More protection, less congestion - The role of car sharing in the Corona pandemic

At the peak of the initial coronavirus crisis in April 2020, the mib (Mobility Institute Berlin) published the study *Beyond the immediate crisis* on the question of what effects the pandemic could have on urban mobility and public transport in the medium and long term.

A lot has happened in the meantime. The first phase of the crisis passed, and Europe entered the second phase of the pandemic. In this calibration phase, we first observed a slow relaxation of existing restrictions. Now, the number of cases is rising again, and in some places, this increase is very rapid. This development is accompanied by renewed, more stringent containment measures.

Especially in the context of the renewed increase in uncertainty, it is important to take a closer look at the findings on mobility in the first months of the pandemic. This is the aim of this paper.

The focus here is on car sharing. *Beyond the immediate crisis* argued that if the number of infections increases, customers could switch to means of transport that they perceive as low-risk. The study therefore advocated for the expansion of multimodal services, recognizing car sharing as an important part of broad-based, multimodal transport systems. In this paper, which is a collaborative effort by mib and global free-floating car sharing pioneer SHARE NOW, we take a closer look at the role that car sharing played in the first months of the coronavirus pandemic and explore what this tells us about mobility during this time.

Our key findings are:

- During the coronavirus pandemic, car sharing helps to solve the dilemma between individual risk prevention and societal congestion problems. People have short-term access to a mobility option perceived as low-risk - the car - without having to commit to private car ownership in the long term.
- The demand for car sharing was less affected by the initial crisis than the demand for public transport. In terms of minutes booked, usage recovered quickly and already exceeded pre-crisis levels by the beginning of June.
- During the crisis, car sharing usage shifted to the urban periphery. Regarding change throughout the day, usage fell sharply in the early morning and evening hours. However, from late morning until early evening, it remained relatively stable.

Car sharing helps to solve the dilemma between risk prevention and congestion problems

With the outbreak of the coronavirus pandemic, mobility behavior changed radically. People traveled shorter distances overall. At the beginning of the crisis, public transport lost an especially large share of riders. Rates of walking and cycling saw relative increases, and people used their cars more often.[i]

In response to this, it has been argued by various authorities that people will turn away from public transport in the long term. Many saw the private car as the big winner.

According to a survey conducted at the end of March, around one fourth of public transport users in Germany intended to continue avoiding public transport even after the end of the pandemic.[ii] Shortly thereafter, another survey found that nearly one third of inhabitants without cars missed having one.[iii] A third survey, at the beginning of May, revealed that about a quarter of people planned to use their own cars more often.[iv]

Above all, lower risk of infection benefits the private car when choosing a mode of transportation. Individual risk perception is an essential and legitimate determinant of modal choice during a pandemic.

Nevertheless, if more citizens were to opt for private car ownership in the future, this would further aggravate the already existing congestion problem in urban areas. According to INRIX measurements, drivers in Germany already spend an average of almost two full days per year in traffic.[v] In large cities, this problem is particularly pronounced. In Berlin, car drivers spend about 66 hours per year, and in Munich that number rises to 87 hours. INRIX calculates that this loss of time cost the German economy almost 3 billion euros in 2019.

Car sharing can help to solve the dilemma between individual risk prevention and societal congestion problems. On one hand, it allows people to switch from public transport to private car in the short and medium term if they feel unsafe. On the other hand, it does not require a long-term commitment to car ownership. This makes it easier to return to public transport after the risk of infection has decreased.

Various studies have also shown that car sharing generally has the potential to reduce car ownership in cities. A study from Munich shows that each shared car displaces an average of four to six private cars in the city.[vi] Another study from Bremen even estimates up to 16 fewer private cars in operation per shared car.[vii] In a recent survey in Berlin, almost a quarter of car sharing users without a car answered that they would buy one if they did not have access to car sharing.[viii]

Car sharing and public transport complement each other in a meaningful way. Car sharing enables people to have access to a car at any time without having to own one. Studies show that this leads to more multimodal traffic behavior in car sharing users.[ix] The aforementioned Bremen study argues that after switching to car sharing, about three-quarters of the trips previously made by private car were instead made using environmentally friendly alternatives such as public transport or cycling. The combination of public transport and car sharing also seems promising for the future: In the Berlin study mentioned above, cheaper car sharing (20% of respondents) and strong expansion of public transport (17%) are named as the most important reasons for selling one's own car.

The effects of the coronavirus pandemic on mobility have proven how livable a city with low traffic volume can be. Numerous short-term measures such as temporary play streets and the repurposing of parking spaces have created a new sense of how vibrant public spaces can be made. At the same time, global CO_2 emissions fell up to 16%, while emissions in the transport sector fell by 36% and contributed the most to the change in overall emissions.[x] These figures show the potential to relieve pressure on the environment by changing mobility behavior.

Car sharing demand is less affected by the crisis than public transport demand

How was car sharing used at the start of the coronavirus crisis compared to public transport? To answer this question, we compare the developments in Hamburg and Berlin in Figure 1. In both cities, users placed more trust in car sharing than in public transport during the initial crisis.

At the beginning of the coronavirus pandemic—the end of March (week 13)—SHARE NOW travel bookings plummeted to around 56% of pre-crisis levels in Berlin and 62% in Hamburg (see Fig. 1). Public transport ridership reached its low point in the following week with a decline of more than 80% in both cities.

The recovery in demand for car sharing and public transport then proceeded at roughly the same pace. In Hamburg, from the low point of demand until mid-June, public transport recovered 33% of the passengers who had been lost at the onset of the crisis. Car sharing in Hamburg won back 31% of the previous users in the same period.

Due to the stronger initial decline in public transport demand, car sharing was still used relatively more often than public transport in Hamburg in mid-June. Car sharing demand on the SHARE NOW app, calculated in number of bookings, was around 69% of the pre-crisis level. For public transport, demand was only 54% of the pre-crisis level.

The picture is similar in Berlin, although the recovery was somewhat slower. By mid-June, public transport had regained 20% passengers (to 45% of pre-crisis demand), whereas car sharing regained 22% of users (to 66% of pre-crisis demand).

Another way of reading the data, however, shows that the recovery in car sharing was stronger than the comparison above suggests (see Fig. 2, green lines). Measured in number of minutes booked, SHARE NOW usage had already returned to around 90% of pre-crisis levels by mid-June. At times, the number of minutes booked even exceeded pre-crisis booking minutes (see week 22). The average rental period increased accordingly during the crisis, for example, from around 26 minutes to around 32 minutes in Berlin – an increase of almost 25%.

The comparison between Hamburg and Berlin reveals further regional differences. Public transport recovered more quickly in Hamburg than in Berlin. By mid-June, Hamburg's public transport had regained almost 10% more passengers than Berlin's public transport, both compared to pre-crisis levels. In Berlin, on the other hand, car sharing recovered faster than in Hamburg. This was particularly true in the first weeks of the crisis. At that time, Berlin regained around 20% more demand than Hamburg, calculated in minutes booked (see week 15 in Fig. 1).

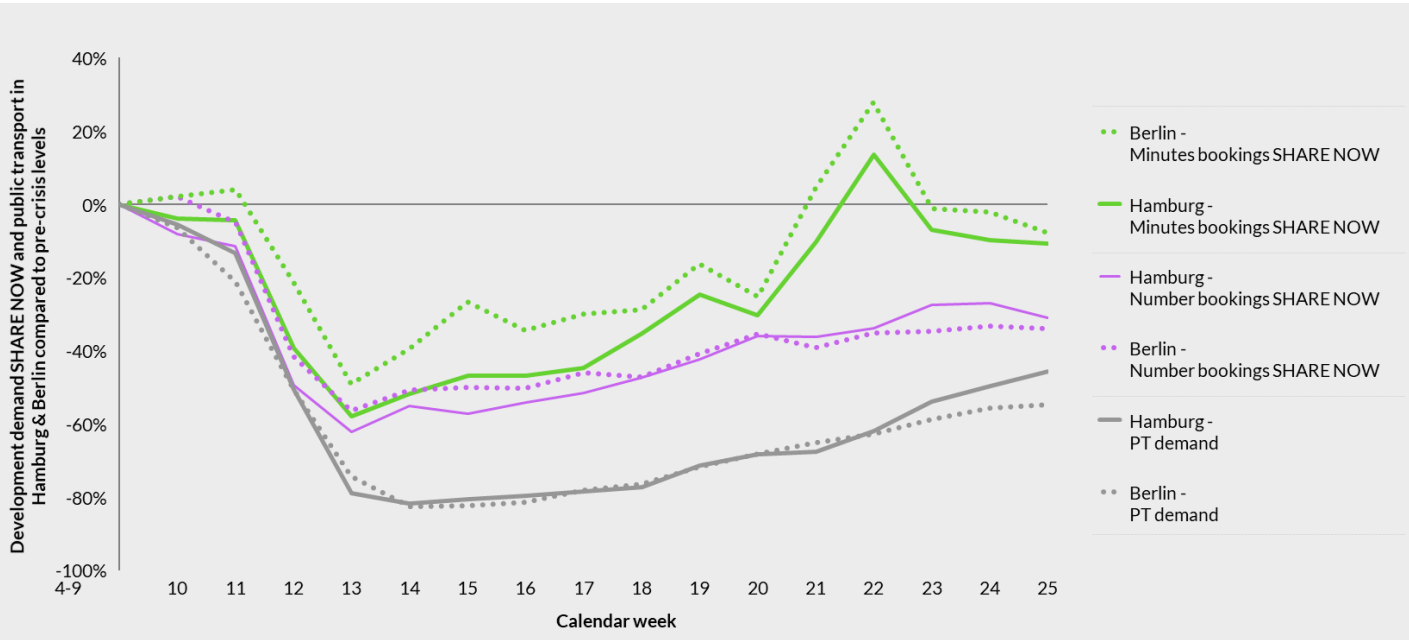

Figure 1: Development of public transport and car sharing demand during the beginning of the coronavirus crisis[xi]

Car sharing use is shifting to the urban periphery and away from rush hours

A closer look at Berlin also shows that car sharing has been used differently during the coronavirus pandemic, both in terms of space and time. The map in Figure 2 shows how the activity of SHARE NOW users has changed across Berlin at the time of the lockdown compared to the pre-crisis period.

It can be seen in the map that activity on the SHARE NOW app in the center of Berlin had the sharpest drop. A decrease in activity on the SHARE NOW app was also observed at university campuses such as the Free University of Berlin in the southwest as well as Technology Park Berlin Adlershof, home of the mathematics and natural sciences campus of Humboldt University, in the southeast of the city.

on the SHARE NOW app in Berlin over an average weekday. Different phases of the Corona pandemic are depicted. There it can be seen how, throughout the day, bookings collapsed at the beginning of the crisis and recovered through the calibration phase.

The slump in car sharing bookings mainly affected early morning and evening hours. The right side of Figure 3 shows how the number of car sharing bookings has changed compared to pre-crisis levels. By contrast, the period between 10 AM and 5 PM was far less affected by the decline in demand during the crisis. Even at the worst point of the crisis phase, the slump here was only around 32%.

By mid-June, the number of bookings between 10 AM and 5 PM had risen back to around 75% of pre-crisis usage. Night-time

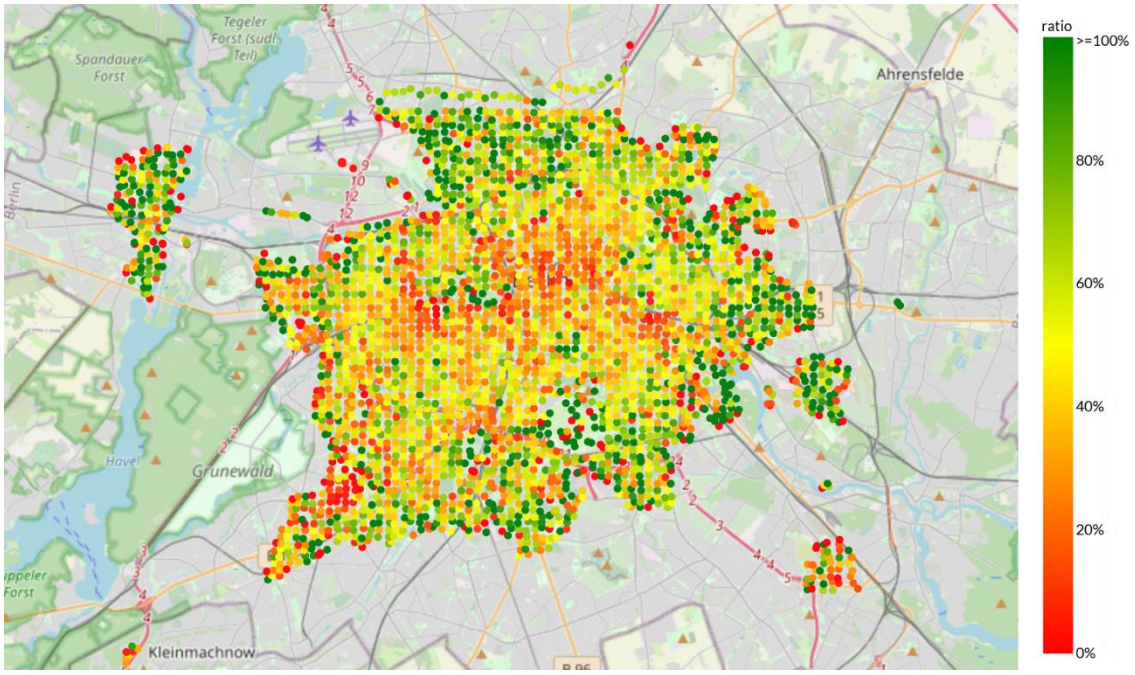

Figure 2: Changes in app openings during the initial coronavirus crisis compared to the pre-crisis level[xii]

In areas further away from the city center, such as Wedding and Gesundbrunnen in the North of the capital and Köpenick and Lichtenberg in the East, app activity remained constant or even increased.

The use of car sharing changed not only spatially, but also temporally. The left side of Figure 3 shows the distribution of bookings

usage also recovered. For example, usage between 10 and 11 PM rose from 28% of pre-crisis levels in calendar weeks 13-15 to approximately 62% of the pre-crisis level in calendar weeks 23-25.

Only between 3 and 4 AM did bookings remain consistently low. In large part, this is due to the number of trips starting at this

time of day with an airport as the destination. Due to continued restrictions on international travel and air traffic, there has been much less demand for these trips than before the crisis.

Overall, the figures considered here show that both public transport and car sharing were strongly affected by the crisis. However, the combination of both mobility options has provided more flexibility for people living in urban areas. Notably, people have been able to reduce their own risk of infection in the short term by switching to a car without the need to buy their own car. As the studies discussed earlier demonstrate, the combination of public transport and car sharing also appears to be a means of making urban public space more livable and sustainable in the longer term. ■

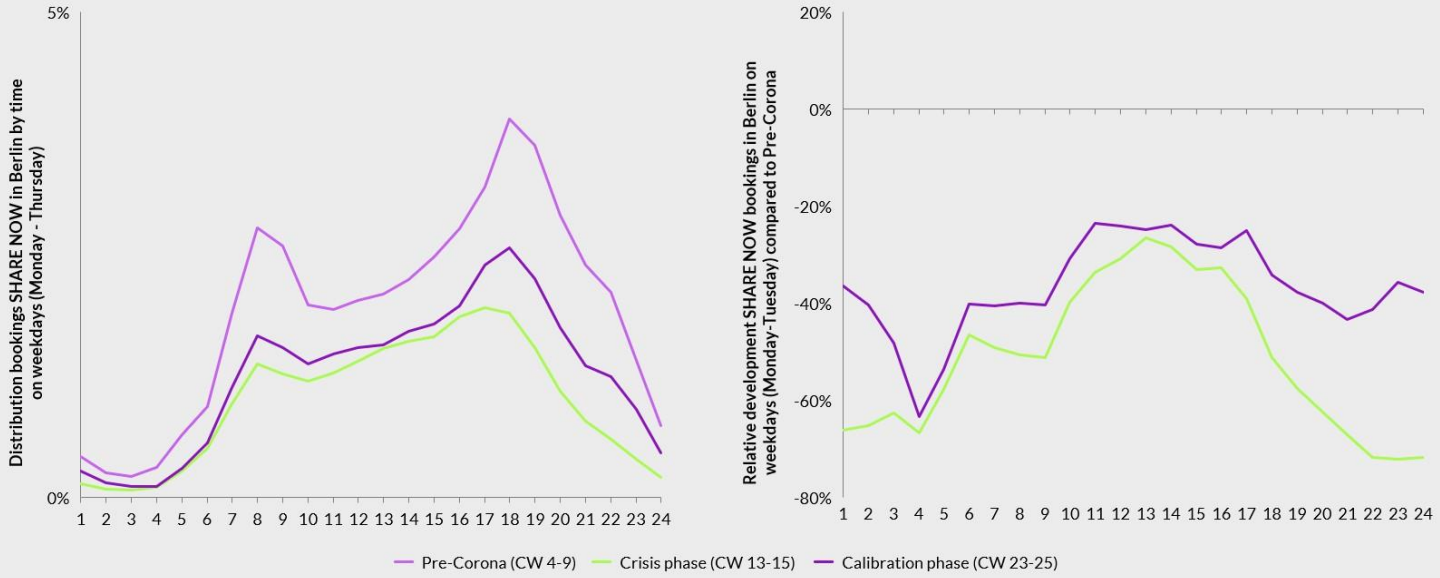

Figure 3: Distribution of bookings on the SHARE NOW app throughout an average weekday

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