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NEW MOBILITY CONCEPTS – BETWEEN HUGE MARKET OPPORTUNITIES AND SIGNIFICANT PROFITABILITY HURDLES

THE BUMPY ROAD TO SUCCESS

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Since the beginning of the 21st century, the concept of Mobility has been increasingly subject to change. In the past years, several start-ups have entered the market and offered **solutions shifting away from personally owned modes of transportation towards servicing Mobility**. Private cars are one of the scarcely utilized commodities concerning their price – on average, they are used only about 1 hour a day which means the other 23 hours are potential idle capacity. A higher utilization by sharing or use-on-demand concepts screams for colossal business potential. The addressable market is significant as Mobility is part and parcel of our everyday life, and experts predict 2-digit CAGRs with an overall size of more than six bn € in Germany in 2025 for Mobility on demand. Given the bright future, several **new mobility concepts like ride-hailing, ride pooling, station-based, and free-float car-sharing** have been introduced in the

past years. **But despite the vast potential, mobility providers are still suffering problems to earn money with their business models.** Many start-ups adapted their strategies, some even stopped their businesses in recent times, and market-giant UBER from the US, for example, is involved in several lawsuits in Germany and has taken its famous service UBER POP from the market. On top of that - at the beginning of 2020, the corona pandemic harshly impacted the mobility market – leading to a complete halt in many areas. **Despite all setbacks, the movement came back into the market just recently with a law amendment effective from August 2021, setting a legal framework for new mobility concepts for the first time and also in July with the takeover of Europcar by VW following a clear vision to utilize the potential of Mobility as a service.**

New mobility concepts are conversely discussed, and running a profitable business in this sector is not as low-hanging as it might look on the first view. Therefore, **we discuss the characteristics of the different new models in this whitepaper and which of those have the most significant potential.** What perquisites and challenges need to be addressed to enable economic returns, and how sensitive are the concepts in terms of market changes. **On top of that, we also want to discuss how far the upcoming automotive evolution will impact mobility services and how concepts might develop in the future.** But first of all, we will start with an instruction of the significant mobility concepts and their most commonly used definitions.

THE MOST COMMON DEFINITIONS

Besides, for example, the well-known rent-a-scooter or rent-a-bike offer, many different concepts are based on passenger cars. The two major categories are "rides," when the customer orders a vehicle with a driver, or a "cars" when a driverless vehicle is used. Within **the "ride" section**, the most common definition is distinguishing between **ride pooling** and **ride selling**. **Ride pooling targets more than one customer by intelligently combining the different customers' routes whereas ride selling offers personal transportation.**








	 Ride Pooling	 Ride Selling	 Car Sharing stationbased	 Car Sharing freefloat	 Shared Mobility / Mobility as a Service
concept	Pooled rides with driver	Individual rides with driver	Short-term car rentals at fixed stations	Short-term car rentals, spread over a defined operation area	Arrangement of intermodal mobility services
Players in Germany	Moia BerlKönig IsarTiger	UberX FreeNow Bolt	MilesMobility Sixtshare Stadt mobil	Sharenow Sixtshare Weshare	Moovit Free2Move Sixt Jelbi (Berlin)
	<ul style="list-style-type: none"> Higher density of pickup-points compared to bus More flexible and lower costs than bus 	<ul style="list-style-type: none"> 10-40% less costs than Taxi Individual rides Luggage possible Pickup at own door 	<ul style="list-style-type: none"> Short term rentals possible Working times usually 24/7 Initial registration allows to choose any available car 	<ul style="list-style-type: none"> High density of cars Special parking possibilities Prices from 0,07€/min Flexible return within operation area 24/7 	<ul style="list-style-type: none"> Broad intermodal service offer Individual preferences can be considered (first-mile, flexibility, comfort,...)
	<ul style="list-style-type: none"> Usually waiting times and loop ways due to pooling Usually no pickup at own door Partly limited workings hours 	<ul style="list-style-type: none"> Usually longer waiting times than Taxi Availability only in a few big cities 	<ul style="list-style-type: none"> Pickup and return only at stations including necessary way to go there 	<ul style="list-style-type: none"> Availability only in a few big cities Return beyond operation area not possible 	<ul style="list-style-type: none"> No overarching service available, up to now usually focus to e.g. a region or transportation modes Partly no intergrated end-to-end processing (information, order, authorization, payment)

Fig. 1: Overview of mobility-on-demands concepts with advantages and disadvantages from customer perspective

On the "car" side, the significant difference is in the location of the cars. **Station-based car sharers have their vehicles usually in one central place, where customers have to pick up the vehicle. In contrast, free-float car-sharers have their fleet spread over a broad but defined area within a city.**

| > Ride pooling and ride selling

Ride pooling and ride selling are very attractive for non-drivers and as a bus- or Taxi-alternative. The prices for Ride pooling are usually lower than for ride selling. Still, customers need to go the "first mile" to virtual ride pooling-stops to take the service. In contrast, ride selling is more comfortable, and the driver usually picks up the customer where he wants. The distances per ride average around 10km. Especially pooled rides are mainly booked for leisure activities. The mobility provider Moia has analyzed that about 60% of the rides are for such purposes, especially in the evening hours leading to demand peaks between 6 pm and 2 am.

| > **Station based and free float car sharing**

In the case of car sharing, the customer has to drive on his own. Station based car sharing means customers usually have to pick up and return the car at a fixed station. Therefore, the prices are usually lower than for free float sharing. On the other hand, the customer can pick up and return the car anywhere within a defined operation area, which often covers a vast area within more prominent cities. Customers of free-float car sharing drive an average distance of 10 km and rent their cars between 30 and 40 minutes mainly to get home, get to a job, and for leisure activities. In the case of station-based car sharing, the average renting time is much longer and ranges between 6 to 8 hours, and the cars are driven 50-80 km mainly for day trips and transportation of goods.

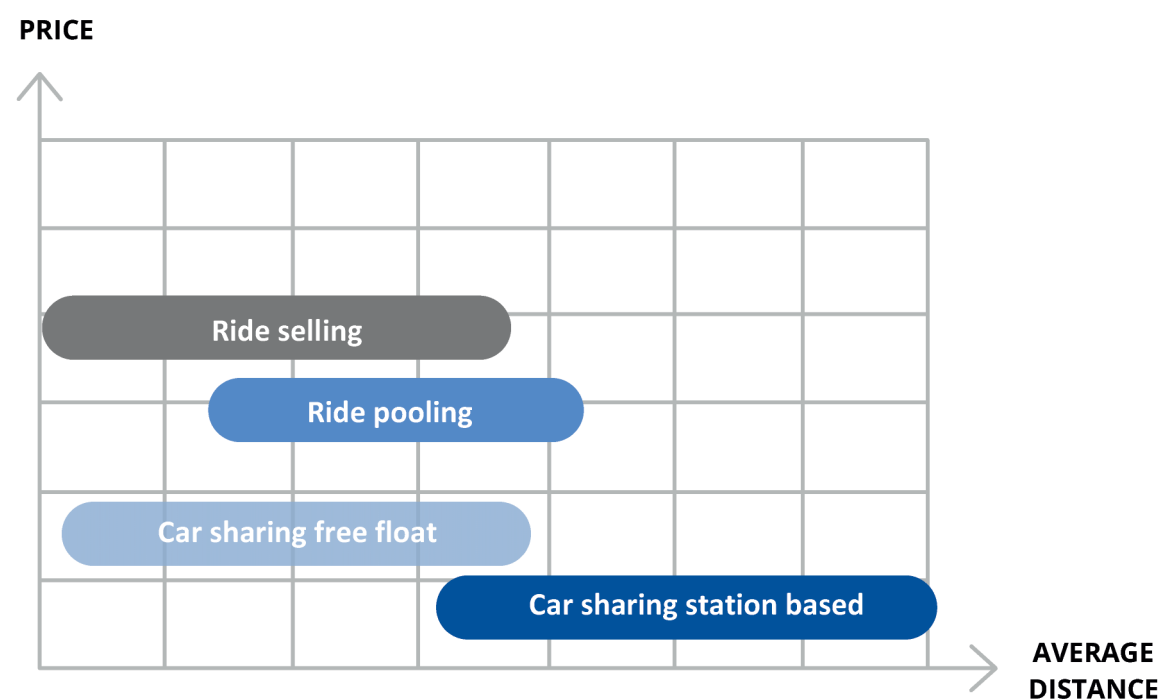


Fig. 2: Average distance and price of mobility-on-demand concepts

| > **Mobility as a service and shared mobility**

Apart from ride selling and car sharing, the concept of shared Mobility or Mobility as a service (MaaS) is getting more and more attention, focusing on the arrangement of inter-modal transportation solutions and is therefore combining above models. On top of passenger car options, MaaS-providers additionally connect trains, scooters, busses, or even flights to offer a holistic

service. Operators either purely focus on the arrangement of different mobility concepts or additionally run their own fleets.

CHALLENGES IN THE MARKET

The promising prognoses regarding market development have brought several start-ups and established companies into the sector, leading to intensive competition. In the meantime, **more than 200 providers offer more than 26.000 vehicles for car-sharing, increasing 400% in the last 19 years.** But the considerable extension of the offer side also ended up in a price war – in some cities, it was temporarily even cheaper for a customer to choose a car instead of a bike or scooter rental.

| > **MARKET SEGMENTATION**

Due to high initial costs, many providers started and are running their business locally in one or a few places and are focused on one specific mobility concept. For customers, this often means that they have to choose different providers depending on their journey's starting point and destination. It also makes a difference if customers want to travel one way - in that case, ride-offers are the preferred solution - or if they're going to make a round-trip, then car-sharing can be a more attractive solution. But customers prefer only to use a limited amount of apps to order and pay for the service. How important this is was shown by several surveys. For ride selling, for example, **easy ordering and paying possibilities are even more critical for many customers than the slightly lower prices.**

Additionally, **the segmentation of services and regions makes it difficult for providers to bind customers.** They often necessarily come in touch with competitors when traveling into other cities or switching between the different mobility concepts due to their different advantages and disadvantages. However, it is essential to gain and bind a certain number of customers to cover the high fix costs of a car fleet and achieve a high utilization rate of the cars. Based on current pricing models, the average utilization of 2 hours per day per shared car is merely sufficient to become profitable.

| > COST STRUCTURE

Furthermore, the cost structure bears the risk of underestimating significant efforts or overseeing indirect costs. For ridesellers and ride poolers, one of the most considerable cost positions is the employee that drives their cars. The legislation does not allow to arrange rides with a private driver due to commercial interests in Germany. Only professionals with a specific license are permitted to do so, which was also why UBER could not copy their US model to the German market. On top of that, legislation requires all ride-on-demand services apart from taxis to return to the company when the customer has been dropped off, **leading to a significant "empty" mileage and additional costs.** For ride poolers, it is crucial to achieve high pooling rates to compensate for lower pricing and the "empty" rides. This appears to be possible in big cities, but in rural areas, it is an enormous challenge. The provider door-2-door, for example, achieves a 65% pooling rate in urban areas, but in rural areas, only every 5th customer can be pooled, reducing incomes significantly.

But also in the case of car sharing, especially for freefloat fleets, costs ended up higher than initially estimated. For example, one problem is that many customers stop the cars in outlying areas of the city where the probability of finding a new potential customer is limited. **Therefore the vehicle needs to be parked back to a hotspot which leads to additional personnel costs.** The same problem appears with the refueling of the cars, which has to be done by personnel or by offering incentives to the customer, e.g., discounts on the price.

Mobility-on-demand services also tend to have significant peak demands. Moia, e.g., reports that most of the trips take place between 6 pm and 2 am. Adjusting capacities to such peaks leads to more extended periods of underutilization and idle capacity during the day.

... AND THEN CAME THE CORONA PANDEMIC

On top of those challenges, especially the corona pandemic hit the mobility market harshly. The total demand imploded due to a retraction of public life, limited leisure activities, and home office disruption. Moia, e.g., originally planned to run 1250 vehicles by 2022 before the pandemic but restarted the business with only 230 vehicles in mid of 2021.

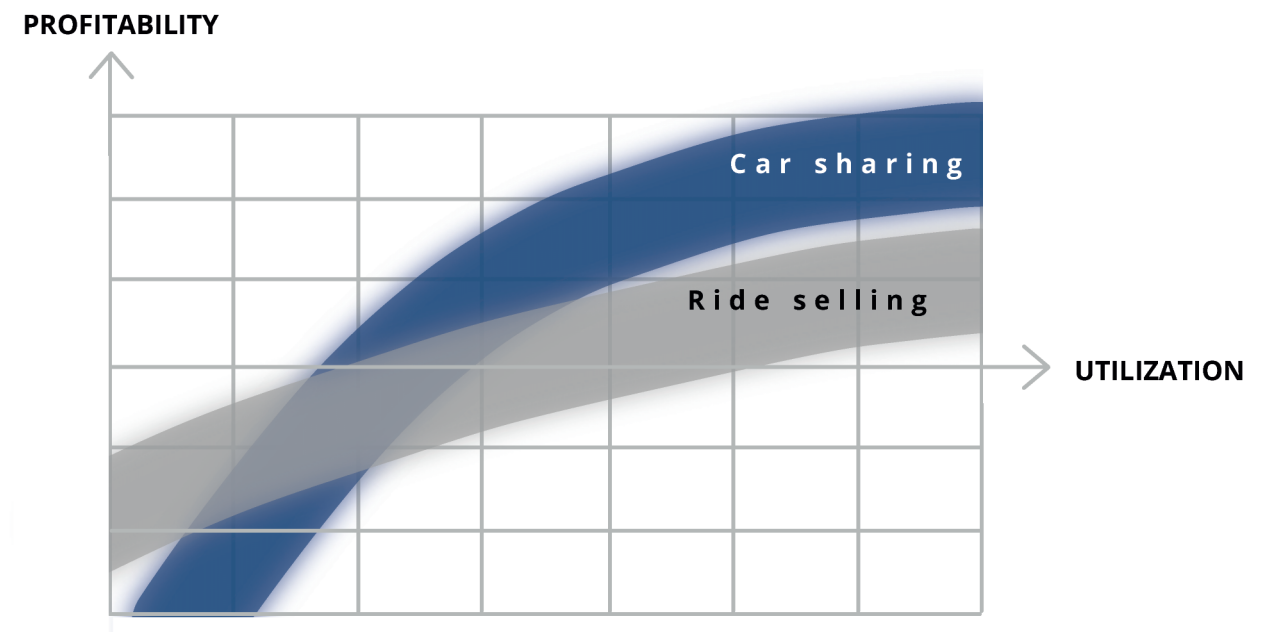


Fig. 3: Sensitivity of car sharing and ride selling in relation to utilization

The high fix costs for mobility concepts severely hit the providers and their anyway limited returns. The business models react sensitively to a change in demand and, therefore, utilization rates and act at the edge of profitability. Where ride-sellers can partially respond by decreasing their high share of personal costs in case of reduced demand, car sharers have limited possibilities due to the significant portion of their vehicle fleet's given costs.

Finally, **all those challenges and the high competition level have led to several consolidations in the past 2 or 3 years.** CleverShuttle, one of the German ride pooling pioneers, e.g., decided to focus on business-to-government moving away from their B2C approach, Daimler AG and BMW merged their businesses DriveNow and car2go to Share Now, Mydriver acting in more than 150 cities in 60 countries was taken over by Sixt and Allygator, and several local services like isarTiger in Munich stopped their businesses to mention a few.

OUTLOOK AND CONCLUSION

One major key challenge of the market is to maximize the utilization of cars. Still, plenty of the current models make this difficult because they are separately operated and competing with each other and operated in locally limited areas. This means that customers have to choose a service supplier depending on where they start, where they want to go and which service is the most appropriate one depending on the preferences in terms, e.g., of price and drive or be driven. Therefore it is difficult for providers to grow and bind their customer base sustainably to increase utilization rates. One trend to face this challenge is that providers extend their services and offer car sharing and ride services on a national scale, e.g., Sixt and the new VW-Europcar. Besides binding customers by increasing the range and density of the offer and allowing customers to choose the most appropriate service flexibly, this enables synergy effects in the car fleet and, therefore, an optimization of the number of cars. VW now even wants to integrate dealership vehicles into one big platform further to boost synergies and the utilization rates of the fleet.

However, especially in rural areas with a generally low population and demand density, it could be an option to cooperate with public mobility providers and to extend or optimize the offers of the ÖPNV (local public transport).

Apart from the core service of Mobility, providers need to pay attention to an easy-to-use end-to-end process for customers and therefore on a comfortable interface and integration of linked services like ordering, paying, authorizing. For many customers, this is even more important than the very lowest price. In addition to directly meeting customer preferences, this also offers possibilities to collect and evaluate data to understand customer demands and adapt the services accordingly.

But besides adaptation and extension of service models, one of the critical success elements will remain a strict and holistic Total Cost of Ownership (TCO) control and management. Costs that do not appear to be obvious on the first view are often significantly underestimated, such as maintenance, infrastructure, service, and repair, and the efforts mentioned above to repark the vehicles to a spot where it is more likely to find the next customer. In addition to initial investments, it is therefore extremely important to carefully plan any costs related to the

business operation and closely track and optimize them - especially against the background of the high sensitivity of the business.

A look at the technical roadmaps in the next two decades shows that the cost structure will probably be subject to significant change. Today, the "human driver" is one of the most relevant cost factors for resellers and car sharers, the progress in autonomous driving will be a game-changer to this shortly. Fully automated driving in level 5 is not expected to be broadly available before 2030, but once available it will significantly reduce the costs per km as a human driver would be obsolete. Car sharing providers' estimate that it would be possible to fulfill today's demand with 50% smaller fleets, as cars could automatically go to wherever the customers need them. Going a step further, the border between car sharing and ride selling would somehow vanish.

Providers who will then have built up a significant customer base and -binding and have their total costs of ownership under control will be in the pole position to fully utilize the completely new possibilities of autonomous driving to operate successfully on the future mobility market.

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