

On-demand transport: A tool to keep people mobile during the coronavirus pandemic

COVID-19 has shocked the world. Urban mobility is no exception. In mib's previous publication « *Beyond the immediate crisis: The SARS-CoV-2 pandemic and public transport strategy* », we underscored the medium- and longer-term effects that the pandemic would have on urban mobility and public transport strategy.

The current stage of pandemic development in most European countries fits into what we called the "Calibration Phase". We predicted that during this phase, mobility demand would be highly volatile due to changing restrictions and unlikely to return to pre-crisis levels. We now see this playing out in reality.

In Spain, for example, after an initial relaxation of restrictive measures, the resurgence of cases in different regions is causing a variety of government responses (ban to nightlife, limitation of social events and encounters, prohibition of smoking in public spaces, etc.). Furthermore, overall mobility demand has not returned to levels seen before the pandemic. In the case of Madrid, the number of trips in the summer months is staying at 65% of what it used to be compared with previous years.ⁱ

In *Beyond the immediate crisis*, we stated that, due to comparatively high perceived risk of infection, many people would avoid public

transport and would get used to more flexible ways of making travel choices.

We thus expected multimodal transport to be an important element in making urban mobility more resilient and consistent with users' flexibility needs.

In this follow-up paper, mib has teamed-up with on-demand transport software provider Shotl to analyze demand for their services during the crisis and compare it to that of traditional public transport. Our major findings are:

- On-demand mobility has recovered more quickly than public transport in the study area considered in this paper.
- Demand from commuters decreased due to the shift to remote working.
- When traditional public transport was suspended, users shifted to on-demand services.
- In neighborhoods where mobility is driven by trips to school, users continued to travel for other purposes.

Our analysis focuses on DRT services in the suburbs of Barcelona

Demand Responsive Transport (DRT) is a collective transport service whose offer is determined by live requests of users. The service does not depend on fixed routes or stops, since these are determined through the combination of pick-up and drop-off needs at a given time. To enable this degree of flexibility, DRT services often make use of smaller vehicles compared to traditional public transport services.



Shotl provides the bus operator with the software to operate a variety of DRT services in parts of the Barcelona metropolitan area, namely the municipalities of Sant Cugat and Vallirana. In this study, we focus on Sant Cugat, which has 90,000 inhabitants and a gross domestic household income that is 14% higher than the municipality of Barcelona.ⁱⁱ

Within Sant Cugat, Shotl provides the software to operate three on-demand services in the neighborhoods of Can Barata, Can Trabal and Les Planes (Figure 1). These services were deployed between 2017 and 2019.

On-demand mobility has recovered more quickly than public transport in Sant Cugat

On March 15, 2020 - end of calendar week (CW) 11 - the Spanish Government declared a countrywide state of emergency due to the spread of COVID-19. The lockdown lasted for two months, during which only essential mobility was allowed. Restrictions were gradually lifted between early May (CW 19) and the second half of June (CW 25).

Demand for bus services – both regular and on-demand – suffered a sharp 95% drop during the weeks following the lockdown, as can be observed in Figure 2. After that, demand recovered at a slow rate during the

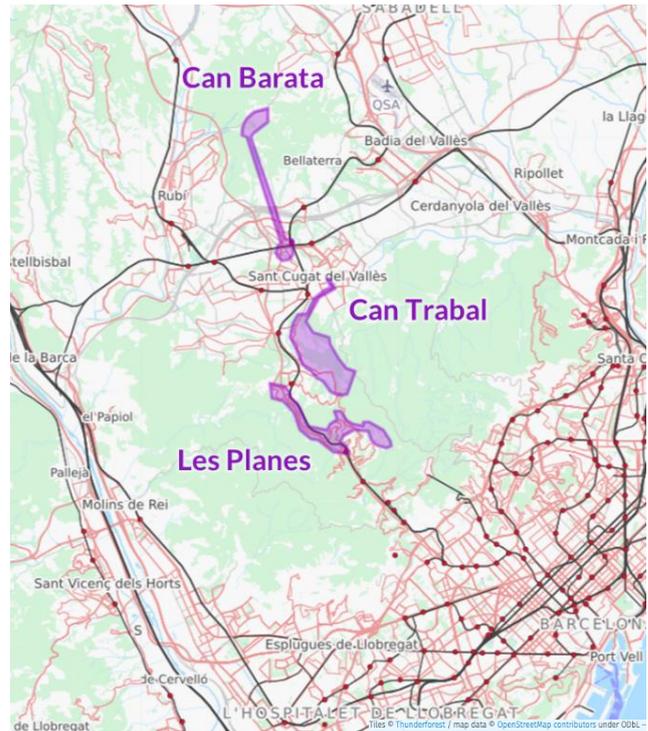


Figure 1. Map showing locations for Case Studies

two following months, from 5% of previous demand to 10%. From the start of May (CW 19), as restrictions started to be lifted, the demand recovery rate accelerated.

However, the recovery rate has varied depending on the type of service. On-demand systems in Sant Cugat recovered very quickly, reaching 87% of its previous demand by the beginning of July (CW 28). On the other hand, regular bus services in the same area recovered only up to 45% of pre-crisis levels by that point.

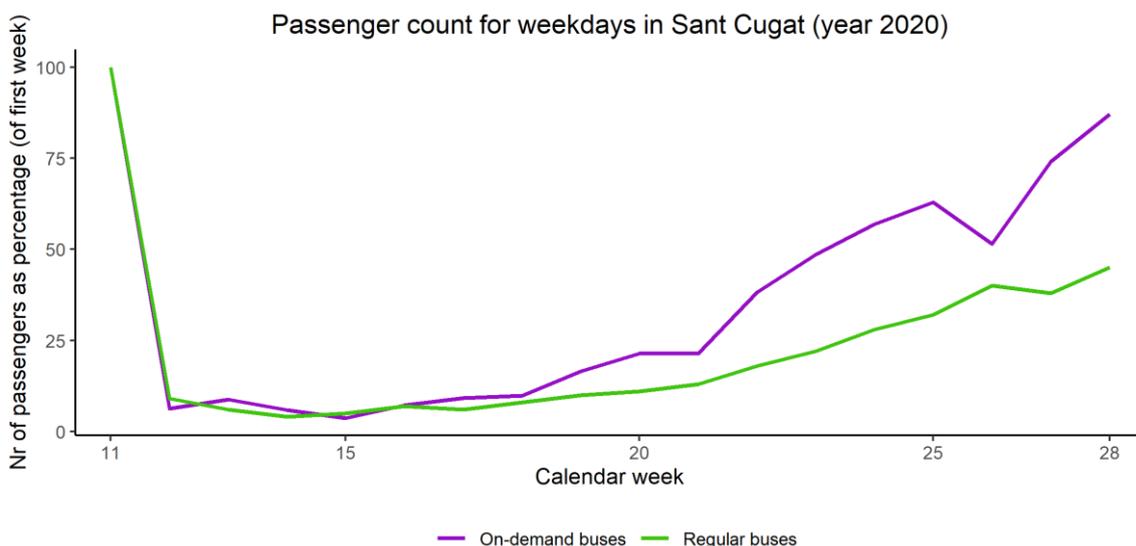


Figure 2. Passenger counts for weekdays by week for both regular and Shotl-managed bus services in Sant Cugat

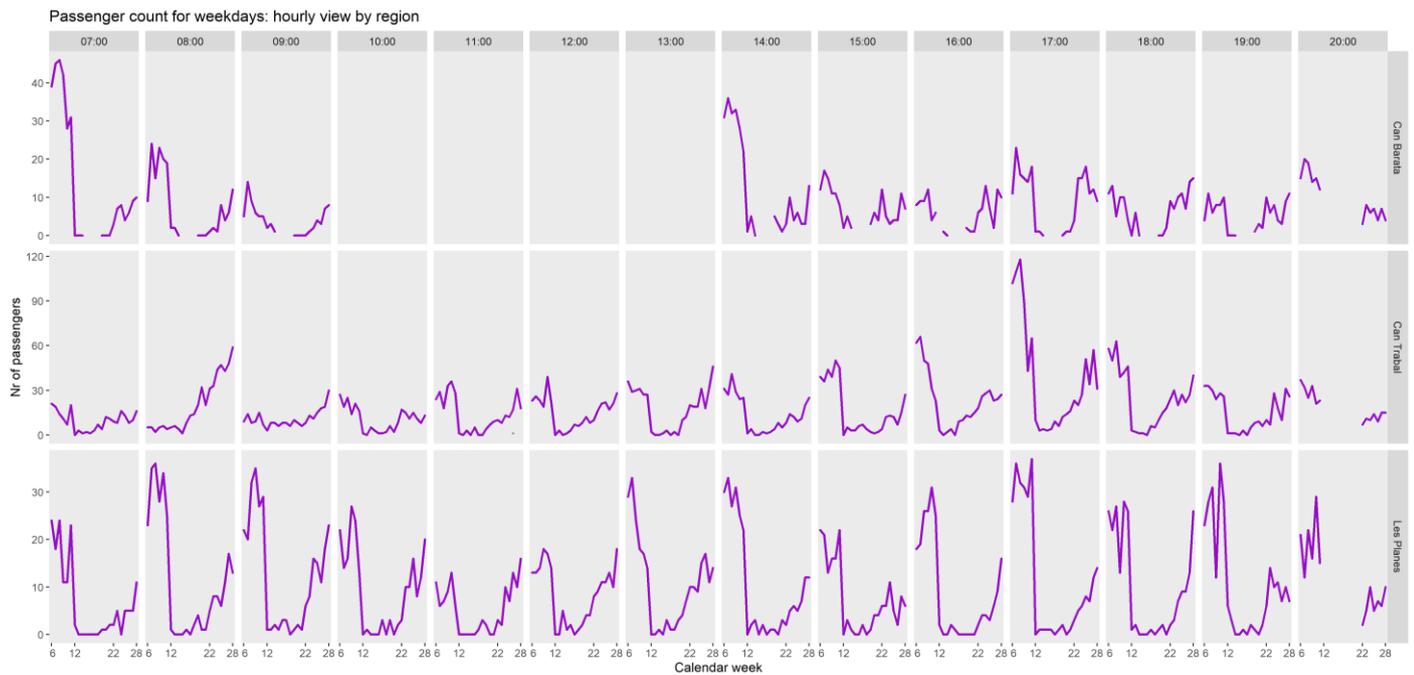


Figure 3. Ridership trends for the different neighborhoods served by Shotl in Sant Cugat (passenger count for weekdays, hourly data)

Demand from commuters suffered from the general increase in remote working

The Can Barata Shotl service connects the 300 residents living in this isolated neighborhood to the suburban train station that brings commuters into the city center of Barcelona, while also providing access to their nearest high school, medical center, and other amenities.

We explain the performance of this service and the other two by referring to Figure 3.

Figure 3 shows the evolution of trips between February and July: each row corresponds to a neighborhood in the study area. Each column plots the number of trips within a given hour. Within each column, these trips are shown for the period ranging between CW 6 and CW 28.

The Can Barata service, portrayed in the first row, only operates between 7 AM - 10 AM and 2 - 9 PM. However, the service was suspended during April (CWs 15 to 18) and suffered a reduction in hours of operation during the second half of March and almost the whole of May.

The figure shows a severe drop in the number of users at peak commuting hours,

not only during the first weeks of lockdown but also during subsequent weeks when measures were being lifted. This could be explained by the surge in remote working, a form of work that may remain common in the long term.

When traditional public transport was canceled, users shifted to on-demand services

In Can Trabal, a suburban area with 2,900 inhabitants, the DRT service connects the neighborhood's remote areas with the suburban train station heading towards Sant Cugat city center.

The Can Trabal example shows that users may switch from regular bus services to on-demand alternatives when the former are reduced.

Once the state of emergency was declared, the Sant Cugat municipality decided to temporarily cancel the regular bus service in the Can Trabal area. At the same time, Shotl usage in the area began to increase, even exceeding pre-crisis demand. As observed in Figure 3 (middle row), the increase took place during the first weeks of lockdown, specifically for the 8AM-9AM slot.

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Students are not stopped by school closures; they instead travel for other purposes

At Les Planes, a low-density area with a population of 1,400 bordering the municipality of Barcelona, the Shotl service connects residents to commercial areas, schools, and the suburban train station.

The importance of school traffic in this area was expected to result in a sharp decline in demand at the morning peak during the crisis, as can be observed in Figure 3.

However, the closure of schools does not seem to have resulted in reduced movement of school children. Unexpectedly, declines in midday and afternoon peak hours were much less pronounced than in the morning. Usage around 6PM even stayed constant.

Interviews with bus drivers in the area indicate that students who were previously using the service to attend school were still using it in midday and afternoon hours, but for leisure purposes instead, indicating that demand persisted for different purposes.



Figure 4. Passenger using Shotl on-demand service at Sant Cugat

ⁱ Ayuntamiento de Madrid, “Informe de evolución de la movilidad”, September 2020.

ⁱⁱ Statistical Institute of Catalonia, “RFDB per habitant”,
<https://www.idescat.cat/pub/?id=rfdbc&n=13301&by=mun&lang=en>