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Shared Mobility

Comparison collaborative mobility services in European cities

student research project VS16a traffic systems

Imprint

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Abstract

This study's focus is on the young and dynamic sharing business in the mobility area. The study examines the offers in seven western European cities: Barcelona, Berlin, Copenhagen, London, Paris, Vienna and Zurich. The comparison of the data is based on direct contact with the providers and from information found on their websites in October 2017. Due to the dynamic market there were already new offers for cities as this study was conducted [1]. However, those will not be considered until the next edition of the study.

After the last year's focus on Peer-to-Peer-Services (P2P), this year's study focuses mainly on Scooter-Sharing. In this sharing service scooters are offered in the same way as bikes.

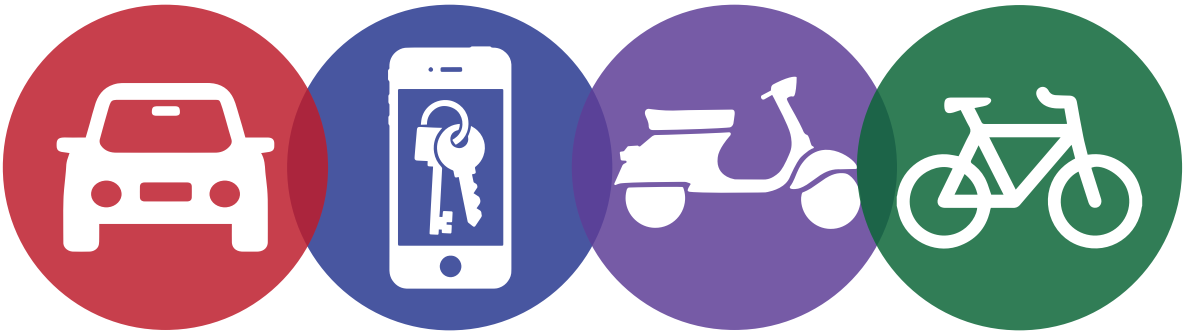
Specific contents of this study are the comparison of the fleet size and purchasing power-adjusted price comparison between cities. Additionally, there will be offering-independent comparisons and classic forms of mobility, such as public transport and car rental, will be considered.

It has been shown that the prices of all providers offering Car-Sharing have fallen. The big players offers were overall a bit cheaper. The price difference between Car-Sharing and P2P-Sharing has been further reduced, although P2P-Sharing stayed lower priced. The Scooter-Sharing market was in a rapid growth, with large price differences between providers. The prices were, in contrast to Bike-Sharing, still far above the public transport. In Bike-Sharing, big changes took place due to the market entry of new suppliers mostly from Asia. The fleet sizes grew massively while the prices were plummeting.

This study is also available in a German version.

Inhaltsverzeichnis

1 Let's share!



For the third time, the study on «Shared Mobility» will be carried out by the Bachelor of Transport Systems degree program at the ZHAW, School of Engineering in Winterthur, Switzerland. The growth of the sharing economy continued last year and led to further changes.

Many properties are idle for most of the year. This is where the sharing economy comes in and seeks to increase the useful life of the item by using items from multiple people. This is not only ecological, but also makes sense from an economic point of view. The costs incurred for purchase, maintenance and storage can thus be reduced.

Mobility is particularly suitable for the sharing economy. In the post-war period, the first sharing offers arose due to financial problems. Nowadays, it's hard to imagine mobility without a sharing economy. It supports daily mobility in places where there is an increasing lack of space and no longer everyone has their own vehicle.

New Focus Scooter-Sharing

Last year's focus was on private Car-Sharing (P2P-Car-Sharing) and above all on a financial incentive. This year's study focuses on so-called Scooter-Sharing . By this is meant the sharing of scooters. These vehicles are particularly advantageous when it comes to reducing the area for locomotion and parking. Particularly popular are the scooters in Berlin the city of origin, where just under a fifth of all offers for Scooter-Sharing in the world are [2]. Only a little behind in the battle for the capital of Scooter-Sharing is Paris.

Bike-Sharing in Change

In transition is also the Bike-Sharing. Last year, various Asian Bike-Sharing companies entered the European market. Their aggressive expansion strategy surprised politics in different cities and influenced the European market.The bicycles of these new providers can usually be parked anywhere in a defined area and are not tied to fixed stations. Such a kind of sharing was only possible thanks to modern technologies and an widespread use of smartphones. Because a prerequisite for the use of such a service is to be able to locate and unlock the bikes at any time.

The development of this efficient, flexible and low-priced market is booming. The seven cities surveyed are embossed by new offers and competitive situations from different providers in the mobility sector.

2 Insight into the Sharing World

The world of sharing economy in the mobility sector is constantly growing. This study is a snapshot of the sharing market of the different transportation systems. All the considered means of transport and their sharing possibilities are presented here.

Car-Sharing

In modern cities the percentage of people owning a car is decreasing. If a car is needed, the use of Car-Sharing offers is recommended. This eliminates problems such as repairs or tire changes, it is included in the price. There are only costs for effective use. With the help of a so-called «Smart Door Opening» system, there is no need for a physical key transfer, which is solved via app or badge. In addition, a free vehicle choice is possible. Depending on the size and comfort level, the cars are divided in different categories.

P2P-Car-Sharing

Privately owned cars tend to be parked most time of the day, doing nothing more than using space and cost money and therefore being unproductive. This is exactly where Peer to Peer sharing wants to make a difference. Without making an effort a car owner can make money by renting his car. With the help of a smart door opening system, which most of the P2P sharing providers have installed, one can even rent his car without having to hand over the key in person. Often P2P platforms rely on a rating system in which both the renter and the lender can be assessed. The cars are divided into categories analogous to the Car-Sharing.

All the data for P2P-Sharing is gathered in our own research. This was due to difficulties in data collection. Details can be found in the chapter data collection and source disclosures.

Scooter-Sharing

Whether as a couple or alone it must be a great feeling to ride on a scooter through a metropolis? The scooters are certainly not being parked at one place all day long, they are provided as sharing offers.

The renting is quite easy. The user creates his own profile on a platform, uploads his driver‘s licence and is ready to rent a scooter. As soon as a scooter is rented the helmet box can be opened via App and off you go!

The Scooter-Sharing market is in development. Therefore, it is still quite manageable.

Bike-Sharing

Since last year’s study a lot has changed in the Bike-Sharing market. New and innovative players are entering the market. In 2017, 14 different providers were considered, in 2016 there were only eight. More often than not these new providers are relying on a free floating concept, but one way and round trip concepts are still an important part of the market too. The smartphone is a very important feature to gain access to the bikes. Payment often can be done via smartphone as well. P2P Bike-Sharing is not considered for this study, but E-Bikes are. Electric motorized bicycles which do not have pedals count as e-scooters and are therefore considered in the scooter category.

2.1 Terms and Symbols

Sharing can be done in a lot of different ways. The most important terms and icons are presented accordingly and used symbolically in the further course of the study.

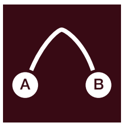
Safety Devices

Smart Door-Opening-System: Smart Door-Opening-System: Through a installation in the rented car the door can be opened via the provider's App and without a key needed. The key which starts the car / scooter is located in the inner of the vehicle.

Personal key exchange: Through a Chat-App messages can be sent to fix a place and time to physically exchange the key for the rented vehicle.

Renting Models

Round-Trip-Service: Pickup and return are made at the same station. This way a ride starts and ends at the same station.

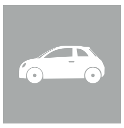


One-Way-Service: Pickup and return can be made at different stations of a provider. This way a ride starts and ends at any chosen station.

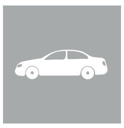
Free-Floating-Service: Pickup and return can be made freely within a defined area without stations.

Car Categories for Car-Sharing and P2P

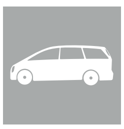
Basically, the rental of cars with Car- and P2P-Sharing is divided into three different categories by size:



Small: This category offers space for two people and their luggage. Small is the cheapest category. Examples for this category is the Mini Clubman, a Hyundai Jazz or a Fiat 500.

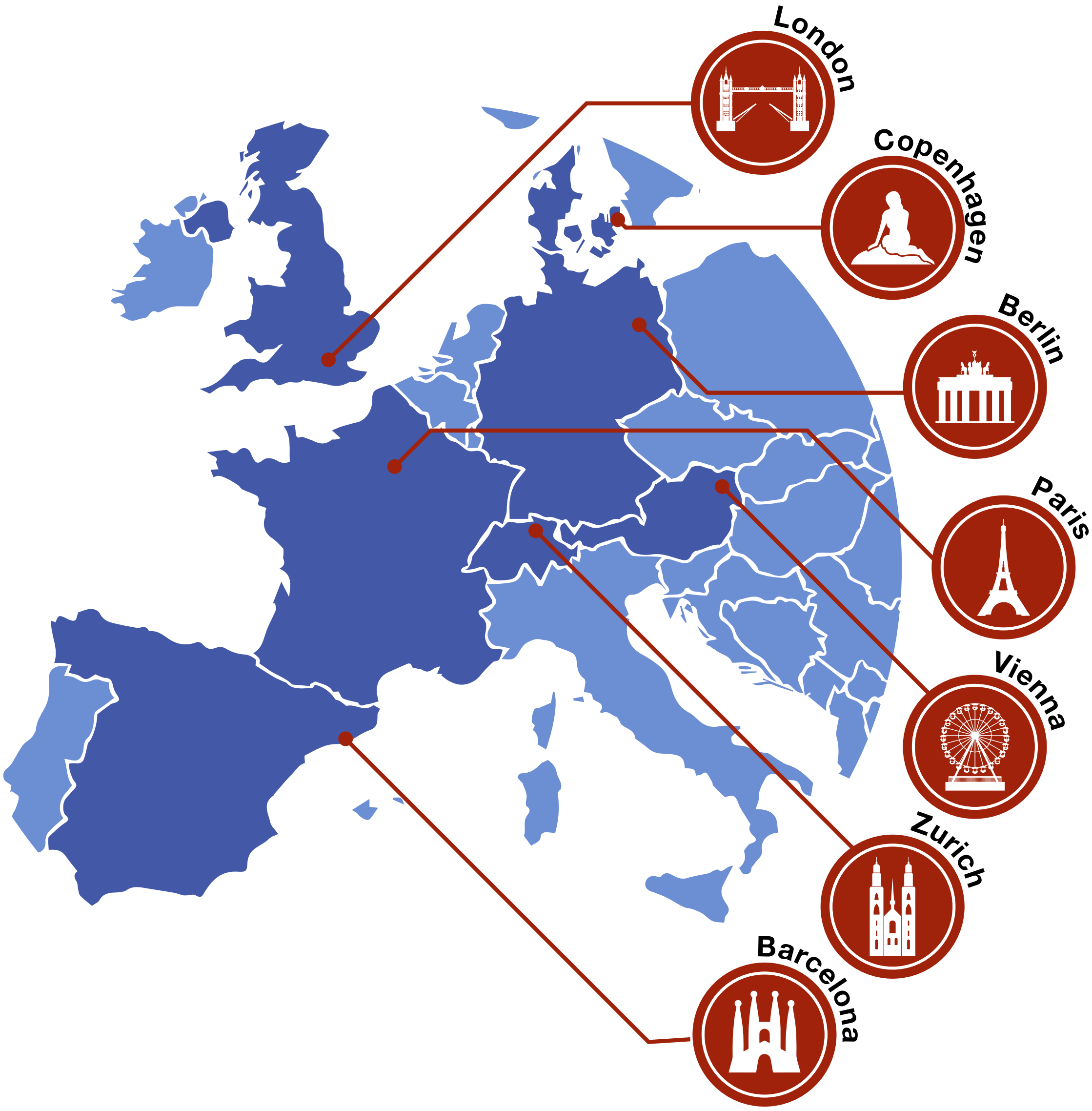


Medium: This category offers enough space for four passengers and has also enough storage space in the trunk. Medium is in the middle of all prizes. The medium category includes, for example, a BMW 1 Series, a Hyundai i30 or a VW Golf.



Large: This category offers a wider space over all categories, more comfort and covers the passengers needs better. This is reflected in the increased costs. The models Mercedes-Benz B-Class, Renault Kadjar and a BMW 5 Series are examples of this category.

2.2 The selected Cities

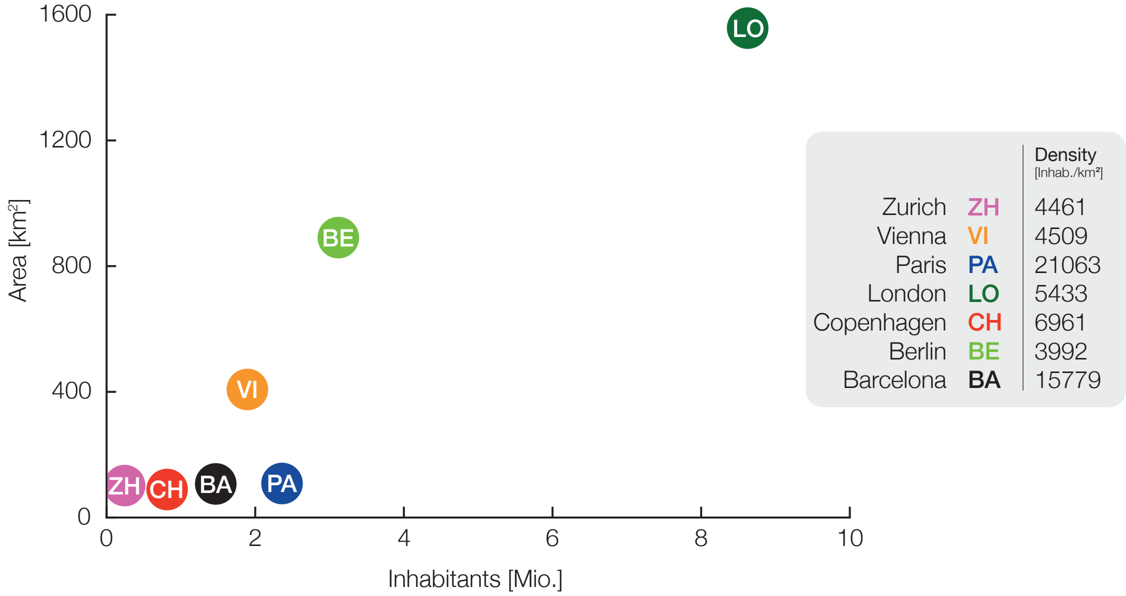


The study's focus is on seven major Western European cities which have already been compared in the previous editions of this study.

- **Zurich** is the largest city in Switzerland and at the same time, purchasing power-adjusted, the most expensive of the seven cities [3].
- **Vienna** is a tourist-dominated city. In Addition, according to the Big Mac Index, it is the cheapest of the considered cities [4].
- **Paris**, the capital and hub of France, is after Berlin the biggest market of sharing, especially P2P and Scooter-Sharing [5].
- **London**, as the largest city in Western Europe and the world's most important financial center, lags behind in the field of shared mobility [6].
- **Copenhagen** is one of the most advanced cities in the field of cycle infrastructure and has a comparatively low degree of motorisation [7].
- **Berlin**, as the capital of Germany, is playing a pioneering role in the area of shared mobility and has experienced an upswing in the city tourism in recent years [8][9].
- **Barcelona** is an important tourist city and one of the more densely populated cities in Europe. [10]

2.3 Population Density

The shared mobility industry relies on a dense population of the covered area. The more densely a city is populated, the more potential users live or work near an offer. In addition, the population density of the city plays a role in order to bundle sufficient demand.



The most densely populated cities are the cities of Paris and Barcelona. All other cities have a much lower population density.

2.4 Comparison of the Cities with the Big Mac Index

Prices of different countries and currencies usually need to be compared with caution. To make it easier to compare, more than 30 years ago the Big Mac index was created by The Economist magazine. The price of a Big Mac is changed into the local currency and then converted into US dollars. In the case of this study, the conversion is done into euros as all price comparisons of the study are on a euro basis with a rate from the 1st of October 2017 (1 USD = 0.8439 EUR). A Big Mac from McDonalds is particularly well suited, as it is available worldwide in the same design and mainly consists of regional products.

Thus, the 2017 Big Mac index published in July 2017 will enable the following purchasing power-adjusted comparison. [11]

Price per Big Mac 2017 according to «The Economist»

The purchase price in Zurich is 5,69 € which is higher than in all other cities. It is lowest in Vienna with 3,27 €, followed by London with 3,47 €. The cities of Barcelona, Berlin, Copenhagen and Paris are almost on par.

3 Car-Sharing

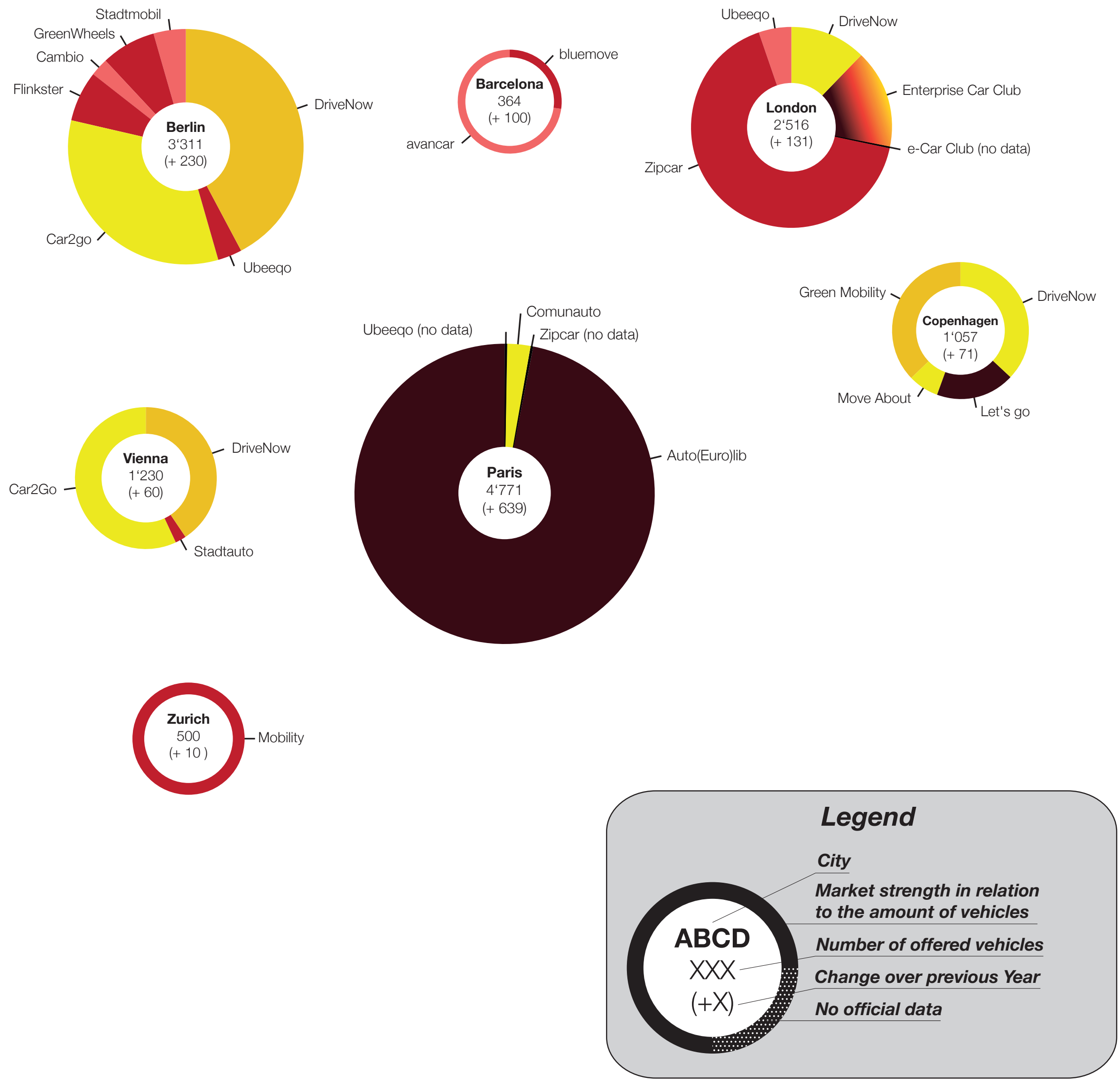
Traveling by train or on vacation and no car? How about a vehicle of the big service provider next door or another Car-Sharing offer?

In the following chapter last year's user groups were redefined in order to use them for price comparison of cities. The new user groups should improve the compatibility of the different vehicle sizes.

Since the beginning of the study, the number of Car-Sharing providers has not changed significantly in the cities studied. In Barcelona and Copenhagen, one supplier each has appeared on the market. After a slight decline in providers, London and Paris now have the same numbers again as in 2015. Vienna, on the other hand, has seen a decline from one provider. In Zurich, there has been no change in the Car-Sharing market, the provider still has the monopoly.

Different offer types:

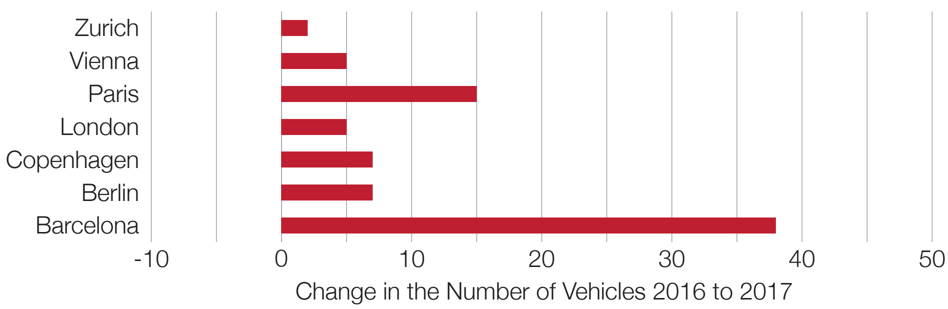
Round Trip   One Way   Free Floating



3.1 Comparison of Number of Vehicles with previous Year

The number of vehicles has increased across all cities in the past two years. The increase was with 40% greatest in Barcelona. Berlin also had more than 300 vehicles more on the market this year. Paris has seen the largest growth in the car fleet, with over 600 cars added last year alone. This growth of more than 15% compared to the previous year is mainly from a single provider. Despite minor changes in the provider market, vehicle fleets are growing. If a provider disappears from the market, the capacities were immediately covered by the competition.

Change in the Number of Vehicles from 2016 to 2017 in Percentage



3.2 User Groups

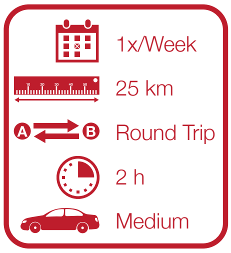
The chosen cities have many different providers with their own pricing structures. The following user groups were developed to make comparisons between the cities based on three user profiles, which are supplemented with the selected car classes.

Couple of Tourists

The 30-year-old tourist couple wants to use a car during their vacation. After arriving at the main train station, they want to get as cheap and easy as possible to their accommodation. The vehicle must provide enough space for two larger pieces of luggage. In addition, there are no round-trip deals asked, as they only want to go to the hotel and not back right away. The hotel is a maximum of five kilometers or a 20-minute drive from the main train station.

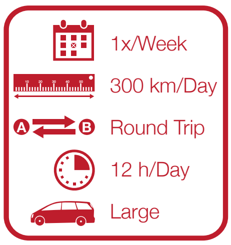
Weekly Shopper

The 45-year-old user does his weekly shopping on a weekday. The vehicle should provide enough space in the trunk for the entire purchase. He drives to the mall, parked there for an hour and then drives back. His shopping tour lasts two hours and he travels 25 kilometers.



Occasional User

The occasional user drives mainly by public transport. However, he needs a car to visit his grandparents with his wife and three children. The car allows him to reduce travel time compared to public transport. The car is also used for domestic weekend trips. On average, he needs a vehicle about once a month and drives round trips of about 300 kilometers lasting several hours.



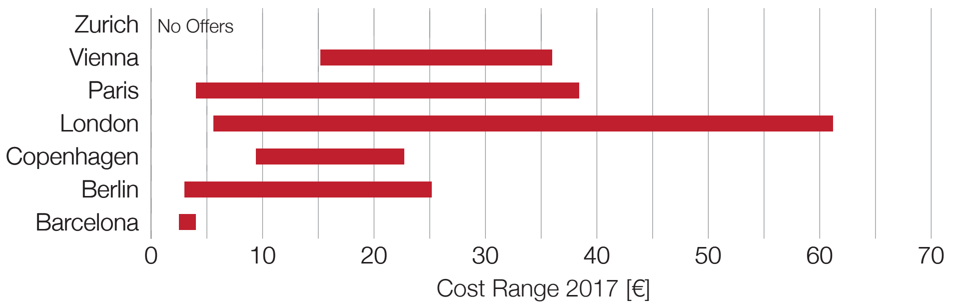
3.3 Presentation of the User Groups with Costs in Euros

The created user groups serve to compare the offers of different providers. The following graphs show the price ranges between the cheapest and to the most expensive offers per city in Euro. To illustrate the different purchasing power of the cities, the offers are also shown in a second diagram using the Big Mac index. In the Big Mac comparisons, the cheapest offers per city are the basis for the diagrams.

Couple of Tourists

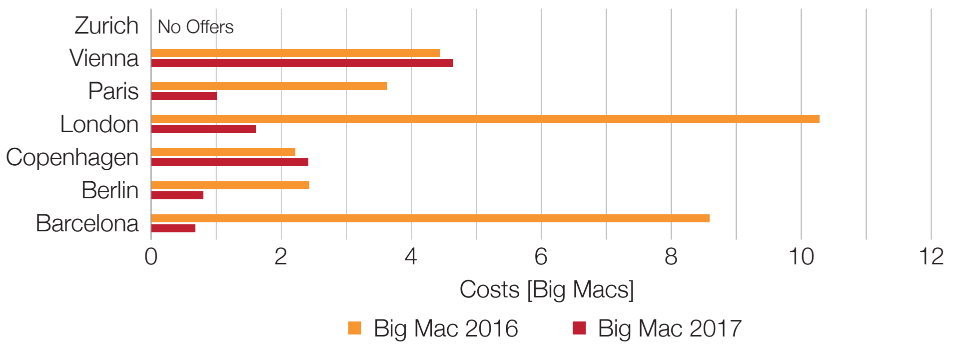
The cheapest vehicle for the tourist couple can be found in Barcelona. Barcelona has the smallest price range and the cheapest offer. In Vienna, the couple pays the most. There are no offers for the couple of tourists in Zurich, because the only provider does not offer a Free-Floating system.

Cost Range of User Group Couple of Tourists - Category „Small“ in Euros



For the tourist couple, especially in Barcelona, London and Paris, significant price changes were observed. Renting a vehicle has become cheaper in these cities over the last year, between three to eight Big Macs. In Barcelona, the new competitive situation could have led to a price reduction. In comparison to this, Barcelona is with less than one Big Mac relatively cheap. The remaining providers are between one and two and a half Big Macs per offer. The most expensive offer is still in Vienna.

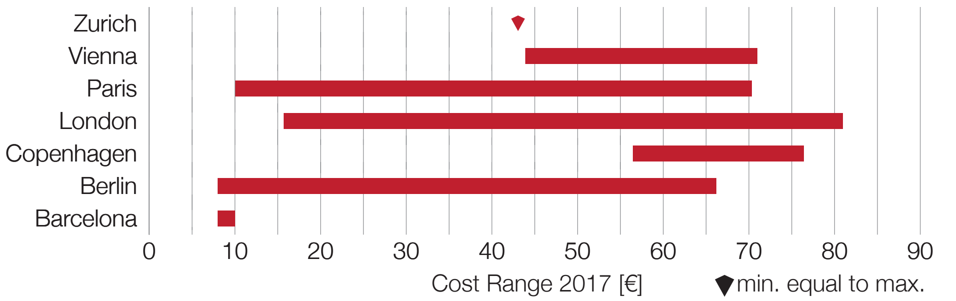
User Group Couple of Tourists - Category „Small“ in Big Macs



Weekly Shopper

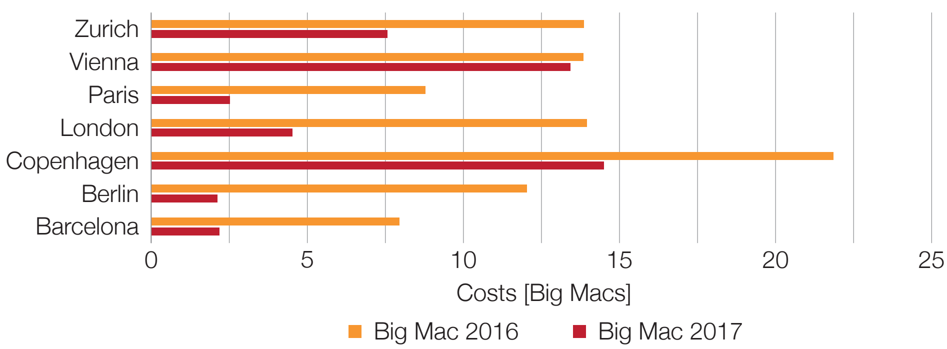
The weekly shopper receives the offers for less than 10 euros in Barcelona and Berlin. The most expensive offer in Copenhagen is almost ten times more than in Barcelona. When looking at the price ranges, you can see which cities have many vehicles. If the price range is large, more vehicles are more likely to be available, such as in Paris, London or Berlin. With few available vehicles, such as in Barcelona or Vienna, the price range is rather small.

Cost Range of User Group Weekly Shopper - Category „Medium“ in Euros

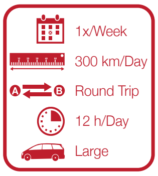


Compared to the previous year, the minimum prices have fallen sharply across all cities, with the exception of Vienna for weekly shoppers. In 2016 Copenhagen was by far the most expensive, while in 2017 Vienna and Copenhagen are almost equally expensive. Barcelona and Berlin also offer the cheapest offers after purchasing power-adjusted prices. The sometimes strong price reduction can be justified by the increased fleet numbers or the existing competition.

User Group Weekly Shopper - Category „Medium“ in Big Macs

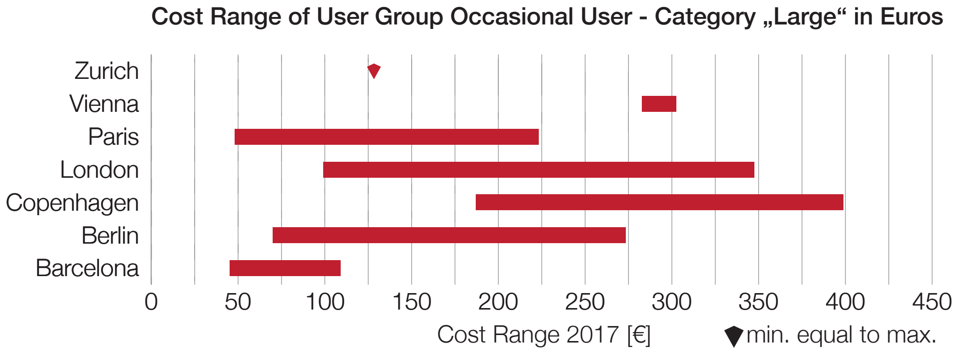


Occasional User

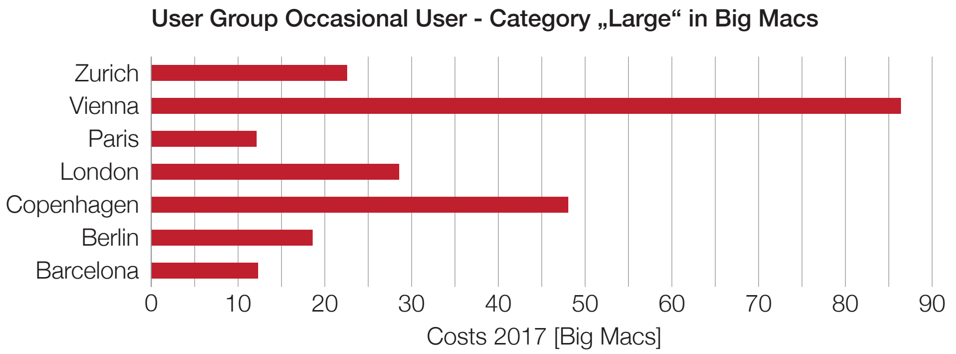


The user group occasional drivers - «Large» has adjusted criteria compared to previous years, so that the different vehicle sizes can be compared better. As a result, only the prices for this year are comparable and the previous year's comparisons are waived.

The occasional driver rents their vehicle the cheapest in Barcelona or Paris. In Vienna, users pay five times as much as in Barcelona or Paris. The price ranges are also larger in this user group for cities with many available vehicles. In Paris, with more than 4,700 vehicles, the price range is over 150 Euros, while in Vienna the different offers are only 20 Euros apart.



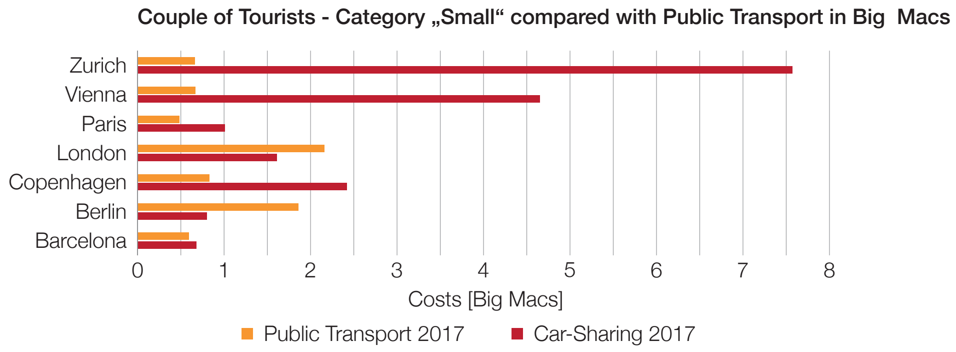
When looking at prices using the Big Mac index, the differences between the individual cities are minimized slightly. Barcelona and Paris are now on the same level, while Berlin's offer has become more expensive compared to Zurich. The most expensive offer is still to be found in Vienna with over 85 Big Macs. The comparison to the previous year is not considered due to the adjusted criteria.



3.4 Comparison of Category «Small» and Public Transport in Big Macs

Many cities have nationwide public transport. Is it worth it to use a car via Car-Sharing? The comparison is based on purchasing power-adjusted prices for the user group «Couple of tourists - Small» and the prices of the operators of the largest public transport network in the cities.

In most cities public transport is significantly cheaper than Car-Sharing. The observed price reductions in Car-Sharing were not sufficient to exceed the public transport. Only in Berlin and London Car-Sharing is cheaper than public transport. The differences are smaller than a Big Mac in Barcelona, Berlin and Paris. While in Vienna, Car-Sharing is more than three Big Macs more expensive, in Zurich a comparison is not possible because of a lack of offers for this user group. For the time being, Car-Sharing can only be seen as competing with public transport in three cities.



3.5 Conclusion

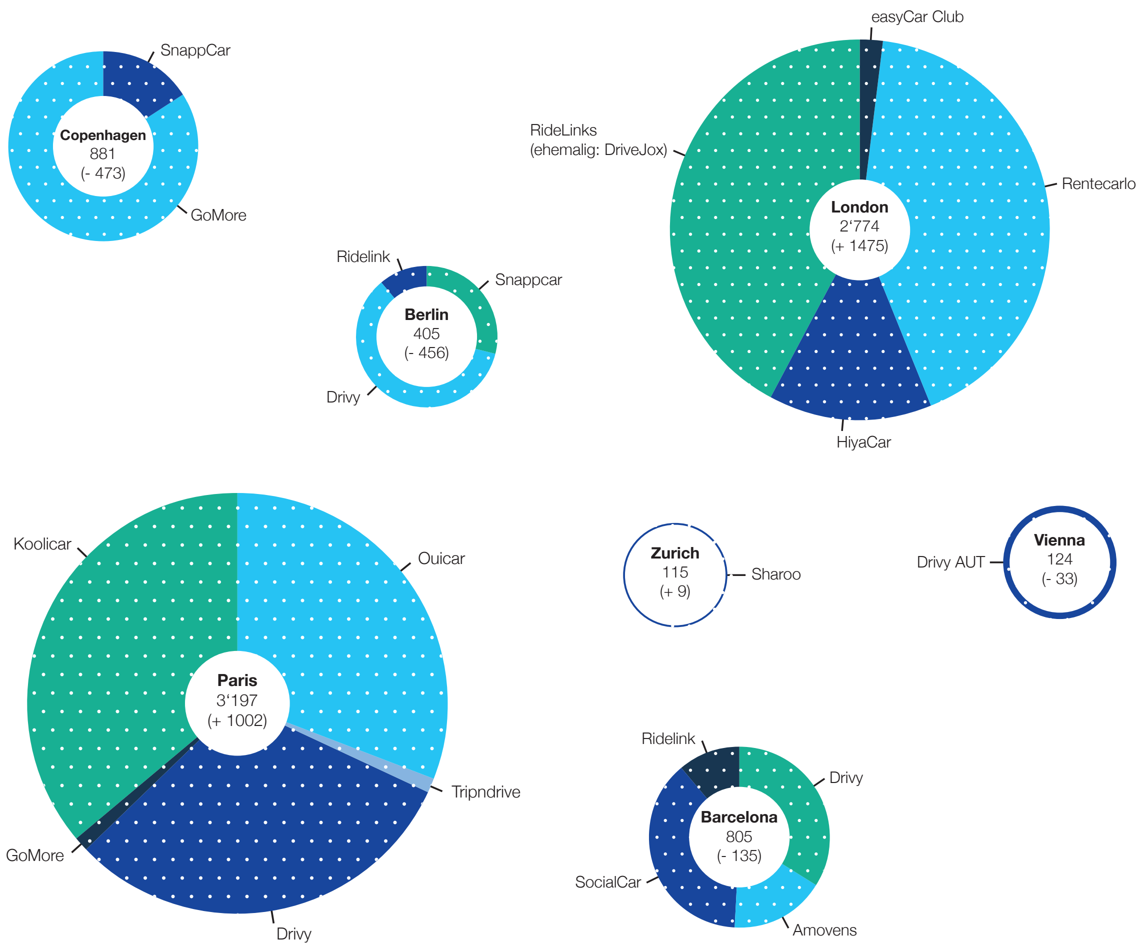
The use of Car-Sharing offers in major European cities is still in vogue. Operators are eager to meet customer needs by offering better deals and a wider choice of vehicle types. On the one hand, this is necessary to keep up with the competition. On the other hand, providers of customers are more likely to be perceived if the providers are represented in several cities.

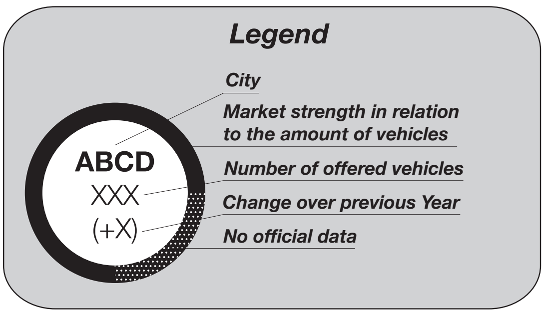
Smaller vendors are usually more expensive than those with a large vehicle fleet operating multiple locations in one city. The choice of vehicle type is almost limitless among the market-leading providers. In the next few years, a further increase in vehicles per providers is expected.

4 P2P-Car-Sharing

Your own car should not stand around unused, but offer an added value via P2P-Sharing. How strong P2P is in the selected cities and which providers operate a system will be shown. Which providers operate on the market and what proportion of available vehicles they have on the respective market is shown in the following graphics. The number in the middle of the circles indicates the total number of P2P-Sharing vehicles in the cities.

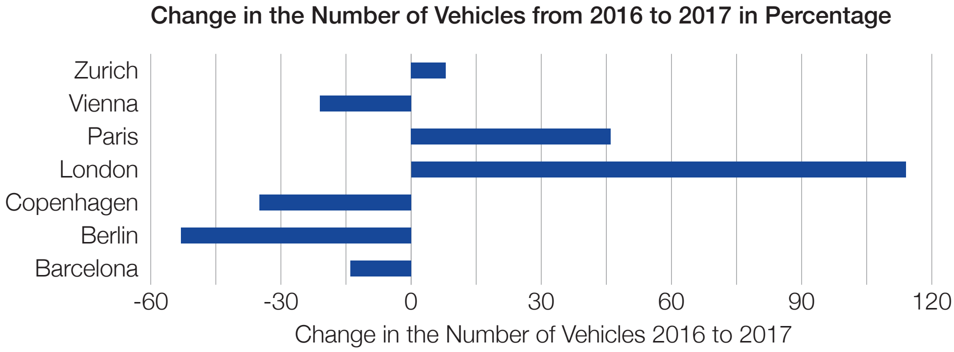
Compared to the other cities, P2P-Sharing is by far the most popular in London and Paris. There are three times more vehicles in London than in Barcelona or Copenhagen. It is therefore not surprising that a lot of different P2P providers can be found in London. The cities of Vienna and Zurich both have only one provider, which affects the number of P2P vehicles.





4.1 Comparison with 2016

In the last year Paris and London have experienced a veritable P2P-Sharing boom. In London, more than twice as many vehicles can be found as last year. Almost 50% more are on offer in Paris compared to the year 2016. Copenhagen and Berlin recorded a decline of 473 respectively 456 vehicles. In Berlin the change is due to a take over from other providers. There were minor changes in Zurich, Vienna and Barcelona.

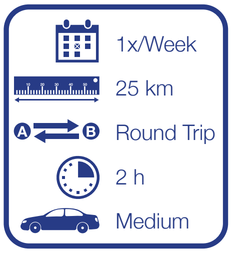


4.2 User Groups

The chosen cities have many different providers with their own pricing structures. The following user groups should enable comparisons between the cities based on three user profiles.

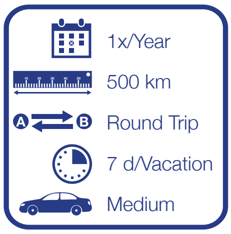
Weekly Shopper

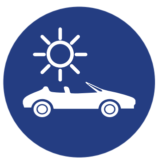
The weekly shopping is done by a 45-year-old user during the week. For this he parks the rented vehicle at the shopping center. After shopping he loads everything in the car and drives home with it. The weekly shopper needs a spacious station wagon that allows him to transport all purchases. On his route of about 25 kilometers, the user otherwise has no special requirements.



Family of Tourists

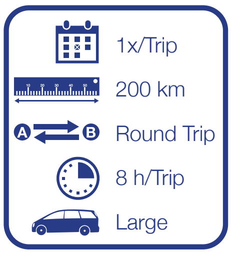
A family of four wants more independence on a vacation and therefore rents a car. The vehicle for a vacation must be spacious, as four pieces of luggage plus family need to be transported. The trip lasts a week, with the family traveling about 500 kilometers.





Pleasure-Lover

The pleasure-lover is only on the road in good weather and on the weekend. For his tour, he wants to rent a sports car or coupe with at least 200 hp. The appearance of the car is also important to him. His rides at least eight hours and he covers a distance of 200 kilometers.

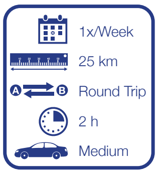


4.3 User Group Comparison

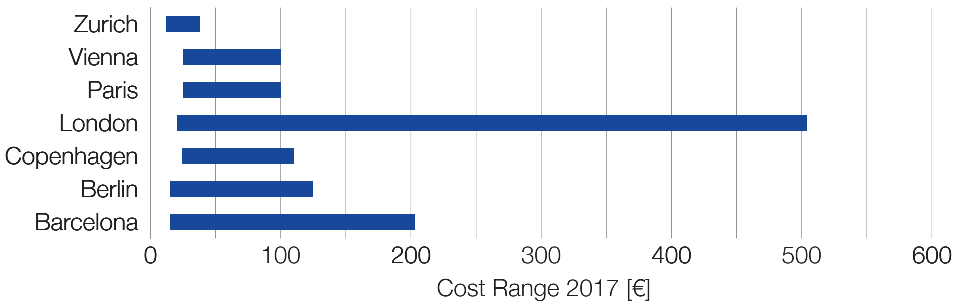
The created user groups are used to compare the P2P offers of various providers. The cheapest offers per city are the basis for the comparisons. The following graphs show the price ranges from the cheapest to the most expensive offers per city in Euro. To illustrate the different purchasing power of the cities, the offers are also shown by Big Mac index in a second diagram.

Weekly Shopper

The weekly shopper will find the cheapest offer in Zurich. Vienna and Paris are the most expensive on the cheap list, followed by Copenhagen. In these three cities, the weekly buyer pays almost twice as much as in Zurich. By far the most expensive offer is in London with over 500 EUR. The smallest price range is in Zurich, the largest in London. The remaining cities have a more moderate price range.

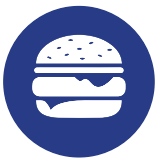


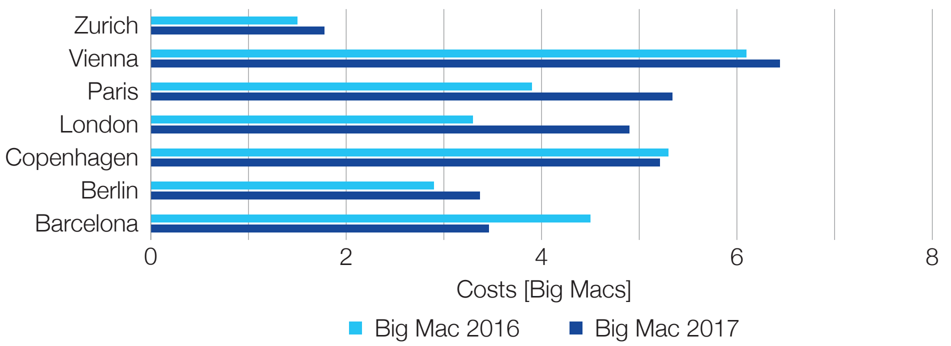
Cost Range of User Group Weekly Shopper in Euros



If one takes into account the purchasing power, Vienna is with 6.4 Big Macs per ride the most expensive city. Zurich is still the cheapest. Berlin, the second cheapest city, is surprisingly twice as expensive as Zurich. Compared to last year's survey, Big Mac prices have increased everywhere, with the exception of Copenhagen and Barcelona.

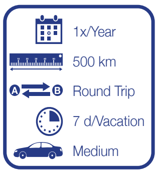
User Group Weekly Shopper 2016 and 2017 in Big Macs



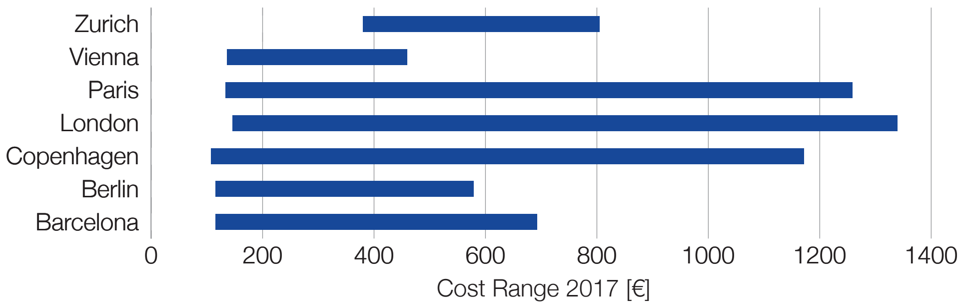


Family of Tourists

The tourist family rents their car most cheaply in Copenhagen. In Zurich, the vehicle is more than twice as expensive as in London. On the lower price end of the price range the remaining cities are all close to each other. However the price ranges of the individual cities vary greatly. In Vienna, the price range is about 330 EUR. Things are different in London, where the offers are almost 1200 EUR apart.

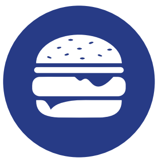


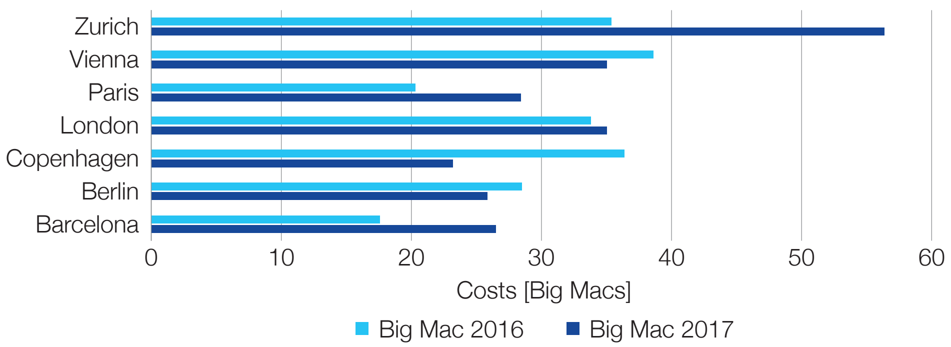
Cost Range User Group Family of Tourists in Euros



With purchasing power in mind, Copenhagen is emerging as the cheapest city. The most expensive offers can be found in Zurich. The tourist family has to pay a total of 56.38 Big Macs in Zurich, compared to more than 20 Big Macs in 2016. Comparing prices to the previous year, prices in Barcelona, London, Paris and Zurich have risen.

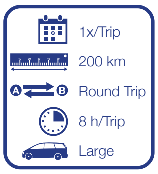
User Group Family of Tourists in Big Macs



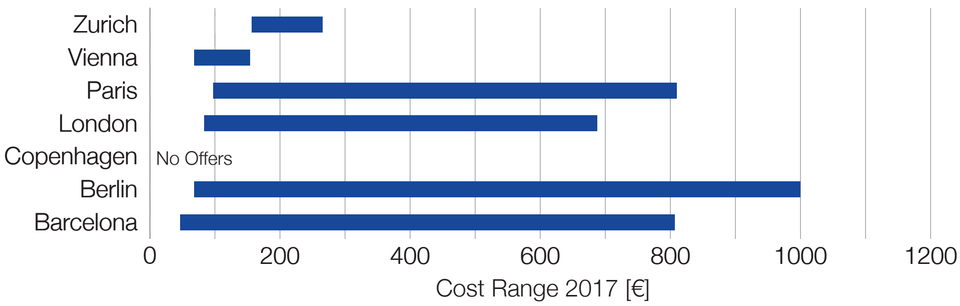


Pleasure-Lover

The absolute prices for the pleasure-lover reveal big differences. The price ranges for Barcelona are over 700 Euros and in Berlin over 900 Euros. Barcelona has the cheapest deal followed by Berlin. The price range of Vienna is smaller than the cheapest P2P offer from Zurich. No comparison was possible for the user profile pleasure-lover for Copenhagen, because the provider offers no vehicle for this user group.

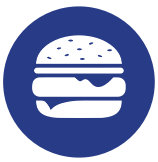


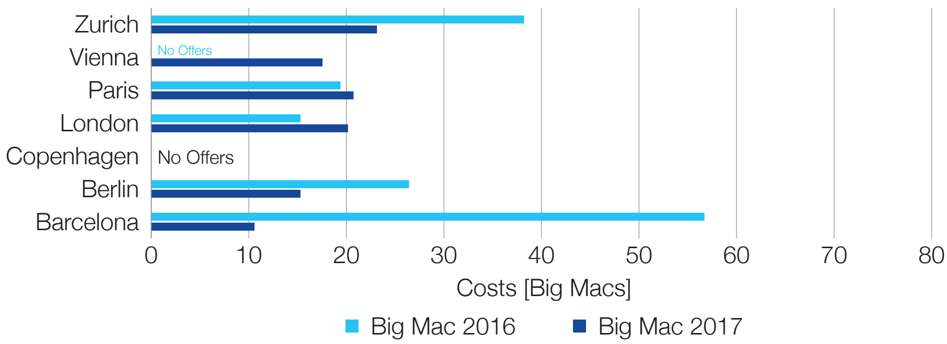
Cost Range User Group Pleasure-Lover in Euros



The purchasing power-adjusted price for the cheapest deal comes from Barcelona, followed by Berlin and London. The most unattractive offer can be found in Zurich with over 20 Big Macs. Compared to the previous year, significantly cheaper deals were created in Barcelona, Berlin and Zurich. Meanwhile, in Paris and London, the changes were no bigger than five Big Macs.

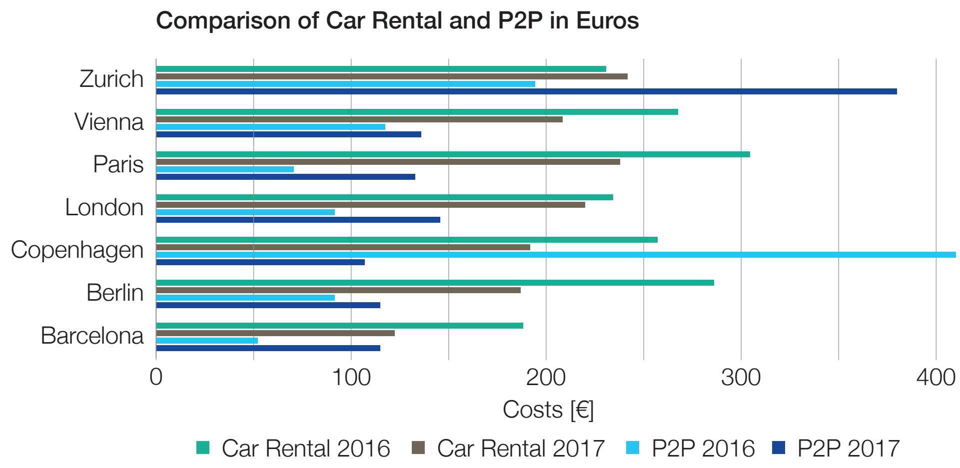
User Group Pleasure-Lover in Big Macs



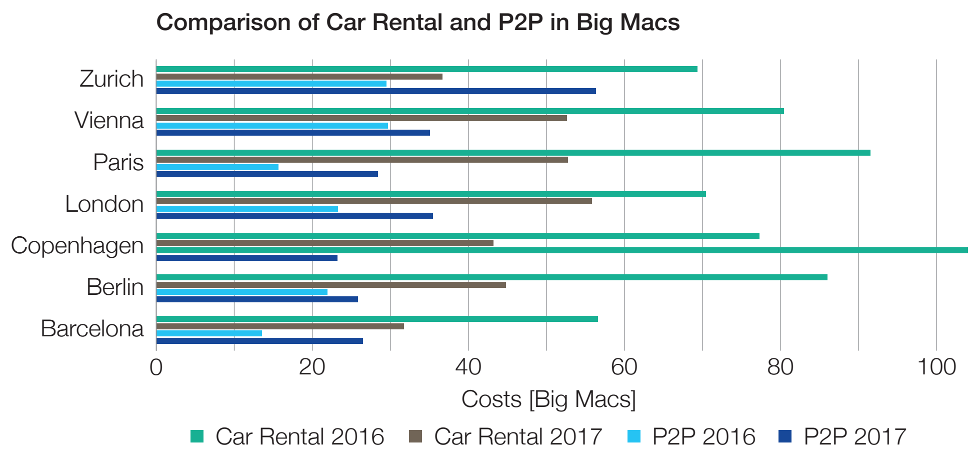


4.4 Comparison of Tourist with Car Rentals and P2P

Tourists rent their vehicle most likely from a rental car company. Can the P2P offers compete with the big car rental companies? In comparison, it can be observed that with the exception of Zurich, P2P offers are cheaper than car rental everywhere. The price differences tend to fluctuate strongly between the individual cities. In Paris the price difference is highest compared to P2P. The smallest difference can be seen in Barcelona; while the remaining cities have differences of 50 to 100 Euros.



The purchasing power adjustment of the evaluation does not change the picture significantly. P2P offers in Zurich continue to be more expensive than car rental. The remaining cities have stayed stable. A major change can be observed in the price level of car rental companies. Car rental prices have fallen by 20 to 30 Big Macs from 2016 to 2017 for the most part. The question arises as to whether prices have become cheaper due to the competition from P2P.



4.5 Conclusion

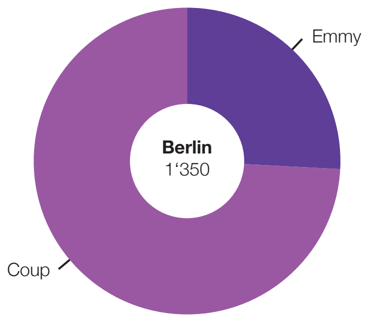
The P2P industry is on an upswing. A rising number of people are offering their vehicle on a sharing platform. In most of the cities surveyed, the offer is especially attractive for a longer rental period compared to traditional car rental. The price development compared to the previous year varies depending on the city. In general, it can not be said directly whether P2P has become more expensive or cheaper across all cities.

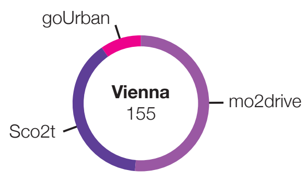
5 Scooter-Sharing

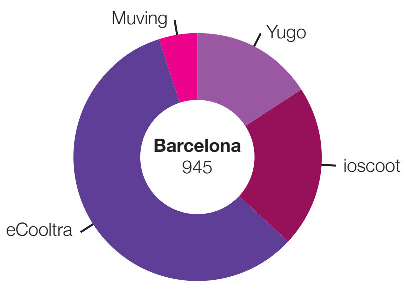
What kind of feeling must it be to run a scooter through the city completely independently of the time of day? You can reach your goals quickly and directly without being stuck in a traffic jam. But on a city trip, such a vehicle isn't necessarily available. The answer to this is Scooter-Sharing.

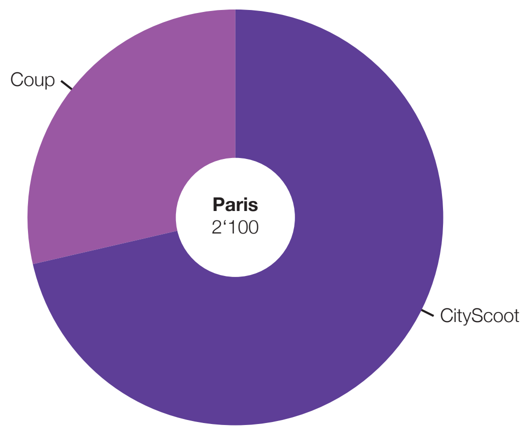
In which cities is Scooter-Sharing operated? Is there a big choice? How expensive are such offers? In 2017 the figures have been collected for the first time in this series of studies.

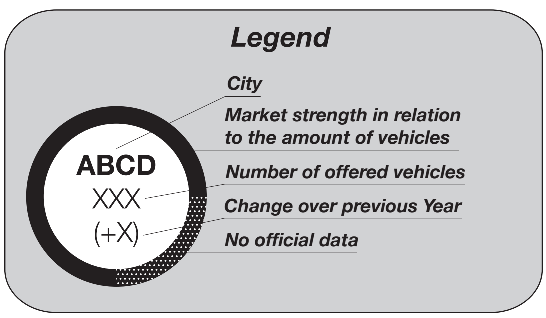
The largest scooter fleet is found in Paris with 2100 scooters. One supplier alone has more scooters than any other considered city. Barcelona has the largest selection of providers, which together have over 945 racers on offer. Yet Barcelona still has less scooter offered than Berlin. Vienna has the smallest scooter fleet. There are no Scooter-Sharing providers in London, Copenhagen and Zurich.











5.1 User Groups

Providers in the different considered cities have partly different price structures. In Scooter-Sharing, three different user groups were defined in order to compare the different offers.

Couple of Tourists

The tourist couple is on a four-day city trip. They use a Scooter-Sharing offer which provides two helmets per offer. The couple drives several times a day from one attraction to another. They make 10 rides during their stay which average in approximately 3 km and 9 minutes per ride. (To consider: only offers with two helmets)

10x/Trip
3 km
Free Floating
9 min

Frequent User

The frequent user uses the sharing offer for various activities. He sometimes uses the scooter to drive to the next business meeting and rides a scooter for shopping after work. The Scooter-Sharing offer is used for 30 rides per month by the frequent user. The distance per trip is on average 5 kilometers. A ride lasts about 15 minutes.

30x/Month
5 km
Free Floating
15 min

Occasional User

The occasional user rents the scooter only a few times per month. She uses a scooter to drive occasionally for leisure activities or shopping in the urban shopping center. She rents a scooter five times a month. Usually the trips last 21 minutes or equal to a length of 7 kilometers.

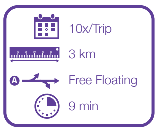
5x/Month
7 km
Free Floating
21 min

5.2 Comparison of the User Groups

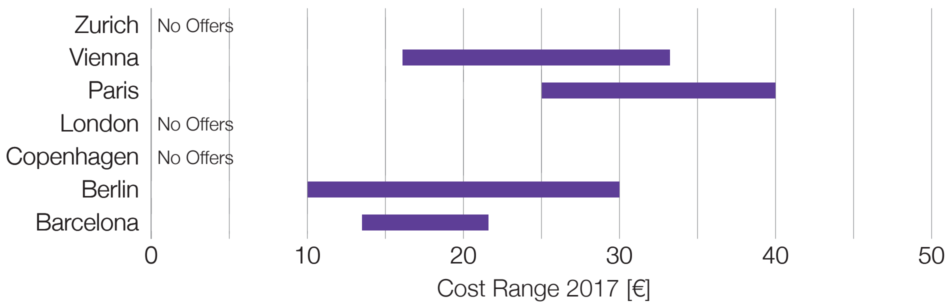
The user groups tourist couple, frequent user and occasional use are considered in this chapter. The cheapest offers in real prices in each considered city are compared. The Big Mac index is used to convert real prices into purchasing power-adjusted prices. Since Scooter-Sharing figures were collected for the first time in this study, a comparison with past years is impossible.

Couple of Tourists

Only regarding the cheapest offer of each city, the lowest price is found in Berlin while the most expensive one is in Paris. The cities of Barcelona and Vienna are in between. The price ranges between the most expensive and the cheapest offer from 17 to 8 euros.

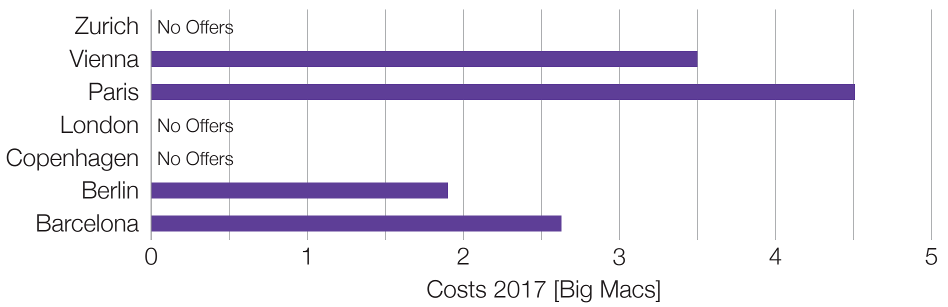


Cost Range User Group Couple of Tourists in Euros



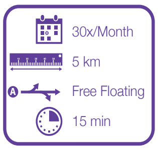
With the Big Mac index taken into account, the order does not change. Berlin remains the cheapest city. In Paris, the tourist couple pays 4,5 Big Macs, which is the most expensive offer. The differences between the cities are up to three Big Macs.

User Group Couple of Tourists in Big Macs

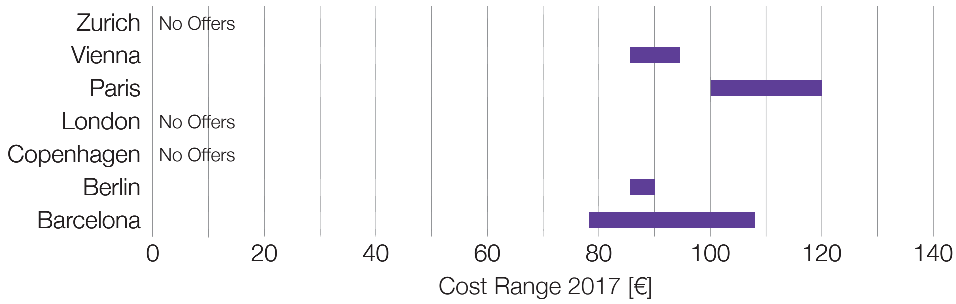


Frequent User

The frequent user finds the cheapest offer in Barcelona. Berlin and Vienna are equally expensive. Paris, as for the coupe of tourists, is the most expensive city. Although Barcelona has the cheapest offer, the difference of 30 euros between the cheapest and most expensive provider is the largest.

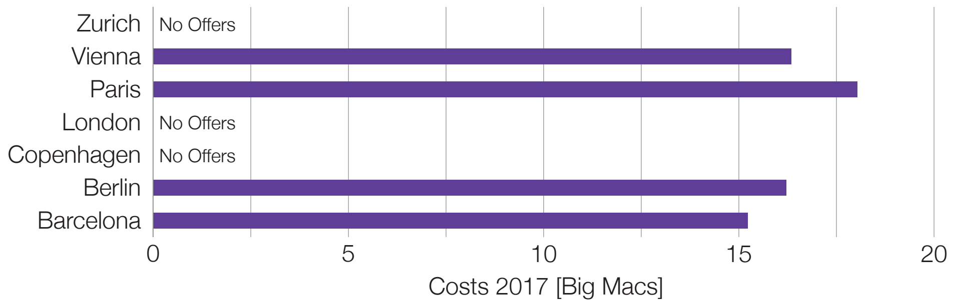


Cost Range User Group Frequent User in Euros



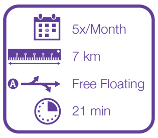
When comparing real and purchasing power-adjusted numbers, the order does not change. Barcelona has still the best scooter offer. The differences between Barcelona, Berlin and Vienna are only about one Big Mac. With 18 Big Macs, Paris has clearly the most expensive offer.

User Group Frequent User in Big Macs

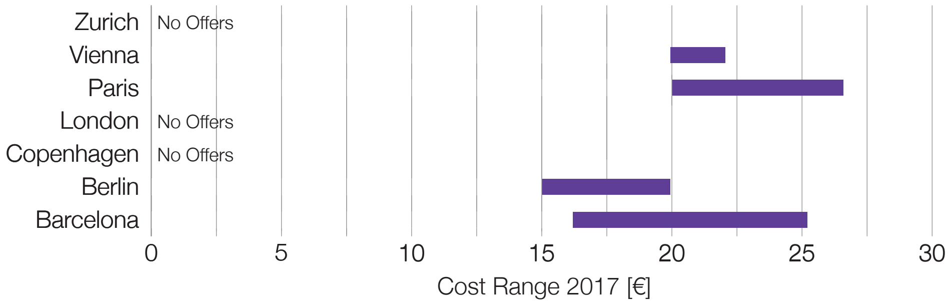


Occasional User

The occasional user finds the cheapest offer in Berlin followed by Barcelona, where the user only has to pay 1,60 euros more. The price of the cheapest offer in Vienna and Paris are basically equivalent. Barcelona has the largest price range while Vienna has the smallest price range.

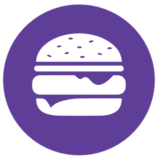


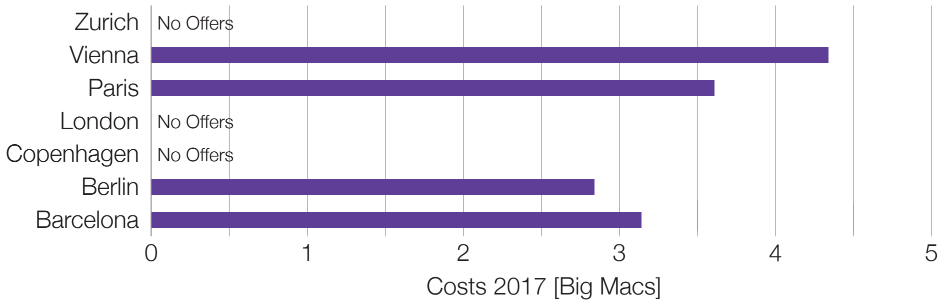
Cost Range of User Group Occasional User in Euros



The purchasing power-adjusted graph looks different as the order changes. Paris no longer the most expensive city as Vienna take over. The most affordable city for the occasional user is Berlin. The range of the prices is about 1,5 Big Macs.

User Group Occasional User in Big Macs



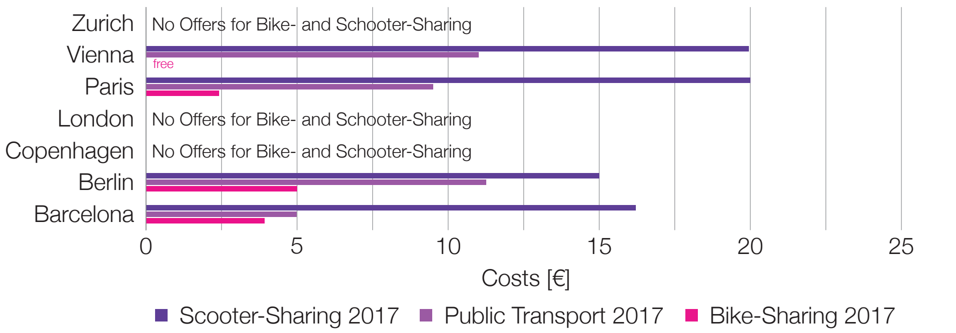


5.3 Scooter-Sharing in Comparison with Bike-Sharing and Public Transport

In this chapter, Scooter-Sharing, Bike-Sharing and public transport are compared with the help of the defined occasional user group. The cheapest prices of the considered cities are compared with each other. The comparison with the help of the Big Mac index provides a purchasing power-adjusted picture.

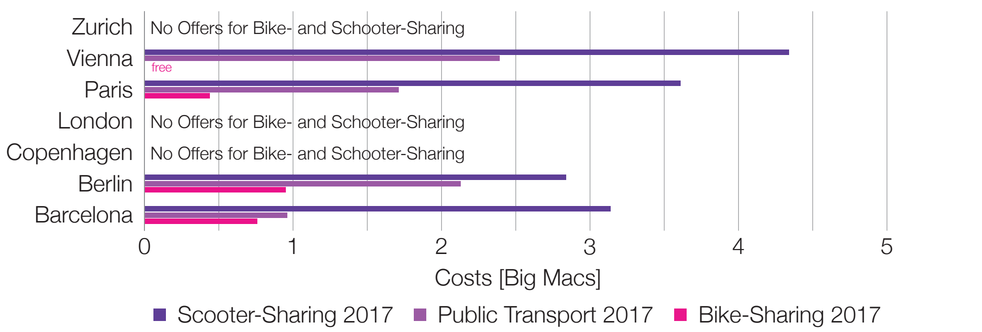
While a bike is free of charge, a scooter is almost double as expensive as the public transport in Vienna. In Paris, the scooter is double as expensive as a public transport fare. A bicycle is relatively cheap. Berlin is a city of extremes: it has the cheapest scooter offers while a bicycle and the public transport are the most expensive. Berlin has the lowest price range between public transport and Scooter-Sharing. In Barcelona, a bike is only about an euro cheaper as the public transport while a scooter costs about three times the amount.

Occasional User compared with Bike-Sharing and Public Transport in Euros



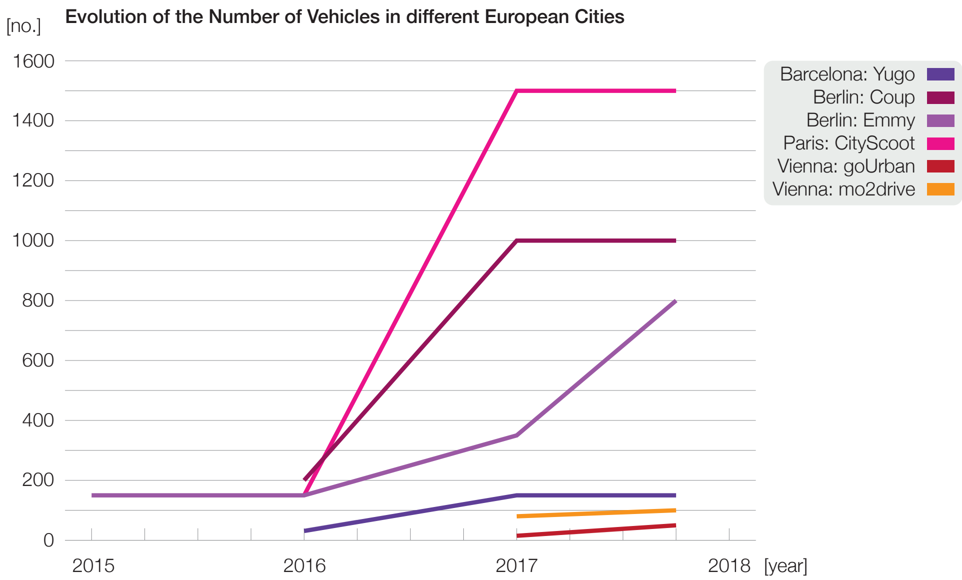
Adjusted for purchasing power, the relations don't shift significantly. Except of Bike-Sharing, mobility is most expensive in Vienna. The scooter is also very expensive in Paris, the bike is very cheap and the costs of public transport is average.

Occasional User compared with Bike-Sharing and Public Transport in Big Macs



5.4 Development of the Scooter-Sharing Market

The demand on the Scooter-Sharing market is huge. This illustrates the development in the selected cities. Especially the operator CityScoot in Paris stands out. It entered the marked in 2016 with 150 scooters. The demand was so strong that CityScoot expanded its inventory to 1,500 scooters in 2017. The provider Emmy in Berlin started a test phase in 2015 with five scooters. Later that year, Emmy expanded its fleet to 150 vehicles. Today they own a fleet of 350 scooters in Berlin and want to expand to 800. [12] [13]



The provider Coup, which is operating in Berlin and Paris, entered the market in 2016 in Berlin with 200 scooters. Coup extended its fleet to 1000 scooters in 2017. Furthermore, Yugo registers an increasing demand in Barcelona. They entered the market in 2016 with three scooters for 150 users. Due to the increased user numbers from 150 to 700, Yugo expanded their fleet in the same year to 31 scooters. Yugo has 11.000 registered users and 150 scooters in 2017. In Vienna there is still no significant development as the two existing providers have only entered the market this year. Since both of them have increased their number of scooters since their entry, it is assumed that there is also a high demand in Austria's capital. Much more can not be determined at this time. However, the figure shows that there is a large demand.

5.5 Conclusion

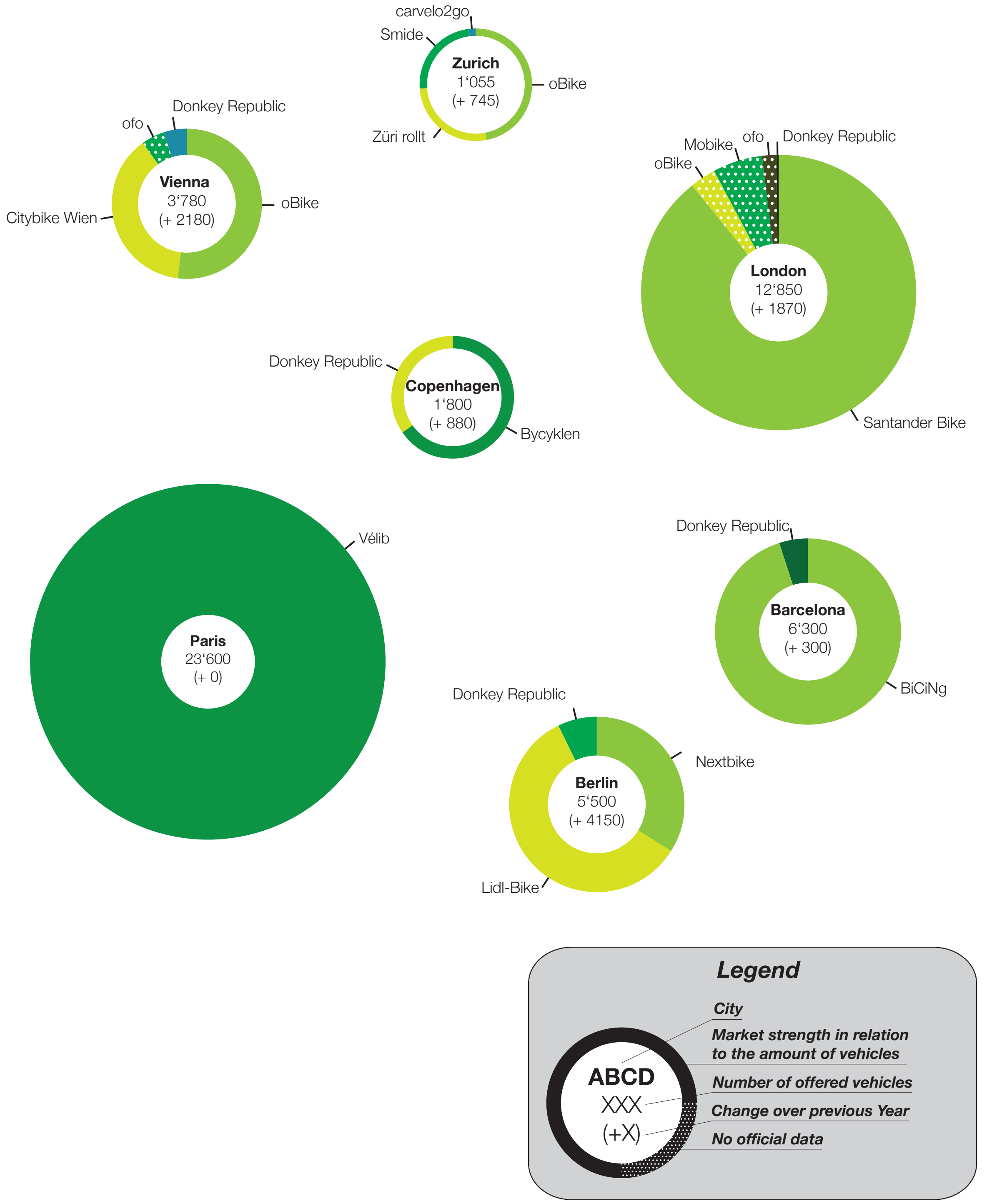
Scooter-Sharing is still in the starting phase. It will be interesting to see how these figures develop over the next few years and which cities will join the Scooter-Sharing business.

Currently there are large price differences between the individual providers in a city. However, it is clear that Scooter-Sharing is relatively expensive. Nevertheless, the vehicle numbers are clearly pointing upwards. The market is likely to develop rapidly over the next few years.

6 Bike-Sharing

Is your own bike a thing of the past? The urge for flexibility and constant availability promoted the Bike-Sharing offers this year. The observed changes in the cities studied provide an insight into the industry.

The leading cities in the field of Bike-Sharing are Paris with 23.600 and London with 12.850 available bicycles. It is noteworthy that in Paris there is only one provider in this sharing area, while in London there are 5 providers in the market. In Copenhagen, the bike city of Europe, only 1.800 bikes are offered which is 880 more than in the previous year. In Zurich and Vienna oBike is the provider with the most bicycles in the city. Berlin was able to register the highest growth with 4.150 bicycles last year. The second largest growth was recorded in Vienna with 2.180 new sharing bikes. In Paris, however, there was no change in number of available bikes.

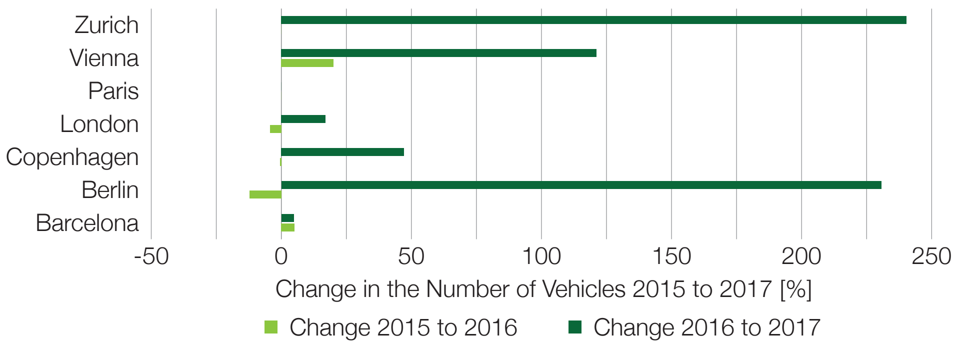


6.1 Providers and their Development

After a year of stagnation, growth rates of more than 200% have been recorded, while in Paris, as in the previous year, no change took place. In Barcelona, there has been continual growth since the beginning of the study. The recent increase of 5% is due to the entry of a new supplier.

The big changes in Berlin, Zurich and Vienna are based on the market entry of various new providers. In Berlin, the growth is due to a displacement battle of two providers. In Vienna, three new providers are trying to steal market share from existing providers. Zurich is a very small market due to the size of the city, which is why small changes result in large percentage changes. Although, some new providers have appeared on the market. In London, the increase is comparatively low, even though new providers are entering the market. One reason for this is that the existing provider has a very large fleet and the four new vendors have not yet established themselves. Copenhagen has seen an increase of bikes, due to a new provider.

Change in the Number of Vehicles from 2015 to 2017 in Percentage

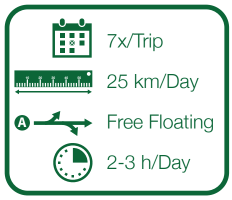


6.2 User Groups

The following user groups serve to compare different offers in the considered cities. In addition, the user group occasional user has been added.

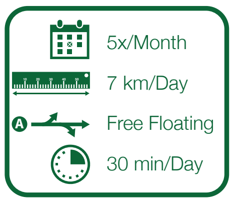
Tourist

The 32-year-old tourist takes a city trip on the weekend. She chooses the bike to explore the city. On the first day, she takes three trips lasting one hour each and on the second day four trips lasting 30 minutes. The tourist deliberately decides against classic bike rentals, because she wants to explore the city independently without being bound to a single location (no round-trip offers).



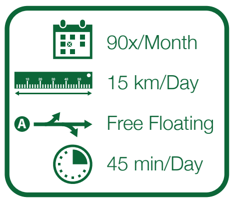
Occasional User

The 40-year-old cyclist uses the Bike-Sharing service several times a month. For leisure activities, spontaneous purchases and as a public transport substitute in marginal hours she decides to use the bicycle as a means of transportation. The places she visits are within 7 kilometers and she only needs 30 minutes each way.



Frequent User

The 27-year-old cyclist uses an offer several times a day. The multiple use of one-way and free-floating services are excellent. The places he visits are within 5 kilometer and he only needs 15 minutes each way.

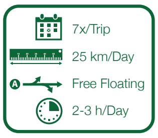


6.3 Comparison of the User Groups

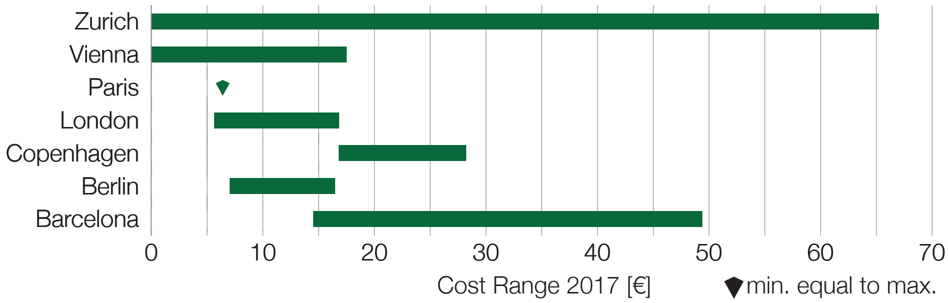
In order to be able to compare the offer of the cities with each other, three Bike-Sharing user groups were defined, which have very different mobility behaviors. For the public transport comparison tariff, the cheapest monthly offer of single-route tickets, multi-trip tickets or subscriptions was chosen.

Tourist

The price ranges are very different in the cities considered. So Zurich has both the cheapest and the most expensive offer. Then Barcelona follows with a price range being half as big. In the other cities, a range of 10 to 20 euros can be observed. There is only one supplier in Paris.

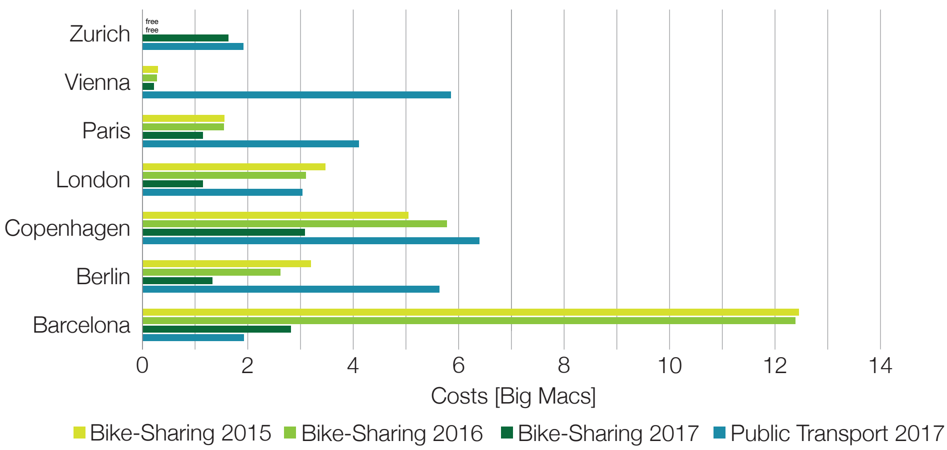


Cost Range of User Group Tourist in Euros



As new providers entered the market in all cities in the past year, prices have fallen sharply. In Barcelona, the public transport is the cheapest - even cheaper than the Bike-Sharing offer- but the difference has become smaller. On the contrary, in Vienna the public transport is profoundly more expensive and the Bike-Sharing offers are by far the cheapest. In other cities, Bike-Sharing is cheaper for the tourist than using public transport. You have to pay most in 2017 in Copenhagen, both for a bike and for public transport. In Zurich, the difference between Bike-Sharing and public transport is the smallest, but the price of a sharing offer has risen, as there are now free-floating providers on the market, which better match the purpose of the tourist, but are not free of charge.

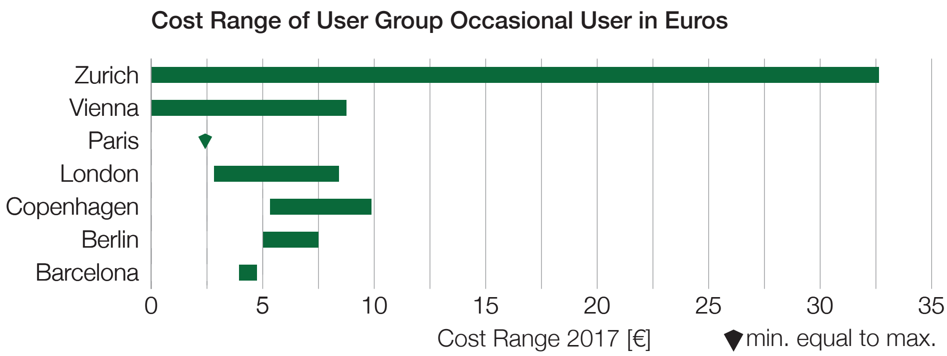
User Group Tourist in Big Macs



The new providers still have a relatively small vehicle fleet. This makes it currently difficult for tourists to guess which system they should use to have a bike available quickly and easily. For example, in Zurich it has to be considered whether the free service with only six stations or rather the free-floating system with 500 vehicles is to be used. Especially in Vienna it is worthwhile to change to the saddle as the bike can be used, after a one-time registration fee of one euro, free of charge for the first hour.

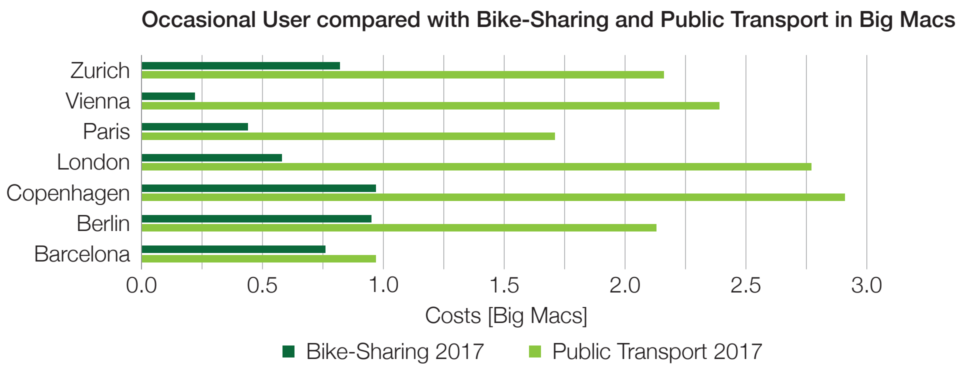
Occasional User

The differences between the price ranges are huge in the cities considered. Thus Zurich has the cheapest as well as the most expensive offer for the occasional user. In the EU cities, the price differences between the offers are much smaller. There is only one supplier in Paris.

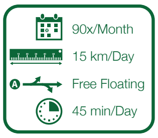


In the graph below it is clearly visible that for the occasional user the Bike-Sharing is cheaper than the public transport everywhere. Again, the offer from Vienna is the cheapest. Copenhagen is the most expensive for the occasional user, both for Bike-Sharing and public transport. In Barcelona the difference between public transport and bike is the lowest.

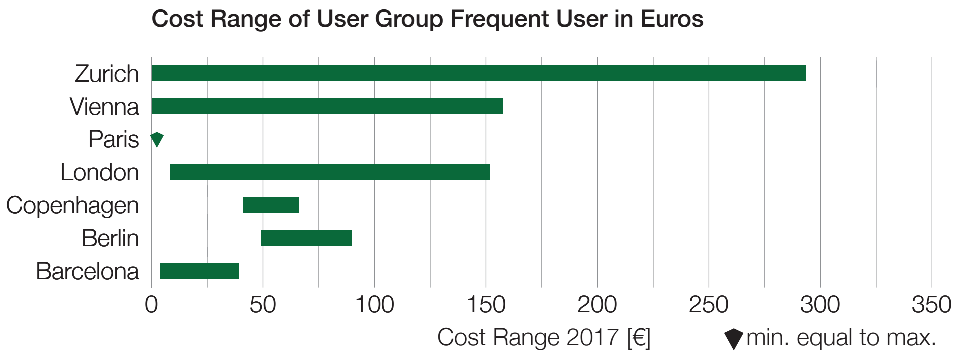
Interestingly enough, the monthly Big Mac index for the Bike-Sharing costs are all between 0 and 1 and the cost of public transport is much higher. For the occasional user, it is therefore more attractive in all cities to swing on a bicycle for a short time instead of buying a public transport ticket.



Frequent User

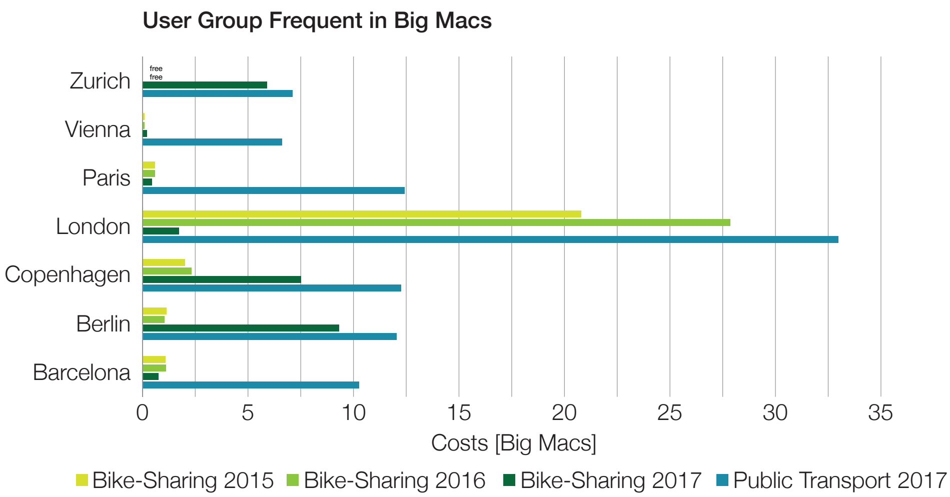


The price ranges in Zurich, Vienna and London are very lange. In Berlin, Barcelona and Copenhagen the price ranges are smaller, while there is only one provider in Paris. The Provider in Paris has at the same time the cheapest offer. The most expensive offer for about 50 euros can be found in Berlin.



In all the cities considered, Bike-Sharing is again the cheaper alternative to public transport. In Vienna Bike-Sharing is worth the most compared to other cities, as you are free of charge for the first hour. As shown in the graph below, the costs in Berlin, London, Copenhagen and Zurich have changed significantly compared to 2015 and 2016. In Barcelona, Paris and Vienna, prices remained the previous year's level.

In Berlin, Copenhagen and Zurich the massive price increase is mainly due to the adjusted tariff structures of the providers or new competitors with a larger fleet, which are pushing into the market. In London prices have plummeted a lot because new Asian suppliers with lower prices attack their established competitors. However, these are in the shadow of the urban sharing system in relation to the fleet provided.



6.4 Conclusion

The market is in upheaval. Suppliers from Asia try to challenge the previous providers. The number of bikes has increased by around 20% within one year.

With the new providers, city trips with the bike are even more rewarding for tourists. They can use the bike for sightseeing as a cost-effective replacement for public transport. In addition, they are no longer dependent on the opening hours of the rental stations and can spontaneously get on a bike 24/7, 365 days a year.

7 The Essentials in Brief

«A Coming and Going of the Providers»

New providers come to it, others disappear again from the scene. The vehicle numbers are generally increasing.

«The Quantity makes the Difference»

The prices vary greatly. It pays to compare different providers. Suppliers with large a fleet tend to be cheaper than those with small one.

«From Fiat to Ferrari»

Everyone can put their vehicle on the platform. This creates a comprehensive, diverse range of offers. This leads to immense price ranges.

«Car-Sharing is catching up»

While prices for P2P-Sharing remain roughly the same, Car-Sharing prices have fallen. Nevertheless, P2P-Sharing is generally cheaper.

«A new Offer hits the Ground running»

The business model of Scooter-Sharing is relatively new. The vehicle numbers are steadily increasing. In many cities, there are already several providers who compete for the favor of users.

«It is worthwhile to compare Providers»

There are big price differences between the providers. Depending on the duration of use or distance another provider is cheaper. Offers are not yet available in all the cities studied.

«Motorized is expensive»

Compared to public transport and Bike-Sharing, Scooter-Sharing is massively more expensive. It also offers new possibilities for comfortable users who want to travel more individually.

«Asian Providers shake up the market»

With huge «free-floating» fleets, Asian providers are turning existing offers upside down. Prices are falling, user numbers are rising.

«Fleets are growing»

After a stagnation last year, the number of available bikes is now growing again. Bike-Sharing is more often in the focus of the public attention due to the spreading of bikes from the free-floating providers.

Data Collecting

The survey of all providers was not identical. The following data collections resulted from the sharing type. For more information on which method (s) apply to which provider, please contact the project team.

Car-Sharing:

Prices:	Online survey on the providers websites
Fleet numbers:	1. Online survey on the providers websites
	2. Direct communication with fleet operator by email / telephone
	3. If there was no data provided or available, a small substitute value was taken to depict the provider in the graphs (was the case for 3 fleet sizes)

P2P-Car-Sharing:

Prices:	Online survey on the providers websites
Fleet numbers:	Online survey on the providers websites

Scooter-Sharing:

Prices:	Online survey on the providers websites
Fleet numbers:	1. Online survey on the providers websites
	2. Direct communication with fleet operator by email / telephone
	3. Study of the Innovation Center for Mobility and Societal Change (InnoZ) GmbH in Berlin

Bike-Sharing:

Prices:	Online survey on the providers websites
Fleet numbers:	1. Direct communication with fleet operator by email / telephone
	2. Online survey on the websites of the providers
	3. Where no data was available, press reports were used

Public transport ticket price survey

Zurich :	https://www.zvv.ch/zvv/de/abos-und-tickets/tickets.html
Vienna:	https://www.wienerlinien.at/eportal3/ep/channelView.do/pageTypeId/66526/channelId/-46648
Paris:	https://www.ratp.fr/titres-et-tarifs
London:	https://www.visitbritainshop.com/deutschland/london-transport-which-ticket-to-buy/
Copenhagen :	http://www.visitcopenhagen.com/copenhagen/transportation/tickets-prices
Berlin:	https://shop.bvg.de/index.php/tickets
Barcelona:	https://www.mapametrobarcelona.net/en-precio-metro-barcelona.php

Source Disclosures

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