, just like the peer-to-peer platforms. The homezone based systems are on average even more recently founded, in 2015 to be precise. This division between older and younger systems has much to do with the availability of new technology. The free floating and homezone based systems apply less strict parking rules than station based systems, which enables customers to park the shared car on another spot than the place where they found it.

This way of operating requires new technologies, not in the least to be able to locate the car. Via GPS-trackers and mobile applications that visualize the location of the car, customers are able to find, book and even open the shared car. Among other things, the increase in the use of smartphones has made this evolution possible. In ten years, free floating systems have grown from almost non-existent to a major, undeniable player in the car sharing field. It is expected that their position will strengthen in the coming years, certainly with regard to their share in the total fleet of shared cars.

The fact that big international car manufacturers like Daimler (Car2Go) and BMW (DriveNow) specifically invest in this type of car sharing, supports this thesis. Experts on shared mobility expect that the gap between the different categories of car sharing will become smaller over time. We already see that some organisations are experimenting with various operational systems, sometimes even in the same city. It will be interesting to see in which direction this trend will continue.

Category of car sharing		Business model		
		Car sharing providers with an own fleet	Peer-to-Peer car sharing	Car sharing among neighbours
Operational characteristics	Roundtrip station-based	greenwheels **Roundtrip station-based**		
	Roundtrip homezone-based	PARTAGO **Roundtrip homezone-based**	drivy Dégage! **Peer-to-Peer car sharing**	
	Free floating with an operational area	CAR 2GO **Free floating with an operational area**		
	Free floating with pool stations	autolib' **Free floating with pool stations**		

Figure 2: Category of car sharing.

Finally, the collected information is used in a cluster analysis to provide a multidimensional classification: all observed organisations were divided into different profiles, based on their common characteristics. Every category of car sharing has its own specificities and a distinction can be made, among many others, based on the size of the fleet, the use of technology for the opening of the car and the average length and duration of a shared trip (a full breakdown is reported in Table 1). Organisations within the category of free floating systems with an operational area, for example, on average have a large fleet, are using an app far more than a chip card to open the cars and have an average trip length and duration of less than 10 kilometres and 30 minutes. Eventually, the cluster analysis at the end of this deliverable brings forward six profiles of car sharing, each of them representing a number of car sharing organisations that have in common their operational characteristic, their business and pricing model, their fleet size, … Most of the organisations described above can be found in profile 1, namely free floating car sharing systems. Services that opt for a free floating system with pool stations have on average a medium sized fleet and still choose more often for chip cards than for an app to open their cars. Most of this cases belong to profile 2, free floating car sharing systems with pool stations. Where most categories of car sharing can be linked to a specific size of car fleet, services with a roundtrip station based system show large variation in their fleet size.

In our study both station based systems were detected with a very limited number of cars and with large fleets. The station based systems show similarities with pool station systems concerning the parking of the cars and that manifests itself, among other things, in the opening technology that is usually choses, namely chip cards. Concerning the trip length and duration, half of the trips of station based cars last longer than 6 hours and are longer than 50 kilometres. The above mentioned cases are clustered into different profiles, namely profile 4, 5 and 6. These profiles differ from one another in terms of the type of shareholders, the size of the fleet or the organisational form. Organisations operating with a roundtrip homezone based system have on average a rather small car fleet and they use an app more often than a chip car to open the cars. During the multidimensional classification no separate profile was found for these organisations. Apparently, these cases don't have any features in common other than their operational characteristic. Lastly, peer-to-peer car sharing organisations can mostly call on a large car fleet, since these cars are owned by private users and not by the organisation itself. Almost all shared cars are used for trips longer than 50 kilometres and are opened with a physical key that has to be swapped between the owner and the user of the car. All these organisations are gathered in profile 3. These profiles, together with the great amount of information on the car sharing providers will be used extensively during the rest of the STARS-project.

STARS - Shared mobility opporTunities And challenges foR European citieS – aims to explore and boost the diffusion of car sharing in Europe. It will analyse the car sharing market, measure the benefits of different services and compare their costs, and study user profiles and behaviour.

For the first time, STARS will also look into the implications and impacts of car sharing rather than on the implementation of the service itself. Impacts on other transport modes (private car, bike, walk, taxi, public transport…) and the car industry will be assessed, and impacts in terms of congestion, greenhouse gases, accessibility and social cohesion will be quantified.

Thanks to the knowledge gained in the project, a policy toolkit that includes guidelines and recommendations will be designed. It will help European mobility stakeholders and policymakers make the right decisions and implement the best car sharing services that will maximise environmental and social benefits, making European cities better and more affordable places to live in.

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