



Intelligent Transportation Systems

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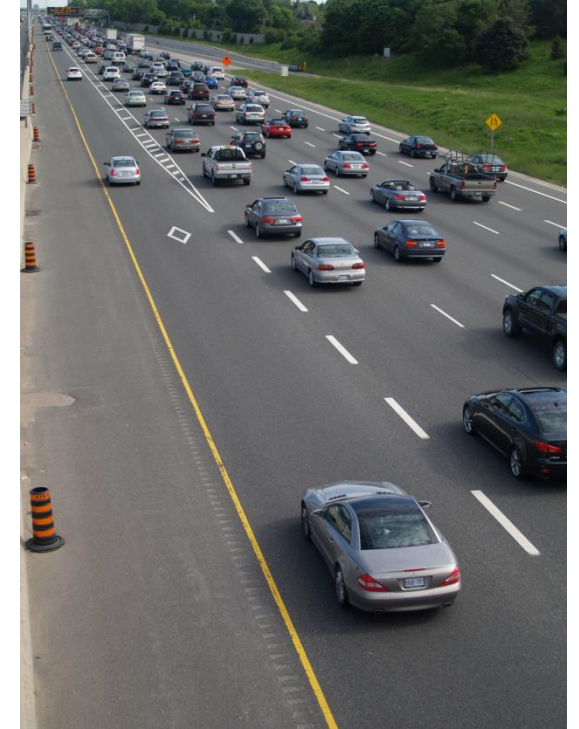
Car pooling

- The problem of public transportation is that it doesn't reach the individual homes
 - Especially in the agglomeration and the outskirts of the cities
 - You have to reach the first bus/metro stop, on foot or by car
- In the same time, most of the people commuting from the agglomeration ride alone in their car
- **Solution: car pooling**
 - More people in the same car, fewer cars, lower pollution, cheaper rides
 - Many solutions, but hard to do the matchmaking of drivers and passengers, questionable reliability, flexibility



Dedicated Lanes - HOV

- HOV – High Occupancy Vehicles
 - Can be used only if at least 1 passenger next to the driver
 - Sometimes its use is restricted to rush hours
 - Buses, electric vehicles, bikes can also use it
 - Even cars, with a single person, if he/she pays for it
 - HOT (High Occupancy Toll) Lane
 - Adaptive pricing, based on demand
- The goal is to motivate people for car pooling
 - Lower pollution, fuel saving
- First bus lane in the USA between Washington and its beltway (1969)
 - From 1973 HOV 3+
 - In 2005, during morning rush hours from 6.30 to 9.30, 31.700 people in 8.600 cars (3.7 ppl/car in average), 29 minutes
 - In traditional lanes 23.500 people in 21.300 cars (1.1 ppl/car in average), 64 minutes ride



Bus and CarPool lanes (HOV)

- Controlling the HOV lanes with cameras
 - Fooling the system with inflated dolls
 - Against the law



- **Drawback – lanes are often sparsely used**
- Trial system in Lisbon in 2007 already
 - Used as bus lane only if a bus is approaching (based on data from sensors, schedule or GPS)
 - The other cars are alerted with light and sound signals
- Some HOV lanes in Australia transformed back to normal lanes
 - **If few cars are using it, it increases pollution**
 - Fewer normal lanes, slower traffic, higher fuel consumption
 - **If many cars are using, it has the same effect...**
 - Fast traffic encourages more people to travel by cars



Not respecting dedicated lanes



Uber

- Mobile application for matchmaking between passengers and private drivers
 - Started in 2009, in San Francisco. Today present in more than 700 cities in 63 countries
 - **Not a peer-to-peer service**, but rather a traditional taxi service
 - I do not take you, because I am around, but because you pay me
 - **Surge pricing** – adaptive pricing, based on demand and offer
 - Many cases caused big scandals
 - 2011 New Year's Eve, 7x price
 - Hostage drama in Sydney, Westminster Bridge attack in London
- **Advantages**
 - Simple and fast to call a car (below 5 minutes)
 - Simple payment, with your credit card number
 - Usually cheaper than traditional taxi
 - Rating drivers and passengers



Uber

■ Critics

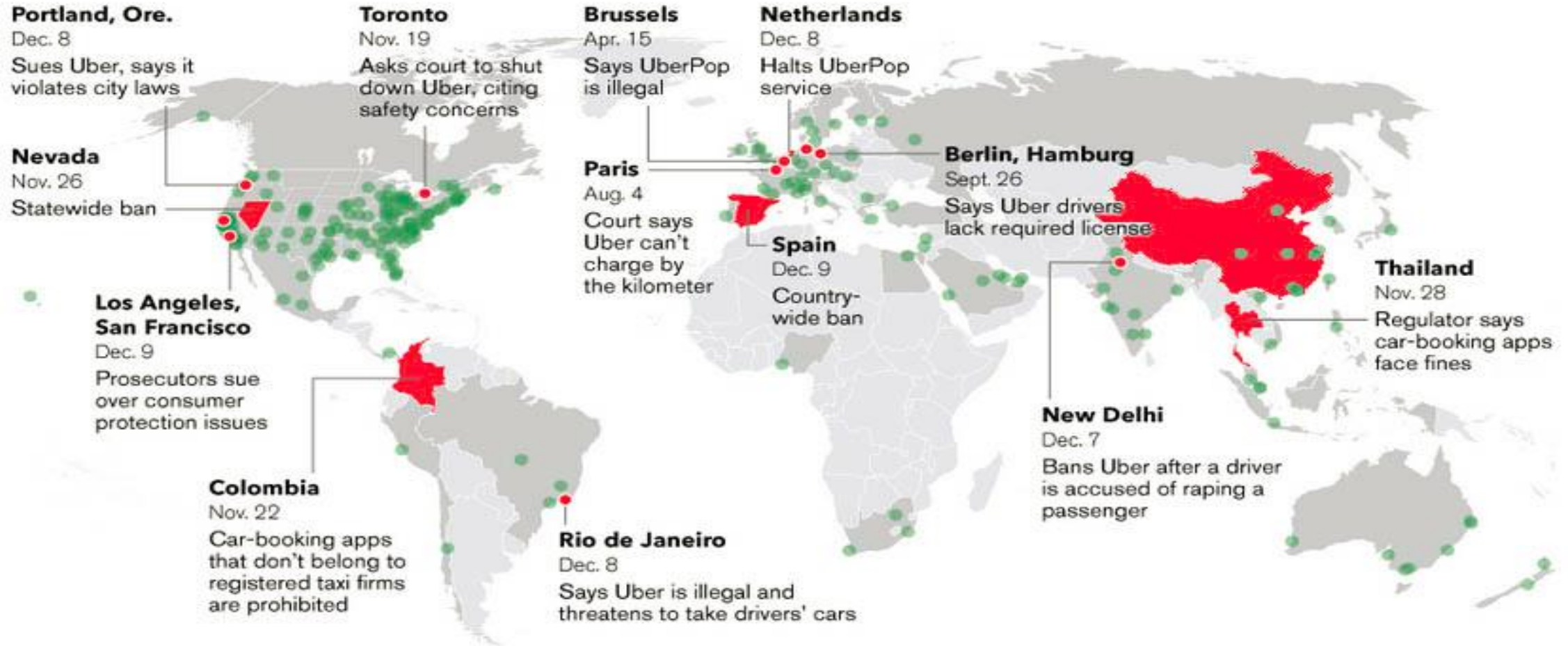
- Serious competition for traditional taxi companies
- For many, not a fair competitor
 - Does not respect the requirements for **car equipment**
 - Fears for passenger **safety**
 - Drivers do not pay **taxes**, insurance
- **Protests** in many cities (including Budapest)
 - Banned totally or partially in many cities/countries
- **Aggressive business and marketing policies**
 - Private investigators to dig into personal lives of journalists
 - Publishing the personal contact information of judges, asking users to harass them
 - Sabotage against competitors



Uber in the world

Where Uber operates, and where it's been shut down

● Cities where Uber operates ● Cities or countries where Uber is banned or is being challenged



Sources: Uber, Bloomberg reporting

GRAPHIC: ALEX TRIBOU / BLOOMBERG GRAPHICS



UberPool

- **Carpooling** service

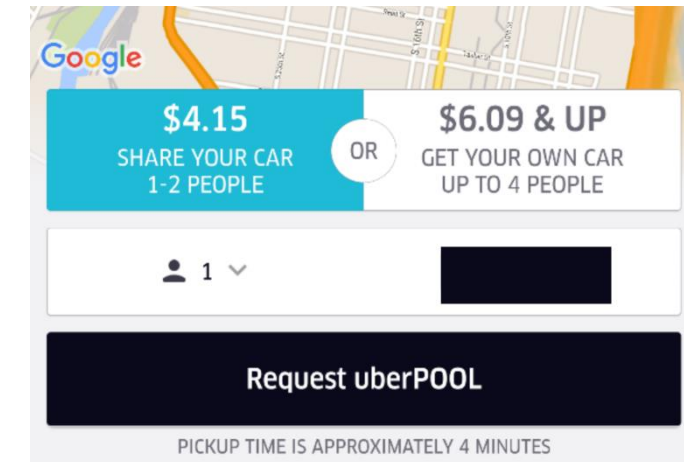
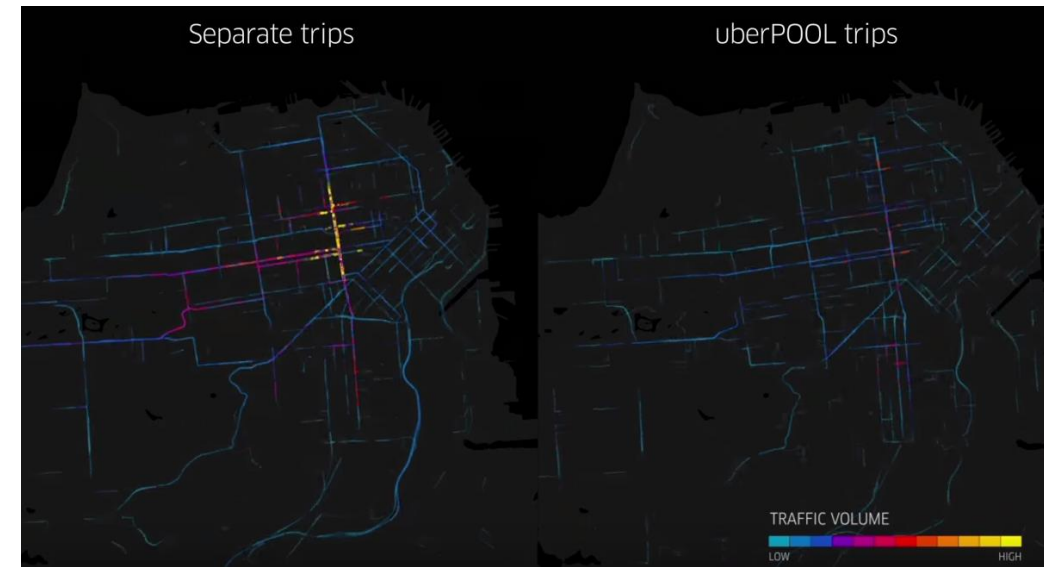
- If two rides start from roughly the same area, and go in roughly the same direction, pool them together

- **Advantages**

- Cheaper, decreases traffic, decreases pollution

- **Drawbacks**

- Drivers do not like it, as it generates lower income than two separate rides
 - Additional headache is the second passengers is late, or hard to find
- Passengers might not like it, as it is unpredictable
 - Another passenger can jump in during the ride
 - Look at it as a taxi service, for which this is not usual
 - In case of a pure car pooling service it would be acceptable

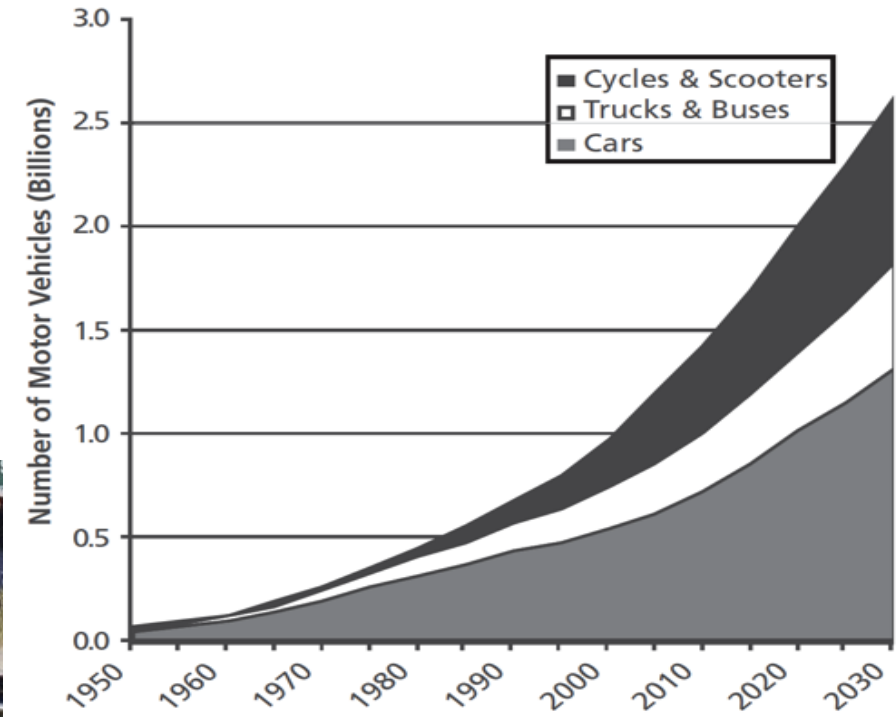


Waze Carpool

- A real P2P ride sharing app (unlike Uber)
- Brings together co-workers, or people really travelling in the same direction (unlike Uber)
- Does not increase the number of cars on the road (unlike Uber)
- Does not let the driver make more money out of it, than the cost of the ride (unlike Uber)
- Limited to two rides per day (unlike Uber)
- Started in 2018, operates now in USA, Canada, Brazil, Israel



Is owning private cars sustainable?



In many cities they think about banning private cars...

Helsinki's ambitious plan to make car ownership pointless in 10 years

Finland's capital hopes a 'mobility on demand' system that integrates all forms of shared and public transport in a single payment network could essentially render private cars obsolete

- [Should we ban cars in city centres?](#)



Rosalind Readhead Wants To Be Mayor of London And Ban Private Cars

Will the next mayor of London ban private cars?

Mayoral candidate **Rosalind Readhead** wants to

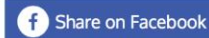


Paris Aims to End Its Pollution Misery by Cutting Out Cars

To emerge from its toxic fog, Paris is enacting what could be the most drastic anti-pollution measures seen in any major world city.

FEARGUS O'SULLIVAN | [@FeargusOSull](#) | Dec 9, 2014 | 22 Comments

5.6k Shares



Car sharing

- Sharing cars, shifted in time
 - Like car rental, but for much smaller time intervals (hours, minutes)
- Features
 - The client is driving the car, not a taxi service
 - „Occasional” rides
 - Not following a regular schedule
 - Random car allocation, not always the same car
 - Each sharing event is independent from the others
 - Flexible solution, although not as flexible as a taxi



Car sharing

- Habits are just being formed
 - Urban and suburban rides (shopping, city break)
 - Also for longer rides (e.g., a weekend)
- Usually few passengers in the same time, but this was not the goal
- On midterm, the usage of the car increases, although demand is not at all uniform throughout the day
 - „Everyone” needs the car in the morning and the afternoon, to go to work and back
 - During working hours „only retired elderly people” are traveling in the city



Car-sharing

- Cars are not used in 94% of the time, and occupy parking slots
 - If more people would share cars, we could decrease the number of cars considerably
- We have everything today for a very simple service
 - Reservation over the Internet, via a smartphone, immediately
 - Opening the car with the smartphone, using the NFC technology
 - Renting for short periods (e.g., an hour)
- If prices really decrease, it will not be worth owning a car



Would You Rent Your Car? You May Have No Choice

2015 CAR Management Briefing Seminars

Bill Visnic | WardsAuto

Aug 5, 2015

EMAIL Tweet +1 Recommend 2 COMMENTS 0

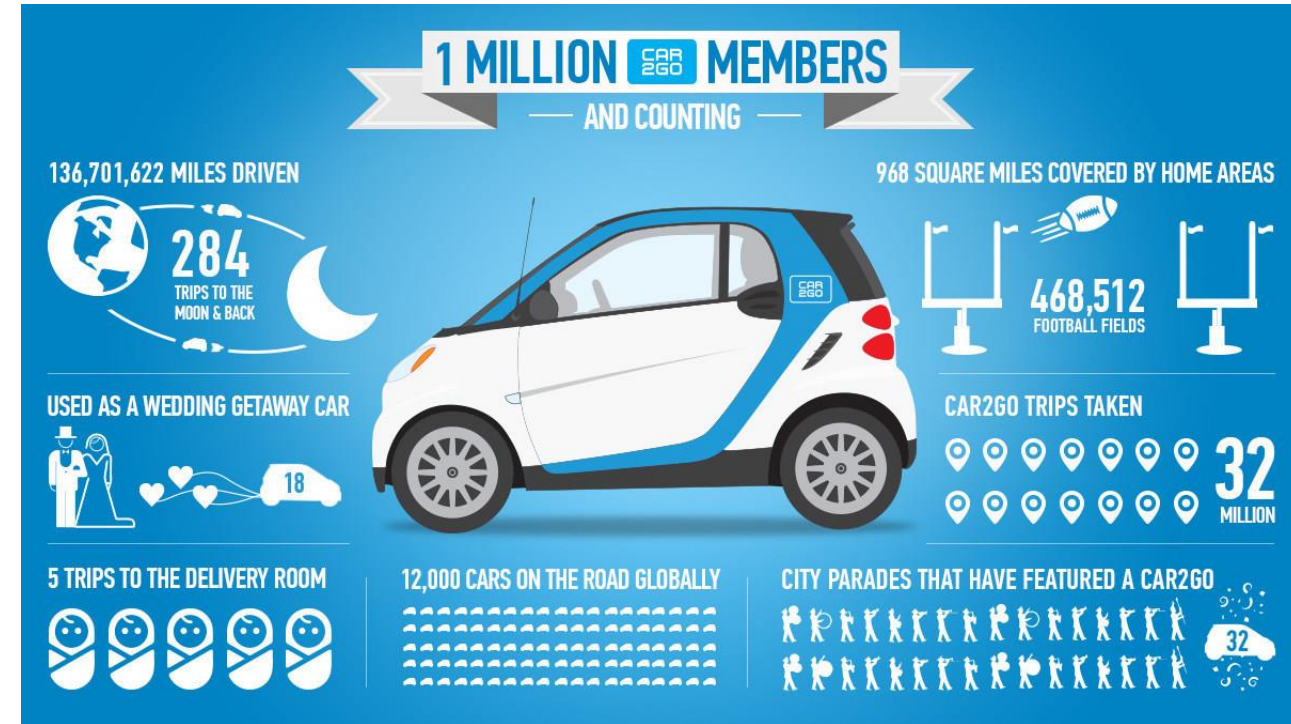
The growth in megacities and likely resulting restrictions on automobile access could force consumers into car sharing, a Ford official predicts.



Ford's Holland: Young buyers much more open to car sharing.
Full View Photography

Car-sharing modes

- Who owns the car?
 - Centralized solution** – a renting company (ZipCar, Autolib, Car2Go)
 - P2P car sharing** – people share their personal cars (Buzzcar, drivy, OuiCar, Koolicar)
- From where to where?
 - One-way sharing** – Car2Go (EV)
 - Round-trip sharing** – cars have to be returned to their original place (usual model for P2P sharing)

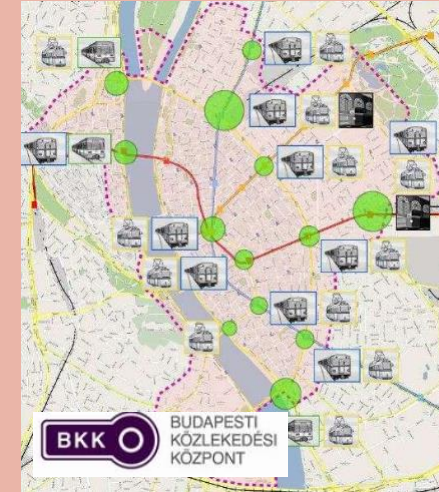


Car sharing support

- **Owner:** can be a private person, a community or a company
- **Client:** usually a private person
- **Service provider:** secures the operation, assumes the financial risk
 - The owner and the client are connected through the service
 - Many different models, depending on the ownership and the business model
 - Expensive investment from the owner, if a large pool of cars then usually the service provider is the owner as well

Analogy: MOL BUBI bike sharing

(1) MOL bubi operations center



(2) The module of the bike



(3) Docking station

Car sharing vs. Car rental

- Car sharing + Car rental
 - Opposing cycles
 - Rent-a-car during the week
 - Business clients
 - Car-sharing during the weekend
 - Spare time activities
- Advantageous business model
 - For a car-rental company
 - Initial investment significantly lower
- Drawback: handicap for newcomers to the market

Figure 2 **\$20 + Million Opportunity**

Zipcar's parent company Avis Budget Group indicates that fleet utilisation between its traditional car hire and round-trip-carsharing units is complementary, and has therefore begun to pool their fleets (Avis Budget Group Presentation to Investors, May 2014)



https://www.acea.be/uploads/publications/SAG_Report_-_Car_Sharing.pdf

Car sharing – responsibility and insurance

- Who is responsible in case of an accident?
 - In Hungary, „objective responsibility”
 - The owner of the car is responsible, unless the driver recognizes that he was driving the car
 - The owner pays the insurance
 - Does the insurance company allow car sharing?
 - The price of the insurance depends on the sex, the age, and the driving record of the owner
 - Insurance for the driver? Not usual in Hungary
 - Who pays the damages that exceed the typical threshold?

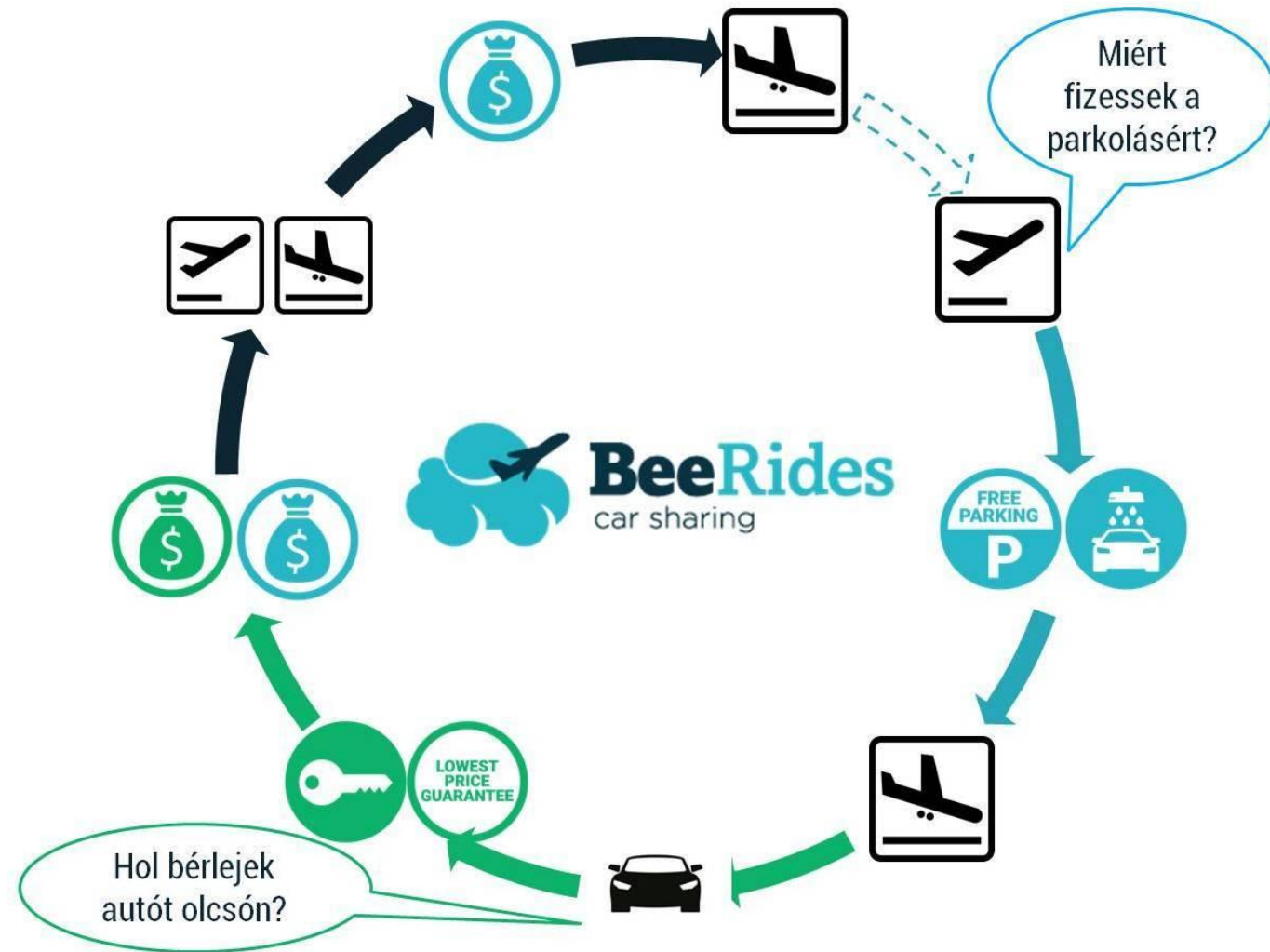


<http://www.citylab.com/commute/2013/09/real-future-ride-sharing-may-all-come-down-insurance/6832/>

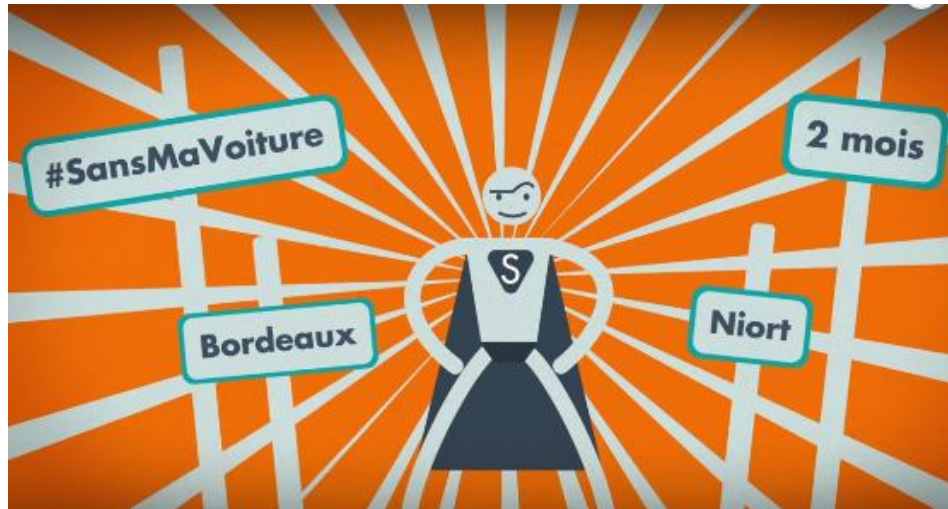
http://www.nytimes.com/2012/04/14/your-money/relayrides-accident-raises-questions-on-liabilities-of-car-sharing.html?_r=0

P2P car sharing

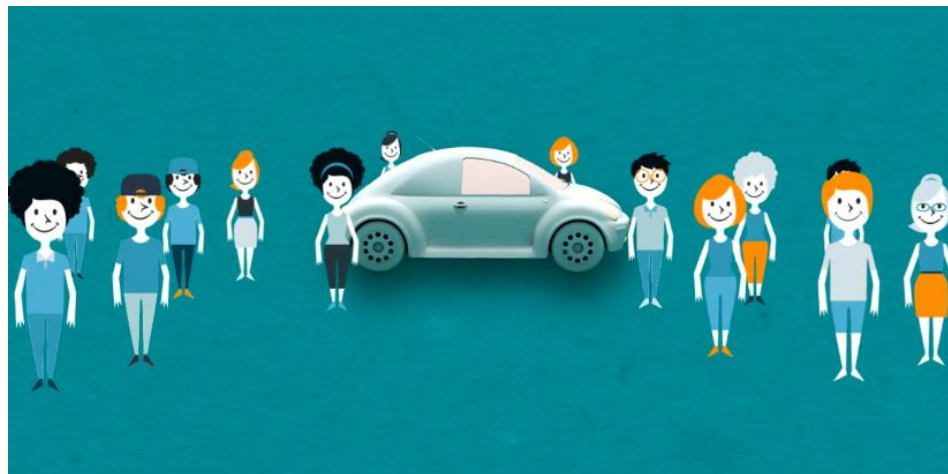
- **BeeRides** – Hungarian startup company
- Leave your car at the airport parking, let others use it while you are traveling
 - Free parking
 - Free cleaning of the car
 - ... and you get some money as well...
- **Would you give your car?**



Marketing actions to increase popularity



Break free from your car
and save your city



100 participants

September 16, 2019

Intelligent Transportation Systems

give up their personal vehicle for 2 months



#SANSMOVOITURE

MOI AUSSI
JE M'INSCRIS !



Devenez vous aussi un superhéros !

Votre mission : abandonner votre voiture pendant 2 mois pour changer l'avenir de votre ville.
Vos super pouvoirs : les acteurs de votre ville mobilisés pour vous offrir les transports en commun gratuits, des réductions sur l'autopartage, des vélos...

Découvrez le défi !



Marketing actions to increase popularity



No vehicle insurance
for 2 months



Bike sharing access



FREE Public Transport
tan 



Drive neighbourhood cars



Marketing actions to increase popularity



October 5th

Hand over your keys

Say good bye to your car



December 5th

Take your car back

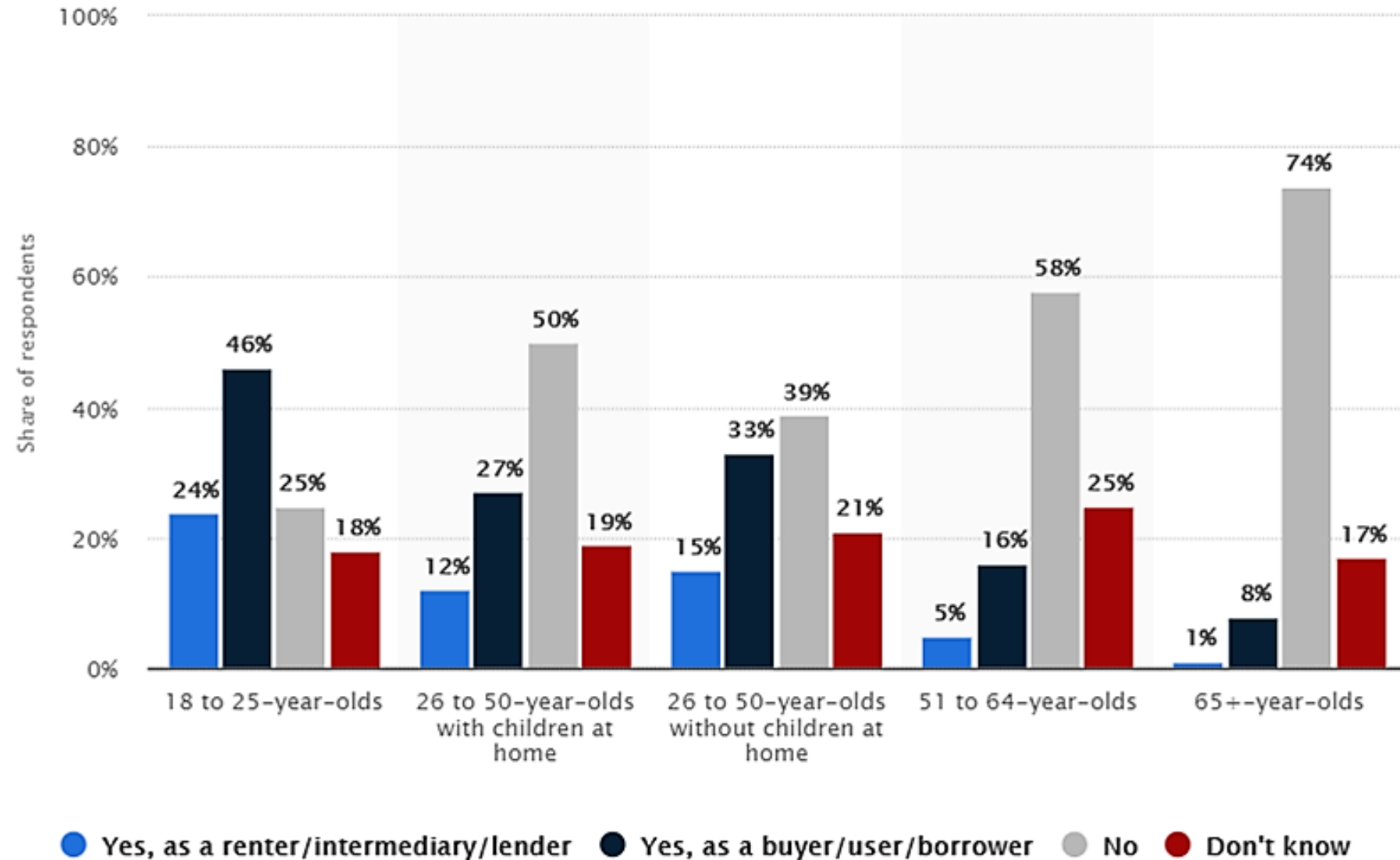
OR

we'll buy it from you

Willingness to use sharing economy by age

- Car sharing, AirBnB, etc.

- Study in Denmark, 2018



Willingness to use sharing economy by region

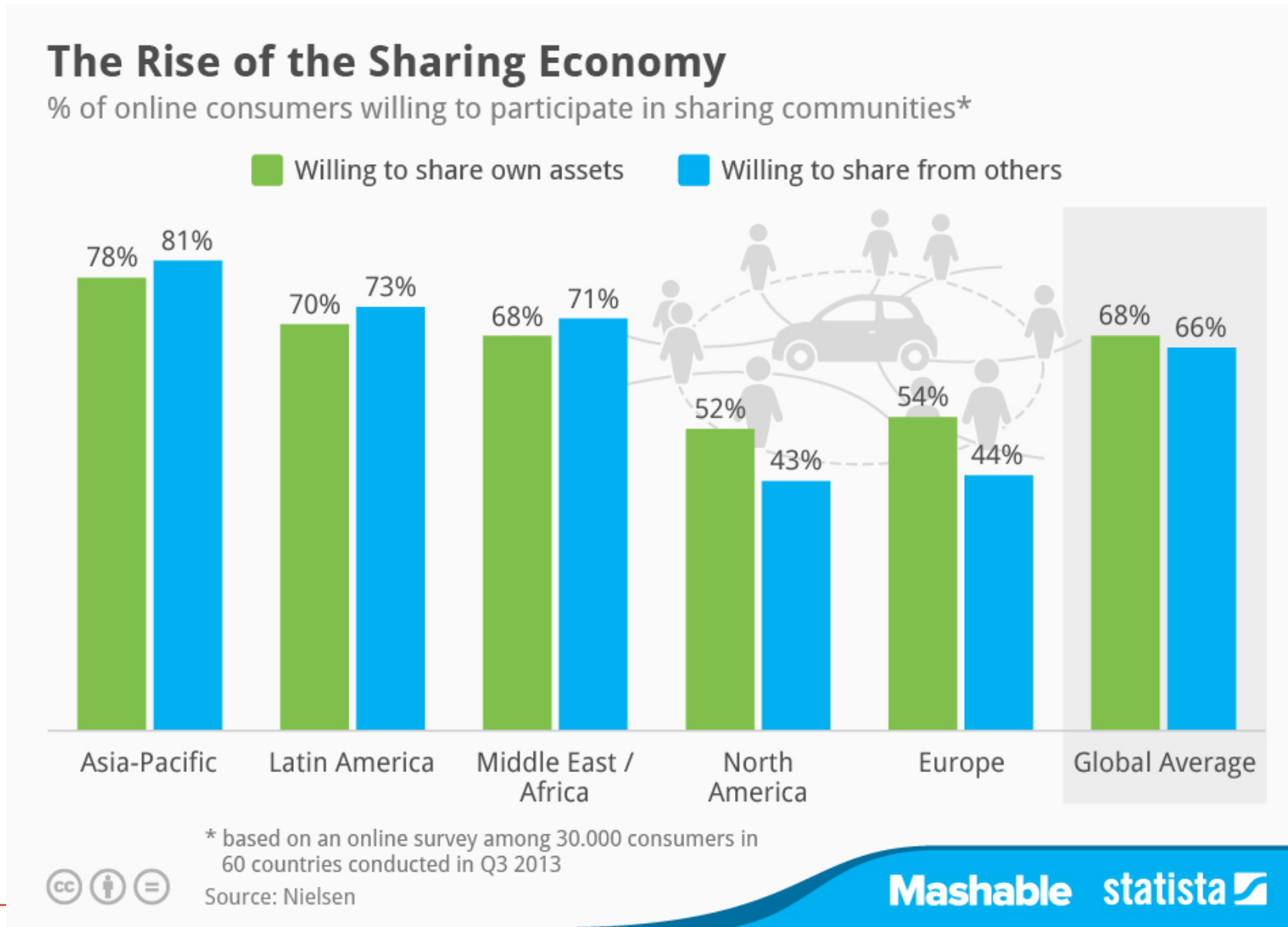


EXHIBIT 1 | More Than 80,000 Car-Sharing Vehicles Were in Operation in 2015



Sources: BCG research; press search.

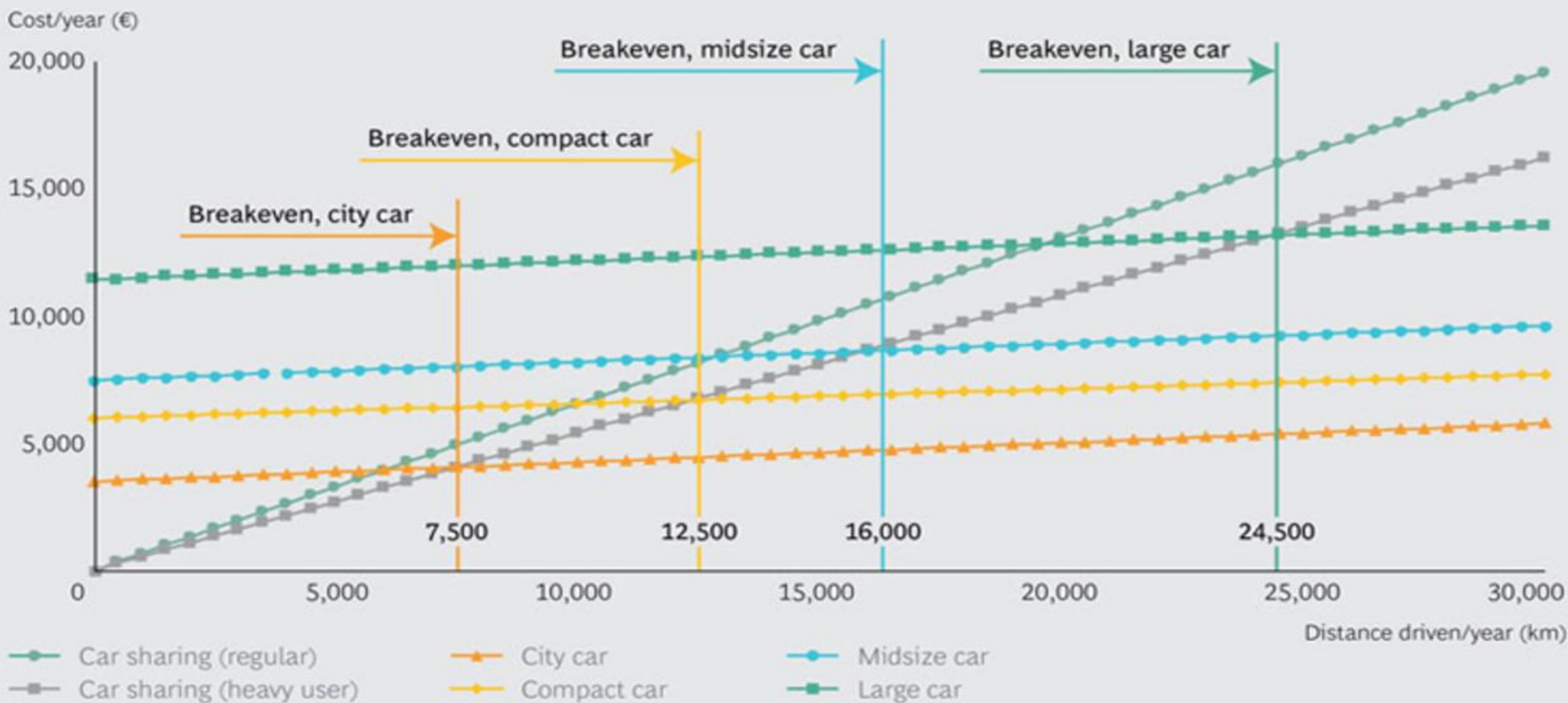
Note: North America = Canada and the US; Europe includes Russia and Turkey; Asia-Pacific = Australia, China, Hong Kong, Japan, Malaysia, New Zealand, Singapore, South Korea, and Taiwan.

When is it worth using car sharing?

- **TCO – Total Cost of Ownership**
 - Devaluation (compared to the initial price, per year)
 - Insurance
 - Service fees
 - Parking fees or owning a garage
 - Fuel cost (depends on usage)
- Car sharing can be cheaper, if we do not use too much the car
- Average car-sharing ride for one trip - 7.5 km
 - 4.95 EUR car sharing (Berlin,, 2016)
 - 18.90 EUR with a taxi
 - 3.45 EUR with private car
 - 2.70 EUR with public transportation
- For the moment, not very deployed – only 0.1% of the rides were car sharing (Berlin, 2016)
 - 29.5% private cars, 12.5 % bikes



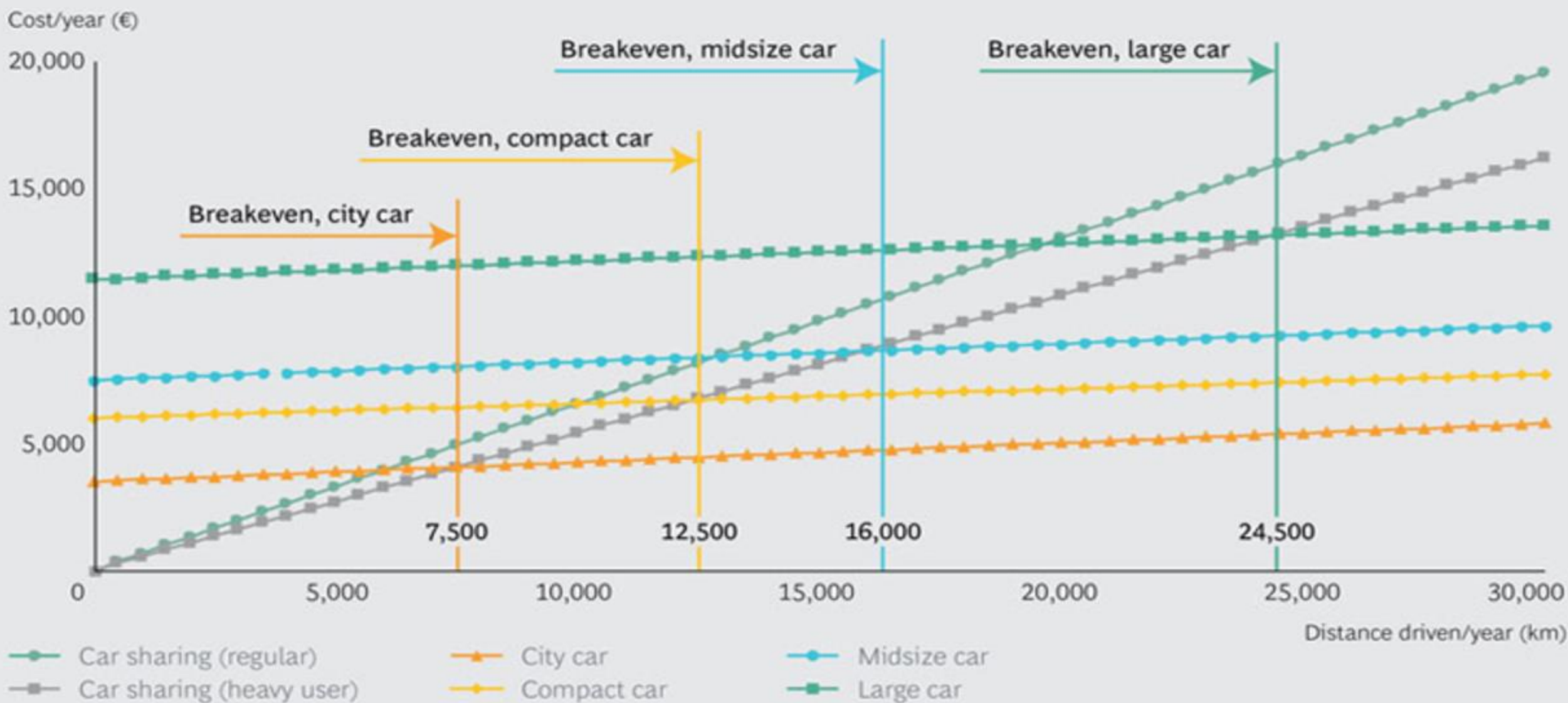
EXHIBIT 2 | Total Yearly Costs: Owned Versus Shared Cars



Sources: Allgemeiner Deutscher Automobil-Club; car-sharing companies; BCG analysis.

Note: Cost analysis for Europe.

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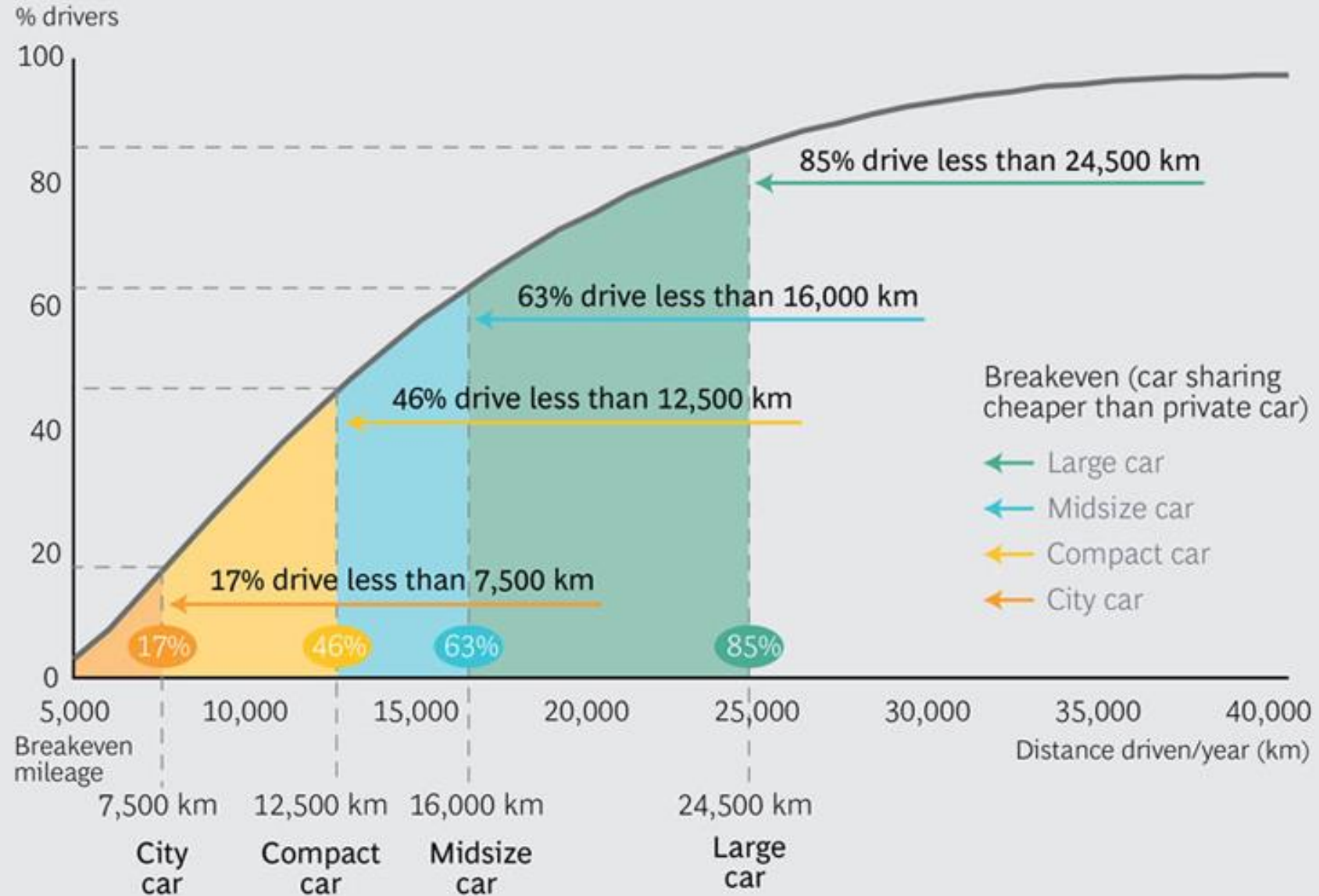


Sources: Allgemeiner Deutscher Automobil-Club; car-sharing companies; BCG analysis.

Note: Cost analysis for Europe.

When is it worth using car sharing?

EXHIBIT 3 | 46% of Compact Drivers Would Save with Car Sharing



Sources: Allgemeiner Deutscher Automobil-Club; DAT Report, 2015; BCG analysis.

Note: Cost analysis for Europe.