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DESTINATIONS

Back to Sustainable mobility in times of COVID-19
Strategies for touristic destinations and small islands

Edited by **Andrea Lorenzini** - MemEx srl



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Back to Sustainable mobility in times of COVID-19 ■ Strategies for touristic destinations and small islands

CIVITAS DESTINATIONS

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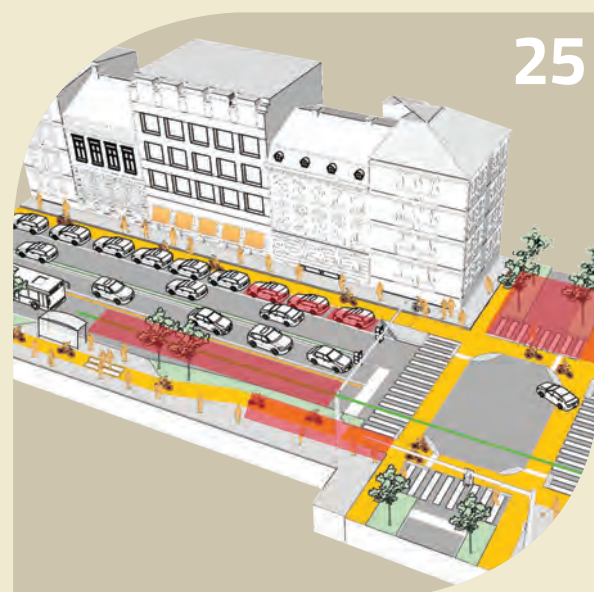
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The Project

CIVITAS DESTINATIONS is a four-year Innovative Actions project co-funded by the EU's Horizon 2020 Programme. Its main aim is the integration of sustainable tourism and mobility strategies through the development of a series of innovative solutions in six European islands.

The process

Funchal in Madeira, Limassol in Cyprus, Rethymno in Crete, the Municipalities of Portoferraio and Rio in Elba, the Region of Valletta in Malta and Las Palmas de Gran Canaria experience significant seasonal flow of tourists each year, which puts great pressure in the transport systems of the islands. This calls for innovative solutions in order to improve mobility patterns and the quality of life for citizens and tourists alike.

The six European islands applied a set of uniform methodologies, in order to develop and implement sustainable mobil-

ity measures and actions, with the view to offering intelligent sustainable transport solutions for tourists and residents alike, through innovation and cooperation of all major stakeholders.

Twenty eight partners from 9 EU member states, with the strong support of their local politicians, have worked together for more than 4 years designing, developing, implementing and operating more than 75 measures and actions aiming at reducing the pressures on the transport systems of the 6 islands due to tourism. These actions and measures have helped develop Sustainable Urban Mobility and Logistics Plans, create attractive and accessible public spaces, promote behavioural change towards shared mobility and electromobility,

manage mobility demand and awareness campaigns and promote attractive, efficient and accessible public transport.

Objectives

- Improve overall urban accessibility;
- Reduce emissions/increase air quality;
- Reduce energy consumption;
- Boost local economic development;
- Change behaviours of citizens and tourists towards more efficient and sustainable modes of transport;
- Enhance social cohesion;
- Improve cost effectiveness and integration of transport and mobility services.



Summary of DESTINATIONS outcomes

Sites have now safer and more accessible public spaces for all, including citizens with physical disabilities.

- Elba increased safety for pedestrians and cyclists;
- Limassol installed 5 bike parking facilities;
- Madeira implemented traffic calming actions;
- Las Palmas de Gran Canaria developed traffic simulation scenarios;
- Rethymno installed 24 traffic lights with countdown timers and beach infrastructure for the disabled;
- Madeira, Rethymno, and Limassol cooperated actively with schools to promote safe routes and mobility plans for schools and university communities.

Long-lasting incentives to promote sustainable mobility were implemented.

- Madeira launched the "Public Transport Friend" discounts in some shops;
- Limassol introduced the Green Label Award and Mobility Card, and the Bicycle Challenge;

- Malta developed the Green Mobility Hotel Award and launched the App "My Malta Plan";
- The "Elba Card" was created to sell PT tickets in the hotels;
- Rethymno created the Sustainable Mobility Agency.

Commitment to contribute to a more attractive public transport (PT) experience.

- Las Palmas GC installed 20 new autonomous panels equipped with PT smartcards readers and acquired 3 hybrid buses and an e-bus;
- Rethymno was the first city in Greece to have an e-bus in the PT fleet;
- Elba signed agreements with the PT operator for better service;
- Limassol installed 20 bike racks on buses;
- Madeira installed various systems on buses to improve the PT fleet efficiency and carried out 4 demonstration tests with electric buses;
- Malta launched a new circular bus route, linking the ferry landing site to the main bus terminal.

The use of more energy efficient vehicles and sharing services was established across all sites.

- Elba designed the Shared Urban Mobility Agency;
- Rethymno improved the bike-sharing system;
- LPGC implemented a new bike-sharing system, Sitycleta;
- These sites also installed new EV-charging stations;
- Malta promoted car-sharing;
- In Madeira, incentive schemes were put in place to support the acquisition of EVs by residents and companies.

These sustainable mobility achievements will continue operating after the end of the project, contributing to the long-term legacy of DESTINATIONS and designating the six participating islands as ideal Sustainable Tourism Destinations making important contributions in the fight against Climate Change.

For a complete list and description of the DESTINATIONS measures please visit <https://civitas.eu/mobility-solutions/project/destinations>

1 Introduction

The transport sector is subject to many uncertainties, at the moment, in terms of mobility behaviours, transport offer/demand, and users' attitude towards public transport and shared mobility. The COVID-19 had severe impacts on the overall mobility services and transportation system, due to the behaviour changes and restriction measures adopted to prevent the spread of the virus in the population, including safety and sanitification procedures on vehicles.

The mobility demand has been severely affected by the pandemic. In several countries, including those of the DESTINATIONS sites, throughout 2020 and early 2021 the National Governments have been adopting COVID-19 mobility restrictions and promoting smart working and similar home-based tasks (home food/shopping delivery, virtual healthcare visits, etc.). Economic activities, where possible, have been digitalised, as well as education (distance learning) and commercial (noticeable increase of the e-commerce and online purchase of products) provoking relevant change on key aspects (reduction of commuter rides, less use of collective services, increase of home delivery/freight traffic, increased use of private cars, etc.).

In 2021, people are still invited to avoid proximity to each other, sensitised to view themselves and others as potential sources of disease. This is the main reason why user perception towards shared mobility, including public transport, has changed. A recent survey conducted in Italy showed that almost 60% of the interviewees consider "much less safe" or "less safe" than in the pre-COVID-19 situation all collective means of transport, both local and medium / long distances. The perception of insecurity is almost as strong also for ride sharing like carpooling, and taxi services. It is likely that in other European countries the situation is quite the same.

The cluster experience of the DESTINATIONS sites on the different shared services management and the e-mobility and active modalities could be a base factor for defining and developing alternative and clean options to the use of the car based on various forms of sharing services (bike, ride, e-scooter, e-bike, etc.), integrated with public transport and pedestrian modality.

This thematic report aims to take stock of the current situation in the DESTINATIONS sites in terms of transport policy, and demand and offer, analyzing the impacts of COVID-19 on urban mobility and presenting some key pathways to be followed for achieving sustainable mobility goals.

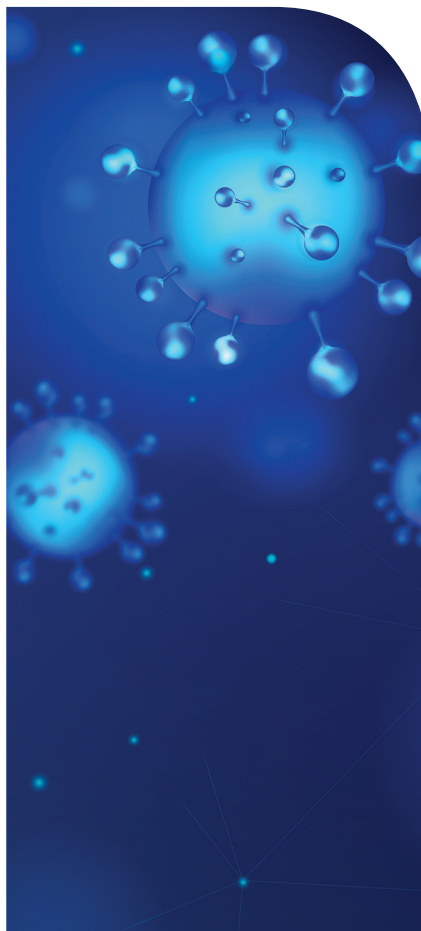
It is based on a specific survey conducted with the DESTINATIONS sites over February and April 2021. The survey aimed to integrate the results of a previous survey conducted in 2020 with a further assessment based on the evolved situation from Summer

2020 on, including some forecasting indications for the touristic season of 2021.

The deliverable is organised as follows:

- **Section 2** provides a short overview of the main characteristics and mobility challenges of the DESTINATION sites, their transportation offer and the COVID-19 impacts on mobility and the tourism flows.
- **Sections 3** focuses on the changes in user perception and behaviour towards mobility services and transport conditions during the COVID-19 crisis
- **Section 4** analyse the impacts and challenges of the COVID-19 outbreak with respect to the transport provision and digital solutions level
- **Section 5** reports the main policies and measures implemented by the DESTINATIONS sites to face the COVID-19 impacts on transport
- **Section 6** presents two possible strategies to restore and enhance sustainable mobility in tourists' cities
- **Section 7** take the findings from the previous sections to highlight some key recommendations on sustainable mobility, targeted to policy and decision-makers.

Considering the COVID-19 crisis and its impacts on the transportation sector, one of the current main priorities is to define possible new mobility policies and transport service schemes, based on the integration of different services (active, clean and shared) with the PT services (redefined under different COVID-19 and post COVID-19 constraints), in order to avoid/contain the "new rise" of the private cars use, especially for tourists. This approach should include both planning and operation/management actions, developing specific measures for Public Transport and shared mobility to better respond to users' needs and overall site sustainability.



2.1 Funchal, Madeira



Funchal,
Madeira (PT)



Inhabitants
111 541



Area
76,15 Km² (city area)



Visitors/year (2018)
2,1 million



Madeira is a well-known tourist destination in the middle of the Atlantic. It is located 973km from Lisbon, with 261.313 inhabitants. Tourism is a main economic pillar responsible for the 10% of the GDP of the Autonomous Region of Madeira. In 2018, Madeira received 1.6 million tourists arriving by plane and 530 thousand by cruise ship. In tandem with the high tourism flow, the residents' excessive

private car use and limited PT use leads to significant mobility problems.

Within the CIVITAS DESTINATIONS project, the local partners build up an integrated approach in mobility and tourism, introducing innovative sustainable mobility solutions. Special attention was paid to the PT services improvement and renovation. Important achievements are the increase

in PT use by residents and tourists, the improved accessibility for pedestrians, and the uptake of e-mobility in both private and public sectors. Due to DESTINATIONS, the PT use has been increased by 5% between 2016 and 2019. PT users became more satisfied (about 80% stated that the service was beyond the satisfactory level), and the monthly PT passes sales have been increased.



Public Transport and Shared Mobility

"Horários do Funchal" PTO. Other main transport companies are Rodeste and SAM.

- About 15 urban lines in Funchal
- About 7 interurban lines, operated by Horários do Funchal, and further lines operated by the other operators



E-charging infrastructure

- 5 public fast e-charging stations, installed by Regional Government.
- 17 e-charging stations, installed by municipalities (11 by CMF).
- 11 e-charging stations, installed by private companies in shopping centres, restaurants, hotels and the airport.
- 18 e-charging stations, installed by public entities due to the national fund Fundo Ambiental for auto-consume.
- 5 electric mini buses, funded by ERDF, operating in Funchal's city centre.

Figure 1 presents the urban mobility changes in Portugal generated due to the COVID-19 pandemic and the governmental policy responses. It demonstrates the movement trends compared to a baseline volume on January 13th, 2020.

Due to the COVID-19 and safety concerns, private car use prevailed in Portugal, especially after the 1st lockdown's lifting. The easing of restriction measures, starting from the end of April 2021, resulted to an increase of daily commut-

ing. More precisely, comparing to the pre-COVID-19 period, the driving was doubled and walking reduced by 30%. The preference for driving compared to walking remained during the 2nd COVID-19 wave. The sharp increase in driving

during summer can be correlated with increased tourism flow.

The COVID-19 impacts on Madeira's incoming tourism are obvious. The pandemic resulted in a 99/% reduction in arrivals in May 2020 compared to May 2019. The first impression of 2021, highlights the consecutively impact of travel restrictions; the arrivals of the first quarter of 2021 indicate an 85% reduction compared to 2020.

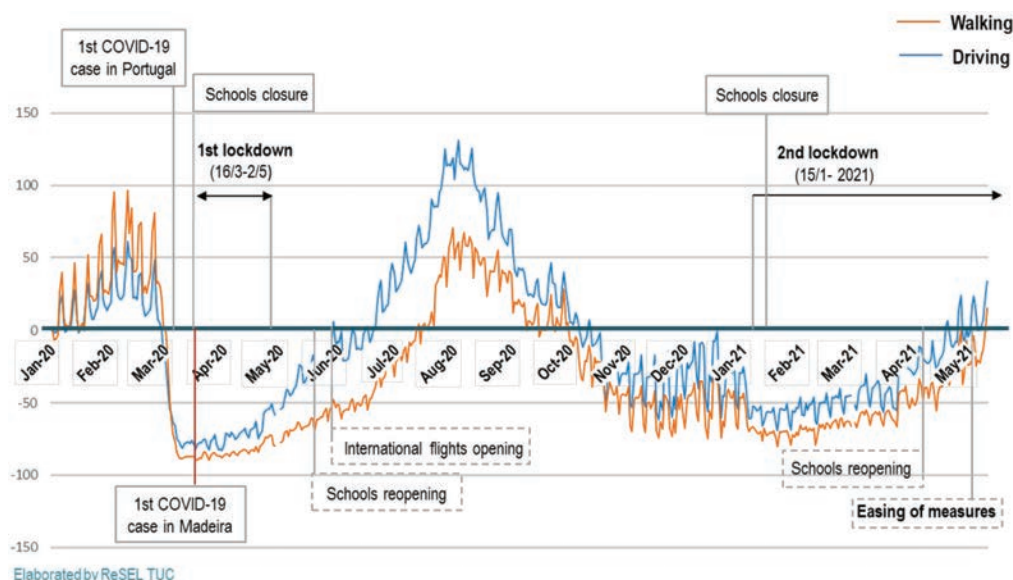


Figure 1 - COVID-19 timeline and mobility trends during the pandemic in Portugal

Data obtained from COVID-19 Apple Mobility Trends Reports (% change from baseline)

2.2 Limassol, Cyprus



Limassol,
Cyprus (CY)



Inhabitants
235 330 (Limassol District)



Area
55 Km² (city area)



Visitors/year (2018)
350 000



Situated in the southern coast of Cyprus, accessible by airport and port, Limassol is a popular tourist destination, attracting between 300.000 to 400.000 visitors annually, which is around twice its population. The high tourism flow imposes great pressure on the city and creates severe demand on road transport infrastructure, especially in the most popular attraction sights. With the aim to enhance sustainable

mobility modes, DESTINATIONS measures included redesigning services, introducing new mobility products, and, most importantly, behavioural change. Since the increased car dependency was identified as the key problem in Limassol (92% of transportation was by car when DESTINATIONS started), the change in residents' travel habits, towards an increased use of sustainable transport modes, was the focus of the implement-

ed actions.

The improved PT timetables and services, the expansion of the bike-sharing system, the additional cycling, walking, and hiking routes managed to engage more residents and tourists in active transportation.

The gradual change in people's travel behaviour was also observed during the pandemic, when the use of bike-sharing services was increased.



Public Transport and Shared Mobility

EMEL, a private company, operates the PT service in Limassol.

- About 21 Urban Lines (from outside and inside Limassol)
- About 15 Students lines
- About 15 interurban and rural lines



Shared Mobility services

Public bike-sharing and e-bike sharing service features:

- 200 bikes, ■ 21 e-bikes, ■ 29 bike sharing stations
- 4 bike parkings installed in the city and one bike parking facility in the rural area.

Service scheme: Dock-based bike sharing system
The bike sharing company is Next Bike CY. Bookings can be made through an app, at the BS station terminal, on the website or calling a 24/7 hotline



E-charging infrastructure

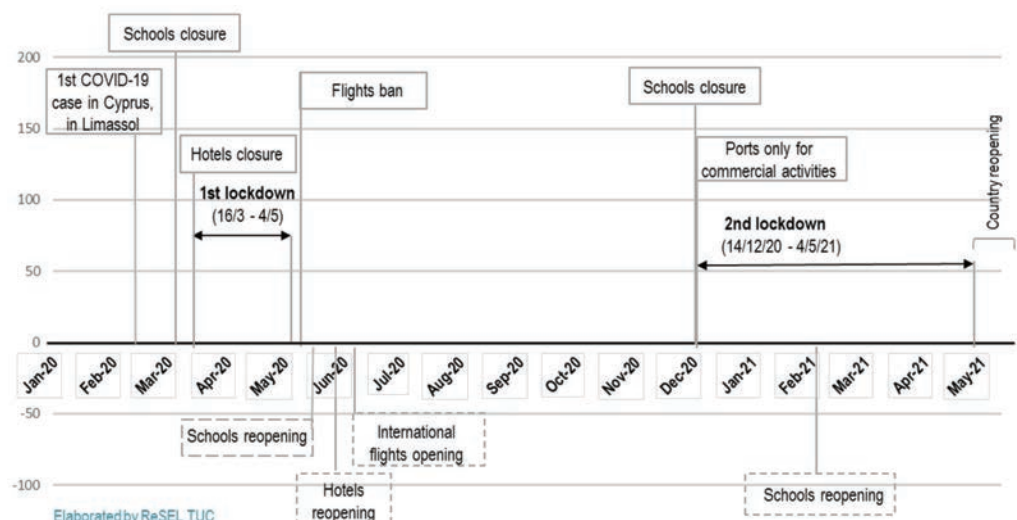
In 2015 the number of EV-charging stations in Cyprus was 15 and only 3 in Limassol Region. During DESTINATIONS, Limassol Tourism Development and Promotion Company Ltd (LTC) in collaboration with EAC installed 7 more EV-charging stations, of which 4 with shelters.

Before the COVID-19 outbreak, the majority of daily commuting in Limassol was taken place by car (74%). Moreover, bicycle and PT use were at 10%, and 6% of residents commuted on foot. The first lockdown was imposed on 16 of March 2020. The country reopened in May 4th, 2020 and faced a second lockdown on 14th of December 2020. The COVID-19 timeline for Limassol is presented in Figure 2.

The tourism flow chart highlights the steep reduction in tourists' arrivals, reaching a peak of 88% reduced arrivals in July 2020 compared to 2019. It is noteworthy that

one year after the onset of the pandemic and with the 2nd national lockdown still in force (since 14/12/2020), the tourism industry continues to record historic losses.

More precisely, in March 2021, Limassol received only 8.811 visitors, recording a 85% decline in inbound tourism compared to March 2020.



2.3 Las Palmas de Gran Canaria



Las Palmas
de Gran Canaria (ES)



Inhabitants
381 847



Area
100 Km²



Visitors/year
1 - 1,2 million



Las Palmas de Gran Canaria is the capital of the Gran Canaria island, with 380.000 citizens in 2019 and around 600.000 inhabitants in the wider metropolitan area.

Thanks to its privileged location and the moderate and stable weather conditions, it welcomes tourists throughout the year, by air and sea, with the high season starting in October and finishing in May. In 2019, Gran Canaria hosted more than 4.2 million visitors.

During the CIVITAS DESTINATIONS project, the Municipality and the urban PT company "Guaguas Municipales" worked together and carried out a high-capacity PT system.

Furthermore, specific measures were applied for the bike network's upgrade and the promotion of cycling. Las Palmas achieved its main goal of curbing private car use and changing modal split. The significant improvement in PT services, alongside the implemen-

tation of the successful public bike-sharing system, "Sitycleta", fostered new travel behaviour in citizens and tourists and enhanced substantially sustainable mobility and significantly improved the quality of life.

During the pandemic, the use of Sitycleta was significantly increased as a result of a shift towards sustainable commuting and the provision of a high-quality municipal service.



Public Transport

Two main transport operators:

- "Guaguas Municipales" PTO, which operates primarily in the capital Las Palmas with a fleet of more than 250 vehicles for over 11 million km per year.
- "Global" Operator, responsible for the extraurban public transport services. Fleet of 308 vehicles travelling more than 27 million km a year.



Public Bike sharing service "Sitycleta"

Sitycleta service operated by SAGULPA, the Las Palmas Parking operator. Service features:

- Dock-based BS system offering 42 stations (5 of them equipped with smart totems).
- 525 anchor points/bike docks
- 20 e-bikes; 375 smart bikes; 2 bikes accessible for people with reduced mobility.
- Three e-vans (partially funded by DESTINATIONS) used to rebalance bicycle stations.



E-charging infrastructure

Before DESTINATIONS, Las Palmas de Gran Canaria had 3 fast charging points in one of its public parking facilities. Sagulpa has installed 6 EV charging points co-funded by the CIVITAS DESTINATIONS project, inside several parking facilities available –for free– for Sagulpa's, clients.

Figure 3 illustrates the COVID-19 impact on people's travel behaviour. As shown, before the pandemic the car

use was limited as residents and visitors opted for walking or PT. Nevertheless, driving was increased compared to

walking during the 1st lockdown and kept rising, reaching a peak in August (+36% driving, -72% walking). Then,

it was gradually decreased until the 2nd lockdown (October 2020).

From October till today, people continue to commute more by car than walking; however, the variation between these two transport modes is less significant. The region reopening on May 2021 signals the gradually re-increase of mobility trends. As in Madeira, the increase in driving can be associated with the increase in tourists' arrivals during summer.

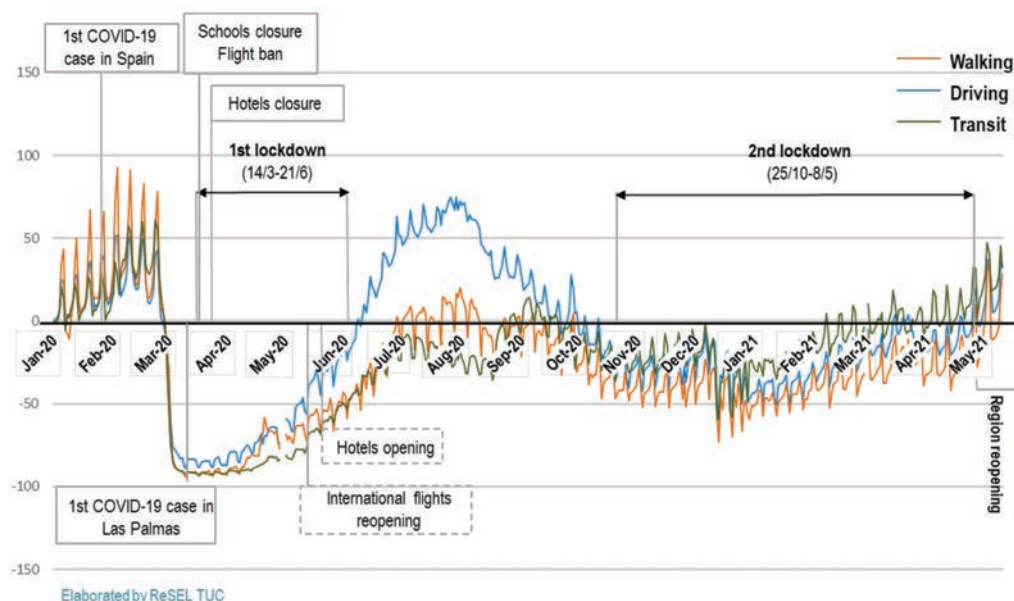


Figure 3 - COVID-19 timeline and mobility trends in Spain during the pandemic

Data obtained from COVID-19 Apple Mobility Trends Reports (% change from baseline)

2.4 Valletta, Malta



La Valletta,
Malta (MT)



Inhabitants
205 635



Area
50 Km² (city area)



Visitors/year (2019)
(number of arrivals) 2,8 million



Malta is the main island in the Maltese archipelago and a popular destination for tourists arriving both by air and by cruise ships.

The high and increasing influx of tourists (2,8 million arrivals in 2019), together with the local population of almost half a million, adds significant pressure on the existing infrastructure and road capacity. Compared to the other DESTINATIONS

sites, the island's mobility features mostly resemble that of an urban area; densely inhabited areas, cars agglomeration and traffic congestion.

Malta was the only DESTINATIONS city having the PT use as the primary commuting mode (53%), above the private car use (41% in total).

CIVITAS DESTINATIONS laid the ground for sustainable mobility and the imple-

mented measures managed to improve the city's profile. In order to combat the COVID-19, Malta applied policies to enhance active mobility.

Many people chose walking as a leisure activity and shifted towards sustainable mobility (Increase by 67% compared to driving which showed a 40% reduction.



Public
Transport

Malta PTO operates about 30 million kilometers every year with a fleet of 430 buses and a team of over 1,300 people

- About 110 bus lines in Malta
- About 15 lines in Gozo



Bike sharing
service

Two bicycle sharing operators on the island.

- Next Bike BS system, operated by NextBike Malta: 58 stations, over 400 bicycles
- Tallinja BS system, operated by Malta Public Transport: 3 stations, 40 electric bicycles, located in the capital city Valletta.

Both NextBike and Tallinja Bike are dock-based systems.



Car sharing
service

The Private company Car2Go launched its GoTo car sharing scheme in autumn 2018, with a fleet of 150 electric cars, supported by 225 charging pillars and 450 reserved parking spaces across all localities of Malta

Figure 4, indicates the main COVID-19 movement restrictions and the movements to parks, workplaces and transit stations, during the outbreak period, based on the Google COVID-19 Community Mobility Reports, for Malta. It compares this change relative to a baseline day given as median value over the five-week period from January 3rd to February 6th 2020.

Due to COVID-19, a sharp decline in tourism flow, of 85%, was observed in July 2020. Although the tourism flow data for the 1st quarter of 2021 was still disheartening,

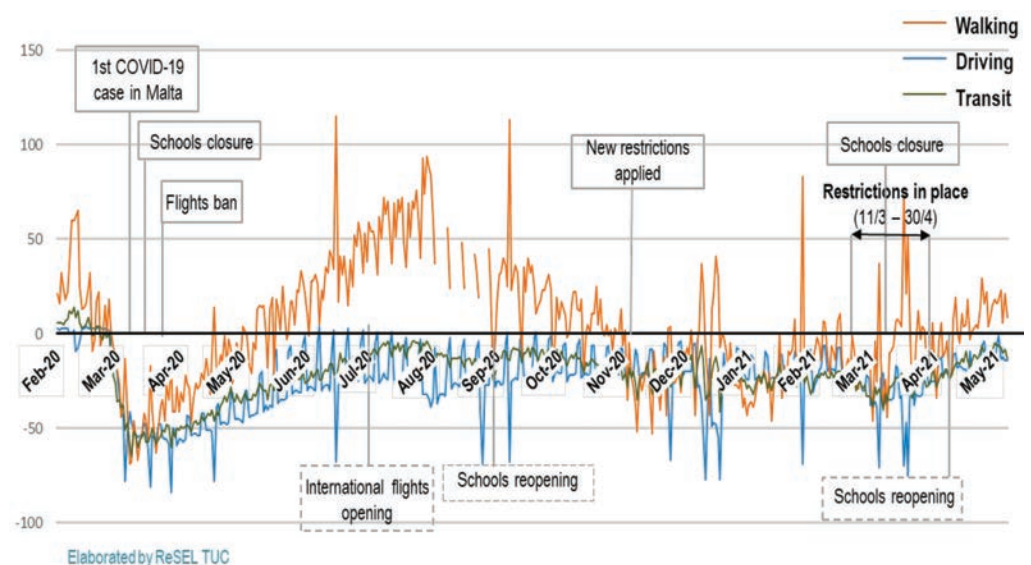
Malta is aiming to revive its tourism industry and recoup COVID-19 related tourism losses.

The authorities, based on the gained experience, aspire to

encourage increased tourists flows to explore the region using economic and sustainable transport modes.

Figure 4 - COVID-19 timeline and mobility trends in Malta during the pandemic

Source of mobility trends:
Google COVID-19 Community
mobility Reports)



Elaborated by ReSEL TUC

2.5 Rethymno, Crete



Rethymno,
Crete (GR)



Inhabitants
62 886



Area
26,7 Km² (city area)



Visitors/year
1,5 million (whole island)



Rethymno is the third largest municipality of Crete, with 62.886 inhabitants. Every year it accommodates more than half a million tourists and attracts over 1.5 million visitors on day tours and cruises. As a top-rated tourism destination, visited both by air (airports in neighbouring cities, Chania and Heraklion) and sea (ports in Rethymno, Chania, Heraklion), Rethymno has to address the rising challenges de-

rived from the high seasonal tourism flow and the subsequent strain on the city's transport system.

The mobility patterns of Rethymno indicate car use as the main transportation mode (60%), followed by walking (20%), PT use (10%), cycling (5%) and taxi (5%). Aspiring to strengthen the city's image as an attractive tourism destination and improve the quality of life residents and visi-

tors, Rethymno, through DESTINATIONS, promoted e-mobility and shared mobility solutions, improve the urban environment (reducing traffic congestion, GHGs emissions and noise), and to enhance accessibility and road safety. Rethymno, succeeded to increase active transportation (walking, cycling) and motivated a change in people's attitudes towards sustainable mobility.



Public Transport

"KTEL Chania - Rethymno SA", is a cooperative private owned PTO of West Crete; a fleet of 244 buses in Crete, connects Rethymno with the main cities Chania and Heraklion. Additional urban lines, at the 4 prefecture units capitals (Chania, Heraklio, Rethymno, Ag. Nikolaos), connect smaller towns and villages.



Bike Sharing services

Public e-bikes scheme, free of charge, with 18 e-bikes used by municipal staff for daily commuting to/from work. It is combined with a PV shelter and 1 e-bike for mobility-impaired people.

Note: during 2019 and 2020, an e-scooter and an e-bike sharing system were in pilot operation by private companies. Due to COVID-19 transport restrictions, as the private companies withdraw their e-vehicles.



E-charging infrastructure

- The first three- in the region- public EV charging stations at municipal parking facilities, due to DESTINATIONS.
- A fast-charger in a bioclimatic square, and a 8-e-car port with a PV shelter.
- 10 micromobility charging stations with photovoltaic panels in the Central Parking area.
- Free parking and charging for all e-cars
- The first e-bus, nationally, operated by the local PT operator, launched in 2019

COVID-19 deeply affected people's mobility patterns. One remarkable impact was the significant increase in active mobility. Citizens took advantage of the improved bike network and walking

routes demonstrated during DESTINATIONS; walking was increased by almost 12% and cycling was doubled. Although private car use was reduced significantly during the 1st lockdown, a rebound effect was

observed as soon as the restriction measures' were lifted. Safety concerns contributed to the increase of driving as they impeded a significant share of the population from using PT. Nonetheless, the increase

in walking noted between the two lockdowns (+250%) is quite promising for the future of sustainable mobility. Since early of May 2021 and the 2nd lockdown lifting, an increase rate in mobility trends is noted. Rethymno experienced severe impacts of COVID-19 to the tourism flow. 2020 recorded almost 4.000.000 less tourists arrived in the island (5.423.732 arrivals in 2019, 1.543.126 in 2020). The reduction reached 96% in June and 67% in July during the high tourism period..

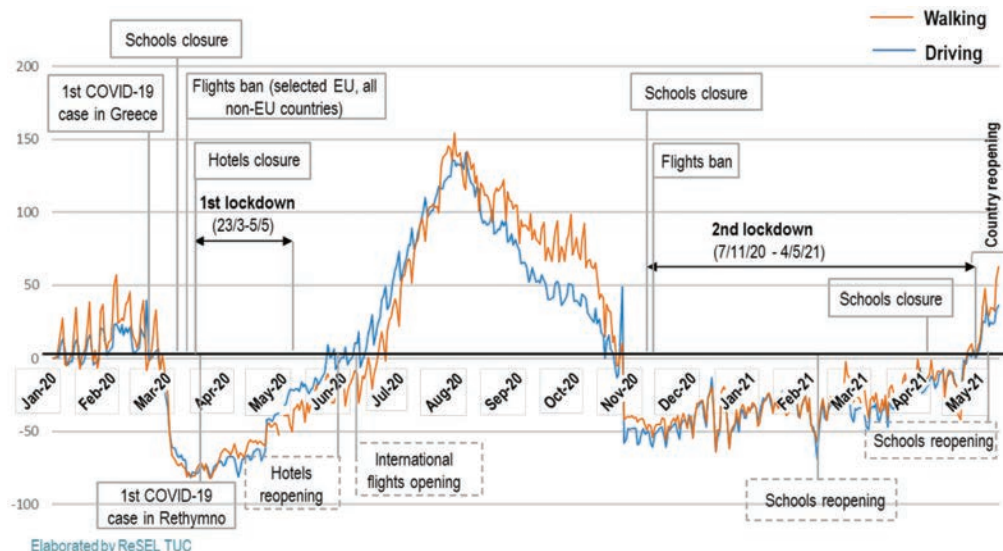


Figure 5 - COVID-19 timeline and mobility trends in Malta during the pandemic

Data obtained from COVID-19 Apple Mobility Trends Reports (% change from baseline)

2.6 Elba, Tuscany



Elba Island,
Tuscany (IT)



Inhabitants
33 600



Area
223 Km²



Visitors/year
440 000



Elba is an Italian island located in the Tuscan Archipelago, and it can be visited only by sea. It has a total of 33.600 citizens (2018), and it is a famous international tourist destination thanks to its variety of beaches and cliffs, mountains

and villages, culture and local foods. During the peak season (June-September), the tourists registered represent about 85% of the annual visitors. This large and concentrated tourist flow in a short period induces significant mo-

bility problems. Among the mobility issues that the city is facing, the low use of PT (15%), the car dependency (57,6%) and the limited bike network prevail (bicycle use at 6%).



Public Transport

CTT Nord, PTO for all island municipalities.

- One urban bus line operated in Portoferraio;
- Three extra urban bus lines connecting the 7 municipalities and the main villages of the island
- "Marebus", a Summer service, connecting different Municipalities with the main beaches



Shared Use Mobility Agency

Structure dedicated to plan, manage and coordinate the different ride-sharing services, mobility information services for users, and other types of mobility planning support available on the island. The platform will be the Agency's ICT backbone and it will help achieve the objective of improving service accessibility and transport information for both final users and citizens



E-charging infrastructure

50 charging stations are planned to be installed in the whole island, 15 stations in Portoferraio Municipality, and 8 stations in Rio have been already installed. The stations are developed by ENEL, the largest electricity provider in Italy.

The DESTINATIONS measures managed to improve the island's attractiveness for tourists and the quality of life for residents. The development and implementation of the Shared Use Mobility Agency, a complete infomobility and multifunction platform and Application, addressed the mobility problems connecting all the available transport services. This innovative action has already contributed to the enhancement of sustainable transportation. Similarly to Las Palmas, limited transportation was observed in Elba during the

lockdowns and car use was increased in the between period. Driving was increased in parallel with the summer tourism flow by 300%. It was again reduced during the 2nd lockdown and is gradually rebounded since the May

2021 reopening. The tourism sector and subsequently the economy had been hit profoundly by COVID-19 during the 1st pandemic wave, considering a reduction of up to 96% in April 2020. Nevertheless, since June, the tourism industry in Elba

showed signs of a strong recovery, as inbound tourism flows reached almost that of 2019. An unexpected observation that cannot be disregarded was the rise, 5.5%, in tourists' arrivals in August.

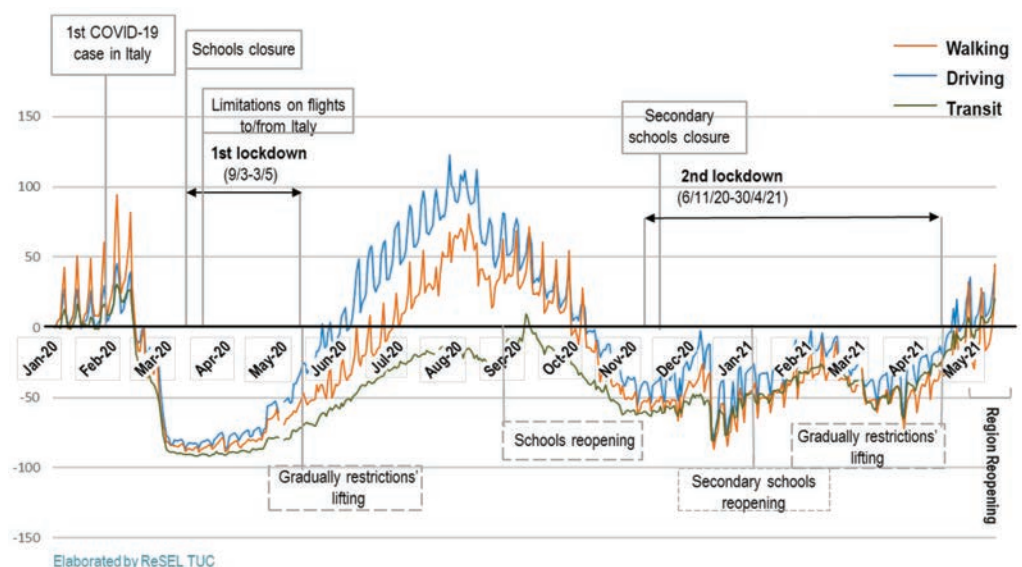


Figure 6 - COVID-19 timeline and mobility trends in Italy during the pandemic

Data obtained from COVID-19 Apple Mobility Trends Reports (% change from baseline)

Elaborated by ReSEL TUC

3 Changes to mobility behaviour due to COVID-19

The COVID-19 pandemic has caused dramatic changes to mobility attitudes and transport behaviour. Whereas some of these changes have been dictated by regulations and restrictions, such as capacity limits, others have been related to the human response to the virus, such as increased safety fears. This was especially the case when detail about the virus was unknown leading to wariness of strangers and crowded spaces. The level of national restrictions has fluctuated across countries in response to local level variations in the spread of the virus. This has resulted in different transport trends, which are demonstrated here through the six DESTINATIONS sites (Elba, Las Palmas de Gran Canaria, Limassol, Madeira, Malta, and Rethymno). Changes in travel behaviour have been assessed at different stages:

- Firstly, the immediate impacts during the start of the pandemic, as the world went into lockdown (April 2020);
- Secondly, the medium-term impacts comparing how behaviour changed after the first lock down (Summer 2020); and,
- Finally, the longer terms impacts, looking at any changes apparent today compared with pre-COVID-19 travel behaviour.

By understanding how the populations are responding to the lifting of restrictive measures, we might shed light on whether behaviour is returning to pre-pandemic habits, or alternatively, changing for the longer-term.

The effects on travel and mobility behaviour in these sites can be seen as a response to government restrictions, such as the lockdown where people were told to stay home and not travel, and also as an emotional response to the pandemic, where people were fearful of travelling in close proximity to others on public transport.

3.1 First impacts of COVID-19 on travel behaviour (April 2020)

In all the DESTINATIONS sites, during the period from March to May 2020, the National Government established severe measures to contain the COVID-19 pandemic. People were allowed to travel only for urgent reasons, schools were closed, and smart working was strongly encouraged.

Therefore, the overall need to travel decreased, including the use of public transport. These reductions on travel, alongside additional capacity restraints on public transport, resulted in a considerable decrease in the number of passengers during the early months. Public transport use fell by 89% in Rethymno, 50% in Limassol, 76% in Madeira and 88% in Las Palmas de Gran Canaria.

During this period, many residents reported feeling most comfortable and safe to use their own car to travel.

However, during the first lockdown in all sites, there was a reported reduction in the number of car journeys too.

Overall movement decreased everywhere. When assessing peoples' mobility behaviour according to the place of visit, similar trends are observed across the sites with a sharp decline of journeys to workplace, retail, grocery up to 70%, but an increase in local residential trips. This data collected by Google seems to show an accurate reflection of the anecdotal evidence.

Sites also saw a gradual return to "normal" (pre-COVID-19) levels in terms of traffic levels and public transport use, although smaller sites such as Rethymno reported a noticeable increase in the number of cars on the roads compared to the return to public transport, meaning that people were more comfortable in isolated



cars rather than return to shared modes. These changes in perceptions and behaviours are likely to linger unless strong efforts are made to encourage people back to public transport and sustainable modes in the near future.

Sites also saw changes in other modes use such as the bike and e-scooter sharing. In Rethymno (like in many other European cities), Lime e-scooter sharing Company suspended their services, resulting in a sharp drop in shared mobility. A fall in use of bike sharing was seen



in Las Palmas de Gran Canaria, even though it was one of the few systems in Spain to remain operative and available during the pandemic. However, usage of Sitycleta bounced back from 5% to 70% of pre COVID-19 levels by the end of the first lockdown. In Limassol, an increase in bike sharing use was reported, showing different stories from our DESTINATIONS sites. The service, operated by NextBike, continued



during the crisis and the number of bike sharing users was significantly higher than the year before, up from 169 users in May 2019 to 605 users in May 2020.

Feedback showed that many people use the service to be in their own space and avoid contact with other people. This shows how micro-mobility can be a solution during such a pandemic.

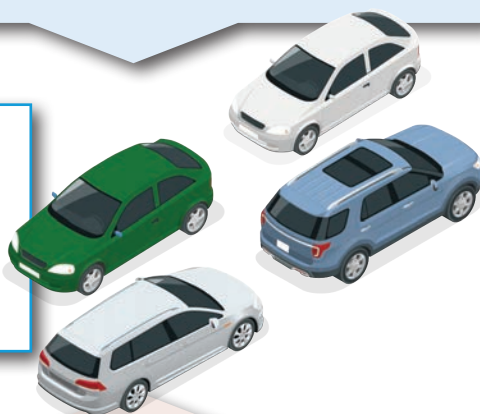
Medium Term Impacts: how behaviour changed

There is evidence in cities across Europe that car use rebounded after the first lockdown and in many places is higher today. A similar picture unfolded in the DESTINATIONS sites.

In **Rethymno**, in April 2020, during the national lockdown, 21% used a private car daily. After restrictions were lifted in June 2020, daily usage of private cars increased to 38% – showing a rebound effect, driven in part by safety fears of using public transport and reduced frequency and capacities. The traffic reduction was less intense during the second lockdown (Autumn 2020). In comparison to the first, people were commuting more often (compared to April 2020).

In **Elba**, private car use became slightly elevated compared to the beginning of COVID-19, whereas in **Malta**, private car use levels remained high before, during and after the first lockdown.

Private car



Compared to pre-COVID, private car use could either rapidly increase, as people return to work, choosing to travel by private car rather than by public or shared modes, or it may not return to its pre-COVID levels, as a result of more people continuing to work from home, and/or staying more local when shopping (localisation of trips).

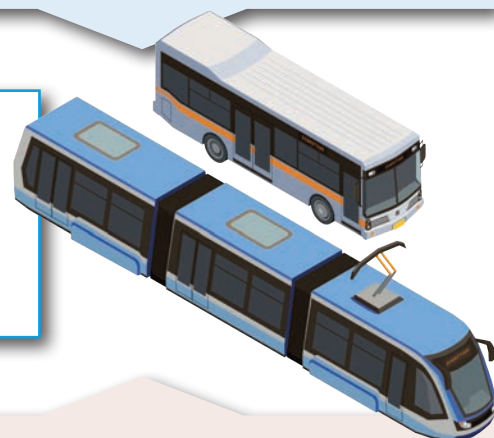
In some of the DESTINATIONS sites, such as **Elba**, **Limassol**, and **Madeira**, a decrease in private car use has been reported. In **Madeira**, a decrease of 73% was originally reported during the first lockdown. However, according to data gathered by automatic traffic counters, as of February 2021, the traffic volume in **Funchal** is gradually resuming to the flow levels seen prior to the lockdown period, but has not yet exceeded them.

On the contrary, **Las Palmas**, **Malta**, and **Rethymno** have witnessed an increase in private car use. In the Region of Crete (for **Rethymno**) for example, prior to the COVID pandemic (January 2020), there was a mode share of 43% using private vehicles daily. As of February 2021, this has increased to 72% (66% driver, 6% passenger). This may indicate longer term behaviour trends which run counter to SUMP objectives.

For public transport, usage levels varied according to the local response and local restrictions. This also depends on the human response to the pandemic – and how safety fears affect people's mobility choice.

In **Elba** and **Limassol**, small increases in public transport usage were reported after the lockdown. However, in **Limassol**, bus users rebounded more substantially according to the Limassol Bus Company. In April 2020, 32,765 passengers used public transport, increasing to 208,806 in December 2020. This is a positive story; however, it is still very low in contrast to December 2019 where there were 342,127 passengers. In **Madeira**, the number of public transport passengers remained low following the first lockdown due to a reduced level of service. In **Rethymno**, usage was very low in April 2020, with the modal share falling drastically to 1% of all trips from 9.7% in January 2020. After the first lockdown ended in June 2020, usage levels did not pick up, remaining at 1% modal share with some restrictions still in place and bus capacity limited.

Public transport



All the DESTINATIONS sites are still reporting a decrease in public transport usage, compared to pre-COVID levels:

- **Malta**, **Madeira** and **Las Palmas** indicate notably lower activity levels around public transport than pre-pandemic. Specifically in **Las Palmas**, Guaguas Municipales (the urban PT company) has data showing that before the pandemic there was an average of 140,000 daily users (on a working day) dropped to 95,000 in March 2021. This means that, despite Guaguas Municipales offering 90% of the public transport service, demand is only 68% compared to pre-COVID levels.
- In **Elba**, although additional services covering more routes and hours are provided, usage is still slightly lower. However, there was good public acceptance towards the changes in public transport services and urban space re-designs, many of which favoured restaurants and bar space.
- In **Rethymno**, as of February 2021, public transport usage is still about 50% lower offering only 5% modal share compared to 10% in January 2020. This shows the scale of the challenge to win back bus patronage.

Longer Term Impacts: travel behavior

after the first lockdown (Spring - Summer 2020)

Most of the DESTINATIONS sites reported an increase in walking and cycling levels during and straight after the first lockdown, compared to pre-COVID times.

In **Rethymno**, active travel levels during and after the first lockdown (April and June, respectively) actually exceeded pre-pandemic rates. Walking levels peaked in April at 54% falling to 46% in June, still above levels seen in January and February. Cycling instead increased of the 6% in April up to the 9% in June, a rate which is double the levels seen before the first lockdown. This shows the potential for longer term behaviour change if carefully nurtured by local policy and investment.

Cycling and walking



Active travel modes have mostly seen a boom during 2020, compared to pre-COVID levels. This trend can be seen in all DESTINATIONS sites and in particular:

- In **Las Palmas**, the use of cycling and other personal mobility vehicles has increased thanks to the implementation of an extended bike lane that connects different parts of the city through a safer route. This has also been supported by the bike share scheme which has always remained in operation. Increased walking levels has also been seen along some streets located in strategic commercial areas.
- In **Madeira**, although no official data is available, there is anecdotal evidence of residents cycling and walking more throughout the pandemic. With no tourists on the streets either, the true effect on modal shift is therefore unknown. Civil works were already in place to improve active mobility, and the Municipality is planning to continue to promote cycling and walking, enlarging sidewalks and expanding bike lanes
- In **Rethymno**, whilst there is no available data for active travel levels in Spring 2021, the increase in walking and cycling observed during and after the first lockdown shows the potential for this change to become more long term.

Levels of working from home, online shopping, and online deliveries increased significantly during the first lockdown in all sites and across Europe. Taking as an example Greece as a whole, we have observed a number of interesting changes regarding journey types and removing the need to travel:

- **Teleworking**: in April 2020 (during the first lockdown), the vast majority of people (87%) worked from home. The teleworking percentage remained high (at 82%) right after the lifting of the restrictive measures in May 2020 but decreased to 47% by late June. During the second lockdown (November 2020), 52% reportedly worked from home.
- **Shopping**: during the first lockdown (April 2020), commuting to supermarkets reduced by 55%, with 72% of citizens opting for more local stores. However, levels of online shopping increased by 30%, reaching a maximum of 50%. A further increase, to 58% was observed during the second lockdown.

Working from home, online shopping and delivery



In **Elba**, **Malta**, and **Limassol**, increases were observed in working from home and online shopping. In **Limassol**, a large proportion of companies requested their employees to work from home or to work on rotation, with most shops obliging to sell their products online and increase the availability of delivery services.

In **Rethymno**, before the COVID-19 pandemic, 64% had never worked from home. Mobility trips for workplaces decreased by 31% between February 2020 and February 2021 showing a lasting shift away from "working in the office". As for online shopping: during the pre-COVID-19 period, 20% of internet users were shopping online. During the pandemic, this increased to 50%, according to a recent study. 36% declared that they will stop shopping online after the end of restrictions.

As of April 2021, most sites still have restrictions of movement, which means it is too early to tell whether these commuting and shopping habits will stay forever. However, most experts believe that it is very likely that a proportion will retain these tendencies. This offers an opportunity to reduce trips made overall within a city, to help pursue decarbonisation objectives.

our today wrt pre-COVID-19 situation

4

Impacts of the pandemic on the tr

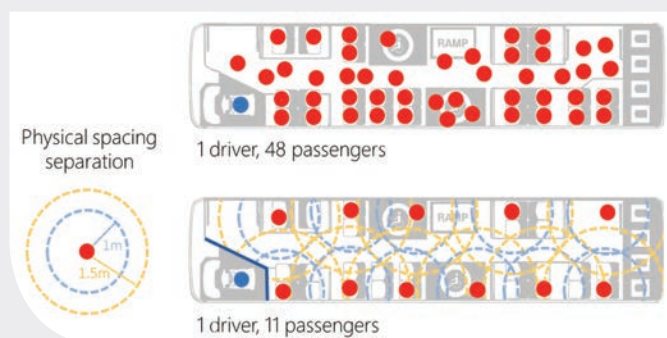
Limits on vehicles' capacity

In all of the DESTINATIONS site, the capacity of the public transport vehicles has been greatly reduced, in line with safe-distancing requirements emanated by the national governments.

In the 'first wave' period, almost all of the DESTINATIONS' sites faced a severe reduction in the capacity, up to 75% in Elba and Malta. Standard buses were operating to 10 persons maximum compared to

rated capacity of about 50 persons. Urban double-deck buses were limited to about 20 persons compared to a rated capacity of 72 seated plus standing passengers. Only one in four seats could have been utilised. Over Summer 2020, the measures started to be diminished, and, on average, the capacity ranged between 50 and 65%. From Autumn on, the reduction in the capacity was normalised at 50% (Elba, Limas-

sol) and 65% (Rethymno). During the summer season of 2021, most of the sites have been restoring the vehicle capacity up to 100%. It is not clear yet whether new restrictions will be applied from Autumn 2021.



sol) and 65% (Rethymno).

One person per double seat, and two persons per four seats were allowed. In Las Palmas, the on-seat capacity was restored to 100%, while the standing capacity was 2 person/m².



Reduction of service level and frequency

Over 2020 and beginning of 2021, conventional public transport services performed under Public Service Obligation (PSO) contracts have continued to operate throughout the pandemic and lockdown periods. However, some variations to existing pre-COVID-19 period were applied.

In particular:

- In Elba Island, among the different lines operated by CTT, the unique urban line of Portoferraio was suspended during summer 2020. The line was normally operated with small buses. The suspension was due to the process for the installation of the plexiglass's separation for the safety of the drivers, which took several months. For keeping an adequate level of offer in the commuting trips targeted to students and workers, among the 7 municipalities and villages, CTT developed a collaboration with some private NCC operators.
- In Las Palmas, during the first wave, the regional government mandated to re-

duce 50% the frequency of Public Transport services. From summer 2020 on, the frequency was restored. Moreover, on some lines (lines 12, 21, 24, 33, 47 and 91), the frequency of buses, especially at peak times, has been increased.

- In Limassol, the frequency of routes, during the first wave, was reduced and, in particular, the routes of the weekend were cancelled. The frequency was then increased in the second and third wave.
- In Madeira, the frequency of the routes has been increased in the peak hours and reduced during the lockdown hours
- In Rethymno, the bus frequency was reduced at 1/3 of the normal during the 1st lockdown. The frequency was increased during the summer, until the 2nd lockdown, which started on the 5th of November 2020 and ended on 4th of May 2021. During the 2nd lockdown, the frequency of bus was reduced again, especial on those lines connecting the regional unit hinterland/villages. On



08/2/2021, the PTO announced an increase of frequency on selected bus routes.

The e-scooters sharing scheme went off-service. The private operator (LIME) withdrew when the 1st lockdown was imposed (March 15), and returned in operation during July - Oct 2020. Since the 2nd lockdown (5th Nov) the service is not anymore running.

Transportation offer

Operation and organization aspects

The COVID-19 pandemic has affected both the operation and organisational aspects of the public transport services by bus and the other shared mobility services. All the operators had to apply health protocols during the whole period. Generally speaking, these included:



- Arrangements for pushing adherence to personal hygiene guidelines by the drivers & passengers, by placing posters for hand and personal hygiene guidelines at bus stations/stops and at indoor/outdoor waiting areas for boarding and disembarkation of passengers.
 - Arrangements for practicing safe distancing between drivers and passengers, by installing plexiglass separation panels.
 - Arrangements for airing out, cleaning, disinfection of public transport vehicles, of sanitary and cleaning facilities and for waste management.
- Moreover, public transport operators had to find suitable strategies to face the reduction in the vehicle capacity. In some cases, the pandemic period had been the opportunity to undertake a detailed planning of the service, and re-structure part of it.
- The main aspects addressed by the DESTINATIONS sites have been the following:

- In Elba, from September onwards, the public transport operator (CTT), facilitated by the Province of Livorno and the Tuscany Region Authority, developed a collaboration with some private operators (NCC). Thanks to this, the overall PT fleet operating in Elba Island has been integrated with additional vehicles (a total of six additional buses of 12 meters were added). This made it possible to duplicate the services operated in the school timing (morning and afternoon) and thus supporting the reduced capacity of the vehicles.
- In Rethymno, the pilot testing of the Travel Planner App, which was postponed due to COVID-19, has been launched on April 2021. A new e-bicycle municipal system for staff's daily commuting to/from work (18 e-bikes and 1 additional for disabled people) was launched

Funding and revenue issues



During 2020, PSO Contract services have continued to operate, despite the challenges imposed by the COVID-19 restriction measures. From the survey carried out with the DESTINATIONS sites, the common financial issues can be summarised into:

- Ridership have fallen, both due to the reduction in capacity for safe-distancing and the reduced demand for travel due to lockdown restrictions, especially

from international tourists. For example, the number of public transport users of Guaguas Municipales public transport company, in Las Palmas, faced a reduction from 140.000 daily users (pre-COVID19 situation) to 95.000 users in March 2021. The reduction in ridership resulted in substantial losses in traffic revenues, especially during 2020.

- PT and shared mobility operator, beyond facing almost fix costs about the structure and staff, had to cover additional costs for the development of cleaning and disinfection procedures. These included the purchase of the Hygienic-Gel Instant Hand Sanitiser, cleaning and disinfection of the vehicles, face masks, etc during the service operation and preparation. These additional cleaning procedures have been developed for both the conventional PT services and the bike and car sharing systems. It should be noted that the effectiveness of these procedures should be guaranteed also during the bus operation with further

impacts on the company organization and costs.

- Said that, some cost reductions have also been incurred. Indeed, operational costs savings were obtained from lower energy consumption, reduced energy costs, decreased infrastructure charges, etc. Although no detailed information is available, these cost savings are likely to be far less than the large losses incurred. However, from the effective answers to the mobility needs point of view, these "cost savings" can't be considered to be a positive result.

In some of the countries of the DESTINATIONS sites (Italy, Spain) the Public Transport Operator has received extra funding for service changes and operation. At this stage, it seems that the financing support should allow the transport system to remain in operation at basic level with the hope to adopt a quick restore of normal service level after the end of the emergency period.

4.1 ICT-Enabled solutions in COVID-19 scenario

In the COVID-19 pandemic scenario, transport operators and authorities need to find suitable supporting solutions to offer safe, efficient, and integrated transport services to their users. Considering the financial issues caused by the reduced revenues from passengers, operators need to make the services more efficient, attempting at the same time to reduce operational costs optimizing the management of their fleet. Clearly, this is not an easy task. In the next few months, PTO will have to operate their services within the constraints established by the national rules (i.e., maximum capacity of vehicles, safe distancing, etc.) and in a scenario where the users are less available to share the ride. Therefore, the supporting solutions should also aim to redirect user behaviour towards more confidence in the use of public transport and the other shared mobility solutions.

Public transport operators have the possibility to implement specific IT-Sys-

tems/solutions to manage the service/fleet conditions, monitor the number of passengers on board, and in turn offer reliable information to users so as to prevent them from being exposed to overcrowded vehicles or stops.

Different systems entered the market, or had been consolidated, during 2020. The main functionalities offered by these systems can be summarised as follows:

- Real time data collection and management of the number of passengers on board, and at the public transport stops;
- Data integration and analysis for prediction of future bus load factor, through specific AI algorithms;
- Intelligent use of data for the management of passenger flows, bus timetables and fleet
- Service quality Data sharing with both authorities and passengers

To carry out the data collection, different

technologies can be installed, including beacons, infrared, video recognition, GPS location, crowdsourcing app, etc. Data collected can then be utilised to plan and manage the operations of the service. The benefits that would be achieved through the implementation of these systems would mainly relate to:

- The operators themselves, thanks to the collected data, would be able to optimise the operational costs and improve the fleet management (for example, by predicting crowding situation on board, and adding new vehicles to the lines)
- The users of the service, as they would be provided with detailed information, such as, the number of seats available, or the crowding situation at the stops, and offering different transport options, including multimodal solutions
- The city-authority, as the information collected may be shared with public

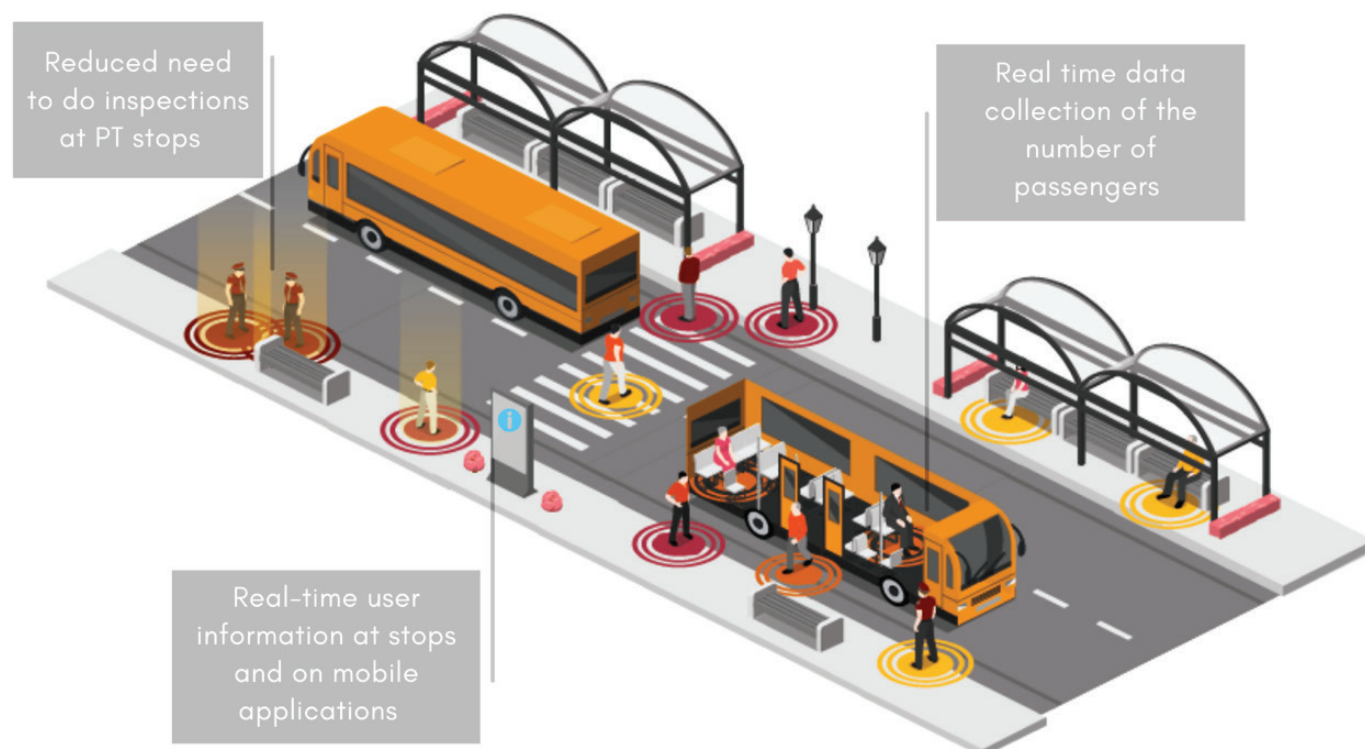


Figure 7 - Monitoring passengers' flow on board and at PT stop.

Source: MemEx elaboration on Pwc, 2020

and private companies, in order to understand how to promote flexible working hours for reducing the peak in the mobility demand.

In the Table 1 below, the main issues and opportunities that ITS system could bring to different target groups and service schemes have been reported.

Table 1 ITS opportunities for improving user safety on mobility.

SMALL AND MEDIUM TOWNS: EXTRA URBAN SERVICES		
Issue		Opportunity
Safe distancing rules means reduction in official bus capacity. Need to inform users on the number of seats available, and bus time arrival		Specific apps to provide details to users on number of seats available or to introduce booking system using, through app or phone calls
Replace low-demand fixed PT routes with DRT system to feed into inter urban/urban networks		Introduction of IT tools for DRT booking/ dispatch provider
Avoid situations where buses run with empty seats, especially in low demand areas		The vacant seats could be used to carry goods, parcels, etc, controlled through specific apps
Asset/Ride Sharing		Virtual agency to coordinate all people and parcel deliveries through the same app
SMALL TOWNS: URBAN TRANSPORT		
Issue		Opportunity
Urban Transport users and operators facing seating capacity issues and where to get on /off avoiding crowds at bus stops		Stakeholders need to control demand to meet capacity of the network. The ability to allocate seats, pre pay and produce a printed ticket takes away stress of waiting at crowded bus stops. Also, reduces the potential for cross infection.
Targeted services for work commuters to provide door to door solutions.		Workers buses could operate like school buses, where seats could be booked, paid and allocated through app
SMALL AND MEDIUM TOWNS - SCHOOL TRANSPORT		
Target	Issue	Opportunity
Transport operator	Know where it is safer to pick kids up (house or Bus Stop)	Apps to book trip from house to school for each pupil (as long as it is possible due to road conditions for vehicle being used)
	Reduction in capacity due to safe distancing requirements	Each child allocated a seat through the App
	No excess capacity for both vehicles and drivers to cope with 50% more vehicle requirement due to social distancing	Reduction in days each kid can go to school safely or have morning classes and afternoon classes. Double the trips with same vehicle. App for planning routes and allocating seats
Parents	Stakeholders Want to know child is safe going to/from school	Tools to advise parents and school on where child will be picked up, seat number, where they get off and time. Full records to be maintained for everyone that travelled on each trip
	Stakeholders want to know where kids get on/off bus, time, place	App to provide boarding and exit details to each parent and school
Local Authority	Need to establish capacity of class, school and school bus	APP to record each vehicle being used and capacity levels
	Need to design PPE policy for each pupil, class, school	APP to cover requirements for Bus Operator Staff and Pupils
	School meals, need for secure, clean delivery system	Apps could also be adapted to cater for delivery of school meals, medicines etc

Table 1 - ITS opportunities for improving user safety on mobility

In small and medium towns, like almost all the DESTINATIONS sites, besides this scenario of main functions and technologies, also the PT schemes could be redesigned and defined. Some fixed-route lines with low demand

may also be converted into Demand Responsive Transport services, for example. Users could therefore be provided with specific apps, offering the possibility to book and pay for specific seat reserva-

tions in a specific PT trip/ride. Of course, the DRTs scheme or approach should be specified in accordance with the PT operators and taking into account the main organization and cost differences.

5 Policy responses to COVID-19

5.1 Cross-site analysis

DESTINATIONS sites applied all recommended measures from European and governmental authorities, and adopted additional policies and tailored measures to address their specific characteristics, needs and challenges.

As insular touristic cities, with economies depending on incoming tourism, they had to address further challenges, such as the tourism industry's preser-

vation, and additional measures to defend their economy and their image as "safe destinations".

As expected, the high dependencies from maritime transportations and increased levels of seasonal goods deliveries created additional difficulties.

A set of measures for safe transportation as an immediate response to the pandemic outbreak were employed to

all six islands; hygiene rules, ban of unnecessary movements, social distancing, teleworking, distance learning.

As major touristic destinations, measures to increase safety for visitors and maintain the city's profile as a safe, attractive destination were also applied.

Further policies, such as monetary/financial measures and governmental subsidies, promotional campaigns (initiated by Tourism Ministries / Governmental Authorities), tourism staff training were taken at country level.

Public Transport provisions and measures

Public transport has been hit hard by COVID-19. Confinement measures, along with PT users safety concerns, led to a steep decline in ridership and it is still a long way ahead before the sector fully recovers. Since human interaction and proximity are innate in mass transit, it becomes quite challenging to combine social distancing with public transportation.

The initial response of PT services was limiting vehicles' capacity in order to restrict the spread of the virus and ensure the safe transportation of workers at essential sectors. This was a common practice for all DESTINATIONS

sites, and in some cases, the capacity was reduced drastically, reaching up to 75%. Enacting safety policies was a priority.

Some of the measures taken are listed below:

- Mandatory face masks
- Regular disinfection of vehicles
- Sanitising dispensers at bus stations and buses' entrances
- Ventilation and no air-conditioning
- Devices in vehicles for indoor air's continuous disinfection

Info materials/posters at PT stations/stops and inside vehicles encouraged riders to follow the prevention meas-



ures, such as the use of mask and social distancing. Passengers were also recommended to remain for limited time on the platform/stations.

Street change interventions & activities

The COVID-19 pandemic reshaped the cities in many ways. Due to the lockdowns and movement restrictions motorised transport plummeted and active mobility flourished, given that the decongested streets encouraged citizens to opt for walking and cycling. Thus, COVID-19, besides the disruption, has given the opportunity to experience what a pedestrian/bike friendly city looks like.

Contrary to PT, active travel is a transport mode that ensures physical distancing. Thus, authorities implemented a series of measures and interventions to promote active mobility. Temporary bike-lanes, car-free routes and

extended pathways managed to engage more citizens in active transportation. Public space reallocation and provision of free bicycles in Las Palmas were additional incentives for people to change their way of commuting for walking and cycling. Promoting pedestrian routes through smartphone applications was another measure to enhancing walkability (Madeira). Similarly, expanding and improving walking and cycling infrastructure (Limassol, Rethymno) and making roads safer for people (e.g., lower speed limit, temporary traffic restrictions) increased remarkably active transportation.



Temporary bike lanes and pedestrian routes by a Ministerial degree in Rethymno (up). • New bike lane opening - Las Palmas (down).

Policies and measures for shared mobility

One sector that severely suffered from the coronavirus outbreak was shared mobility. Health considerations regarding the risk of contagion due to the contact of different users hindered many people from opting for shared vehicles.

In Rethymno, the e-scooters sharing system operator (Lime) withdrew in March 2020, at the onset of the pandemic, and returned in operation in July 2020, after 1st lockdown's lifting. It was withdrawn again in November 2020, due to the 2nd wave and the subsequent national lockdown.

The limited interest in shared mobility was also observed in Elba. The Shared Use Mobility Agency has been launched in summer 2020, based on a tailored web platform and APP, and the low number of APP downloads underpinned peoples' safety concerns and hesitation towards shared transportation. Nonetheless, Elba aspires to make the Shared Use Mobility Agency the backbone of its mobility strategy and is already developing a promotional campaign, as the agency is expected to be fully operating during summer 2021.

Micro mobility and cycling are ideal transport modes as they guarantee

appropriate social distancing. Also, they can contribute substantially to alleviate the PT systems.

In order to minimize the potential transmission of COVID-19 and ensure users' safety, specific guidelines for cleaning and disinfection of shared vehicles were established in Malta, Las Palmas, Limassol, Madeira, Rethymno and Elba.

Targeted measures recommended to commuters to wear gloves and to clean surfaces before and after the shared bikes/e-scooters use. To engage more citizens in using the public bike-sharing service (Sitycleta), Las Palmas invested in 50 new e-bikes and 4 stations and increased by 1 hour the system's operation time framework.

Remote working has been increased tremendously in response to the COVID-19 emergency, and it was a measure adopted both in the public and private sectors. To reduce further human interaction and potential infection risk, flexible working hours, shift changes, and reorganisation of



opening/closing time were applied. In Rethymno, since the pandemic start, the public sector adopted teleworking and operated only with the minimum necessary staff.

Shift changes and employees' arrival at different hours (7:00, 8:00, 9:00) alleviated PT and provided the required social distancing. Teleworking and flexible work shifts were recommended for the private sector as well.

During the 2nd and 3rd wave, remote working was forced by a ministerial degree in Greece, making it obligatory for 50% of employees.

In Las Palmas, teleworking was recommended, but not obligatory.

Long term planning and cross sector cooperation

Recovery plans and long-term interventions, have been studied since the 1st pandemic wave. In Elba, mobility stakeholders and policymakers worked together to avoid "rebound effect" on the private vehicle use.

In Limassol, a consultation meeting was held to discuss the pandemic challenges and restrictions posed by the government. It was attended by all mayors of Limassol region, members of the Parliament, the Limassol port's manager, the director of Limassol Marina, the Limassol Chamber of Commerce chairman and representatives of local hoteliers. Madeira readjusted the recovery budget and adopted a new resiliency plan to accommodate more

actions targeted at improving active mobility, while Malta is currently preparing a similar plan.

Reforming cities into resilient places is a priority at European level. Monitoring, management and analysis of data can facilitate efficient resiliency planning to this end. Thus, Las Palmas is developing a big data mobility management system. Rethymno exploited the monitoring systems installed due to DESTINATIONS, thermal cameras and environmental stations, to record traffic loads and on air quality; to analyse the impact of restrictions in daily commuting and to capture the impact of tourism-related transportations (limited tourists in

summer 2020) aiming to gather useful insights for future mobility planning and efficient risk management.



Tourism Mobility and tourism recovery

The tourism sector and relevant transportation (aviation, trains, ferries) are among the highest impacted sectors globally. DESTINATIONS project aiming to link tourism and sustainable mobility, brings in the forefront the tourism needs and requirements; addressing efficiently the impacts on transportation in insular cities is vital.

Hence, all DESTINATIONS sites have applied tailored measures and policies to support the tourism sector and tourism mobility.

DESTINATIONS sites increased the available open space for visitors by offering public space to restaurants and bars to enable keeping the social distancing rules. Additional transport services were put in place in Madeira, Limassol and Elba by activating extra bus and ferries routes.

All sites applied measures for tourism facilities; national guidelines about hy-

giene protocols were followed in Elba, Malta, Las Palmas, Limassol, Madeira and Rethymno. In Limassol, Madeira and Rethymno, extended campaigns including training videos and online information, and labelling "COVID-19 free" schemes, aimed to promote the cities as safe tourism destinations. Moreover, in Rethymno, targeted governmental monetary measures for tourism related services and businesses were imposed. Financial facilities for tourism businesses and employees, VAT reduction, employment support mechanisms, dedicated training about the necessary hygiene protocols, and reduced traffic fees for tourism transportation modes are some of the implemented tourism support policies.



Impacts assessment of policy responses; social, environment, tourism, transport

A wide range of mobility measures applied to all DESTINATIONS sites, affecting various sectors; social, environment, tourism and transport. Over 55 immediate response measures about hygiene protocols, safety on transportation modes, street change interventions, soft measures for shared and freight transport, and tourism mobility, as well as long-term recovery plans, were implemented at the six insular cities.

The six cities proceed to a self-assessment of the individual measures implemented as a response to COVID-19, focusing on four impact category (social, environment, tourism and transport) and three levels of impact; high, medium, low.

As expected, most of the policy measures affect more than one category i.e.

buses operation modifications in frequency and capacity, a widely applied measure, affects all four categories; the transportation (fewer people to commute), the environment (emission savings as a result of sharply decrease of routes), the society (users avoid to use PT during the pandemic and return to their private vehicles) and the tourism (fewer tourists to be served by public transport).

Moreover, the PT operators are facing huge decrease in revenues due to the lockdowns and additional operational costs for applying safety precautions and increased number of routes.

The majority of the measures are related to the social and transportation sectors. Inevitably the environmental sector was affected as well, as a result of the transportation restrictions.



Having a closer look at the sites, Rethymno and Las Palmas have applied since the pandemic beginning 40 measures, Elba 32, Madeira 30, Malta 23 and Limassol 20. Madeira and Las Palmas have transport related measures in the forefront; Malta, Limassol, Rethymno and Elba the society ones. Tourism sector is in the cutting edge of DESTINATIONS approach; therefore, a notable number of measures affecting also tourism have been reported (22% - 50%).

5.2 Post Covid-19 planning

The post COVID-19 estimations for the mobility sector has presaged optimistic but uncertain. The available resources for the EU countries recovery, their financial condition at the end of the pandemic crisis, in relation to the pre-COVID-19 state on mobility trends, transport policies and priority actions, will define the future on transportation in each area. According to the European's Parliament in-depth analysis requested by the TRAN committee, assessing the rapid-responses of EU cities on COVID-19 pandemic, four alternative scenarios are expected to prevail:

Urban Transport to return to the pre-COVID-19 situation

The first scenario, according to DESTINATIONS cities responses, seems as a feasible one; over 70% of measures applied is expected to be reformed or abolished after the pandemic end. However, infrastructure such as new bike lanes, incentives for promoting walking and bicycle, upgraded PT and shared services in terms of cleaning and disinfection, will remain, to further enhance the efforts taken before pandemic to promote safe, attractive and sustainable mobility.

Prevailing of private transport means, especially cars

During the initial post-pandemic period, the increase in private car use is anticipated as occurred during the national or regional lockdowns end (Figure 9). This was a combined result of applied restrictions (limited capacity in the private vehicles) and the resistance or fear to use PT. The financial conditions, the policies supporting soft measures, and previous efforts on sustainable mobility, will determine the share of private mobility.

Overall reduction of transport demand

The recently adopted measures by EU countries, i.e. teleworking, flexible working hours, services and shops on demand, can reduce the transport demand and the overall commuting, although, most of the DESTINATIONS sites have indicated that teleworking is a temporarily measure. Digitalization of services can also affect the mobility trends, especially in city centers where public services are located.

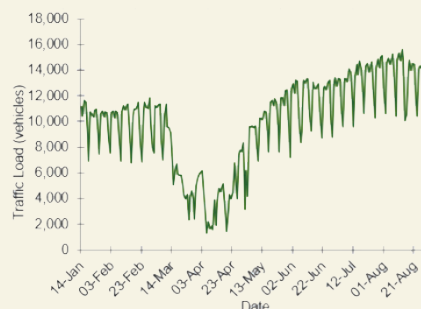


Figure 8 - Rebound effect after the end of 1st lockdown, Rethymno - Source: ReSEL - TUC

Multimodality combining active mobility and public transport will be dominant

Aspiring to become sustainable, clean destinations, EU cities have tried to promote and deploy effectively multimodality concepts. DESTINATIONS shared

this vision across the six sites, which successfully promoted active mobility combined with upgraded PT services. Post COVID-19 period planning include the preservation of policies that facilitate sustainable active mobility;

- Ministerial degree for temporary bike lanes, pedestrian routes, low traffic zones, parking restrictions and vehicles access in certain routes, low speed limits, in Rethymno, Greece.
- Involvement of citizens/students to the mobility planning at local level, in Elba, Italy.
- Digitalization of services in Valletta, Malta and Limassol, Cyprus.
- Planning of bikes lanes and cycling plans, in Funchal, Madeira.

Attempting to address the COVID-19 financial impacts and to reverse them, the central governments of DESTINATIONS countries have developed tailored recovery plans and are focusing to promote resiliency planning. The Recovery Plans and Strategic Measures and Policies towards recovery, include a variety of actions to enhance financial, tourism, environment, and transport sector.

Tourism recovery is critical in all DESTINATIONS countries, as one of their core economy pillars. For example, Madeira developed a COVID-19 Safe Tourism Guide – continually being updated, for tourism reopening. Las Palmas presented a Guidelines and Recommendations Report for measures to reduce the spread of coronavirus, promoting the Active Tourism and Ecotourism.



6 Opportunities towards sustainable mobility recovery and enhancement

Multistakeholder planning approaches

After the different COVID-19 waves, the PT service is re-operating under the “common” constraints: limited seats/persons per bus, new rules for bus get in and get out, assigned space for stand up and seating, social distancing at the bus stop, etc. As mentioned in the previous section, from the operator point of view, these new constraints require need of extra activities/tasks, such as:

- i) Monitoring the bus occupancy rate, and keeping it below the target threshold;
- ii) Keeping the frequency and interval stable, avoiding dynamic instability of bus generated by queue at the PT stops during the pick-hour period (as well as during the “usual” negative

situation caused by traffic jams);
 iii) Introducing extra buses in peak hour or most used lines, without penalising the “weak” lines (such as rural and peripheral ones), increasing the frequency or service timing.

To carry out these activities, Mobility and Transport Authorities should facilitate the dialogue and cooperation between (contracted) public and private operators. Those routes, where the frequency has to be reduced due to the need of increasing the fleet on other high demand lines, could be operated by taxi and shared services companies (i.e., NCC) and tourist transport; some form of public private partnership can also be established so that the public transport operator can lease the vehicles and add them in their fleet.

Furthermore, local authorities can promote the setup of working groups between the local public transport operator and other relevant institutions, such as, school and third-sector associations.

These would facilitate the identification of the mobility needs of residents, and how these needs have evolved due to the COVID-19 pandemic.

A “good practice” example among the DESTINATIONS sites refers to Elba, in which from September onwards, the public transport operator (CTT), facilitated by the Portoferraio Municipality, the Province of Livorno, and the Tuscany Region Authority, developed a collaboration with some private operators.

Thanks to this, the overall PT fleet operating in Elba Island has been extended with additional vehicles (a total of six additional buses of 12 meters were added). This made it possible to duplicate the services operated in the school timing (morning and afternoon) and thus supporting the reduced capacity of the vehicles.

Furthermore, after Summer 2020, the planning and updating of the conventional public transport services in Elba Island was developed through good co-



operation among different stakeholders. In particular, CTT, the Livorno Province and the ELBA Municipalities, and the different schools' institutions were involved in proposing changes and new ideas for the existing PT and collective services.

Local Authorities can also work at the urban planning level for reallocating public spaces in favour of sustainable means of transport. New cycle paths, pedestrian areas, and dedicated bus lines could

improve people willingness in moving into the cities with their bike or using the public transport system, and decreasing their will to use the private car.

Among the DESTINATIONS sites, investment in new cycling/walking paths and routes have been made in Limassol and Madeira. In Las Palmas, the operation time framework of the Sitycleta public bike sharing service have been increased of 1 hour (now from 6:00 to 23:00), and new electric bikes have been introduced

(50 new e-bikes and 4 new stations for e-bikes, plus, other 40 smart bikes on 4 new bike stations).

Some measures, such as allocating more space to pedestrian areas, require small capacity and financial resources, although efforts are needed to engage the local shopkeepers in the area. Other interventions, such as low emission zone, require a certain level of technology maturity and further capacities and resources.

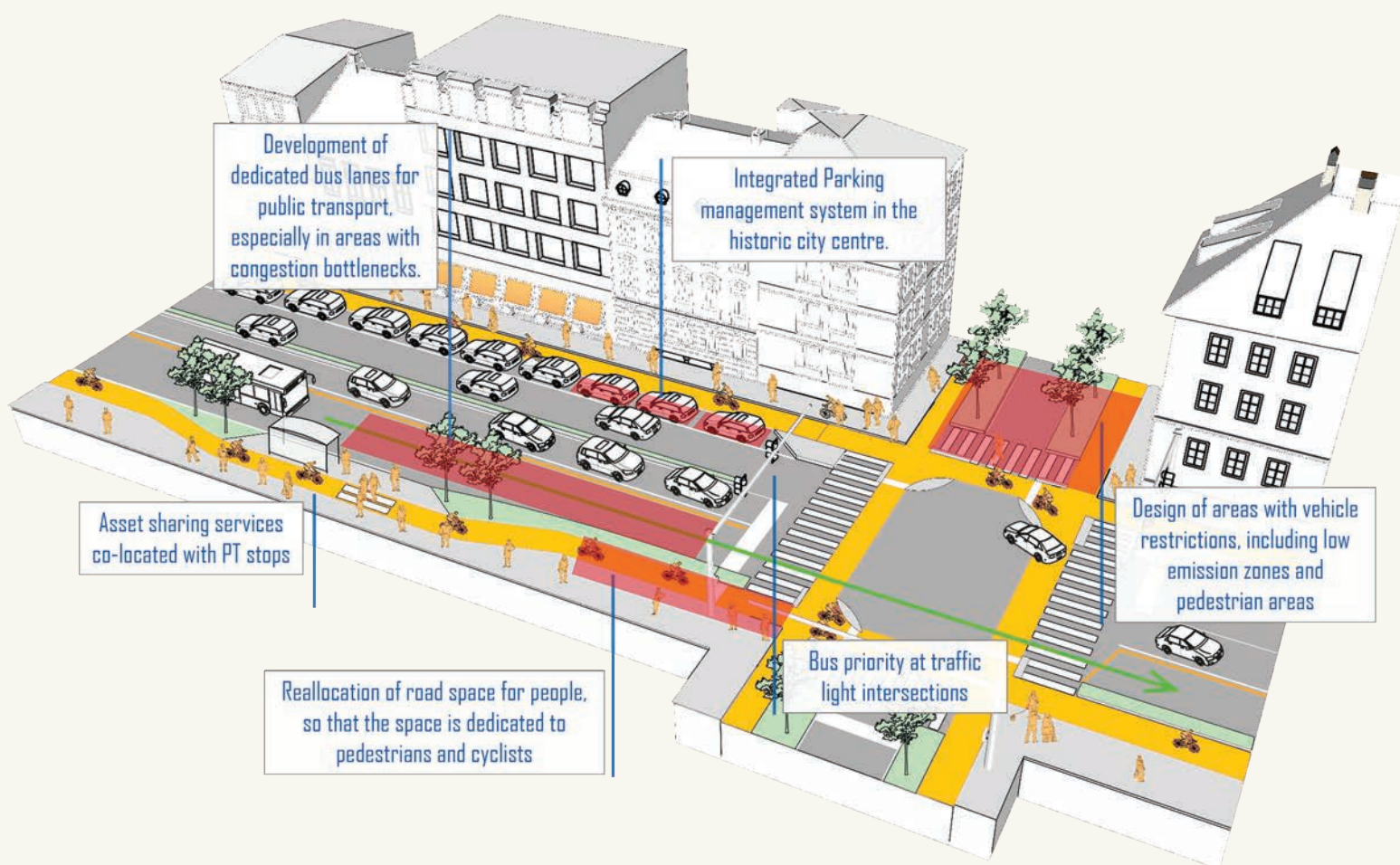


Figure 9 - Urban space reallocation measures

Source: MemEx elaboration on "CoVivere: la mobilità in Italia oltre il COVID19", Decisio BV, Studio Chiarini.

Figure 9 provides with a good overview of some key interventions about the reallocation of the urban public space:

- In areas with congestion bottlenecks, road space could be dedicated to hosting bus lanes for public transport, in order to keep stable the frequency of the services. This measure could be combined with bus priority at traffic light intersection, thus mak-

ing travelling by bus faster and even more efficient.

- Public transport stops could be redesigned to host asset sharing services, such as bike sharing and scooter sharing services. The co-location of the different services facilitates the integration of the different modes.
- Reallocation of road space for people. Reserving more space for pedestrians and cyclists would make these active

modes safer and more convenient than driving. Areas with vehicle access restrictions, including low emission zones, could also be designed, to discourage the use of the private car.

- Integrated Parking management system in the historic city center. The possibility to check the free parking lots and route to them would reduce the time spent looking for where to park and thus reduce car congestion.

Services and digital solutions integration

From the experiences gathered in the six DESTINATIONS sites, and from the discussion held with the different sites' stakeholders, it emerged that almost all the sites are working on the integration and coordination of the different mobility services in the target area and on the deployment and integration of the related digital solutions or/and IT platforms.

The key issue of "integration" both from the side of the different mobility services operators, the public transport service, and the digital platforms or IT system, has to be faced at different layers, with different complexity. Based on the DESTINATIONS site experiences we have identified the following "layers" as reference context from the PT services and shared mobility perspective:

- "Layer 0": No integration, all services are operated separately without any level of integration
- "Layer 1": "Passive connection" at the bus stop, where some shared services are offered in the same physical place.
- "Layer 2": Co-location and coordinated timetable of the PT services
- "Layer 3": Coordination/simple management of services, information and digital solution
- "Layer 4": Connection management, with processes, data sharing and digital solutions
- "Layer 5": Fully integrated, including the Operational layer
- "Layer 6": Fully integrated at Operations and Customer Service layers

These layers should take into account the different responsibilities and objec-

tives (interests) of the involved PTOs and PTA. The project identified that the success of the integration process is based on the "engagement" of the different actors from the beginning, especially at the stages of design (as made for example for SUMA Agency) and commercial agreement definition (as for example in Rethymno for the asset sharing services), allowing to define the desired layer of integration. From the Layer 3 onwards, the level of complexity substantially increases, as digital solution context and interfacing are required.

Therefore, in order to achieve the desired level of coordination and cooperation among the mobility services operators, different aspects, as found in DESTINATIONS site, need to be considered as the following ones: organization and operation procedure; planning and service design; stakeholders' engagement; business model and marketing; product and service schemes; and funding and commercial agreements.

Among all these aspects, the physical and ITC/Digitalization layers play the role of "enabling factors", with different potential depending on the area context, role and dimension of involved actors, rules and legislation, responsibilities, typology and scheme of services, etc. In particular, the digital solutions and ICT enable and support the service operation and integration covering different function, as data collection, performance assessment, control and monitoring, interoperability and accessibility and service reporting and analysis. From the experiences of the DESTINATIONS sites and the stakeholders position analy-

sis it is emerged that Local Authorities, should play a "balancing role" among the different operators and defined mobility services to be integrated facing and guaranteeing some key aspects as the following ones:

- i) ownership of data and the right to exploit them to provide "added value" services;
- ii) costs to provide and maintain the quality and "open format" of the data;
- iii) liability levels among the involved actors and services integration levels.

Finally, it has also emerged that the integration costs should be supported by PTA or PTO but, in any case, they should be considered at minimum in PT service integration contract.

All these considerations/actions could be enabled by a unique management platform, where both public Transport and shared mobility services could be coordinated, controlled and operated.

Figure 10 summarises the possible integration approach. The realization and implementation of an integrated Technological Platform to plan, monitor and coordinate mobility and active transport services, already existing or planned, as the ride and asset sharing (such as DRTs, ride hailing, carpooling, bike-sharing or e-scooter sharing systems, car sharing systems, demand responsive transport, etc.) can support the modal shift from private car to sustainable mobility services including the collective transport. The Platform should also provide with specific app to provide multimodal user information, through services dedicated to each category of user, providing suggestions and indications of alternative



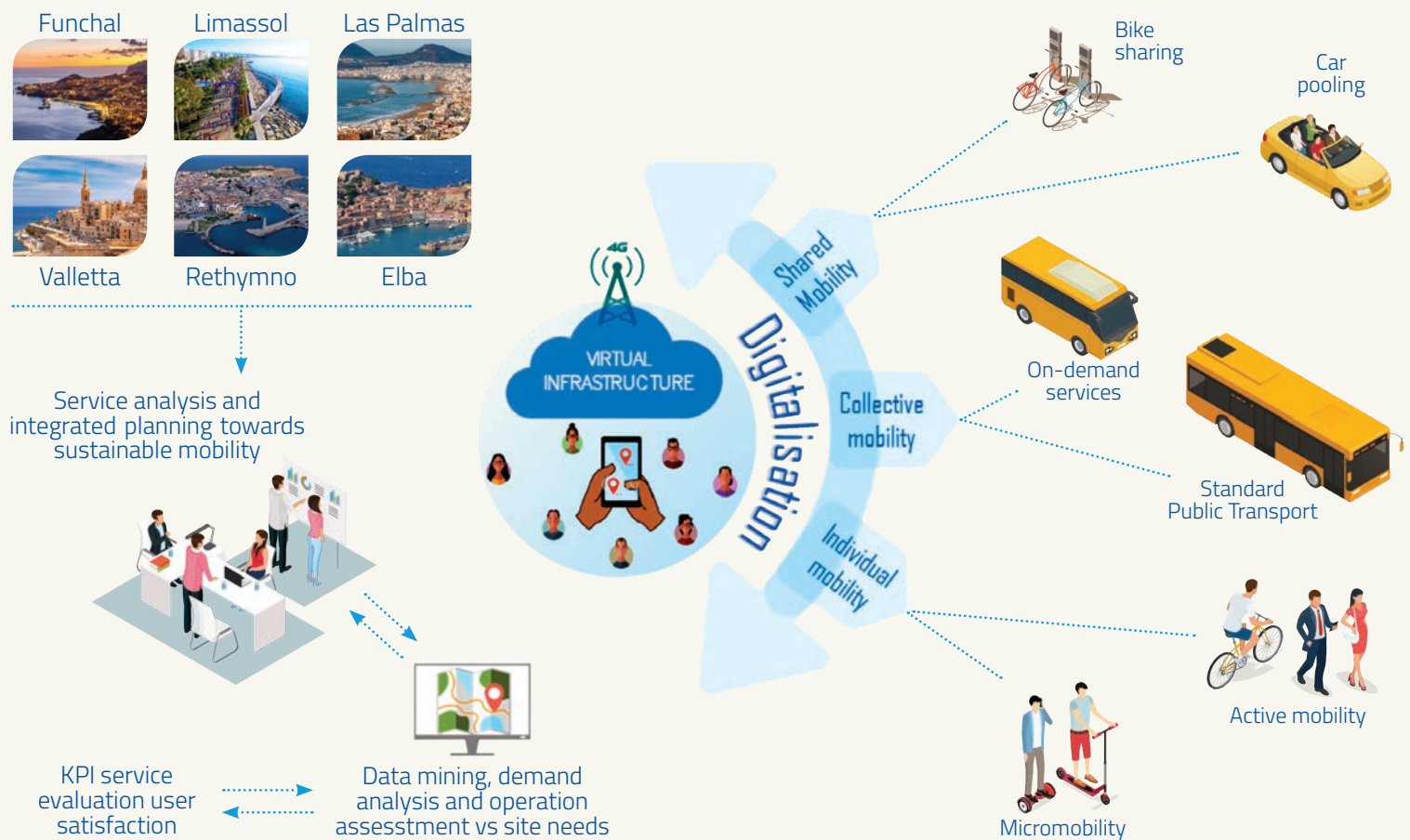


Figure 10 - Single management platform for service integration • Source: MemEx

“green” routes that use different modes of transport.

The provision of user information, with data related to different mobility services and transport options, would be guaranteed by common protocols and different interfaces among the different digital solution and system dedicated to specific control and monitoring process (timetables, occupancy rates of buses to ensure social distancing rules imposed by COVID-19, e-bike, ride-sharing, occupancy of bike stations, bus time arrival, journey planner, etc.).

These data, offered through an APP or web site, allow users to have different travel information, pre trips or during the trips, and, at the same time, complying also the different COVID-19 constraints such as possible occupancy rules (for example, no more than 50% to ensure social distancing).

The provision of info-mobility services will enable users to gain full confidence to incorporate new mobility schemes into people’s mindsets and lifestyles.

In conclusion, to achieve a notable level of services integration operated in a specific area, especially in small or rural areas, it is essential to face and define some relevant aspects such as suitable cooperation schemes (with respect to organization and operation, on-road control, system/service responsible, etc.), business models (mainly for the

The provision of info-mobility services will enable users to gain full confidence to incorporate new mobility schemes into people’s mindsets and lifestyles

openness and responsibility of data maintenance, system interfacing, user information device, etc), legal/commercial aspects (different level of tax for the service price, integrated tariff, clearing schemes, etc).

Facing these aspects require close co-operation between the data providers, the system responsible, and the service provider, being these the backbone for the realization of the integration ecosystem.

In any case, it has to be noted that integration can be mobilised starting from an existing structure making gradual steps as indicated for the previous integration layers.

At first, based on the existing service and digital solution, start with the definition of common criteria: cooperation principles, relations among different actors, data flow, business models; then, the integration can be scaled up through a step-by-step process, leading to a more complex structure (depending on the functions to be added, such as journey planner, booking, the available funds, the economic feasibility, etc.).

In this regard, the involvement of the different existing public transport operator can smooth the process thanks to the expertise and capacity on the domain.

Conclusion

The COVID-19 pandemic has severely changed the existing positive trends of mobility. The progressive modal share towards sustainable means of transport, which has also been promoted by the DESTINATIONS Project, has been altered due to: i) people's feeling of uncertainty in sharing trips with others; and, consequently, ii) increased use of the private car. What's more, the conventional public transport services have been under stress, due to a drastic reduction in the vehicle capacity which consequently reduced the income from users. In this

Municipalities (and Association of Municipalities) should come back to a central role in Public Transport and collective services

scenario, municipalities (and Association of Municipalities) should come back to a central role in Public Transport and collective services, by rethinking the space management policy, promoting the collaboration among different mobility and transport operators, and implementing technological tools which can control, coordinate and assess the transport services offered.

The DESTINATIONS sites have adopted specific measures and policy to promote sustainable mobility, improve teleworking, and making urban space more liveable. Moreover, as being touristic destinations, all cities implemented measures to increase safety for visitors and maintain the city's profile as a safe, attractive destinations.

Las Palmas de Gran Canaria originally witnessed the biggest fall in public transport demand to 12% of pre-pandemic levels, but this bounced back to 50% within the first few months after lockdown, and to 68% in 2021.

This elasticity of demand gives us hope of a return to the dominance of sustainable modes.

Alongside the changes reported for private car and public transport use, most of the DESTINATIONS sites reported an increase in walking and cycling levels compared to pre-COVID-19. This was evident in Rethymno for example, active travel

levels during and immediately after the first lockdown actually exceeded pre-pandemic rates, with cycling rates doubling between January and June 2020. A number of DESTINATIONS measures have already supported this effect with additional micro-mobility services and extended bike lanes. Despite the pandemic, 21,889 additional users were recorded using the Sitycleta bike share scheme in Las Palmas de Gran Canaria. This shows that such services are an important part of the mobility offering where social distancing is enforced by government and helps to reinforce the resilience of local communities.

The impact on micro-mobility services elsewhere was more nuanced. In Rethymno the newly-installed eScooter and eBike schemes were suspended by the private operator (Lime).

This indicates that the reliance on tourists for revenue makes for a more fragile business model. Whereas established bike share schemes in Limassol (Nextbike), which is well used by local residents, and Las Palmas, where Sitycleta is operated by the public company SA-

The reliance on tourists for revenue makes for a more fragile business model, whereas bike-share schemes operated by public companies, and well used by residents, appear to be more resilient to external influences such as COVID-19

GULPA, appear to be more resilient to external influences such as COVID-19.

We have also seen a positive uptake of online services during the pandemic, allowing people to carry out their activities virtually. ITS services, mobility information points, and applications that enable people to do their shopping and see the status of mobility modes have shown

themselves to be less affected by social distancing laws. Digital services and broadband truly offer resilience against external factors, reduce car dependency and is the best way to remove the need to unnecessary trips. The ability to work from home, the availability of shopping online, and new habits that may have been cultivated during the lockdown months will all have a potential impact on how trips are made in the years ahead. Remote and flexible working is

Remote and flexible working is expected to be part of the "new normal" in the post-COVID-19 era

expected to be part of the "new normal" in the post-COVID-19 era. With fewer people commuting daily to work, or at different times of the day, this could also encourage more cycling taking advantage of quieter roads.

In many ways, it is still too early to make a definitive assessment on the long-term implications of COVID-19 on the way people travel. This is due to the fact that most countries continue to be under some level of restriction of movement or social distancing causing a drag on normal habits re-emerging. Nevertheless, a number of recommendations can be drawn from the findings in the DESTINATIONS sites. These can help tourist towns and cities to prepare and react to future pandemic situations.

The principal objective is that the long-term implications such pandemics do not lead to the re-emergence of private car use in urban areas. Not only would this be counter to years of Sustainable Urban Mobility Plan progress, but it would also scupper the advances currently being made to decarbonise surface transport, on which international, national and local policy making now focusses.

Later in 2021, after the end of restrictions, new surveys and further analysis should be performed to determine

any changes to long-term mobility behaviour. Then SUMP measures should be reviewed and updated to include any new mitigation measures to counter the growth in car use and support public and shared mobility services.



Ten key recommendations

1 Lock in the positive “local living” habit, enforcing home working, broadband access for all, digital service for community building, and space use optimisation

2 Enhance walking and cycling infrastructure, policy, and conditions as viable alternatives to car-based local trips

3 Consider public-private partnership in the micro-mobility and ride-sharing business models

4 Promote bus services to win back patronage, and offer reliable and high-quality services to foster people changing their mobility behaviour towards public transport

5 Consider parking and access restrictions to inner centres to discourage and decrease commuting trips with private cars

6 Encourage flexible working hours to smooth out the traffic peaks, enable quieter streets, make better use of the bus service, and enforce active mobility

7 Embrace integrated planning approaches by facilitating the users’ needs assessment and promoting the dialogue between public/private transport operators and other relevant institutions, such as school and local associations

8 Transport Authorities and Operators to properly plan and manage ridesharing services, as a complementary part of the overall public transport offer

9 Design and implement digital platforms where both the public transport and shared mobility services could be accessed, integrated, and evaluated

10 Define data mining and service KPI assessment procedures of the current transport and mobility services to tune or update the measures and hypotheses planned in the SUMP

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