Car sharing unlocked

How to get to a 7.5 million shared car fleet in Europe by 2035

ING Economics Department • October 2018

ING

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Car sharing taking off through 21st century technology

Car sharing was conceived in the 20th century with reports of car sharing schemes dating back as far as the late 1940s. Success was limited until 21st century technologies such as (4g) internet, smartphones, apps and car connectivity increased the possibilities of car sharing, raising its popularity.

How far can car sharing reach?

Cars take 80% of all passenger transport km's in the EU. For this, a fleet of around 270 million cars is used*. On average 1 out of every 2 Europeans owns a car. These cars are parked up to 95% of the time**. Still only a very small percentage of them are shared. This report investigates the potential of car sharing in Europe to 2035. We do this through desk research, expert interviews and an international consumer survey. Close to 13,000 consumers in 13 different European countries were questioned about their thoughts on car sharing.

* Source: Eurostat

** Joint Research Centre Institute for Institute for Energy and Transport European Commission (Driving and parking patterns of European car drivers 2012)

Executive summary

Car sharing shows potential...

Car sharing is gaining interest across Europe, particularly in major cities, but faces several barriers on the road to success. The user experience needs to improve and make car sharing more straightforward in order to gain demand. On the supply side, platforms and technology development will help generate trust among car owners to share. Only when the owners of cars are prepared to share their cars will car sharing be able to exploit its potential.

...but faces barriers to growth

Our growth scenario leads to a 7.5 million shared car fleet in Europe in 2035, up from an estimated 370,000 currently. Our analysis suggests that the take-up of car sharing will ultimately lead to a peak car moment, at which point the total number of cars in Europe will fall and new car sales will also decline. Car manufacturers can take a leading role in car sharing by creating their own peer-to-peer platforms and utilise their existing customer network.

How to unlock supply and demand

Demand

30% of Europeans with a driving licence show interest in car sharing. But car sharing faces heavy competition.

- Ride hailing is on the rise.
- Most of all people take pride in having their own car with two out of three Europeans attaching emotional value to their car.

Supply

Most cars are parked 95% of the time. Yet still only 0.13% of all passenger cars in Europe are shared. The ING International Survey shows 6 out of 10 people are willing to share their car for money. But trust is essential for car owners to do so in practice.

Technology can assist to overcome barriers in both supply and demand

Connected cars can help overcome trust and practical supply issues, for example providing remote access and monitoring.

We expect usage of level 4 autonomous cars to rise after 2025. Level 4 cars drive autonomously on restricted routes and can help the user experience by offering quick access. They can also increase trust among suppliers, making cars safer.

Better user experience

4 out of 10 Europeans want to see improvement in the car sharing user experience, which would involve a more reliable, faster, easy-to-use service and increased supply of cars.

Lower costs

Europeans want to see improvement in cost. Car sharing is currently cost competitve for low mileage drivers only. Increased government regulation (taxation, city access and parking space limitations) can increase its competitiveness versus car ownership.

P2P platforms

Car sharing needs to be able to adjust to supply. Professional fleet owned (business owned) expansion is capital intensive and relatively slow and inflexible. Further development of peer-to-peer (private owned) supply and pricing mechanisms is essential.

Trust and reliability

Car sharing will need to generate trust among car owners to actually share. Platforms need to create transparency through reliable 2-way rating systems.

Chapter 1 | The state of car sharing in Europe

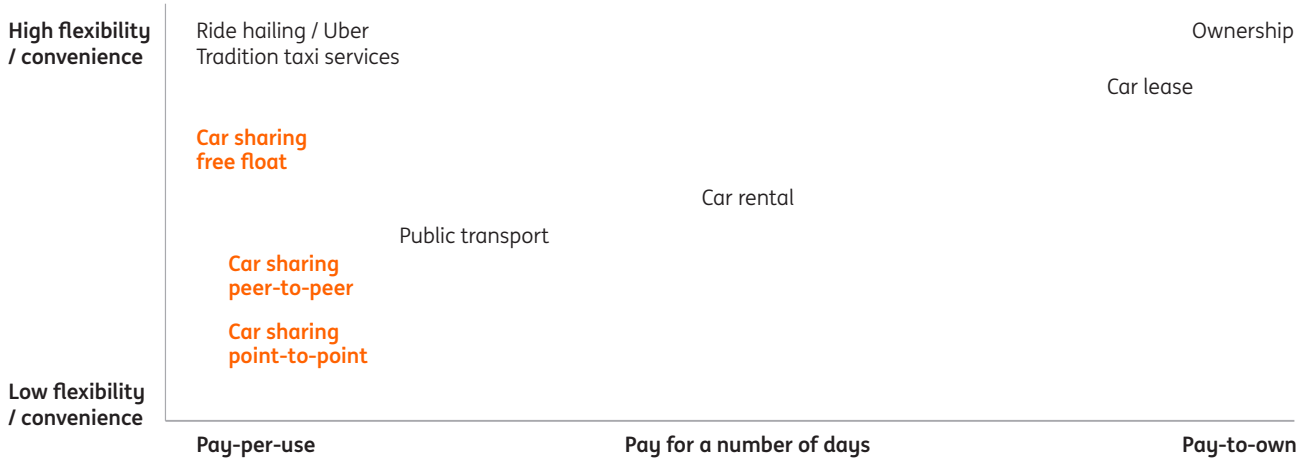
1.1 Car sharing provides short term, pay-per-use car access

What is car sharing?

A standardised definition of car sharing does not exist. In this report car sharing refers to services that provide car access for short term periods with the following characteristics:

- Payment is mostly per minute or hour and/or based on the distance driven. In this report we exclude informal (unpaid) forms of car sharing.
- The service provider can either own the car itself (e.g. Car2Go, DriveNow, Zipcar and Ubeeqo) or function as an intermediary (e.g. Snappcar, Amovens, GoMore, Drivy) and connect private individuals (peer-to-peer).
- Cars are distributed across a wide variety of locations, as opposed to car rental services with (usually) limited locations.
- Cars have to be picked up and driven by end users themselves. (This is opposite to ride hailing services such as Uber, where people are driven by chauffeur).
- Car sharing can come in different forms; free float (pick-up/drop-off anywhere), point-to-point (fixed locations or roundtrip) and peer-to-peer (pick-up/drop-off private car owner).

Car sharing within the mobility landscape



Views on car sharing vary slightly

There is a wide variety of definitions for car sharing, ranging from simple to highly detailed. A simple and straightforward definition comes from MOMO (more options for energy efficient mobility through car-sharing): 'What is meant by Car-Sharing is simply the sharing of vehicles, professionally organized and managed.' Millard-Ball et al. 2005 present the following defition: "Carsharing is a membership-based, self-service, short-term car access system with a network of vehicles for which members pay by time and/or distance."

The European Automobile Manufacturers Association (ACEA, September 2014 - Carsharing: Evolution, Challenges and Opportunities) states carsharing generally involves accessing a car owned by another person or entity in exchange for an agreed monetary payment. During the period of time when a person has access to a carsharing car, they are responsible for it and its use is for their exclusive benefit. Rather than carsharing cars being shared between consumers, it is the authors' view that the behaviour is more accurately described as sequential short-term car access."

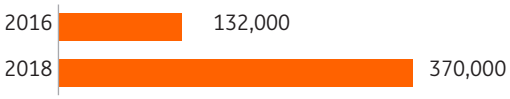
1.2 Fast growing, but still a niche market

Europe's shared fleet has grown to 370,000 cars

The number of shared cars and registered users of car sharing services is growing rapidly. There is currently an estimated car sharing fleet of 370,000 in Europe in 2018. This is still only just over 0.1% of all passenger cars in Europe.

Shared car fleet in Europe has almost tripled in past 2 years

Shared car fleet in Europe

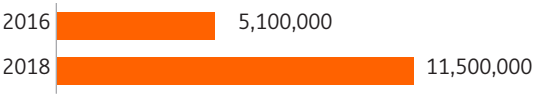


Number of 'registered users' growing fast

Equally impressive is the growth in users of car sharing services, though it has to be noted that the quality of this number is unknown. Some might use car sharing regularly, while others might use car sharing once a year.

Number of users doubled from 2016 to 2018

Number of car sharing service users in Europe



Source: all figures based on Bloomberg New Energy Finance, adapted for Europe by ING

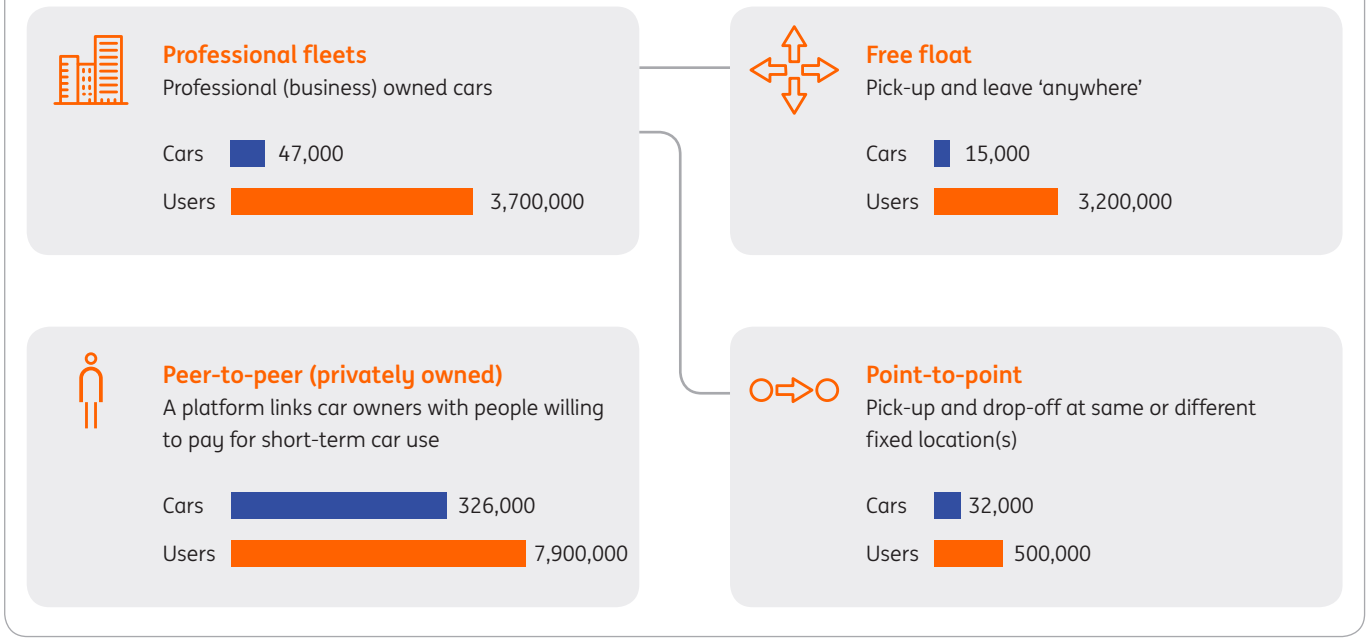
Most cars in peer-to-peer sharing

The majority of the shared car fleet is run by private individuals, entered into peer-to-peer schemes. The availability of these cars is unknown as someone could enter his or her car only once a month or once every quarter. This contrasts with professional fleet cars, which are permanently shared.

Free-float car sharing generates many users

Professional fleet schemes can be organised in different ways. Free-float car sharing, in which drivers can pick-up and leave cars in any location they desire, is attracting most users. This provides more convenience than other schemes, which oblige users to pick-up and drop-off cars at fixed locations.

Most shared cars in peer-to-peer schemes, many users in professional fleet based schemes



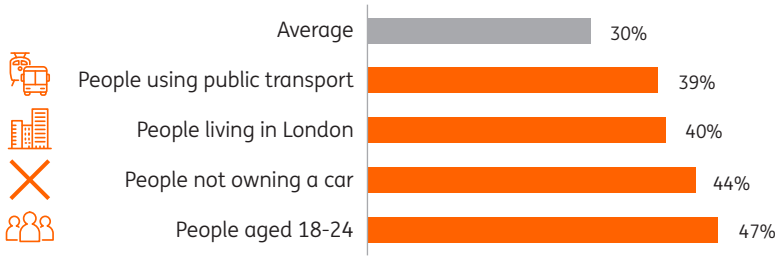
1.3 High potential triggers expansion

Low car ownership rate rises interest in car sharing

Growth in car sharing is set to continue. Our survey shows that close to 7% of Europeans with a driver's licence state that they use car sharing, while 23.5% would consider using car sharing services over the next year. Interest rises among people who do not own a car and/or use public transport as their main mode of travel. People living in metropolitan areas, where parking spaces are limited, also show high interest. So do young people and those living in countries with relatively lower incomes.

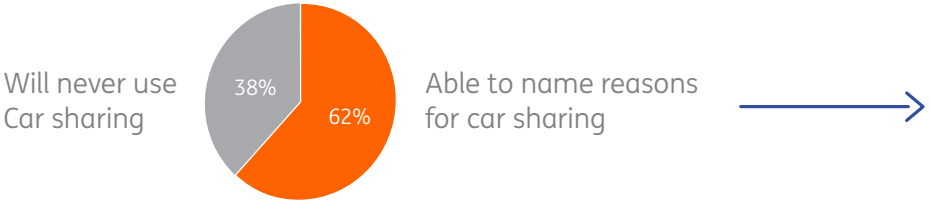
Young people without a car living in cities show high interest in car sharing

Percentage of people with a driving licence that use car sharing or indicate to use within 1 year



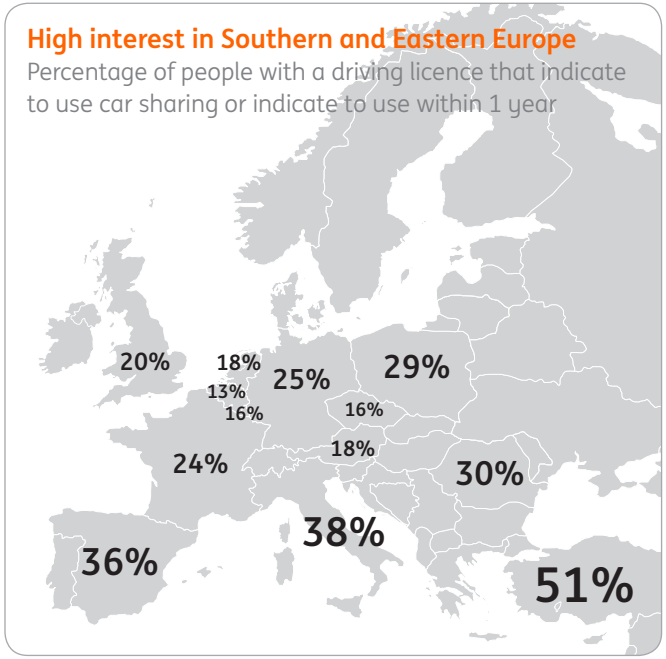
62% of people can think of reasons to use car sharing naming cost, sustainability and/or flexibility

In % of respondents



High interest in Southern and Eastern Europe

Percentage of people with a driving licence that indicate to use car sharing or indicate to use within 1 year



Source: ING International Survey

1.4 Car sharing competes with car ownership and other transport services

Car ownership is dominant

Although car sharing shows growth, it is still far from a real breakthrough. Compared to car ownership it is a very small niche. Car ownership remains dominant with the number of cars per inhabitant still rising in most European countries. The total passenger car fleet grew from 240 million cars in 2005 to 277 million in 2016*.

Europeans love cars

It is not just convenience and flexibility that make owning cars popular. Our consumer survey shows that, for many people, cars are more than just a tool to get from A to B. Two out of three Europeans attach emotional value to cars. We can see this throughout Europe, but it is especially valid in Eastern and Southern European countries. Furthermore the love of cars is present throughout generations.

Competition rising in the city

Car sharing is not only competing with ownership of cars. It can also be an alternative to public transport. But car sharing is not alone in its quest for customers. Certainly in dense (city) areas, we see a widening array of transport options. Examples are bike and scooter sharing and of course ride hailing.

Aggressive expansion of ride hailing

Ride hailing has made a strong entry through Uber. Expanding aggressively it is changing the competitive landscape. Ride hailing is now successful in the US and poses a threat not only to taxi companies, but also public transport as research** indicates. Furthermore it has halted the growth in car sharing in the US. In Europe, ride hailing platforms are more restricted in accessing markets through regulation.

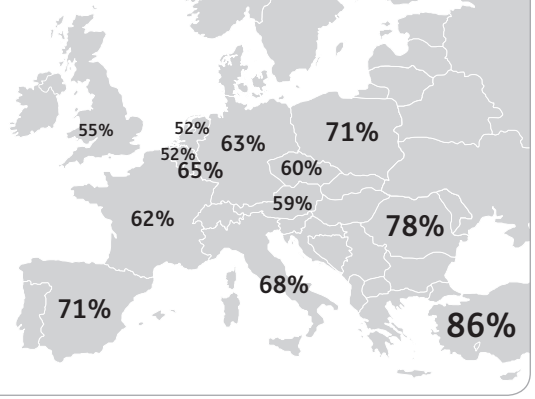
Europeans are attached to their cars and like to drive

What car 'lovers' like: (ranked)

1. driving pleasure
2. my personal space
3. car design
4. image enhancing
5. status symbol

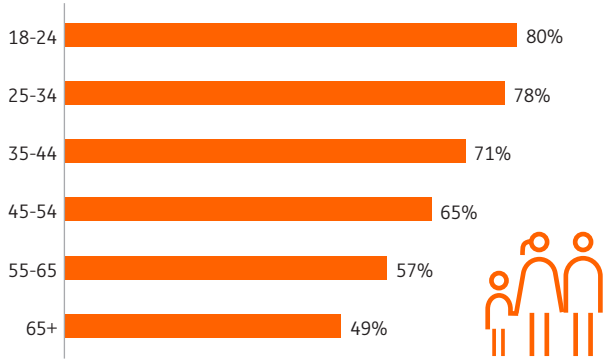
The love of cars is widespread in Europe

% of people who attach emotional value to car



...and fully present throughout generations

% of people who attach emotional value to a car



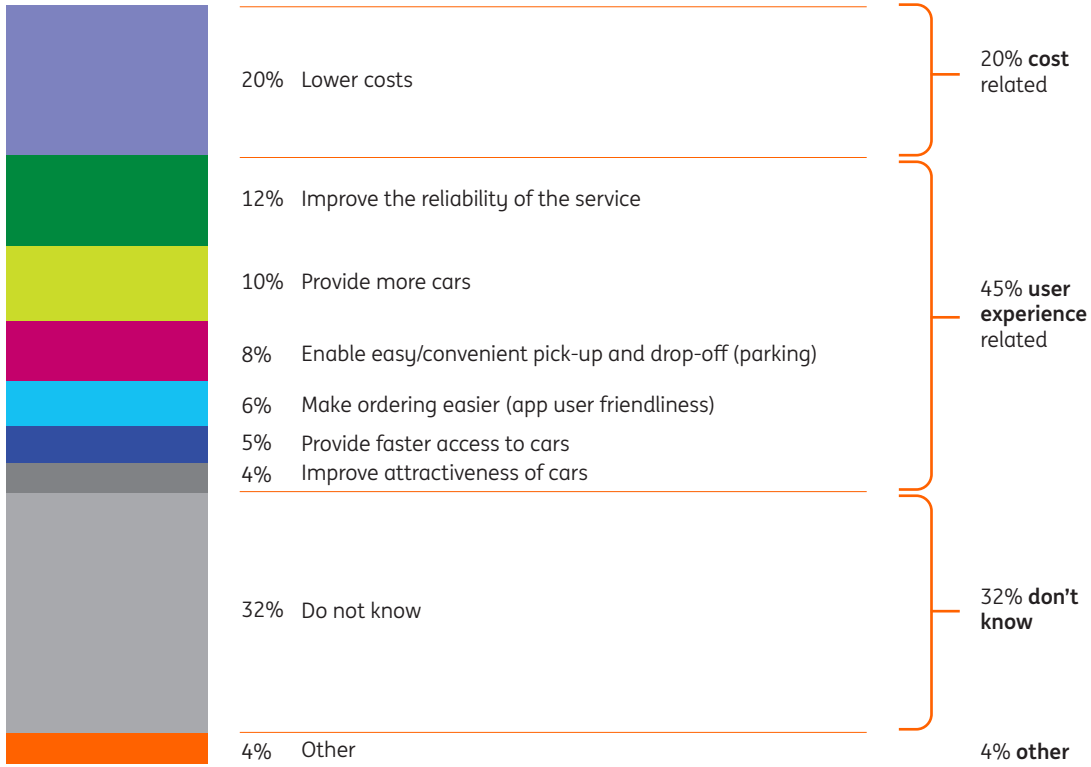
Sources: *Eurostat **Wall Street Journal / Transportation Sustainability Research Center (link)

Chapter 2 | The barriers to car sharing

2.1 Most barriers to car sharing are user experience related

Interest in car sharing is present amongst many Europeans, but what needs to improve to convert them to customers?

What is the main thing car sharing services should improve on?
In % of people with a driving licence



Looking for lower costs

Although costs were mentioned as a driver for car sharing, a number of people see this as the main barrier to use car sharing services. To convince this group, the services have become (even) more cost competitive.

Many user experience aspects to improve

Most barriers mentioned can be categorised as qualitative aspects that form the user experience. Most important aspect is reliability. Users need to trust they can rely on car sharing to fulfil their needs when necessary. Sufficient supply of cars also relates to this. Furthermore car sharing needs to focus on convenience and ease of use.

Car sharing not in consideration

A large number of people simply do not consider car sharing an option. They might have psychological barriers to car sharing or it simply does not fit their social norms. Most people in this group prefer their own car and do not plan to use car sharing.

Source: ING International consumer survey

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2.2 Costs – Majority of car owners unlikely to switch

Car sharing can save costs...

When comparing total cost of ownership car sharing can reduce costs. Calculations of the total cost for ownership, leasing and sharing show this is the case for mini cars (A segment) driven less than 9,000 km, small cars (B) driven less than 9,250 km and compact cars (C) driven less than 12,000 km. See Appendix for these calculations.

...but convenience of ownership influences decision

However, there are also non-financial costs associated with not having 24/7 exclusive ownership of a car. Take for example the time lost by having to order cars and additional transport time and costs to pick-up points and from drop offs. These factors can be multiplied in the case of larger households / families with travelling needs for more than one person.

Emotional value not to be underestimated

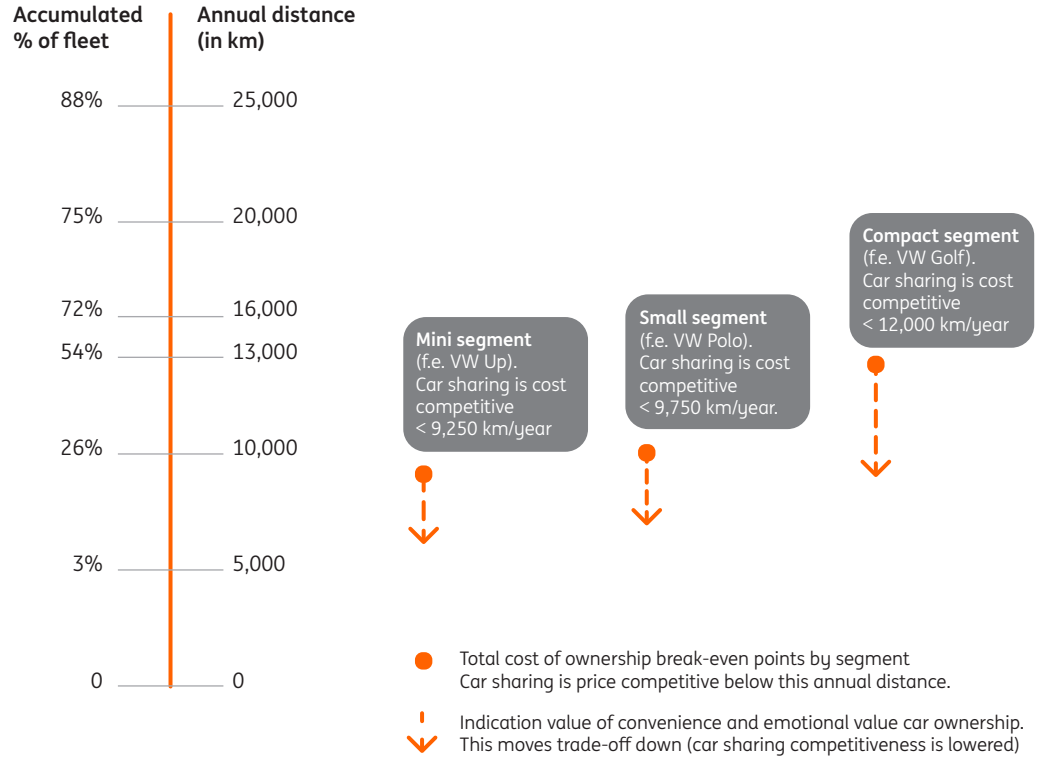
Besides offering convenience, cars often represent more than a tool to get from A to B. As shown on page 8, emotional value is something that should not be underestimated.

Transparancy issues limit comparability

Factors such as convenience and emotional value create difficulty in making an exact (cost) comparison. Furthermore it should be noted that consumers will often have difficulty to estimate and take into account the total cost of ownership of a car. People owning cars might not realise alternatives such as sharing could suit them well.

Small group of car owners might save on costs by switching to car sharing

Annual distance per car by accumulated percentage of fleet in Germany, 2015 and break-even points car sharing versus ownership and private/personal lease



The average annual distance travelled per car in Germany was 14,350 km in 2015. A quarter of cars are driven less than 10,000 km. The cost comparison shows that less than a quarter of car owners might switch to car sharing based on cost savings. We expect convenience factors and emotional value to rise with larger and higher cost vehicles.

Sources: Calculations ING (see Appendix) accumulated % of fleet and annual distance are 2015 figures for Germany and based on DAT report 2016 (dat.de)

2.3 Policy makers can improve cost competitiveness

Cars getting 'cheaper' compared to public transport

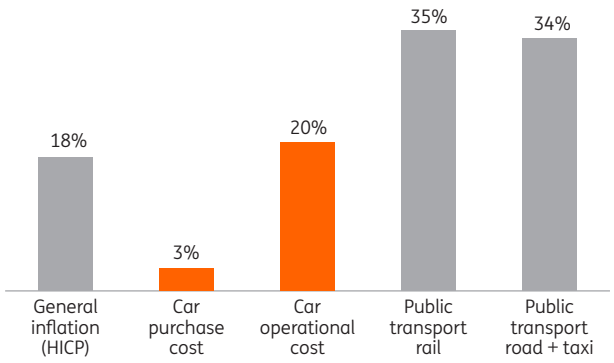
Car sharing not only competes with car ownership and leasing, but also with other forms of transport. Many factors influence whether the absolute cost of public transport is higher or lower than car sharing or ownership. Over time cars have become more cost friendly versus public transport by rail and bus.

Price trend likely to continue

It is likely that the above trend will continue. Low interest rates have helped consumers finance cars. Leasing companies also benefit from this. Furthermore the rise of (fully operational) private/personal car leasing is helping lease companies achieve economies of scale. This in turn helps to discount purchase and operational costs.

Price increase cars lower than public transport

HICP price development 2007-17 European Union



Source: Eurostat (HICP is Harmonised Index of Consumer Prices)

Cars putting pressure on public transport

Although the EU market share of cars versus rail and bus transport has been relatively stable over the past 10 years, there is danger in public transport providers losing interest. As stated on page 8, new car based mobility services such as ride hailing attract public transport users. Transport by car will often be preferred thanks to convenience and flexibility.

Cars could collapse under 'success'

The ever increasing use of cars also brings undesirable effects; traffic congestion, road accidents and pollution. This is especially valid in dense urban areas. Governments often try to counter this by taxing car ownership, fuel, parking and/or by charging tolls.

Restrictions on car ownership and use

To actually reduce car use local governments look set to enforce more strict measures. Bans on polluting vehicles are on the rise and several cities, such as Oslo and Amsterdam, are reducing the number of parking spaces.

Madrid enables lower costs in car sharing

Local authorities and car sharing providers cooperated in Madrid to stimulate car sharing and reduce road congestion. Car sharing services are allowed to drive in restricted areas and also benefit from free parking. This has driven down the cost of car sharing. Car2Go is able to offer electric Smart cars for €0.21 in Madrid versus €0.26 in Germany and €0.31 in the Netherlands. Car sharing services in Madrid benefit from high usage rates.

Governments can use regulations to push car owners to car sharing

Increase in cars / traffic forces governments to regulate

- Increase of taxation on cars (purchase and operation)
- City driving bans and restricted zones
- Increase in parking costs
- Decrease in parking space availability
- Stimulate alternatives such as public transport and car sharing

This leads to pressure on car ownership

- Increased cost of car ownership
- Increased risk of car ownership (uncertainty on residual value)
- Decreased convenience of ownership
- More competitive costs for car sharing

And increases demand for car sharing services

2.4 User experience – Improving the service in car sharing

The user experience – a road with hazards

Most people indicate that the main barriers to car sharing lie in the user experience. Improvement is wanted in the following areas:

- Improve the reliability of the service
- Provide more cars
- Enable easy/convenient pick-up and drop-off (parking)
- Make ordering easier (app user friendliness)
- Provide faster access to cars
- Improve attractiveness of cars

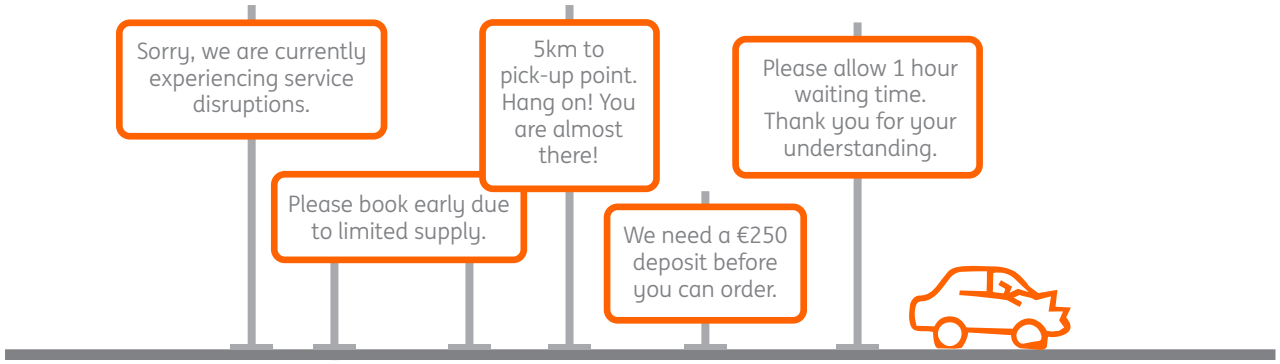
Platform development to improve user interaction

Car sharing platforms / apps are an important factor in improving the user experience. They have to be easy to use and provide a fluent ordering process, transparent info and easy payment. Furthermore linkups with other transport services can be interesting in creating a platform that meets multiple transport needs.

Learn from (big) data

Car sharing can generate lots of data. By analysing this and using machine learning supply and demand can be better matched.

Things to avoid in user experience



More cars to improve supply and create fast access

Expanding the fleet to grow car sharing is essential. For fleet owners, this can be difficult as expansion requires large investments. However, the number of users will only grow if supply is guaranteed. Once more users are attracted, the service will again need to expand to keep up the user experience. Cooperation between fleet owners can help improve supply. An example is the announced merger of BMW's DriveNow and Daimler's Car2Go, which should improve supply to their customers. This will be discussed in more detail on page 17.

Offer attractive cars...

Several manufacturers are involved in experimenting with subscription services. In the US it is now possible to subscribe to several premium car brands and drive different models on demand.

...and sustainable cars

Several car sharing operators have full electric cars, which seem ideal for city traffic. Progress in battery technology and electric vehicles should help car sharing operators to offer more sustainable and cost efficient cars in the future.

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2.5 Autonomous cars to help user experience

Autonomous cars gradually hit the road

Although it is hard to forecast the exact roadmap for autonomous vehicles, development will raise their usability in the coming years. A gradual roll-out on a route-by-route basis is likely.

Autonomous in restricted areas on its way

A vehicle that can drive itself anywhere and under all (weather) circumstances is called a level 5 autonomous car. This is however not expected anytime soon. But levels 3 (still) requiring human intervention) and 4 (autonomous within a designated area) look to be on their way.

Improve user experience...

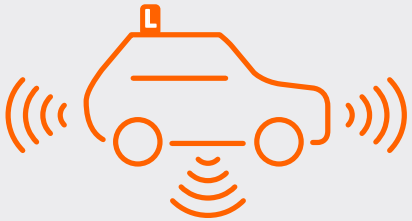
Level 4 autonomous vehicles still allow humans to drive. They can however help in providing door-to-door services, with vehicles driving themselves to a station, parking spot or the next customer. By performing such tasks they can:

- improve supply and reliability of car sharing services and provide quick access to cars.
- eliminate pickup and parking issues
- create a more stress free driving experience
- decrease accidents and insurance costs

....and increase competitiveness

All in all autonomous cars can help reduce time and handling in car sharing, thus eliminating direct and indirect costs and improving the user experience. This should raise the competitiveness of car sharing services.

Breaking the barriers to autonomous cars



Bringing down hardware costs

A high cost element in autonomous cars is Lidar (Light Detection And Ranging of Laser Imaging Detection And Ranging). The initial cost of US$75,000 per car has been reduced, but it remains an expensive item. Expectations are that further development should lead to the total hardware package (incl. sensors, cameras, lidar etc) costing no more than US$5,000 by around 2025.

Timing of 5G network roll out

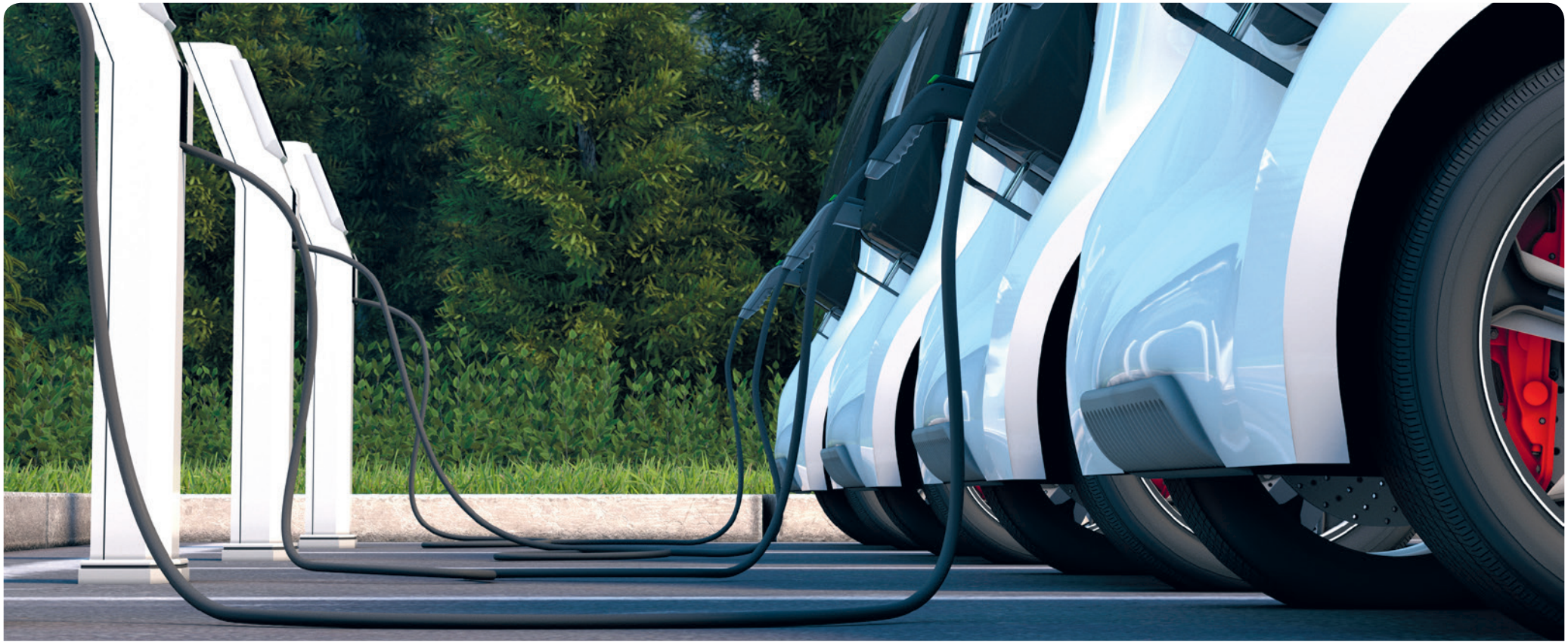
2025 is targeted by Europe for a wide roll-out of 5G networks. This will be important in vehicle-to-vehicle communication, needed for autonomous cars to anticipate traffic conditions ahead.

Learning to drive

The actual 'brain' of autonomous cars will have to learn to drive. By clocking up test miles and gathering data, machine learning should improve responses. Several countries and cities have allowed or plan tests of autonomous vehicles to enable further development.

Legislation

Following accidents in tests, there has been talk of a 'driving licence' system for autonomous cars. This should licence an autonomous vehicle to drive within a certain area, for which it has passed a test.



Chapter 3 | Car sharing growth and impact on Europe's auto industy

3.1 High growth potential in supply of cars

Growth in supply needed to facilitate demand

In chapter 2 we discussed the barriers to increase demand for car sharing services. But is there sufficient supply to facilitate growth in demand? This will require increased supply not just in fleet owned cars, but also in peer-to-peer car sharing. But are people willing to share?

Majority of car owners open to share car for money

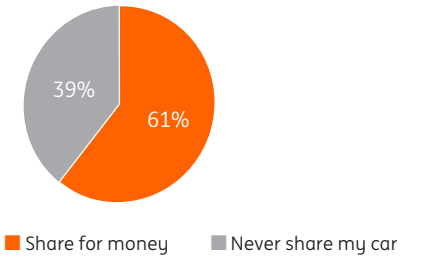
The majority of people said 'yes' when asked whether they would share their car in return for money. The minimum amount people want to be paid for a day varies. Over 70% of the group willing to share for money desire a minimum income of €10 to €30 per day, while 18% would be satisfied with a minimum of €50 per day.

Willingness to share high in Turkey, low in Benelux

We saw that a relatively high interest in using car sharing is present in Southern and Eastern parts of Europe (page 7). The same trend is visible when looking at the supply side. People from Eastern and Southern parts of Europe are most willing to share their car. Less willing are people from the Benelux countries.

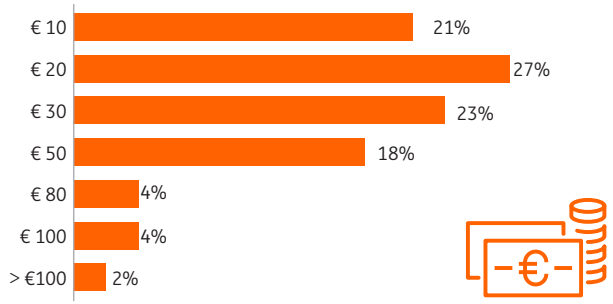
61% of respondents open to sharing their car...

Percentage of Europeans willing to share car for money



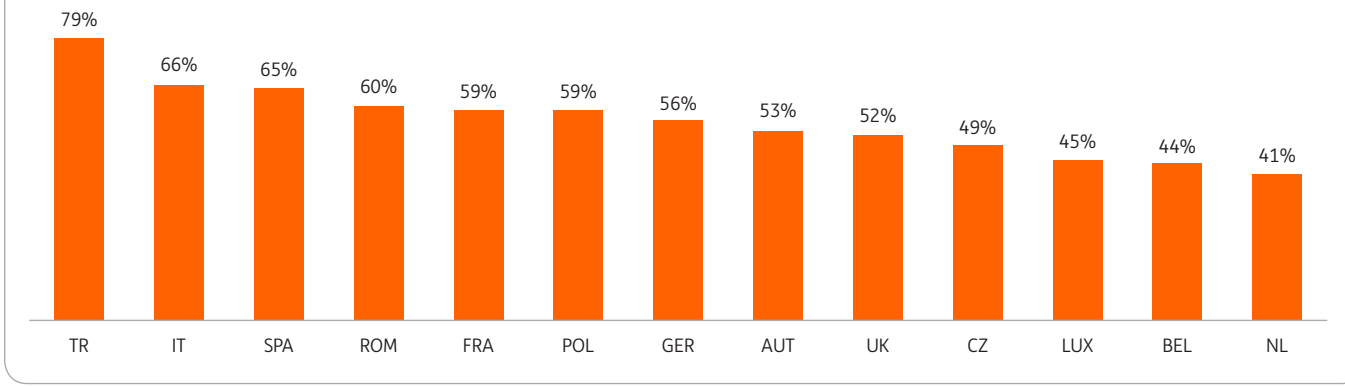
...for just over €30 on average

Minimum desired income per day in percentage of Europeans that are willing to share car for money



South and East most willing to share for money

Percentage of respondents willing to share a car for money by country



Source: ING International Survey

3.2 Platforms and technology to unlock demand and supply

Car sharing lagging behind

Although there is potential in both demand and supply, car sharing services will have to unlock this potential. This is challenging for both fleet and peer-to-peer sharing.

Inflexible supply of fleet owned car sharing

Business owned fleets control their own supply, but this limits flexibility to adjust to demand. Expansion takes time and once added, this capacity cannot easily be adjusted downward. Too much supply and utilisation rates fall. Too little supply and service levels drop.

Trust and practical issues in peer to peer

Peer-to-peer platforms have the potential to expand faster and can better adjust to supply, utilising privately owned cars. However, unlocking supply is a challenge. Trust is of great importance, considering the emotional value of cars to owners. Other issues are more practical such as the need for physical handover of keys.

Technology to the rescue

Help is on the way. Technology can assist peer-to-peer car sharing to create trust and transparency:

- Increased connectivity can help overcome practical and transparancy issues in providing remote access and monitoring and rating users' driving skills.
- Autonomous systems can help prevent accidents and limit insurance costs.

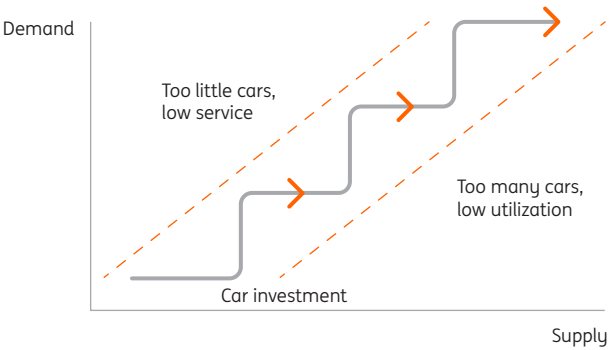
Learning from ride hailing platforms

An important lesson comes from ride hailing. Platforms such as Uber and Lyft operate 2-sided networks*, bringing together both users (demand) and riders (supply). Besides building a strong platform, they successfully unlock both demand and supply through:

- Creating transparency: ride hailing platforms have a reliable reviewing system where both sides, users and riders, rate each other. This creates trust.
- Controlling price and utilising dormant supply: using a highly aggressive pricing strategy a ride hailing platform such as Uber increases demand. Because of high demand, supply is also released. Despite a low price, Uber is attractive to riders as it offers many users. Car sharing might not benefit from the same price elasticity, but this could change over time when the user experience improves.

* Machine, Platform, Crowd" by Andrew McAfee and Erik Brynjolfsson

Hard to balance fleet owned expansion



Price unlocks supply in ride hailing 2-sided network

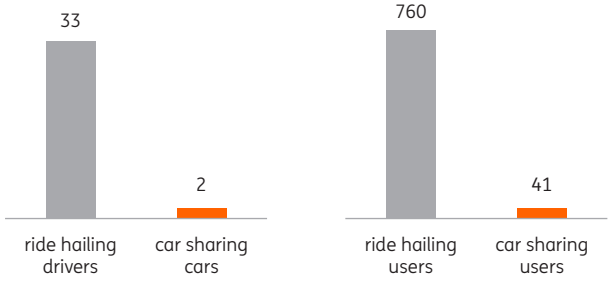
Demand shows high price elasticity.

Low prices attract many users.

A platform with many users attracts more riders.

Ride hailing successfully unlocks supply and demand

Global volume x 1 million*



Source: Bloomberg New Energy Finance

3.3 Car sharing accelerates after 2025, results in ´peak car´

Based on various findings we estimate the size of the European car sharing market and its possible impact on the European passenger car fleet. We do this via a growth scenario, sketching the landscape in which car sharing operates. Furthermore we look at the likely development of car sharing to 2035 and whether it can tackle the barriers to a breakthrough.

Assumptions: Governments and technology support car sharing

- Urbanization* in the EU continues, with more people living in dense city areas. Additional pressure on transport demand, traffic, availability of space and quality of living is expected.
- This forces governments to regulate car ownership and traffic through increased taxation and limitations on parking and access to cities. Car sharing gains support from local governments.
- Ride hailing remains highly regulated in most countries.
- Connectivity increases use of remote access and monitoring to create trust in peer-to-peer sharing.
- Electric cars get more competitive during the 2020s**.

This supports car sharing in offering sustainable transport at lower operational costs. Insurance costs are limited thanks to remote monitoring and more advanced crash avoidance.

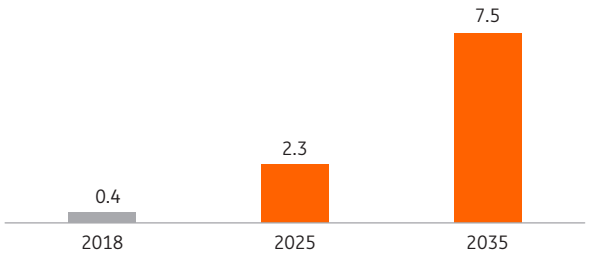
- From 2025 onwards increased usability of (level 4) autonomous driving is expected, though restricted to certain routes and during regulated times. This can help (re)position cars more efficiently.

* United Nations Urbanization Prospects

** ING: Electric cars threaten European car industry – 2017

Car sharing fleet grows to 7.5 million in 2035

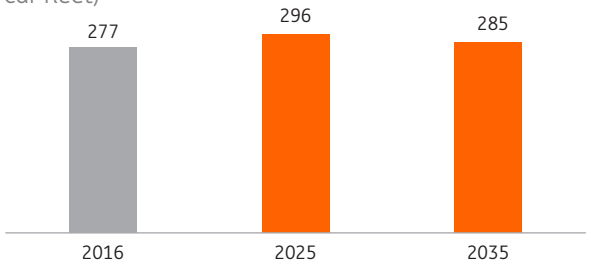
Total car sharing fleet x 1 million in Europe



Source: 2018 Bloomberg New Energy Finance, ING Forecast 2025 and 2035

Peak car in Europe around 2030

Total passenger cars in Europe x 1 million (including shared car fleet)



Source: Eurostat 2016 (EU+EFTA+Turkey), Forecast ING 2025 and 2035

Result: rise of supply and demand in car sharing

- Technology improves the user experience. Furthermore it supports car sharing services to better unlock both supply and demand.
- This can benefit peer-to-peer platforms, but will also help fleet owned services to gain more users, increase utilisation and lower costs.
- While interest is already high among people without a car, sharing services will also appeal more to car owners. Up to 2025 the potential users will be restricted to low mileage drivers, based on cost calculations (see 2.2).
- Through government intervention and technological gains, we expect this can rise to average mileage drivers after 2025.

Impact: Shared fleet to 7.5 million, peak car after 2025

- Based on various studies and articles we expect on average 1 shared car to replace 10 owned cars.
- Adding in our assessment of interest from both car owners and non-car owners we expect the shared car fleet to rise to 2.3 million in 2025.
- Demand will further accelerate after 2025. Car sharing will appeal to more people as the user experience and cost competiveness improve. We see the car sharing fleet accelerating to 7.5 million in 2035.
- Car sharing is expected to reduce growth in the European passenger car fleet up to 2025 and help reduce the number of cars after 2025.
- This will result in a ‘peak car’ moment between 2025 and 2035.

<< Contents

3.4 Car manufacturers need platform strategy

Car sharing impacts car sales

As the increase in car sharing services reduces the passenger car fleet, it will also impact new car sales. Fleet growth will be lower and eventually the total passenger car fleet will be reduced. Average sales during 2007-2016 (EU+EFTA+Turkey) were at 14.5 million passenger cars per year. Looking at additional demand to 2025 and replacement rates versus the impact of car sharing we expect sales will remain at this level in 2025. Car sharing eliminates growth in car sales.

One million unit sales reduction to 2035

The impact of car sharing on car sales will increase and the total European car fleet will be reduced. We see average passenger car sales decreasing by 1 million unites per year (-7%) to 13.5 million.

Decrease in passenger car sales in 2035

Annual registrations passenger cars EU+EFTA+Turkey (million)

Source: Eurostat 2007-16, ING scenario 2025, 2035

1.5 million shared car sales in 2035

Furthermore we expect that in 2035 average sales of 'shared cars' will be 1.5 million units or 1 in every 9 cars sold. Sales of new 'shared cars' will be boosted by higher demand for car sharing and high utilisation of shared cars. The high utilisation of these vehicles is expected to result be driven far more than 'normal' vehicles, resulting in a high replacement rate.

Automotive industry needs bigger role in car sharing...

Even though sales and ownership of cars remains dominant in our growth scenario, it will be vital for manufacturers to play an important role in the growth of car sharing. Not just in the provision of these cars, but also through providing car services and supporting car sharing platforms.

...or risk losing out to independent platforms

Many car manufacturers are starting or expanding car sharing activities. Most opt for fleet owned operations, refraining from peer-to-peer car sharing. As shown in 3.2 this restricts growth. There is a risk of losing control over car sharing once independent platforms manage to unlock demand and supply in large quantities. Instead car manufacturers can choose to develop their own platforms and help their customers share cars.

How can car manufacturers adjust?

1. Utilise customer fleet

An important advantage for car manufacturers is their brand name, distribution and service network and their existing customer base. They should be able to gain trust more quickly among a large group of car owners. Manufacturers are in a position to support peer-to-peer sharing by helping their own customers share cars for money.

2. Create 'open' platforms and cooperate

For this intermediary role manufacturers will need to create or buy their own platforms. They can combine this with their own shared fleet and/or link up with other manufacturers or independent parties to extend their network. A large platform with sufficient supply can attract and support many users.

3. Build cars for sharing

By integrating technology for sharing cars, manufacturers can prepare their cars to be shared on their platforms. Connectivity and autonomous driving technology will help overcome trust and practical issues, increase transparency and ultimately unlock supply and demand in car sharing.

Automotive industry entering new roads

Manufacturers do not only invest in car sharing fleets, but also experiment in peer-to-peer sharing. Examples are Maven from General Motors and Reachnow from BMW. Fleet owners such as leasing companies are also offering new services, combining private lease and car sharing. This could become even more important as companies switch from company cars to mobility budgets, allowing employees more freedom in the choices they make regarding transport. Other parties are also becoming involved in shared cars. For example housing companies offering shared cars to apartment buildings. The competition in this young market has only just started, but should ultimately help to make car sharing move out of its niche. The potential is there and it is up to the market to unlock it.

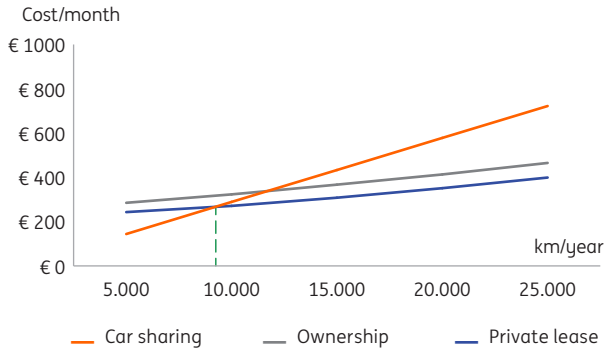
Appendix – cost comparison

Cars and costs

- All cost calculations based on German market, this being the largest market and fleet in Europe.
- Car sharing selected per segment within most popular free float schemes (Car2Go and DriveNow).
- Ownership and lease models selected on best selling models in segment (VW Up, Polo and Golf).
- Ownership includes loss of value, repair and maintenance, tyres, fuel, insurance and taxes.
- Private/personal lease is full operational lease including the items mentioned above. Payment is on a monthly all-in tariff (fuel costs included, but paid separately)
- Car sharing also includes all items mentioned above. These are paid per minute/hour and/or per km driven.
- Any additional parking costs are excluded as are special tariffs in car sharing when entering specific locations / regions.

Mini car (A segment) – 9,250 km or lower

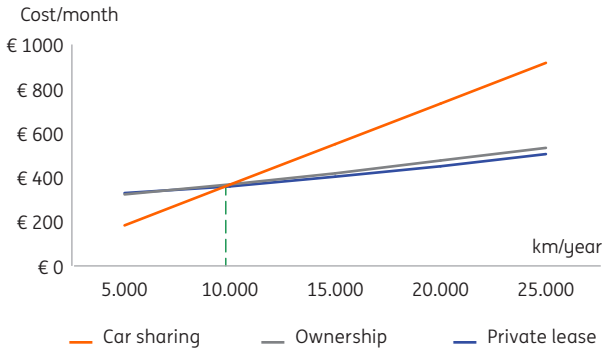
Germany Car2Go Smart vs. ownership/lease VW Up



German market, ownership or private (operational) lease for 48 months of VW Up 1.0 44 kW 3 door. Ownership based on ADAC cost calculation. Lease on Sixt Privatkundenleasing rate including full insurance, repair&maintenance, roadside assistance and dealer delivery. Car sharing is car2go Smart with fixed rate 0.26 / minute. Recalculated assuming 45 km/h average speed.

Small car (B segment) – 9,750 km or lower

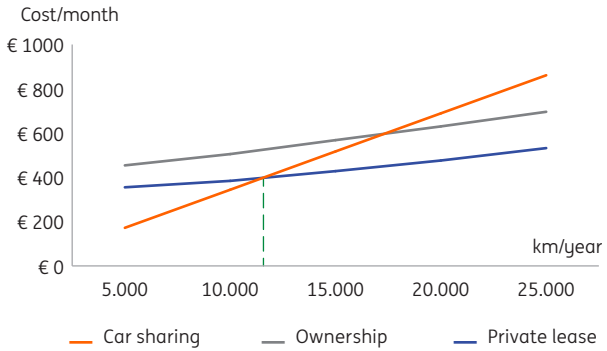
Germany DriveNow Mini vs. ownership/lease VW Polo



German market, ownership or private (operational) lease for 48 months of VW Polo 1.0 TSI 70 kW Comfortline, manual, 5 doors. Ownership based on ADAC calculation. Lease on Sixt Privatkundenleasing rate including full insurance, repair&maintenance, roadside assistance and dealer delivery. Car sharing is DriveNow with fixed rate 0.33 / km for Mini.

Compact car (C segment) - 12,000km or lower

Germany, Car2Go Mercedes A Class vs. ownership/lease VW Golf



German market, ownership or private (operational) lease for 48 months of VW Golf 1.0TSI 63 kW 5dr Comfortline, manual, 5 door. Ownership based on ADAC calculation. Lease on Sixt Privatkundenleasing rate including full insurance, repair&maintenance, roadside assistance and dealer delivery. Car sharing is Car2Go with fixed rate 0.31 / km for Mercedes A class.

Would you like to know more?

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ING International Survey
The ING International survey took place in 13 countries with 1.000 adults over 18 in each country, apart from Luxembourg with 500. Ipsos conducted this survey in March 2018. Sampling reflects gender ratios and age distribution, selecting from pools of possible respondents furnished by panel providers in each country. European consumer figures are an average, weighted to take country population into account.

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