

# **Is CarSharing a profitable business model for automotive OEMs?**

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## **Abstract**

CarSharing is seen as one of the four major trends in the automotive industry. The ever-increasing traffic volume in large cities, easier access to digital services through smartphones and the change in people's ecological thinking are seen as drivers for this business segment. Nevertheless, the German car manufacturers BMW and Daimler, normally competitors in the market, have joined forces in a joint venture (ShareNow) in the hope of being finally profitable. The venture does not release any information about their business figures and also in the literature there is so far no detailed analysis of the costs for operating a Free-Floating CarSharing company. This article will therefore use the Munich-based company ShareNow as an example to determine the cost structure and examine the non-monetary benefits for car manufacturers in addition to the monetary side. The analysis indicates that this business cannot be operated profitably and that even considering the non-monetary benefits, remaining in this business segment is questionable.

**Keywords:** car sharing, free floating, automotive, business model, cost structure

## **Introduction**

We are in a time of change that affects the classic automotive industry in particular. Cities are struggling with strong growth and an ever-increasing traffic volume, which is accompanied by high emission levels. As a result, governments have to develop new mobility concepts to reduce the number of vehicles on the roads. At the same time, the smartphone has become the daily companion of most people and has never offered such easy access to digital services. In addition, it is increasingly important for people to act ecologically. Automotive OEMs have seen this change and are trying to expand their

business with CarSharing models. And the media also believes that car sharing is the solution to the mobility problem in cities, with headlines such as "Owning a Car Will Soon Be as Quaint as Owning a Horse" (Swisher, 2019).

Extensive literature research shows that mobility services and, above all, car sharing is considered by experts to be one of the four major trends of the future in the automotive industry.

If this sector is so promising, the question arises as to why companies are withdrawing from existing territories or stopping entirely. ShareNow has completely withdrawn from America and Canada in 2020. They have also discontinued their services in the European cities of London, Brussels and Florence. But it's not just German OEMs that seem to be struggling with profitability. American automaker General Motors has also completely discontinued its "Maven" service after original reductions in cities. Ford has also discontinued its "Chariot" service in 2019.

The purpose of this paper is to investigate whether CarSharing can be considered a profitable business segment for traditional automotive OEMs. For this purpose, the company ShareNow, a holding of the companies Daimler and BMW, will be used as an object of investigation. The reason for this is that, compared to the VW company WeShare, it is an established company with a nationwide offering and a diversified vehicle portfolio.

The operators do not reveal their business figures and therefore it is difficult to make financial analyses. Based on interviews, however, it is becoming clear that this is a negative business model for the companies and even as a joint holding company, supported by the large companies BMW and Daimler, the continuation of the business is questionable. So Daimler boss Ola Källenius said in an interview that Daimler and BMW have already invested a lot and the cash flows must become positive in perspective, otherwise it must be reacted. There are also rumors that the two companies are already in negotiation talks with UBER for a deal (Kaleta, 2020).

## **Methods and Data**

The first step is to investigate the relevance of mobility services, or more precisely CarSharing, for the automotive industry in a literature review. Annual reports and newspaper interviews of the car sharing companies WeShare, DriveNow, Car2Go and ShareNow were then analyzed to provide information on the business model, vehicle fleet, user numbers and cost structure. Based on this information, a cost calculation for the operation of the vehicle fleet is calculated and it is deduced whether and how a CarSharing company can be profitable. The classic break-even analysis is used as an orientation aid. In addition, user surveys and statistics on the behavior of CarSharing customers are examined in order to be able to make statements and recommendations for action.

## **CarSharing**

CarSharing is divided into three different business models. They can be well distinguished by the degree of flexibility. The three models are peer-to-peer car sharing, stationary car sharing and free-floating car sharing (Schiller, Pottenbaum and Scheidl, 2017).

In Peer-to-Peer CarSharing, private individuals can offer their car to other members via a platform. Users have to pay a daily fee and can use the car. This concept is very similar to the traditional concept of car rental companies. It represents a small percentage of providers (6%) and is only available in 19 countries (No Name, 2019b). Automotive OEMs are not represented in this business segment. A large provider for this type of car sharing is the U.S. company Turo.

Stationary CarSharing is the most widely distributed service in Germany in terms of area. The largest provider in terms of fleet size is Stadtmobil (No Name, 2021a). In this variant, there are fixed parking spaces where the vehicles are parked and have to be picked up. At the end of the rental, they must then also be returned there. It is primarily designed for longer rental periods and the car can be booked days in advance. German car manufacturers are not represented in this area either.

The model with the highest flexibility is called Free Floating CarSharing. The customer can pick up and park the car wherever he or she wants in a specific business area. It is often also possible to park the car outside the business area against a service fee. This service is mainly used for spontaneous and relatively short trips, as a longer rental period is not profitable given the comparatively high rates. This business area is covered by the German automotive OEMs.

## **Relevance of CarSharing for Automotive OEMs**

The 21st century can be described as an era of constant disruption (Kumaraswami, Garud and Ansari, 2018). In this time, constant technological innovations often driven by digital revolutions such as Web 2.0 (Belk, 2014) are challenging existing business models and opening up entirely new business options. In addition, there is an increasing mindset change among customers away from owning goods to "access-based consumption." This means that transactions are mediated in which there is no transfer of ownership (Bardhi and Eckhardt, 2012). In contrast to the usual model of selling an object with an accompanying transfer of ownership, services or objects are rented or shared for a limited period of time.

Mobility as a Service and CarSharing have been discussed in the literature for years as an important trend for the future of the automotive industry. In the Gear 2030 Report of the European Commission, it is made clear that due to a changed concept of mobility, mobility services are crucial for the competitiveness of the automotive industry and the EU (Asselin-Miller et al., 2017). PwC makes the assumption in its paper that automotive compies need to offer mobility as a service to compete against their competitors in the field. Otherwise, they would become suppliers to the large mobility service providers. They predict a shift to sharing cars and OEMs that cannot compete with the big tech companies face the risk of being taken over by them (Weber et al., 2018).

McKinsey predicts that nearly one in ten vehicles sold in 2030 will be a shared vehicle (Kempf et al., 2018).

Car sharing in combination with autonomous vehicles are seen as an important step to relieve the infrastructure in the future (Rea et al., 2017; Scott and Pankratz, 2017).

In addition, it is repeatedly predicted that the sale of vehicles will decline in the future due to car sharing and that automotive companies should therefore not lose focus on this business segment. Responsible for this is also the changed mindset of customers that access to a vehicle has become more important than ownership. New mobility providers like Uber and tech giants like Apple and Google are forcing established OEMs to expand their business (Kaas et al., 2016).

Kuhnert, Stürmer and Koster (2018) predicts that the future car in 2030 will be electrified, connected, shared, autonomous and yearly updated.

As early as 2012, CarSharing was seen as a potential growth driver for automotive OEMs and even considered to be a must for OEMs in the future. Great market growth opportunities were foreseen and a winner takes it all scenario was drawn up. Which means that the strongest supplier in a city will displace all other suppliers (Cornet et al., 2012).

Helbig, Sandau and Heinrich (2017) have predicted that in 2025 vehicle sales may decrease by 10% due to car sharing and therefore OEMs should make their own offer in the area.

Through the extensive literature review, it is clear that car sharing is considered as an important trend for the automotive industry. Following the previous statements, it would be almost irresponsible for an OEM not to enter this business field.

### **Overview of the Car Sharing companies owned by Automotive OEMs**

In Germany, all automotive OEMs have an offering in the car sharing business. While ShareNow is a holding of BMW and Daimler, ShareNow is a business unit of VW.

#### *ShareNow*

ShareNow is a joint venture between the then competing companies car2go (Daimler) and DriveNow (BMW), founded in 2019, and the global market leader in flexible car sharing. The two companies invested a total of \$1.13bn in the merger, according to media information (Hawkins, 2019).

Car2go was officially launched in 2010 and offered its service in 26 metropolitan areas in Europe, North America and China with over 14,000 Mercedes-Benz and Smart vehicles. It was a 100% subsidiary of Daimler AG, unlike DriveNow (No Name, 2019e). Already in 2017 it was the market leader in Europe and North America with 24 million vehicle rentals and 1.97 million users worldwide (No Name, 2018). In 2018 the numbers increased to 3.6 million users worldwide with 25 million rentals (No Name, 2019d).

DriveNow was founded in 2011 as a joint venture between BMW and Sixt and started operations in Munich in the same year. In March 2018, it became a 100% subsidiary of BMW. The service was offered at twelve locations in Europe with over 6,500 BMW and

Mini vehicles (No Name, 2019e).

ShareNow significantly reduced the number of cities after its formation and is currently present in 16 major European cities in 8 countries. All locations outside of Europe have been discontinued. At the end of 2020, according to the company, 3 million customers were registered (No Name, 2021d). The fleet was reduced from approximately 18,820 vehicles (of which 3,130 electric) 11/2019 to 11,340 (of which 2,890 electric) vehicles 01/2021. It includes BMW, Mercedes Benz, Fiat, Mini and Smart vehicles.

### *WeShare*

WeShare is a subcompany of VW and has started its operation in July 2019 in Berlin. The big difference between it and ShareNow is that WeShare operates a fully electric fleet with e-Golf and ID.3 while ShareNow has reduced the number of electric vehicles in their fleet. So far, the company has focused on Berlin as its only location. An expansion was planned to seven other cities in Europe in 2020. The fleet planned to increase from the current 1,500 vehicles in Berlin to a total of 8,400 vehicles. In Prague and Budapest, the company was planning to cooperate with Skoda. However, due to Corona, these plans were temporarily postponed (Automobilwoche, 2020).

## **Results**

The costs for a CarSharing company, including their determination, are presented below. The calculations are based on the Munich location. The fleet size and distribution are then determined and the average time of use and frequency are examined.

### **Cost Overview**

The costs for operating a CarSharing fleet consist of fixed costs, variable costs and special costs. Table 1 provides an overview.

Tab. 1: Cost overview

<b>Fixed Costs</b>	<b>Variable Costs</b>	<b>Special Costs</b>
Car Leasing/Purchase	Fuel	Damages
Hardware/Software	Service costs for refuel	Service costs for reparking
Parking costs		Service costs for cleaning
Overhead Employees		
Vehicle Tax		
Insurance		

Source: Authors.

### *Vehicle Costs*

The largest part of the fixed costs for the business model are the costs for the vehicles. It can be assumed that automotive OEMs have a cost advantage over their competitors here. However, in an interview, Sebastian Hofelich, CEO of DriveNow, reported that DriveNow

leases the cars already equipped with the necessary software and hardware from BMW for one to two years, "at standard market conditions" (Goldmann, 2018).

Based on this statement, it is assumed that this procedure has not changed after the merger into ShareNow. In addition to the leasing rates offered directly by the manufacturer, the rates offered by comparison portals on the Internet for commercial customers were also examined. For the further calculation the most favorable rates of leasing contracts over 2 years and 20,000 km are used. Electric vehicles currently receive a subsidy of €6,000, which is included in the calculation.

#### *Hardware/Software Costs*

Another fixed cost item is the cost of the hardware and software for the vehicles in order to make them available to customers (booking and opening via app, reading out the fuel content, etc.). It was not possible to obtain costs for this from the company ShareNow. For this reason, a comparable system from the company getaround is used. This company charges 29€ per month for the operation of the system, each additional car costs 19€ (No Name, 2021b).

#### *Parking Costs*

In Munich, parking costs are set at a fixed rate of 1,000 euros per vehicle per year (Goldmann, 2018). In Hamburg, on the other hand, a fee of 900 euros per vehicle per year has been agreed. Electric vehicles are excluded from the fees in this city. In contrast, there are parking fees of more than 100 euros per car and month in Berlin for all vehicles (Mortsiefer, 2020).

#### *Overhead employees*

To run a company more than just the vehicles and software/hardware are needed. ShareNow has a total of over 500 employees in various areas that are required for a company (e.g. marketing, business administration, software developer ...). A large block is accounted for by the fleet managers, who take care of the control of the vehicle fleet. Salaries are not public, but users can enter their salary on the platform "Kununu". While fleet managers earn an average of 32,700 euros, software developers earn 65,500 euros (No Name, 2021c). With a usual company structure, an average salary of 42,000 euros can be assumed. These employees are calculated down to the current 11,340 vehicles.

#### *Insurance*

The cost of insurance is a critical issue. Due to the large number of users, there is a high risk of damage. The service can only be used from the age of 21, and the customer must hold a driver's license for at least one year. Inquiries with the insurance companies were not answered, so the usual market costs for insurance with a similar range of coverage were assumed.

#### *Vehicle Tax*

The tax of the vehicles is based on the engine capacity, the exhaust emission standard and the CO<sub>2</sub> emission. Electric vehicles are exempt from the vehicle tax.

### *Fuel Consumption*

First of all, the average fuel consumption for the individual models is determined. Real data reported by a large number of users of the platform "Autokostencheck.de" is used to determine the average fuel consumption for each model. The reason for this is that these values are more realistic than the values provided by the manufacturers under laboratory conditions. In addition, it can be assumed that consumption is generally higher than for a non-CarSharing car, since almost only short distances are driven and users tend not to look at fuel consumption during their journey. The reason for this is not only the fun of driving and the "all-inclusive idea", but also the minute-by-minute billing, which leads to an effort to quickly end the rental process.

The consumption per minute can now be calculated down to the minute using the average speed in Munich. According to a study by HERE from 2019, the average speed in Munich over the course of the day is approx. 41km/h. It should be noted that this is an overall view of Munich. At rush hour and on the busiest streets in Munich, the average speed decreases significantly. On weekdays between 4 and 5 p.m., for example, it is only 20.5km/h for a busy street in Munich (No Name, 2019c).

Since most CarSharing users also travel during rush hours and in the central area (typically the business area), it can be assumed that the average speed is lower. Based on this evaluation, an average speed of 35km/h is assumed. With this information, an average consumption per minute can be calculated for the respective fleet model. Using the average gasoline price in 2019 of 143.2 cents, the cost per minute can also be determined. The year 2019 is taken as a reference, since Corona has reduced the gasoline prices above average (Hohmann, 2021). For the costs per Kwh, the common ChargeNow costs of 0.28 euros are used.

### *Service costs for refuel*

There are incentives in the form of credits for customers if they refuel the vehicle themselves. Since the incentives are comparably low (5 Euro credit corresponds to 17 minutes of driving time on average) and most users use the car to get from A to B quickly (Ruhrt, 2020), it is assumed in the calculation that every vehicle must be refueled by the service employee. The refueling process is carried out when there is still 50km remaining range in the tank (warning message appears in the cockpit).

### *Vehicle Allocation*

According to a Forsa study, cars in the free floating concept must at best be within a walking distance of 5 minutes (Weimer, 2016). This results in a converted distance of approx. 500m. ShareNow does not provide any information about the exact distribution of its vehicle fleet per city. The only indication is that 200 of 1,200 vehicles in Munich are i3s. In Munich, the available vehicles were therefore evaluated via app over several days and a percentage was calculated. Due to the currently prevailing exit restriction by Corona from 9 p.m. in Munich, it can be assumed that almost all vehicles are unused from 11 p.m. onwards. By looking at the data over several days, isolated deviations can be smoothed out.

## Costs / revenues not considered

### *Set Up and finish time*

One minute could be added to the revenue for getting in and setting up the vehicle and one minute for the locking process. During this time, the vehicle is at a standstill and therefore the minute tariff can be charged in full, without deducting variable costs. However, the share of the total turnover is so small that this is not considered for the sake of simplicity.

### *Damages*

The damages are covered by the insurance. The drivers have to pay the deductible. It is not considered here that many users do not report the damage and therefore these cannot be accounted to them. Furthermore, it is not considered that the car manufacturers can repair the damages much cheaper than other CarSharing providers. This could result in a positive asset for the manufacturers. However, this item is not considered due to the uncertain data situation.

### *Service for relocation and cleaning*

If the car is parked outside the business area, the customer must pay a fee of approximately 10 euros. It can be assumed that this fee on average covers the cost of re-parking. In addition, costs are incurred by re-parking to ensure even distribution in the business area. Further costs arise from the regular cleaning of the vehicles inside and out.

### *Unavailability due to repair or technical problems*

Not all vehicles are available at all times. Reasons for this can be workshop stops or also technical problems.

## Break Even Analysis

The costs are presented divided into fixed (Table 2) and variable costs (Table 3). This is followed by the calculation of the break-even point from when the vehicle generates a profit (Table 4).

Tab. 2: Fixed Costs

	Leasing costs (total) [€]	Vehicle costs/day [€]	Hard-/Software costs/day [€]	Parking costs/day [€]	Overhead employees /car	Vehicle tax/day [€]	Insurance /day [€]	Total [€]
<b>Mini</b>	8,352.00	11.44	0.05	11.74	5.00	0.37	2.53	22.13
<b>Smart</b>	4,100.00	5.62	0.05	11.74	5.00	0.07	1.78	15.26
<b>1 series</b>	9,425.76	12.91	0.05	11.74	5.00	0.27	3.01	23.98
<b>X1</b>	11,736.00	16.08	0.05	11.74	5.00	0.23	3.15	27.25
<b>2 series conv.</b>	16,944.00	23.21	0.05	11.74	5.00	0.53	3.25	34.79
<b>2 series tourer</b>	10,920.00	14.96	0.05	11.74	5.00	0.23	3.15	26.13
<b>A-class</b>	9,700.00	13.29	0.05	11.74	5.00	0.27	2.74	24.09
<b>Fiat 500</b>	3,650.00	5.00	0.05	11.74	5.00	0.07	1.77€	14.63
<b>i3</b>	7,176.00	10.88	0.05	11.74	5.00	0.00	2.49	21.17

Source: Authors.



Tab. 3: Variable Costs

	Fuel consump. /100km [l]	Fuel /minute [l]	Fuel /minute [€]	Service Refuel [€]	Fuel tank [l]	Fuel minus 50km remaining [l]	Fuel range [minutes]	Refuel costs /minute [€]	Total [€]
<b>Mini</b>	7.1	0.04	0.06	9.5	44	40.5	974	0.010	0.07
<b>Smart</b>	5.8	0.03	0.05	9.5	28	25.1	740	0.013	0.06
<b>1 series</b>	7.4	0.04	0.06	9.5	50	46.3	1070	0.009	0.07
<b>X1</b>	8.1	0.05	0.07	9.5	51	47.0	991	0.010	0.08
<b>2 series conv.</b>	7.9	0.05	0.07	9.5	52	48.1	1040	0.009	0.08
<b>2 series tourer</b>	7.5	0.04	0.06	9.5	51	47.3	1077	0.009	0.07
<b>A-class</b>	7.5	0.04	0.06	9.5	51	47.3	1077	0.009	0.07
<b>Fiat 500</b>	5.1	0.03	0.04	9.5	35	32.5	1088	0.009	0.05
<b>i3</b>	18.5	0.11	0.03	9.5	42.2	33.0	305	0.031	0.06

Source: Authors.

Tab. 4: Break Even

	Total fixed costs [€]	Total variable costs [€]	Rental charge /minute [€]	Var. Profit / minute [€]	BE / minutes
<b>Mini</b>	22.13 €	0.07 €	0.28 €	0.21 €	105
<b>Smart</b>	15.26 €	0.06 €	0.19 €	0.13 €	119
<b>1 series</b>	23.98 €	0.07 €	0.31 €	0.24 €	100
<b>X1</b>	27.25 €	0.08 €	0.34 €	0.26 €	104
<b>2 series conv.</b>	34.79 €	0.08 €	0.34 €	0.26 €	131
<b>2 series tourer</b>	26.13 €	0.07 €	0.31 €	0.24 €	110
<b>A-class</b>	24.09 €	0.07 €	0.31 €	0.24 €	101
<b>Fiat 500</b>	14.63 €	0.05 €	0.19 €	0.14 €	106
<b>i3</b>	21.17 €	0.06 €	0.31 €	0.25 €	85

Source: Authors.

### Frequency of use and duration

To determine profitability, it is important to know the behavior of the customers. It is difficult to get usage data from companies regarding frequency and duration of trips. Often, long-term rentals are included in the figures. However, these should not be included here in the financial analysis, as the cost structure is different. The following studies were selected because they seem to make the most sense in terms of their data base. Hülsmann et al., (2018) created a relatively recent study whose results were obtained through control group surveys with the result that the average frequency per user is less than once a month. The study by Ruhrort (2020) is based on real booking data from WeShare in Berlin. The result is that 2/3 of the trips are under 30 minutes and 1/3 are over 30 minutes. Furthermore, it is relevant to look at the general average trip duration in Munich independently of CarSharing. The Mobility Study Munich results in an average of 31 minutes and 12.5 km (Follmer and Belz, 2018). An analysis conducted in cooperation with BMW and based on real booking data showed that each user makes 0.8 bookings per month and the average travel time is 29 minutes (Kopp, 2015). A press

release from ShareNow (Süddeutsche Zeitung, 2020) mentions an average of 35 minutes (including long-term rentals) and 25 million rentals with 4 million customers. This results in a monthly booking per customer of 0.5 bookings. Based on these evaluations, an average duration of 30 minutes and a usage of one rental per customer per month is assumed.

## Discussion

Based on the calculated costs, it can be seen that the majority of the fixed costs fall on the vehicle. It is unclear why the automotive OEMs have opted for the leasing model at standard market conditions. It should be possible to provide the company's own vehicles much more cost-effectively, thus giving up a competitive advantage over other operators of Free Floating CarSharing. The next most significant cost driver is the apportioned employee costs for operating the business. In addition to insurance, parking costs are a high cost block. As already described, the costs here differ depending on the city.

The variable costs arise primarily from fuel consumption and service with regard to refueling and recharging the vehicles.

The break-even point is different for each vehicle (Table 5). Due to the incentives for electric vehicles, the i3 can be leased relatively inexpensively and is exempt from vehicle tax. Due to the attractiveness of electric vehicles, a comparatively high rental fee of 0.31 euros can be realized. Although the pure energy costs per minute are the lowest of all the vehicles offered, the use of a service employee is necessary for charging due to the shorter range. In total, however, the variable costs for the i3 are the lowest after the Fiat 500. Thus, the i3 already reaches the break-even point on the day with 85 minutes. With an average booking time of 30 minutes, slightly less than 3 bookings are required per day.

The smallest and cheapest vehicles stand out with comparatively high break-even values. While the Smart has to be booked for 119 minutes per day, the Fiat 500 has to be booked for 106 minutes. The reason for this quite high value, despite the low fixed and variable costs, is the very low price per minute of 0.19 euros.

Tab. 5: Break Even Bookings

	BE / minutes	BE Bookings /day	Cars in Munich	Total Bookings
<b>Mini</b>	105	3.5	229	802
<b>Smart</b>	119	4.0	328	1299
<b>1 series</b>	100	3.3	42	141
<b>X1</b>	104	3.5	42	145
<b>2 series conv.</b>	131	4.4	36	157
<b>2 series tourer</b>	110	3.7	78	285
<b>A-class</b>	101	3.4	34	115
<b>Fiat 500</b>	106	3.5	210	738
<b>i3</b>	85	2.8	200	568

Source: Authors

An important issue for profitability is vehicle utilization. For the requirements of the free floating concept it is necessary that there is always a vehicle within walking distance. As mentioned above, at best within a 5 minute radius. This results in the necessity of a large vehicle fleet with the risk of underutilization. Putting the vehicles in relation to the required break-even trips per day results in the required number of 129,295 monthly bookings for Munich.

It was not possible to obtain ShareNow users' data for Munich. In 2019, however, there were around 250,000 users registered with the various providers in Munich (Engels, 2019).

An approximation of the possible user group makes sense in order to get an indication of the profitability. First, it needs to be determined how many people are living in the so-called hot spot areas. These areas usually coincide with the provider's business area. Stolle et al., (2019) has calculated a figure of 422,000 people in the area in the case of Munich. Next, the relevant target group must be extracted. According to the city of Munich, approximately 70% are between the ages of 20 and 69 (No Name, 2019a). This results in a potential user number of 295,400 people.

If we now take the average booking of one per customer and month for calculation purposes, 44% of these people would have to be ShareNow customers.

Even though there is no data from ShareNow regarding the number of users per city, it is clear that it is unlikely that this model can be operated in a profitable way. Munich is also a city with good operating conditions. On the one hand, it has a high income structure and a relatively central cityscape. It can therefore be assumed that the break-even analysis is weaker in for example Berlin. Another risk is that new competitors in the cities will take users away. The relatively constant number of potential customers is confronted with an increasing number of vehicles and providers.

### **Non-monetary benefit for the OEMs**

In addition to the purely financial aspects, there are also non-monetary factors that can make a case for operating a CarSharing fleet. They will be examined and evaluated in more detail below.

#### *Awareness of technical innovations*

Contact with the latest technology can create a desire or need among users of the vehicles. Often the current technical developments of the manufacturers are not known. Without the knowledge of, for example, a Stop&Go assistant that brakes and starts automatically, there is also no desire on the customer's part. A changed interior design or cockpit can also make their own car look outdated (Kaas et al., 2016).

#### *Brand Image*

Companies are always concerned with creating a positive image among their customers. Especially for automotive companies it is important to appear modern, innovative and agile. The brand image could be positively influenced by CarSharing, because this is

associated with sustainability and it also shows that the company is not trapped in its classic old thought patterns, but is open to new trends. On the other hand CarSharing is no longer a new concept, but has existed for years. In addition, more and more competitors are entering the market that offer the same service and are not automotive OEMs. For this reason, it can be assumed that car sharing has no special influence on the brand image.

#### *Attracting new customers*

Another advantage that can be considered is that by using the vehicles new customers can be attracted and companies can reduce the advertising budget. BMW had gross advertising expenditure of around 1 million euros in Germany in 2019 (Weidenbach, 2021). With a total of 329,262 vehicles sold, this amounts to just under 3 euros in advertising per vehicle sold (Immen, 2020). This amount does not seem to be a decisive factor in the decision to operate a CarSharing fleet.

By having their own carsharing fleet, young people in particular who do not yet own a vehicle can be branded early on so that the manufacturer is at least considered when purchasing a vehicle in the future. In addition, carsharing rides are an easy way to experience the cars. While customers used to have to go to the dealership and convince the salesperson that they want to buy the car, a test drive with the nearest car can be booked very flexibly and inexpensively. Electric cars in a carsharing fleet can help change people's mindset by getting them used to driving an electric vehicle and reducing any prejudices they may have. Looking at the current fleet, it is dominated by inexpensive vehicles such as Smart and Mini. The number of 1-series and A-class models is very low, and most recently the Fiat 500, a foreign brand, was added to the fleet. It seems that the advertising impact of car sharing is no longer the focus of the manufacturers

#### *Data Collection*

The collection of data is another advantage that should not be underestimated. Short journeys with permanently changing drivers put extreme stress on the car and thus represent a good test in terms of durability and possible faults. This data can be used in future product developments. Furthermore, customer behavior provides important information on how often which functions and services in the vehicle are used. Feedback from the predominantly younger Car-Sharing customers also provides important information for the development of new products. Since the younger customer group does not usually drive premium vehicles, it is difficult to obtain feedback from interaction with the vehicle in the conventional way. However, since the younger generation are the buyers of tomorrow, it is fundamentally important to know which things are valued and which features or functions are not of great importance.

#### *Fleet bonus with electric vehicles*

The use of compact and electric cars helps OEMs meet their CO<sub>2</sub> fleet targets and thus avoid penalties. Due to the continuous expansion of the range of electric vehicles and the increasing sales figures, this point will become less important in the future.

### *Compensation for declining demand*

In the previous literature review, CarSharing was seen as a compensation for the decreasing number of possible car sales in the future. The reason for this is that more and more people no longer see the need to own a vehicle. This argument can be refuted, at least for Germany, with regard to new registrations in Munich, where DriveNow has been available since 2011. New registrations are growing continuously and more strongly than the growth of the population (No Name, 2020).

## **Conclusion**

Based on the analyses and the consideration of the non-monetary benefits for a CarSharing business, the model does not appear to be profitable in the long term. The reasons for this are, on the one hand, the high vehicle costs due to the use of premium vehicles. On the other hand, there are the low-cost vehicles from Smart and Fiat. Although their fixed costs are lower, they can only achieve a significantly lower rental price. Due to the existing competitors, companies are also forced to offer low prices in order not to lose customers. With these vehicles, however, many non-monetary advantages are no longer available. In general, a certain fleet size is necessary to operate Free Floating CarSharing. If the vehicles are underutilized, it makes more sense to maintain a large share of vehicles with low fixed costs.

Another important aspect is the support of the government in the respective cities. Too much bureaucracy, for example, in registering vehicles in certain urban areas, or high costs in the form of parking fees or congestion charges can very quickly make the entire business model unprofitable.

Due to the very low margins, it is important to gain as many customers as possible that use the offer regularly. Due to increasing competition in this field and a relatively fixed maximum value of possible customers, it appears difficult to further increase the number of customers. In contrast, there is more of a risk that existing customers will switch to other providers or take the closest car regardless of the provider.

The calculations have shown that the currently most lucrative option for the CarSharing provider is in the area of electric vehicles. Due to the various subsidies, they are currently relatively inexpensive. They also attract customers who are willing to pay more for the experience. According to a study, 66% of customers who signed up with car2go in Stuttgart did so in part to try out an electric car (Hülsmann et al., 2018). However, this advantage may be overturned as soon as the subsidies are reduced. In addition, there is a risk that many customers only want to have the experience of driving an electric car once and will return to the less expensive alternatives for further trips. With regard to production capacities, the automotive OEMs must also consider whether electric vehicles should not be sold instead. If the number of electric vehicles in a city is too high, there may also be problems finding charging stations. Blocking charging stations with fully charged vehicles that are not driven away can have a negative impact on the company's image. The

range plays another important role. The i3 is a vehicle with a comparatively short range. This leads to higher service costs for recharging the vehicles. However, if vehicles with a range similar to conventional vehicles are used, the economic benefit is even greater. In addition, the operation of electric vehicles provides important data for the still relatively new technology of the automotive industry.

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