COVID-19 and Sustainable Mobility

Observations and documentation of first developments

Content

COVID-19: A global challenge

When the outbreak of the COVID-19 pandemic became an international challenge at the beginning of March 2020, we very quickly realized that the impact on the transport sector would be enormous. Not only that the transport sector is one of the transmission vectors, but also that with the social and economic constraints, it became clear that transport demand would decrease and that transport services would have to be adapted to the conditions of the emergency.

We also recognized that there was (and still is) a need for direct knowledge exchange and mutual learning and therefore on the one hand set up a blog from which this publication grew, started a Twitter thread and implemented various learning formats such as webinars (e.g. on March 20, 2020 on "Combating COVID-19: The Shenzhen Bus Group's Experience (China)". SLOCAT has set up a resource center with links to many other efforts.

The result is an initial summary - it traces, documents and provides initial orientation. It documents the period early of March to early May 2020, i.e. the phase in which the COVID-19 crisis took on a global character. The paper concentrates on urban mobility, looks at the COVID-19 crisis itself, measures taken by cities and the respective potential effects. It does not claim to be exhaustive or balanced, but focuses closely on sustainable mobility solutions, such as public transport, cycling and walking, shared mobility and public space development. In doing so, we document observations, facts and initial assessments. It is still far too early for a full evaluation of the measures, their effectiveness and an overall assessment of the crisis.

Figure 1: The new "normal" in Monrovia/Liberia, Source: Yana Tumakova / GIZ

On the meta-level it can be observed that:

- ■ The global sustainable transport community has come together very quickly, has jointly developed solutions and communicated them worldwide.
- ■ Learning from experiences by organizing and participating in webinars, social media communication and blogs works well.
- ■ In particular public space gained in (positive) perception; without high-quality space physical/social distancing is not possible

We see that the transport systems in most cities were and are able to cope with the immediate challenges of the pandemic, but at the same time we have seen that negative effects such as unequal access to public transport, limited spaces for pedestrians and cyclists and often long commuting distances for - often underpaid - frontline workers are intensified or particularly negative in times of crisis.

A central challenge remains the lack of knowledge about how the virus spreads in public spaces, public transport, etc. In particular, the questions of on which surfaces the virus adheres to for how long, how tightly it is spread and what protective measures are effective and necessary have not been adequately answered. Authorities and transport companies have taken different measures, sometimes with contradictory intentions or justification logic. This has confused users and the international community of experts rather than providing safety. Therefore, further epidemiological studies are needed to ensure and increase confidence in transport measures – stakeholders in the health and transport sector and related areas such as public safety, urban planning etc. must work more closely together.

The paper is released on occasion of the TUMI TV conference on May 26, 2020. We would like to thank all frontline workers in the transport sector for their dedication to keep services running – UITP has put these workers in the focus of the Guardians of Mobility campaign.

Figure 2 – COVID-19: Government Response Stringency Index, May 12, 2020

The Government Response Stringency Index is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest response).

This index simply records the number and strictness of government policies, and should not be interpreted as 'scoring' the appropriateness or effectiveness of a country's response.
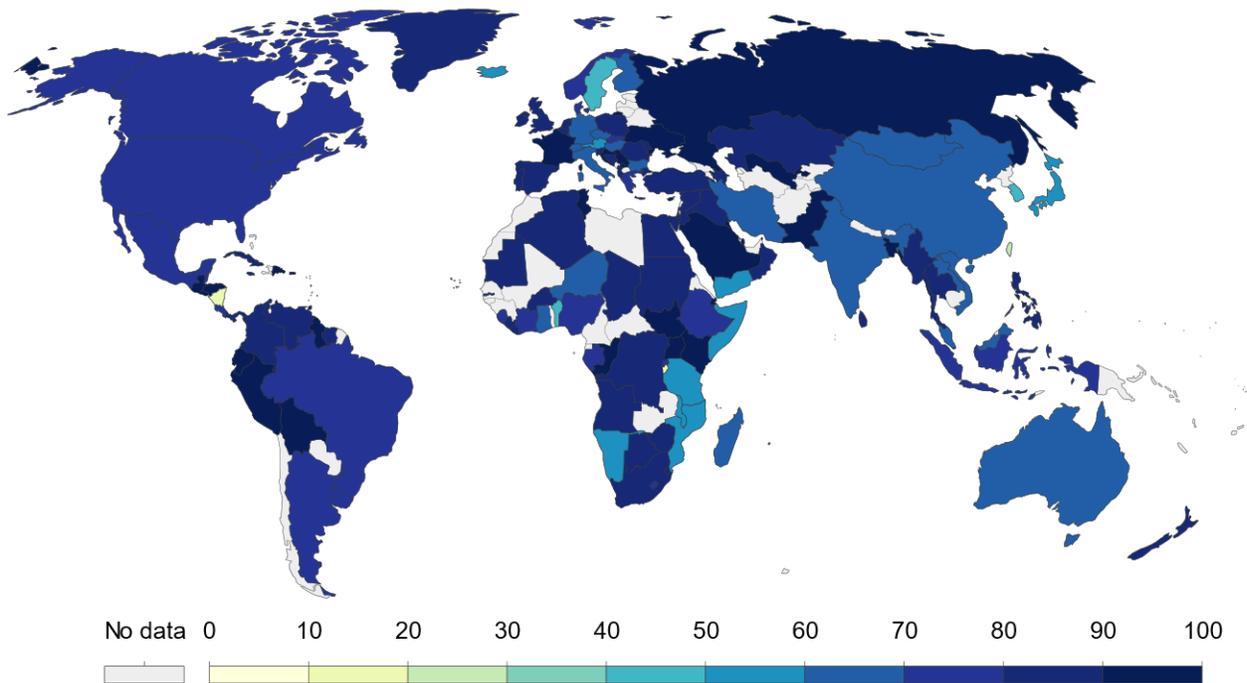
No data 0   10   20   30   40   50   60   70   80   90   100

Source: Hale, Webster, Petherick, Phillips, and Kira (2020). Oxford COVID-19 Government Response Tracker – Last Updated 12th May. OurWorldInData.org/coronavirus • CC BY

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A crisis evolves

Figure 3 - Four phases of COVID-19; Source Julieta Peruzzo
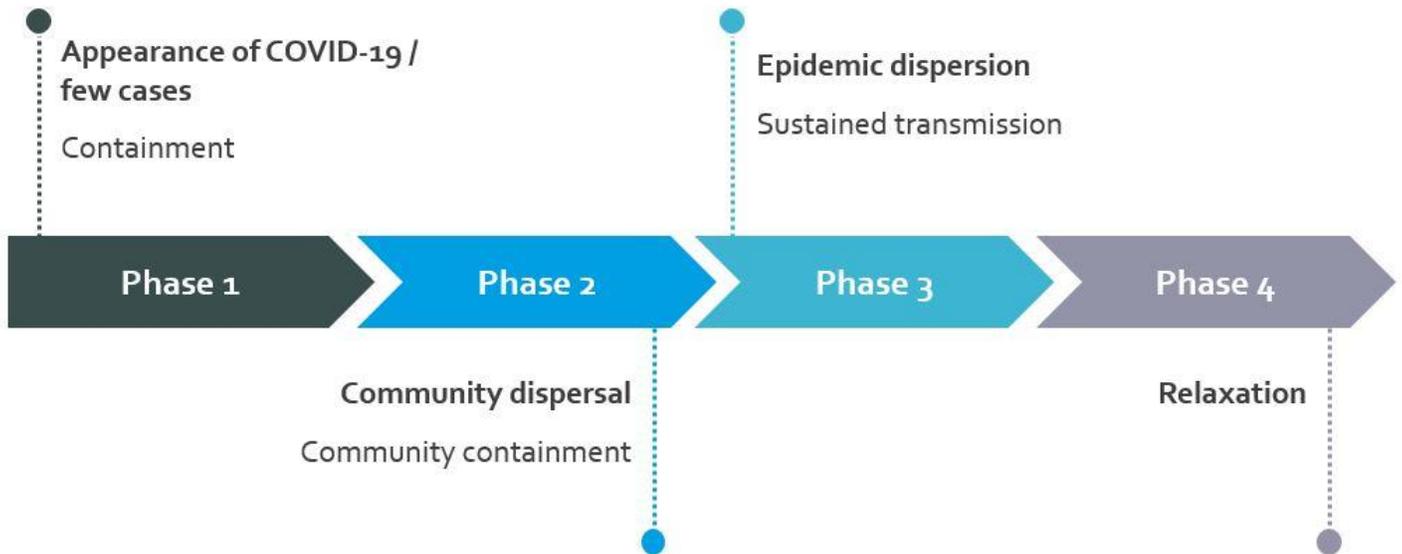
As global crisis, the COVID-19 pandemic develops in 4 Phases:

- **Phase 1: Appearance of COVID-19 / few cases (containment)**

- **Phase 2: Community dispersal / community containment**

- **Phase 3: Epidemic dispersion / sustained transmission**

- **Phase 4: Relaxation**

Phase 1 of the virus outbreak started with the appearance of COVID-19 in the Chinese city of Wuhan in early January, spreading globally as pandemic in the following months.

The lockdown of the Hubei province and Wuhan starting January 23, 2020 can be considered as the beginning of phase 2 in China; in Europe, Italy and France enforced lockdowns starting early to mid-March, followed by other countries. On March 11, 2020, the World Health Organization (WHO) has declared COVID-19 a global pandemic.

Already as of March 26, 2020 about 2.6 billion people (including 1.3 billion people in India alone) were under lockdown to contain the spread of the virus. Figure 2, as of May 12th, shows that most countries have imposed measures such as closure of school, workplaces, places of recreation, etc.

Phase 3 describes a phase of full lockdown with substantially reduced travel and phase 4 the easing of restrictions. Right now, in mid-May 2020, we are observing a substantial easing of restrictions in many European countries, whereas other countries such as India and Colombia remain under lockdown.

During phases 1, 2 and beginning of 3, decision-makers and planners in the transport sector initially focused on the role of public transport as both a potential vector for spread of the virus and important key to support mobility of essential workers (the categorization of population in essential, e.g. health, security, staff at groceries, and non-essential workers became quickly a feature of the COVID-19 crisis).

Phases 1 and 2: Focus on Public Transport and getting prepared

With regard to the pathogens' ability to travel, buses and trains are of course excellent ways of spreading of infections - the study on [infection of 9 passengers in a long-distance bus in Hunan in January became famous in this respect; the study has been retracted meanwhile without giving reasons (however, we do keep it for documentary reasons).](#)

Figure 4 - How COVID-19 spread through a Hunan bus
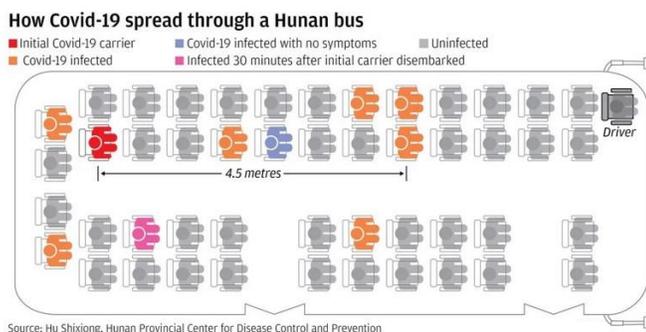
In many Chinese and Indian cities such as [Wuhan](#), [Huanggang](#) or [Delhi](#), public transport was suspended in order to contain the virus. Even though the total shut down of public transport systems was and is not a measure taken by all cities which are affected by the epidemic, it is important to systematically identify areas of action to minimize the risks for public transport staff and passengers.

Cities quickly understood the need for coordinated response as well as the need to protect staff, infrastructure and passengers:

Coordinated response

In order to ensure a systematically coordinated response and effective implementation of measures by public transport companies and authorities, contagious virus or pandemic response plans shall form the basis for action and measure implementation. In addition, all measures taken by governmental agencies and public transport companies in order to ensure safety of staff and passengers as well as a further spread of COVID-19 shall be based on comprehensive impact assessments. Social, environmental and climate as well as economic impacts of measures shall be taken into account.

Protection of Staff, Infrastructure and Passengers

Employees are the most important assets in public transport. They are therefore given special protection, both as individuals and in their function as drivers, supervisors, managers, etc. It is in the nature of things that employees in public transport have close contact with the customers, i.e. the passengers. Therefore, protective measures cannot cover all potential risks.

International associations like the [Transport Research Board](#) (TRB), the [American Public Transport Association](#) (APTA) and the [International Organisation for Public Transport Authorities and Operators](#) (UITP) provide factsheets and general information and monitor the situation. It is worthwhile to search on their platforms regularly for information. For example, APTA recommends the following measures:

Measures	Examples
Engineering Controls	Separate people from the contamination (e.g., Plexiglas barriers for drivers and ticket sellers)
Administrative Controls	Training, plans, policies, and procedures that articulate and enforce means to reduce infection
Personal Protective Equipment	Gloves and respiratory protection to reduce contamination; hand washing, waterless hand sanitizer
Environmental Hygiene	Cleaning (e.g., steam cleaning, disinfectants) of stations, vehicles, and workplaces to minimize surface contamination (fomites)
Social Distancing	Maintain a space of 3-6 feet between persons to minimize contamination from aerosol and droplets (e.g., sneezing and coughing)
Ventilation Control	Heating, ventilation, and air conditioning to reduce the spread of contamination
Providing service during the pandemic	Identifying essential functions—those primary and supporting services that the organization must continue even in the event of an emergency. Ridership will likely go down during a pandemic. People are likely to stay home from work and go out less often to shop or partake in entertainment. People may stay home from fear of exposure in public, or public health and emergency management may order people to stay home. People showing symptoms of infectious disease may try to use public transportation services to get where they need to go. The NCHRP report advises that "transportation agencies should establish clear safety protocols for providing reasonable accommodation to potentially contagious individuals while best protecting uninfected workers and riders.
Managing workforce impacts	Regular staffing will likely be disrupted during a pandemic. Organizations may require increased staff time to take on new tasks like additional cleaning of transit vehicles. Workers may stay home due to illness or fear of exposure to infection. Because of this, the NCHRP report advises that "worker safety and providing a healthy and safe workplace must be the highest priority for transportation organizations to maintain ample human resources."
Crisis communications	Communication during a pandemic is critical as well as challenging. Simplified messages are necessary during a crisis to ensure that the message reaches a distracted community.

Table 1 - APTA recommendations for preventing the spread of disease, Source: APTA (2020), Summary: A Guide for Public Transportation Pandemic Planning and Responses (NCHRP Report 769), March 2020, (https://www.apta.com/wp-content/uploads/APTA-Coronavirus-Brief-03-05-20.pdf)

The Shenzhen Bus Group Company has compiled a [comprehensive report](#) on measures and experiences in the fight against the corona virus including:

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01 IMPLEMENTATION OF EMERGENCY MEASURES
        Frequent and regular sanitization of all SZBG properties
        Measures to adjust bus services during the epidemic
        Emergency procurement procedures are established
        Robust management of staff movement and deployment
        Establishing a clear and unified information and communication media platform
        Canteen and cafeteria management

02 EVACUATION OF PASSENGERS FROM THE ´COSTA VENEZIA´ CRUISE SHIP
03 RESUMPTION OF BUSINESS AND WORK
04 ONLINE TRAINING COURSES ON VIRUS PREVENTION AND CONTROL
05 TAXI SERVICES

INTELLLIGENT OPERATION SYSTEM DEPLOYED FOR PREVENTION AND CONTROL

CARING FOR THE COMMUNITY AND STAFF
        Free transfer service for blood donors
        Free health service to public transport staff through online clinics
        Employee Assistance Programme (EAP)
        Hotline for counseling
        Hairdressing services
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Source: Joe Ma (Deputy General Manager at Shenzhen Bus Group Company) via LinkedIn

Protection of Staff and Infrastructure

Following measures have been implemented by public transport companies in order to protect their staff, infrastructure and operation and should be considered as default:

a) **Information and awareness:** Staff need to be well informed and awareness shall be raised on the risks of infection and the measures needed to be taken in order to minimize those risks.

b) **Training:** Staff shall receive special training on how to disinfect facilities and surfaces properly. Furthermore, staff shall be trained on how to communicate with and react to passenger's concerns about measures taken to prevent the virus spread (e. g. disinfection measures).

c) **Provision with protection gear and disinfection:** Staff shall be provided with adequate protection gear (face masks, gloves/hand sanitizers) in order to secure their health and avoid them from being infected.

d) **Health check-up:** Regular health check-ups can support and ensure that the employees feel safe and comfortable at work as well as identify any potential infections in an early stage.

e) **Close of front door / No ticket sales by driver / E-Ticketing:** In many bus companies, passengers board the bus at the front and pay for their ticket or show it to the driver. This is not only an operative headache (keyword: long stops), but also a permanent health burden for the driver. For this reason, many public transport operators now prohibit passengers from boarding at the front and no longer sell tickets on the bus. This should become the rule even without a spreading virus and accelerate the transition to electronic and contactless ticketing/payment (e. g. [smart cards](#), [QR-code based ticketing/payment](#)). Examples include [Berlin](#), [Beijing](#), and cities in Switzerland and Poland. PT TransJakarta will implement a non-cash payment system at all TransJakarta stops to prevent transmission of the Corona Virus. The Head of the Corporate and Public Relations Division of PT TransJakarta, Nadia Diposanjoyo, stated that top up stations were available at all BRT shelters. ["Starting Thursday, March 19, 2020, all forms of transactions using cash in top-up activities or top up for electronic money and starter card purchases will be unavailable," she said.](#) In the same thrust, [Matatu operators](#) in Kenya envisage to accept payments through M-PESA, destroying a long held myth that informal transport an cash go hand-in-hand

f) Separation of drivers/ticket sellers and passengers: Drivers and ticket sellers as well as any other staff should be separated from passengers by Plexiglas or other means, temporary measures to avoid too close contact can include plastic tape "barriers" like in Switzerland:

Figure 5 - Temporary measures to avoid too close contact can include plastic tape "barriers", Source: Janina Möller / GIZ

g) Provision of infrastructure: As for example bus drivers are often visiting restrooms at stops but many have closed in response to the COVID-19 outbreak, some cities such as Detroit have provided drivers with portable toilets.

h) Protection of infrastructure and operations: Command and control infrastructure and operation should be protected (e. g. by staff working in different shifts to avoid infection of important knowledge carriers or operators). Common spaces such as canteeens and cafeterias should be well managed. This can include extended serving hours, requirements to maintain distances of at least 1m while waiting and eating.

Protection of Passengers and People

The protection of passengers is not only a necessary welfare measure but also an important measure to maintain people's confidence in public transport. Measures must therefore be effective, but also adequately accessible and understandable in terms of communication.

a) General information: Information for passengers on standards of conduct can be disseminated through various channels. APTA offers many examples. Posters and Social Media information examples from Singapore are also illustrative.

Figure 6 – Campaign material by LTA Singapore, Source: LTA Singapore
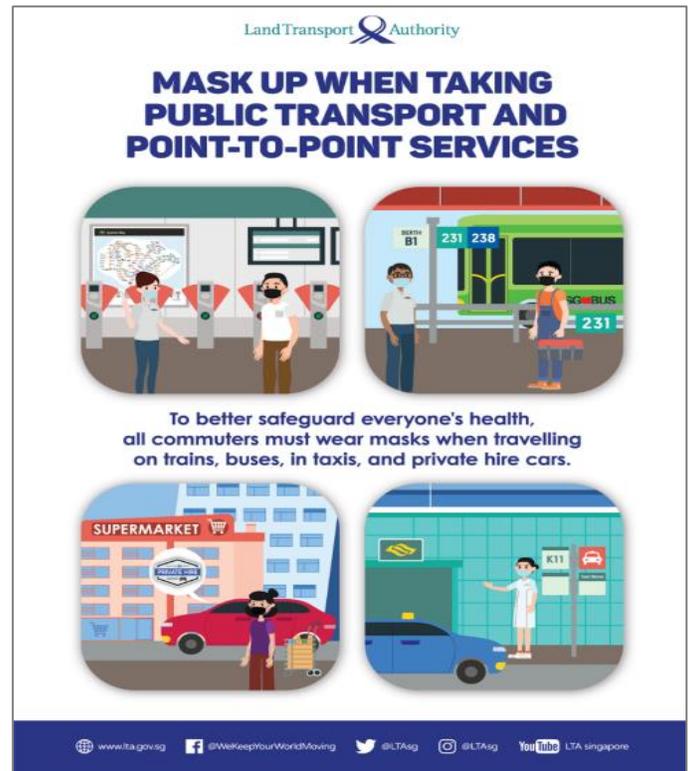
The use of video as applied in the King County Metro can enhance outreach and accessibility for users.

b) Risk information: Transparency is the most important aspect of dealing with extreme situations. In other words, in case that there was any passenger infected with COVID-19 using public transport, the local government and public transport provider should do its best to provide extensive information about the risk (e. g. by [providing QR-code based info platforms to passengers](#)), trace the activity of persons and share all potentially valuable information with the public. It will help to identify further cases and to ensure trust in public transport from the passengers.

c) Information on public transport schedule and time table adjustments: Against the background of a dropping demands, some cities and public transport operators such as the [BVG in Berlin](#) have adjusted their public transport operation schedules. A direct and transparent communication (e. g. by Social Media) of those adjustments of schedules, time tables and intervals shall be communicated to passengers in order to ensure public transport system and operation effectiveness, reliability, trust and convenience.

Figure 7 - Announcement of public transport interval changes by BVG/Berlin, Source: @BVG_Ubahn via Twitter

d) Access control and temperature checks: In order to minimize the risk of infected people entering public transport stations (e. g. subway, or train stations), health control checkpoints have been added in many cities in China. Before accessing a public transport station, people's body temperature has to be checked. In case that signs of fever are found, people are not allowed to enter the station.

e) Cleaning & disinfection: Regular disinfection of vehicles and equipment (such as turnstiles and handrails) with special anti-microbial cleansers is essential to reduce infection risks. [Examples are available worldwide](#). The Shenzhen Bus Group Company has provided information on how and when vehicles are cleaned, both buses and taxis. In addition, hand sanitizers and maybe masks shall be provided (in South Korea, especially in buses, hand sanitizers have been provided at the front entry and back exit of each vehicle). Other examples include MoBus by @CRUT_BBSR implementing comprehensive cleaning measures. As advanced approaches, reports from Shanghai show the [use of UV-light to clean vehicles](#)[1] or as in Hongkong the [use of robots to clean/disinfect vehicles](#).

f) More space & physical distancing: Implement measures that increase the distance between passengers to minimize the risk of infections. This can be done by increasing the frequency of public transport (as in the Example of Copenhagen), by [extra markers](#) as shown in the image below or by demand control using apps. As a counter-draft to larger capacities, the city administration in Ulaan Bataar reduced bus operations by 50 percent to reduce travel opportunities (and thus risks for infections). The [traditional Car-free Day in Kigali / Rwanda](#) (here as of March 15, 2020) focused on individual

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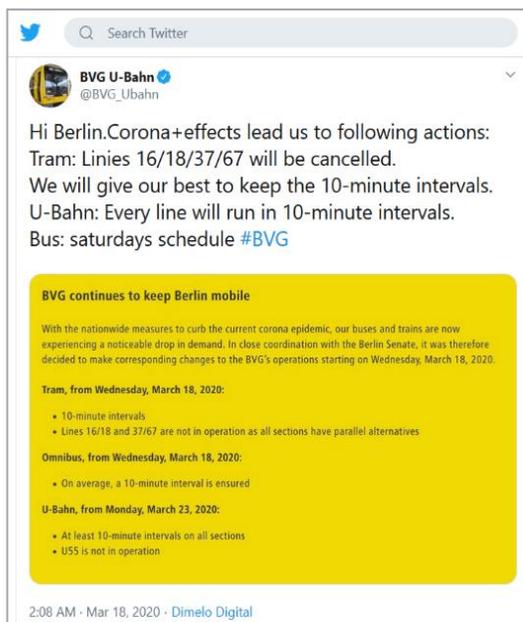
[1] A scientific report on the use of far-UVC light to control the spread of airborne-mediated microbial deseases can be found [here](#)

exercises to [reduce health risks, and transport being limited to carry seated passengers only.](#)

In Shenzhen, it is required to reduce occupancy of public transport vehicles to a maximum of 50 percent. South Korea introduced a "Social Distancing" campaign, asking people to refrain from social activities and public gathering outdoor.

g) One early non-human victim of COVID-19 were "**beg buttons**" - no one will touch them again.

Coordinated Demand Management

Several developments have come together at the beginning of phase 3 (lockdown): On the one hand, governments and administrations have deliberately reduced or even suspended public transport services (e. g. [Oman (March 19ᵗʰ)](#), [Cuba on April 11ᵗʰ](#), a growing list is available [here](#)), while on the other hand people have avoided travel and using public transport fearing risks of infection. All this led to a decline in demand for public transport - but public transport is still needed to provide basic services,

especially for employees of essential service functions. In this context, a coordinated approach consisting of reducing demand and supply is necessary.

a) **Impact assessment:** In order to avoid rebound effects from demand control and management measures (e. g. higher passenger density due to schedule changes and longer intervals), comprehensive impact assessments should be conducted before implementation. Examples, e. g. from Jakarta, show that a one-sided reduction of supply while demand remains the same leads to even greater concentration and thus counterproductive results. E.g., the limitation of the operation of transport modes by the DKI Jakarta Provincial Government (Pemprov), is considered not yet effective in suppressing the transmission of the corona virus. Observers consider that this very sudden policy is not aligned with the policies of private companies. The impact is that employees who have not been asked to work from home continue to go to work, where many still use public transport. Critics has also arisen as many passengers of public transport are not maintaining physical distancing. Starting March 16 to 30, 2020, [TransJakarta](#) services only operate on 13 routes with a 20-minute headway. This means that all non-corridor (Non-BRT), Royaltrans and Microtrans services are eliminated. Reduction of physical interaction is applied at TransJakarta bus stops and buses that pass across 13 corridors by providing inter-individual distances of one to two meters in public transportation space, such as at bus stops and on buses. For the bus stops, TransJakarta will provide markers and require customers to stand at a set distance. Whereas on the bus, customers will be seated to set the distance so as to minimize physical interaction between customers. This resulted in busway passengers queued reaching hundreds of meters outside the bus stop due to the reduction in the number of TransJakarta bus fleets.

b) Public transport booking and appointments systems: In order to manage demand, a staggered access to public transport stations was trialed in Beijing. Beijing plans to experiment with a "subway by appointment" system to prevent crowding at entrance of subway stations. Users can use apps getting appointments to enter two of the busiest subway stations in Beijing during peak times. In works via a QR-Code on user's phones that is valid for a half-hour time slot to enter the station.

Coordinated management needs to build on national alerts levels and translate the risk assessment into concrete measures in the transport sector (Example New Zealand).
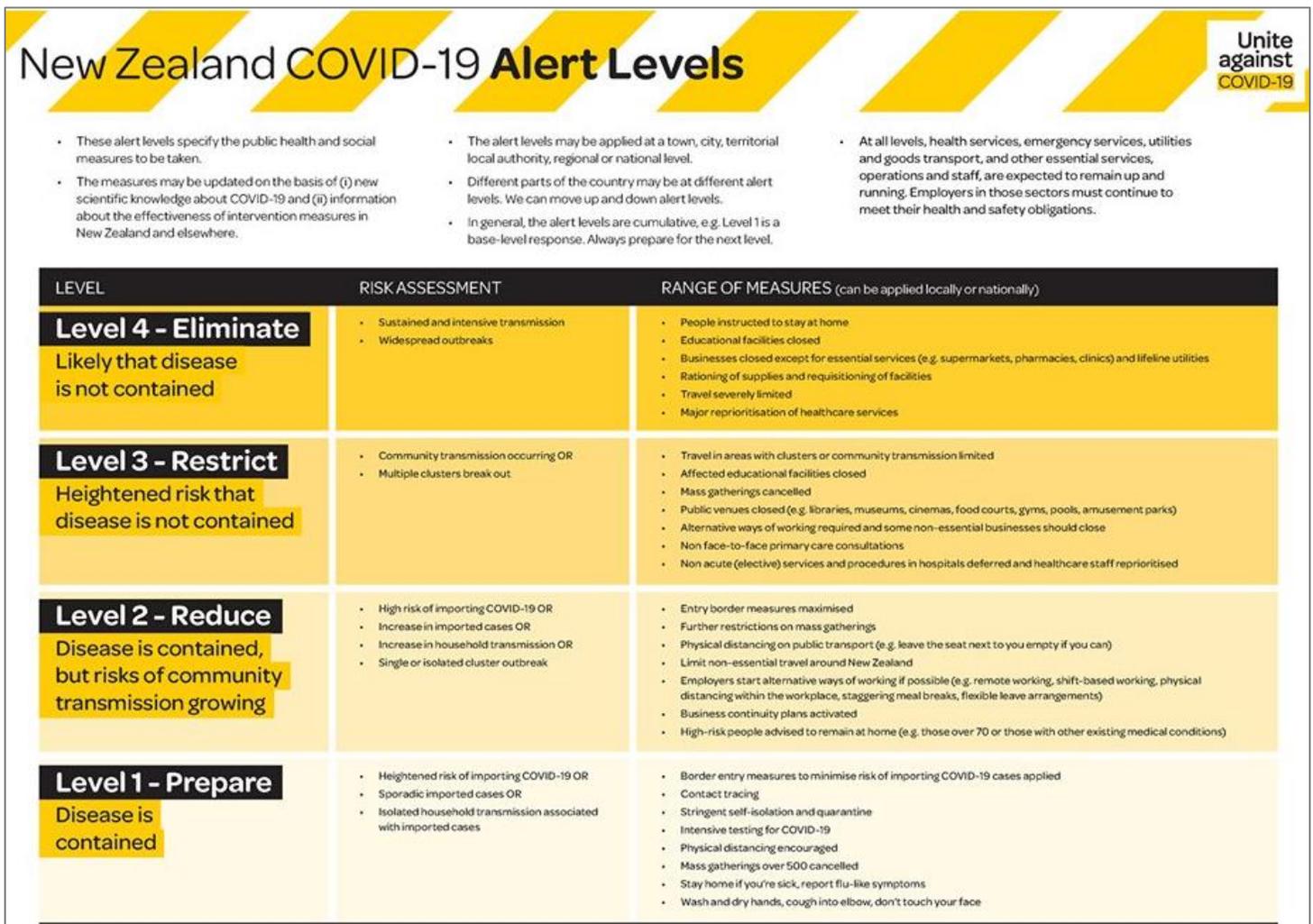
Figure 9 – New Zealand COVID-19 Alert Levels, Source: New Zealand Civil Defence

Shared mobility

Shared-Mobility features the same challenge as public transport: Different people, who often do not know each other, are using the same vehicle, at the same time or immediately after each other – both alternatives with a risk of catching the virus from fellow travelers.

Therefore, shared mobility companies (which cover ride-hailing, bike-sharing, car-sharing and micro-mobility) but also food and parcel delivery companies, have come under increasing pressure to look after people who work on their platforms and are typically classified as independent contractors, often lacking sick leave and other benefits. Many shared-mobility service providers worldwide had to suspend their services, lay off staff and have taken various measures in order to protect drivers, passengers and their businesses. Below listed is an overview on implications of COVID-19 to and measures taken by shared mobility service providers (see more discussion on this topic [here](#)):

a) **Suspension of services:** Against the COVID-19 pandemic, many shared mobility companies have suspended their ride-sharing services. It was reported that [Uber](#) has halted its pooled rides services in the US and Canada and [Lyft](#) did so in all its markets. Both of them are only providing ride-hailing services to individual customers. Ola has stopped its services in [Delhi](#). In Hamburg, ride-pooling company [Moia](#) will suspend its operations from April 1, 2020. The world's largest e-scooter rental company [Lime](#) has stopped its services in nearly 24 countries and Uber (Jump) and Bird (Circ) stopped operations in almost all European cities. Around a quarter of micro-mobility and a third of bike-sharing systems in North America halted operation (as of the first week of May, according to the [NABSA COVID-19 Shared Micro-mobility Status Tracker](#)). Nation-wide lockdowns impact carsharing services, e.g. [CityHop in New Zealands](#) is being suspended.

b) **Reduction of staff/salaries and working time**: Many of the new mobility start-up companies were under financial pressure already before COVID-19. The [venture capital investment](#) had already dropped by more than half in 2019 compared to 2018. The virus outbreak and reduced numbers of passengers and customers is increasing this pressure, forcing companies to lay off staff and to reduce salaries and working time. It was reported that German company [Tier-Mobility](#) has set about 60 percent of its staff on short-time work with reduced working hours and salaries and so did [Moia](#) and [Clevershuttle](#). [Bird](#) laid off about 30 percent of its employees, about 406 people, amid the uncertainty caused by the virus outbreak.

c) **Protection of drivers and passengers:** Shared mobility companies take various measures to protect their drivers and passengers from infection. [Uber](#) announced that it will suspend the accounts of drivers and passengers who are tested positive for COVID-19 or may have been exposed to it. Most companies are providing disinfectants to their drivers to keep their cars clean. Staff of e-scooter rental company [Tier](#) disinfects scooters with each battery change. Swedish E-scooter company [Voi](#) recommends its customers to use gloves in order to protect them from infection risks. It was reported that Clevershuttle is increasingly using its LEVC London Cab which has a glass window between the driver and passengers in the back of the car. For its other vehicles, plastic film protective sheets is used in order to avoid contact and reduce infection risks. [Didi Chuxing](#) has rolled out the use of protective sheets in Wuhan, Shenzhen and other cities under the guidance of medical professionals. [Grab](#) encourages passengers to go cashless with GrabPay to minimize physical contact. In China, Didi Chuxing is requesting passengers who do not book rides through the app and pay in cash to leave their contact details and phone

numbers in order to track infection chains and to inform passengers in case a driver is later reported to be sick.

d) **Financial support to drivers:** In order to support drivers which are affected by the virus and got infected and sick, Didi Chuxing has set up a special fund to financially support them in case that they get infected with COVID-19 and face loss of income. After introducing the fund in China, Didi has set-up an USD 10 million fund to support its drivers in Australia, Brazil, Chile, Costa Rica, Panama, Japan and Mexico. Grab Malaysia introduced a "ride cover" policy to include coverage for Covid-19 and financial support will be given by the company to drivers who struggle during the outbreak. Ola has launched an initiative under its social welfare wing, Ola Foundation called "Drive The Driver Fund", wherein the company offers support to auto-rickshaw, cab, kaali-peeli and taxi drivers through a contribution from the Ola group, investors and a citizen crowdfunding platform. The fund will support drivers and their families that have been affected by Covid-19.

e) **Provision of food delivery services:** China's Didi Chuxing has introduced delivery services in 21 cities, such as Shanghai, Hangzhou or Chengdu, to provide drivers with more income as COVID-19 has battered ride-hailing demand. Customers can order groceries or coffee via the Didi App and the driver will buy the requested items and deliver them. Didi also plans to introduce speedy courier services. Also Grab has introduced car-based delivery services in order to improve income opportunities for drivers. It was reported that KFC and Pizza Hut in China have launched a contactless delivery service in an attempt to reduce the risk of person-to-person transmission of COVID-19. After customers select the "contactless delivery" option when placing an order online, couriers will call them to set a delivery location. The courier will watch from at least a 10-foot distance as the customer picks up the order.

f) **Transport of medical staff:** In Berlin, van pooling company BerlKönig suspended its regular operations from March 25 till now (15.05.2020) and started to provide on-demand rides for medical and emergency staff which can use the service for commuting from home to work. While suspending its ride-hailing service, Chinese Didi Chuxing in Wuhan, the epicenter of the COVID-19 outbreak, and other cities has provided free transportation to medical workers, deploying two special fleets of drivers dressed in protective uniforms with regularly disinfected vehicles. In Bogota, thebikesharing company https://muvo.bike/ provided 400 electric bicycles to medical staff, allowing them to reach their work and make use of the emergency bikeways. The initiative was led by NUMO, Despacio and MUVO.

Conceptual Framework for Transport Sector Response to COVID-19

Based on Avoid-Shift-Improve Approach

Figure 11 – Avoid Shift Improve – Instruments @ COVID-19, Source: TUMI Initiative

Globally, cities and countries are implementing a large number of measures in the field of transport to prevent the further spread of COVID-19. It is not yet possible to draw any final conclusions about the efficiency and effectiveness of these measures. At the same time, we should not and do not want to lose sight of the goals of sustainable mobility. In order to create a better understanding of possible measures and at the same time provide a link to the transport policy debate, we have arranged the measures according to Avoid-Shift-Improve:

1. **Avoid:** Measures to reduce individual (motorised) transport demand - both in the short term to combat the coronavirus epidemic and in the long term to reduce carbon emissions, accidents and congestion,

2. **Shift:** Measures to direct users to safe, clean, low-contact means of transport in the wake of the corona crisis. In the long term, promoting forms of active mobility such as walking and cycling and attractive, reliable, accessible, affordable and competitive public transport to keep cities liveable,

3. **Improve:** Improving quality of operations and services, especially in public transport, in order to remain attractive and, in particular, to avoid crowding. An improved quality of biking and walking will help to free space in other modes.

Avoid Shift Improve – Instruments @ COVID-19*
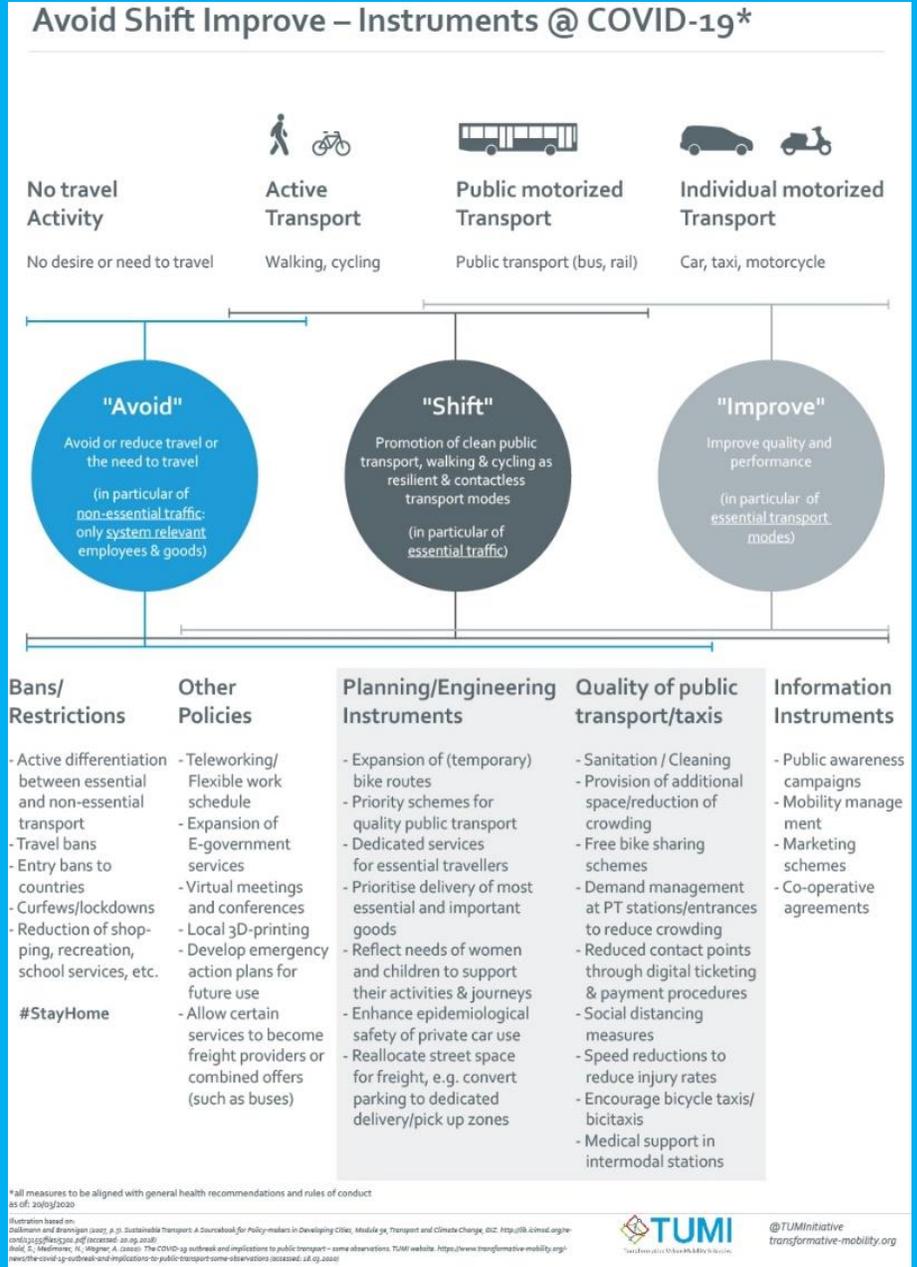
Technological innovation and in particular digitalisation are important elements to achieve improvements and developments in all three fields Avoid, Shift and Improve.

With the following overview, we want to suggest that the measures taken in the context of the corona crisis are both fair (in terms of social participation, gender and generational equity) and support the objectives of transport transformation in the long term.

With the drastic tightening of movement regulations in many cities and countries, the need to differentiate measures has become even more apparent. Here, the distinction between essential and non-essential traffic is particularly important. Necessary traffic includes essential delivery transport, the transport of medical personnel, retail and wholesale employees, employees of strategic infrastructures (water, energy, transport, etc.), security personnel, etc. This traffic is to be handled under the highest possible sanitary standards and also adapted to e.g. shift work. In order to relieve the regular public transport at this point, possibilities such as the construction of temporary cycling infrastructure or the limitation of private car use (to free up space) should be used.

An essential element of the strategy is the sequencing of measures - here, administrations from the areas of health, transport, safety, etc. must work together. Anecdotal observations show that unilateral restrictions on public transport services are often counterproductive. However, the measures for initial restrictions must first be communicated and accepted by the population, after which the public transport service can be restricted and tailored to essential user groups.

Further, measures need to be differentiated according to the phases of the epidemic. It is clear that the elements of the Avoid-Shift-Improve approach need to be applied and prioritized differently depending on the phase of the pandemic. In phases 1 and 2, measures in the area of Shift and Improve are relevant in order to enable physical distancing on the one hand and the transport of essential goods and people on the other hand. Phase 3 focuses on avoid measures that dramatically reduce the transport volume and focus centrally on essential actors and goods. In this phase, the transport sector clearly implements the instructions of the health authorities – transport is a servant of health paradigms. In many places, these requirements include a strict quarantine / lockdown.

Figure 12 – Lockdown Cases: France (Status April 2020), Source: Julieta Peruzzo

Lockdown cases: France

General	Public transport	Pedestrians	Bike system and shared mobility	Cars and motorways	Taxis
Everyone must remain in their homes, valid 24 hours a day. Exception: purchasing food, medication, hospital or work (those who cannot telework). **Police monitor that this is being adhered to.**	In Paris **public transport is still working but with lower frequency.** Buses are predominantly in service so as to transfer employees in the health sector. Boarding must be done via the back door.	Can circulate but with a **sworn declaration** which details the reason for the trip. Those who do not have this will be fined. One can go walking, (ensuring social distancing), dog-walking in the local vicinity, and separated parents can pick up their children. It is forbidden to visit parks.	**Vélib: service is limited but still functioning.** Limited personnel, only those deemed as essential workers for the service to function. There is also hygiene advice. Jumb, bicycles and scooters (Uber) - suspended.	Only essential trips can be made via car (essential work, food shops, caring for at risk residents, health employees).	Taxis and VTCs continue to function with certain precautions in place in order to reduce the risk of contagion. The President called the taxi union, delineating the necessary personal hygiene steps necessary for the foreseeable future in order to reduce the risk of contagion.

Phase 3: And the winner is…cycling

Phase 3 is characterized by severe lockdown measures, including closure of schools, closure of factories and offices, closures of places of recreation, worship as well as substantial restrictions of travel, e.g. limited to the close vicinity of places of living and for essential reasons only.

In this situation, the role of public transport is focused on transport of essential workers (the Canadian Department of Public Safety has issued a comprehensive [list of Essential Services and Functions by Critical Infrastructure Sector](#)).

Cycling is not only a great way to stay healthy (not only in times of the COVID-19 outbreak) and is a suitable alternative to gyms which in many cities had to close. But cycling is also an effective way to support physical distancing and to relieve the burden on public transport during a pandemic.

Early on, Denmark released recommendations for public transport users, among which the first recommendation is to walk or cycle if possible. In Germany, the German Minister of Health Mr. Jens Spahn stressed that people should avoid public transport and instead should cycle more in order to reduce risks of infection. Even though cycling besides being a healthy and sustainable means of transport is a good way to release pressure from public transport systems, it is important to also induce a shift from private car usage (incl. ride-hailing and taxis) to cycling but also walking to ensure the health of people and allow them to conduct physical activity safely.

Against this backdrop, the topic of pop-up bike lanes has developed great momentum in recent weeks. Pop-up bike lanes (also called emergency bike lanes) are temporary bike lanes that enable social distancing by providing more space for cyclists on the one hand and relieving the public transport system on the other. As part of the Tactical Urbanism movement (learn more [here](#)), pop-up bike lanes are characterized by fast decision making, trial and error approach and fast implementation, which is made possible by available building materials, materials for construction site equipment and marking.

The first major approaches were realized in Bogotá, in particular to relieve the Transmilenio-BRT system. Many cities have adopted this concept, including Berlin, Lima, Tirana, Paris, Brussels, etc.; the first technical guidelines were also developed very quickly to ensure the process is technically and legally sound. Examples include [Making Safe Space for Cycling in 10 Days: A Guide to Temporary bike lanes from Berlin](#) and [Ciclovía Recreativa Implementation and Advocacy Manual](#).

Bogota is a great example – the city has set up a network of emergency bike ways (Bogota already has 550km of permanent bikeways):

- Monday, 16th March 2020: 22 km of crucial corridors, only peak periods
- Tuesday, 17th March: 117 km of all ciclovía network, all day
- Wednesday: 76km of adjusted network, all day
- The measure was initially suspended after four days, as a full quarantine started in Colombia; but resumed shortly afterwards:
- [At the end of April, about 80 km additional bike lanes were assigned](#)

The measure was not only aimed at countering the further virus spread, but in particular at relieving the Transmilenio BRT system and improving air quality. This shows, however, that the objectives of sustainable mobility and COVID-19 abatement are highly congruent.

Pop-up bike lanes have the potential to be transformed into permanent cycling infrastructure and thus contribute to a more equitable use of space in cities.

Equivalent to pop-up bike lanes, cities like Berlin, Oakland, Milan, and Paris, have implemented concepts to create more space for pedestrians, children's play (and cycling) – broadly under the title of openstreets. This is particularly relevant against the background of the restrictions on going out caused by the lockdown and thus the reduced physical activity: Through openstreets, people in densely built-up areas are given the opportunity to stay at a safe distance outside buildings and still be close to their homes. For more ideas on open streets please check our publication Open Streets – Streets for People and this.

Figures 13: Pop-up bike lane in Berlin

Brussels has used the COVID-19 crisis to implement a whole package of measures, including 20 km/h speed limit in the city centre.

Another example for cycling in times of the virus outbreak is New York City: The ridership of Citi Bike increased by 67 percent in March, and more people have been seen bike commuting to avoid using the subway. Furthermore, restaurants are only allowed to provide take-outs and deliveries. In order to support this policy, the mayor had to lift a previous ban of e-bikes to support deliveries.

Pop-up bike lanes emerged in New York at the end of March: after the Mayor announced to close the 2nd Ave bike lane gap leading up to the Midtown tunnel.

In order to promote cycling, the City of Vienna/Austria has published a cycling network map to facilitate cycling. The shift to cycling is not uncontested: Reports indicate that under the curfew rules in Spain and Italy, cycling is prohibited. It was initially whether this ban refers to cycling sport or also for daily chores. As a counterexample, Berlin has kept bicycle repair shops and bicycle dealers open during planned lockdown to support resilient, sustainable mobility.

Figures 14: Pop-up bike lane in Berlin (left) and old infrastructure (right: combined, narrow bicycle/pedestrian infrastructure), Source:

Lena Stiller

In New Zealand, the government is supporting cities to set up temporary infrastructure like pop-up bikelanes and wider sidewalks.

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Phase 4: Post-Lockdown

Focusing again on public transport as well as on long-term prospects

With decreasing infection rates, and a much better understanding of the characteristics of the pandemic, numerous countries are daring to ease the lockdown rules and permit travel again (e.g. the metro in Wuhan has resumed service on March 28th). However, as of May 12th, in many countries public transport is still reduced or suspended.

Figure 15 – Public transport closures during the COVID-19 pandemic, May 11, 2020

Public transport closures during the COVID-19 pandemic, May 11, 2020

Our World in Data
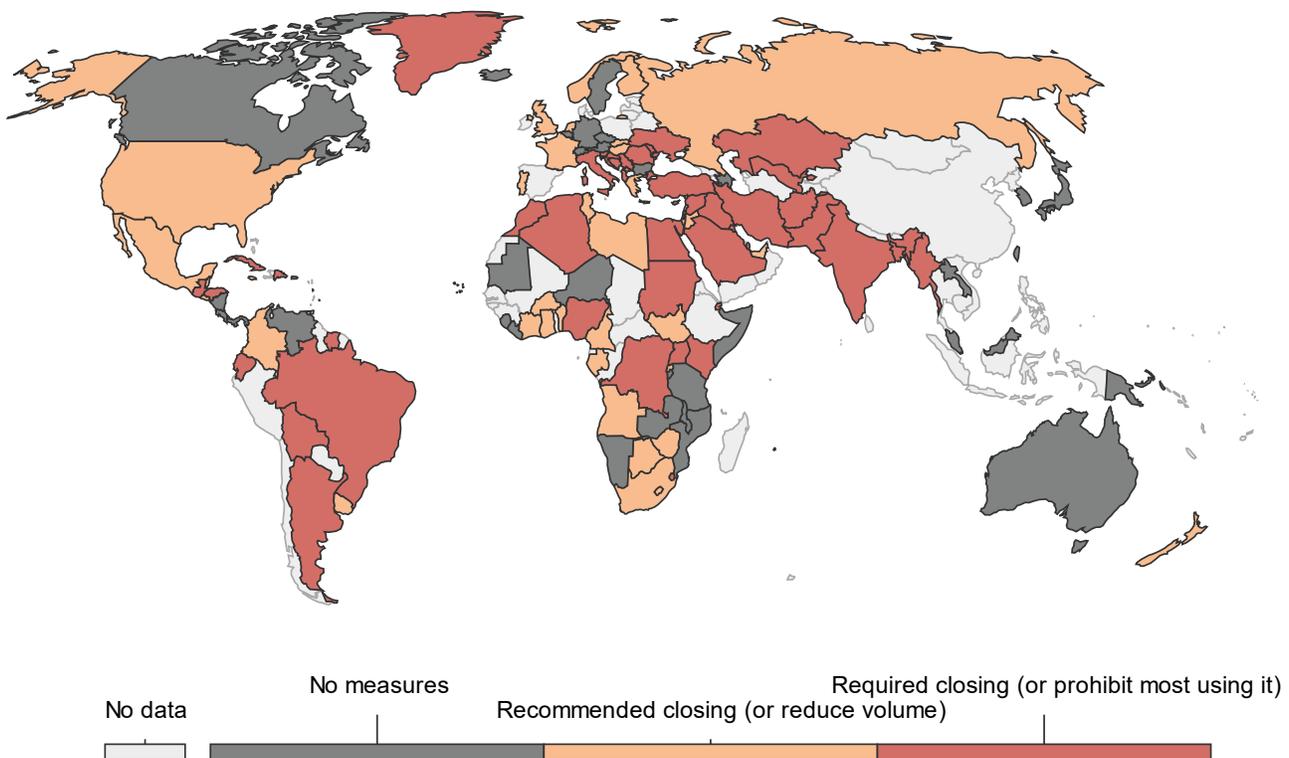
No data   No measures   Recommended closing (or reduce volume)   Required closing (or prohibit most using it)

Source: Hale, Webster, Petherick, Phillips, and Kira (2020). Oxford COVID-19 Government Response Tracker – Last Updated 11th May.
OurWorldInData.org/coronavirus • CC BY

Several organisations have published guidance on post-lockdown resumption of services:

- UITP: [Resuming Public Transport Services Post Lockdown](#)
- SMART-SUT India GIZ: [Standard Operating Procedures SOPs for Bus Transport Post Covid19 Lockdown](#)
- Shenzhen Bus Company: [Facing up to the new normal](#)
- ITDP India: [Post Lockdown Guidelines for Bus Operations](#)

These guidelines are focusing on:

- Distancing between the passengers inside buses, at bus shelters/terminals and interchange,
- Safety for on-board crew i.e., driver and conductor as well as at depot & terminals, and to establish the trust of the passengers on public transport as safe mobility choice
- Encouraging use of on-demand services

The WHO has published a leaflet on moving around during a COVID-19 outbreak.

Figure 16 – Moving around during the COVID-19 outbreak, Source: WHO

The bill and green stimuli

The bill

The issue of the financial viability of public transport has come to the fore. Public transport in particular is struggling worldwide with reduced passenger load factors of 50 to 90 percent, resulting in revenue losses of up to 75 percent. Single ticket sales, which normally account for 50 percent of ticket revenues, slumped by 80 to 90 percent according to the Association of German Transport Companies (VDV). In Munich alone, there are currently revenue losses of EUR 30 to 50 million - per month. Transport for London (TfL) estimates that EUR 2.29 billion will be needed to keep the system running until autumn 2020, and the loss of confidence in public transport threatens to cause the industry long-term damage.

In the wake of the initial easing of containment measures in Germany and other OECD countries, the political discussion is focusing increasingly on the design of stimulus programs to support the economy and promote environmentally friendly economic recovery. Against the backdrop of falling tax revenues, the focus should shift more strongly to cost-efficient economic stimulus measures in addition to large-volume investment programmes. Instead of planning additional funds, several levers can be used, especially in the transport sector, to reduce existing subsidies (e.g. diesel taxation) and to leverage savings potential in terms of a "green" transport infrastructure.

Green stimuli

Under the banner of Green Recovery, UN Secretary General António Guterres calls on governments to use their stimulus packages to create more sustainable, resilient and inclusive societies ("build back better"). This is supported by leading economists such as Nobel Prize winner Joseph Stiglitz and climate economist Nicholas Stern. According to a recent study by the University of Oxford, green COVID-19 recovery packages are better suited to boosting economic growth and halting climate change than a return to old routines. A green restart is an opportunity to shape the 21st century economy in a way that is clean, green, healthy, safe and resilient.

Green stimulus packages in the transport sector should be closely aligned with the Avoid-Shift-Improve paradigm. Investments are very durable, especially in the mobility sector, and must be designed now. The following approaches, among others, should be taken into account:

1. **Reduction of (motorized) transport demand (Avoid):**
   - Promotion of compact resource and space-saving, human-centred accessible and barrier-free and mixed-use oriented cities instead of suburbanisation and respective urban sprawl; "fast internet instead of highways"
   - Promotion of remote working and learning, resulting in reducing traffic volumes and congestion, in particular reducing the number of commuting journeys to work by between 20 percent and 40 percent and equalising traffic.

2. **Promotion of public transport and active mobility (shift)**
   - Promotion of safe, reliable, affordable, accessible and high-quality public transport, cycling and walking (including infrastructure, services, safety and education) as a resilient means of transport (examples: Berlin, Milan, Bogotá)
   - Restore confidence in public transport

3. **Improving the quality of transport (Improve)**
   - Provision of "mobility bonus" instead of "car bonus": Mobility bonuses for sustainable mobility solutions such as public transport, (e-)bicycles, cargo bikes, company bicycles, e-bike charging stations among others
   - Linking the promotion and implementation of transport measures to increasing energy efficiency and mitigating CO_2 emissions

Early observations on impact of COVID-19

Already, we can see the impacts of the pandemic and the consequences of measures taken to stop or slow the spread of the virus worldwide. The impacts – on the economy, on social behavior, on climate and urban environments - can be observed and felt in various fields.

Illustrative examples showcasing impact on emissions, demand and other aspects

Unintentionally, many of the measures enacted against the pandemic let GHG emissions and air pollution drop. Here, the largest cause is the (voluntary or imposed) restrictions on mobility: fewer commuters driving their cars to work, air travel has gone back, many people stay at home or only move locally. The only exceptions currently seem to be cargo ships and delivery services. Data analysis from location technology providers shows that car travel in European and US cities has reduced quite dramatically, and those moving around in a city often shift to their bicycle.

Earth satellite observation data also reveals that locations with severe virus spread and bad air quality are more likely to suffer, as those persistently exposed to air pollution are more at risk of dying from the pandemic. Needless to say that air pollution is already responsible for causing lung and heart damages leading to over 8 million premature deaths annually.

While it is currently too early to estimate real time economic effects, data on national electricity demand and household mobility point towards a significant downturn in economic activity. The consequences of this pandemic-induced recession might last longer than the virus outbreak, hit strained finances heavily, and lead to a strong increase in unemployment. Next to airline and other industries, public transit agencies and associations have started making demands for financial government aid packages to help them through the unraveling crisis. In addition, taxi industries or informal transport operators, especially in countries with limited capacities for stimulus policies, are suffering since their daily revenues have been cut. Remember, these consequences are not distributed equally: women may be hit particularly hard.

Initial analysis of mobility trends[2]

The data-sets by [Google's COVID-19 Community Mobility Reports](#) and [Apple's Mobility Trends Reports](#) provide a first opportunity to analyze the global impact of COVID-19 on individual mobility and transport modes. Google's data-set indicates how the mobility to different destinations (retail and recreation, groceries and pharmacies, parks, transit stations, workplaces and residences) has changed compared to the average mobility on 3 January to 6 February 2020. The data by Apple shows how the direction requests for driving, transit and walking have changed compared to a baseline of 13 January 2020. These two data-set work as good proxies to understand the dimension of mobility changes since early January.

As discussed in this article, everything points towards that public transport is affected the strongest by the pandemic. Examining the data, it confirms this observation and shows a steep decline of mobility to transit stations (Figure 17). With the start of the second week of March 2020, all regions encountered reductions. At first, Europe was affected the strongest but by 19 March Latin America and the Caribbean became the most affected region. By end of April, the reductions were over 50 percent in most regions and over 70 percent in Latin America and the Caribbean.

Figure 17 - Mobility to transit stations assessed for regions, Source: Google, 2020, COVID-19 Community Mobility Reports

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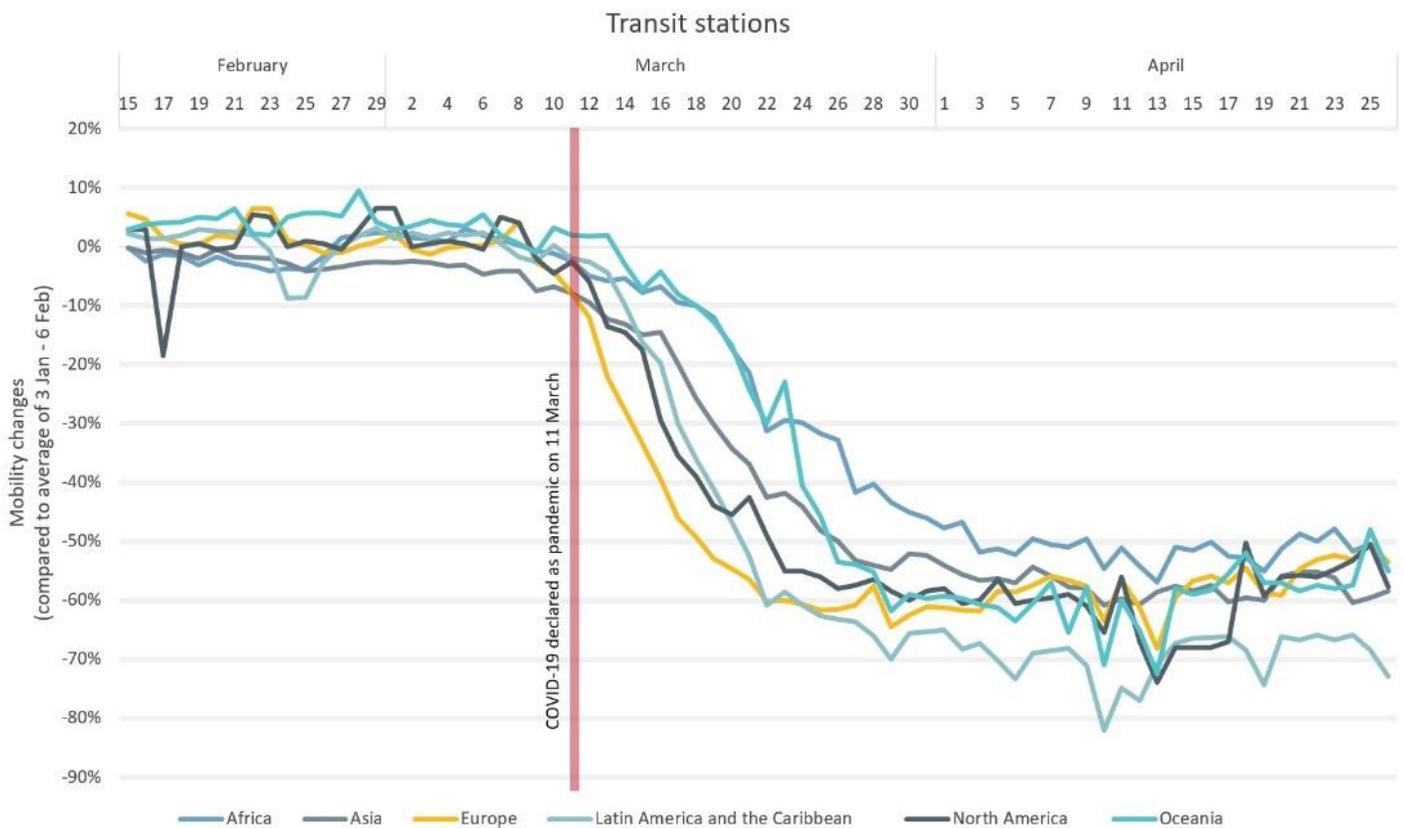
Transit stations
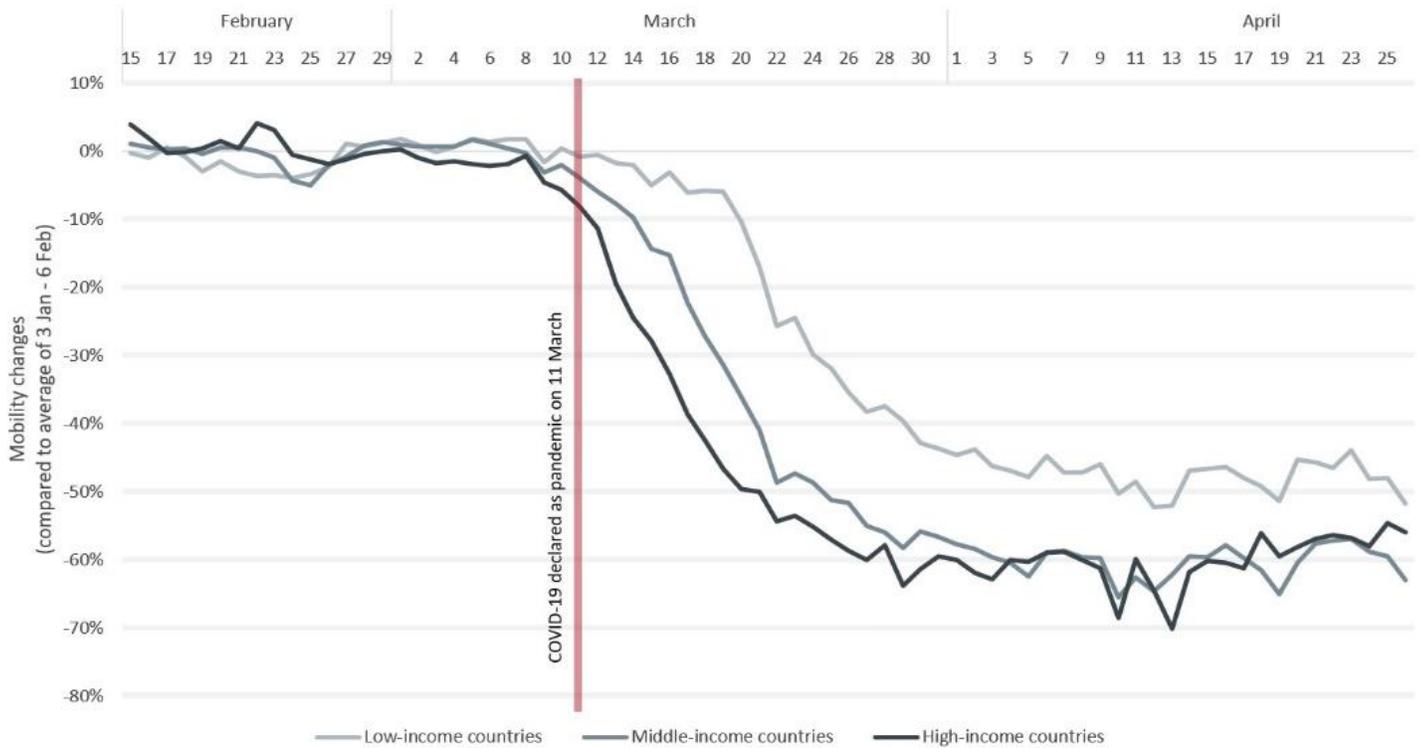
Figure 19 - Average monthly impact on transport modes, Source: Apple, 2020, Mobility Trends Reports

The mobility to residential destinations (representing people staying at home) increased largely since March. It shows the impact of social distancing campaigns, lockdowns and other policy measures, allowing to slowdown the spread of the virus. Grouping the data set by income groups, it can be observed that high-income countries experience the highest reductions in terms of mobility to transit stations (Figure 18).

While conclusions have to be done with care, it can be connected to high numbers of confirmed cases in high-income countries and the implemented lockdowns during April 2020.

Figure 18 - Mobility to transit stations assessed for income groups, Source: Google, 2020, COVID-19 Community Mobility Reports
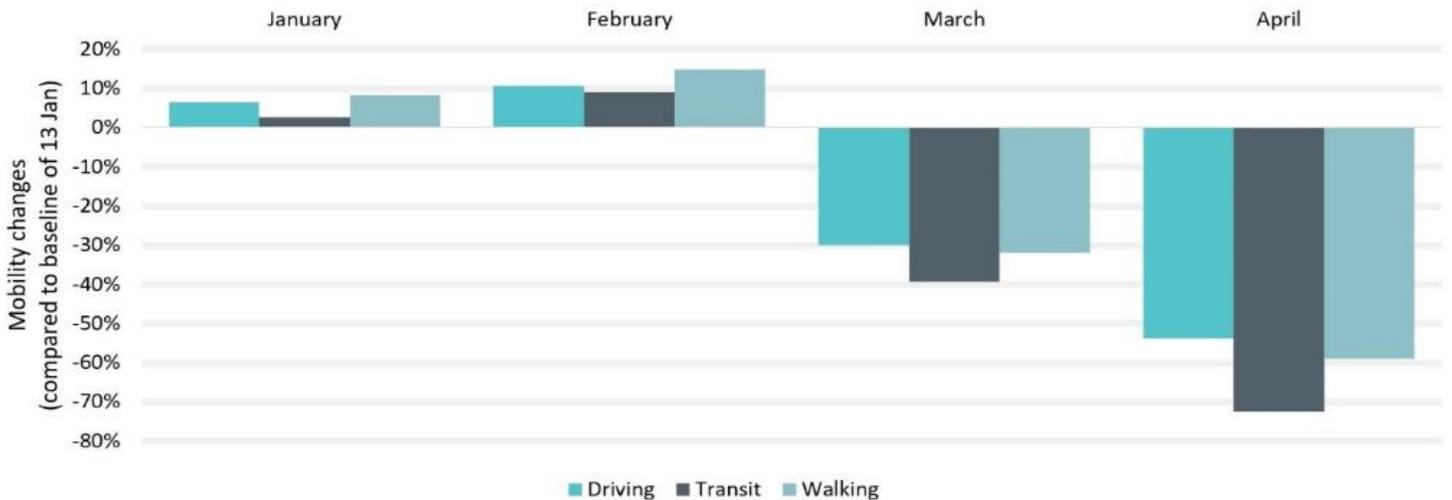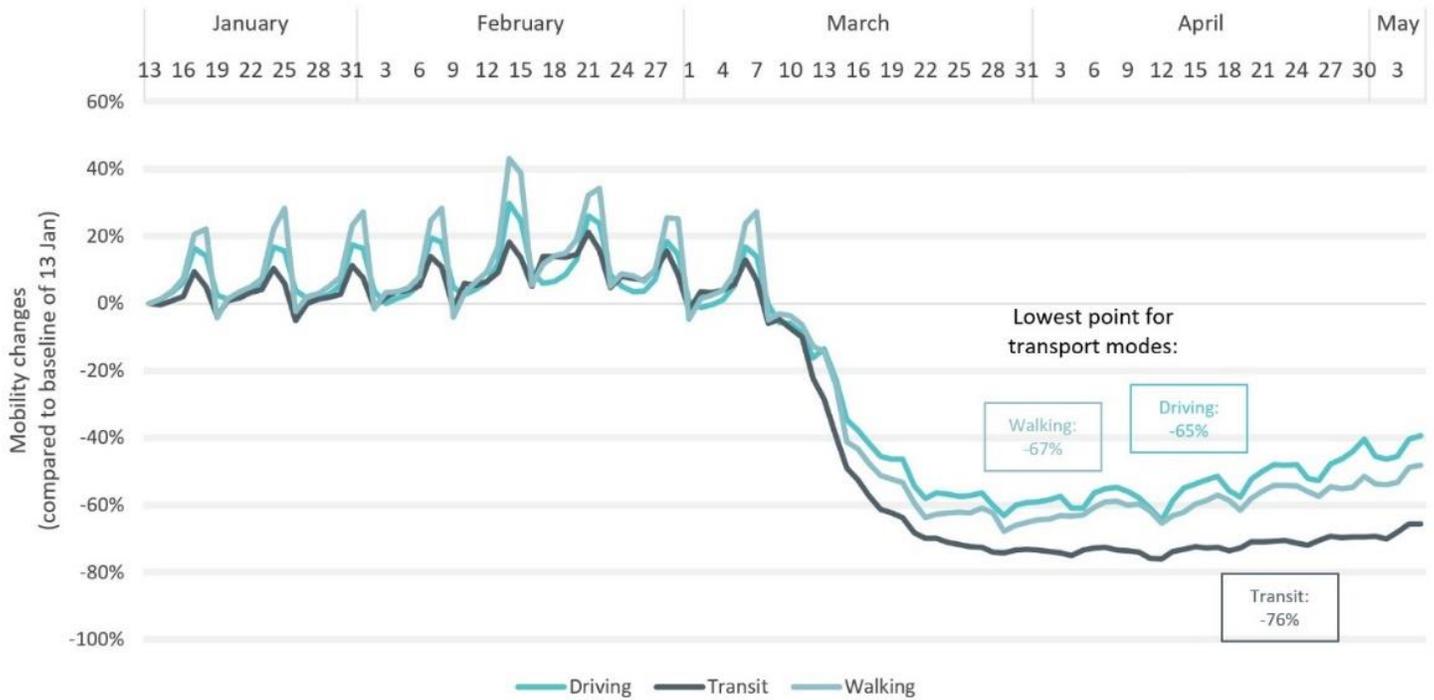
Figure 20 - Changes of mobility trends, Source: Apple, 2020, Mobility Trends Reports

Apple's data-set on driving, transit and walking shows that the interest in transport modes have seen a strong decline since March. Public transport was affected the strongest, followed by walking. The impact on driving is the

In detail, on a daily basis, the analysis show that all covered transport modes experienced an extreme decline in Mid-March 2020. Transit was affected the most by COVID-19.

The strongest reduction of driving and transit were reached on April 12, 2020 (-65 percent and -76 percent, respectively), while walking was at -67 percent on March 29, 2020 (Figure 20. Driving and walking have slightly improved since then but long-term observations are needed before further conclusions can be made.

Plotting the number of deaths per million people due to COVID-19 in each country to the impact of transit station mobility change (in this case for April 17, 2020) gives clusters that overlap with the different regions. It emphasizes again that mobility in Latin America and the Caribbean is hit the strongest even though it has less deaths (compared to Europe) (Figure 21). Asian countries show a large diversity in terms of mobility changes while European countries show a very large range of the number of fatalities per country.
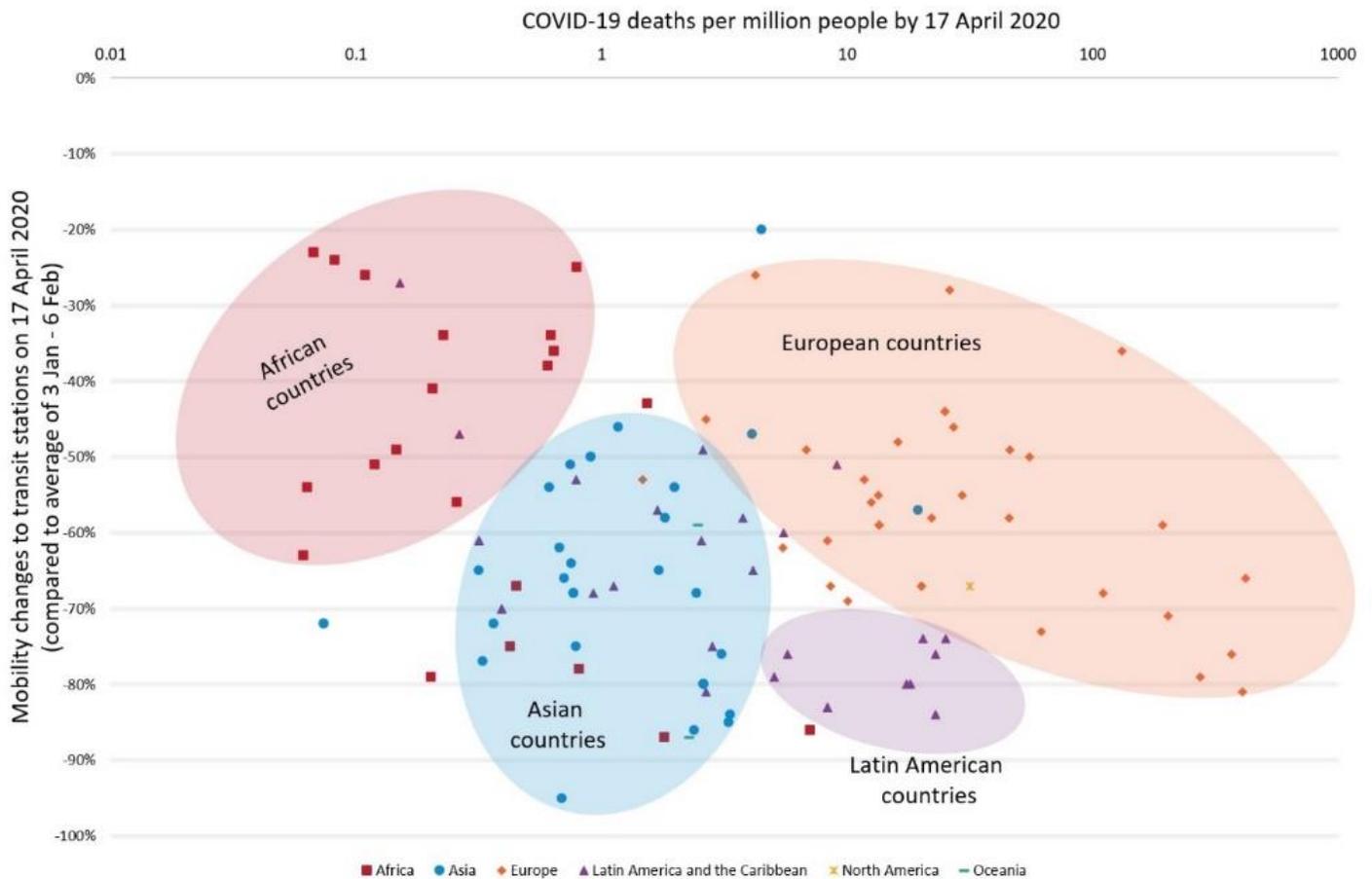
**Figure 21 - Clusters of mobility changes and COVID-19 deaths,
Source: Google, 2020, COVID-19 Community Mobility Reports and
Our World in Data, 2020, Coronavirus Source Data**

A complete analysis of COVID-19's impact on mobility and transport modes is being developed by the SLOCAT Partnership here.

Taking a look into the next months to come, it is important to keep in mind that measures enacted now aiming to mitigate the impacts (e.g. short-term work, stimulus funding) will have an indifferent or even negative effect on sustainable mobility later unless measures are also targeted specifically. Otherwise, the legacy of the COVID-19 shock will be damaged economies and damaging mobility systems.

Summary

The long-term implications and impacts of COVID-19 on public transport and shared mobility and in general mobility behaviour cannot be fully assessed in the moment (May 2020). But it is clear that all possible efforts need to be made to ensure that measures taken by governmental agencies, public transport and share mobility companies in order to ensure safety of staff and passengers as well as a further spread of COVID-19 shall be based on comprehensive impact assessments, taking into account social, environmental and climate as well as economic impacts.

…last but not least…

"You never let a serious crisis go to waste. And what I mean by that it's an opportunity to do things you think you could not do before." ([Rahm Emanuel](#))…foster innovation and make use of digital solutions, promote e-payment, increase automation, focus on customers, quality of facilities and high service levels to ensure long-term oriented competitive, attractive and safe public transport.

Annex 1: The four phases of COVID-19 and transport response

Phase 1: Appearance of virus/import (Containment)

Progress of the virus: Appearance of virus / and People who "import" the virus from abroad. Adequate containment must be implemented. Isolation and control measures introduced so that those who are sick do not pass on the infection to others.

Aim: Reduce the circulation and concentration of passengers in public transport and help promote social distancing.

Types of measures that can be implemented:

1. Reduce trip demand
2. Guarantee offer
3. Change trip modality
4. Regulate the fluxes in travel demand
5. Communication and awareness to the passenger

Phase 2: Community contagion

Progress of the virus: People who are infected in a communitary manner within the same country and without direct contact with those who have travelled to areas of risk.

Aim: Reduce circulation and concentration of passengers in public transport as much as possible.

Types of measures that can be implemented:

1. Reduce travel demand
2. Guarantee offer
3. Change trip modality
4. Regulate the fluxes in travel demand
5. Communication and awareness to the passenger

Phase 3: Sustained Transmission

Progress of virus: Sustained communitary transmission cases with large numbers of infected.

Aim: Suspend public transport/radically modify.

Types of measures that can be implemented:

1. Determine who are the essential workers in specific areas (health, security etc.)

   ■ Police

   ■ Doctors and nurses

   ■ Fire department

   ■ Personnel on duty in government entities and companies that offer specific services.

2. Map the origin-destination of personnel designated as essential workers.
1. Define logistics plan.
2. Agreement with bus/minivans in order to coordinate transfers.

Phase 4: Relaxation

Aim: Clean and safe recovery of transport services

Types of measures that can be implemented:

1. Development of new SOP (standard operating procedures) with:
   a) Enforcement of social distancing rules
   b) Enhanced disinfection and hygiene
   c) Early detection of new outbreaks
2. Development of new business models and operational plans
3. Green Recovery

Figures 22 to 24 - Examples:

Beijing

cases					
574	7,736	11,821	80,924	81,021	**81,439**
January	February		March		**cases (total in China)**
Phase 1	Phase 2	Phase 3			

11/01
First death due to COVID-19

23/01
Total quarantine in Wuhan - 11 million people

25/01 - 05/02
Festival: "Lunar New Year".
Virus spread to various cities in China.
Schools and universities were already closed due to the long weekend.

30/01
Public Transport:
- Rigorous cleaning various times per day.
- 50% reduction in the number of passengers, one person per row of seats, no one can travel standing.
- Daily temperature checks of drivers.
- Hygiene measures for drivers: gloves, facemasks, hand sanitiser.
- Health checkpoints on the road (not just in Beijing but in other cities in China as well).
Contact tracing: to control the "path" taken by the virus/contagion spread.
Obligatory social isolation:
(not as rigorous as Wuhan, the majority of the population abided).

10/03
44 new cases, the lowest official rate since the severity of the crisis was recognised in January in Wuhan.
3.119 deaths

11/03
- Obligatory quarantine established for all those who enter Beijing from other countries.
- Must remain in observation in their homes or specific pre-designated areas.
- Applies to all countries with no exceptions.
Source

14/03
20 new cases reported, 16 of those are imported.

Beijing gradually and slowly returns to normality. Certain shops and companies are reopened. Hubei has no new cases. Wuhan has closed all its temporary hospitals.

Singapore

cases	0	3	5	14	27	58	110	187

January — February — March → **879 cases**

Phase 1 — Phase 2 — Phase 3

03/01
Body temperature controls carried out on passengers from Wuhan in airports.

20/01
All people who have travelled from Wuhan in the last 14 days must go into isolation.

22/01
Body temperature controls in airports extended to all passengers arriving from China

24/01
Recommendation to avoid travel to China

27/01
Designated official quarantine sites implemented

31/01
All passengers arriving from China are not permitted to enter Singapore.

07/02
Suspension of inter school and external school activities
Source

13/02
A 77 million SGD fund announced in order to help taxi drivers and private car drivers

03/03
Restrictions extended to Iran, north of Italy and South Korea.

03/03
Limit meetings to maximum of 250 people.
Travellers from Italy, France, Spain and Germany are prohibited from entering Singapore.
Social distancing measures implemented.

12/03
Many restrictions on travellers applied. ICU/beds freed up in hospitals in order to cater to additional needs.
If there is a significative increase in cases, only the most serious cases will be hospitalised.
Social distancing measures continue to be implemented (schools suspended, work turns implemented or telework).

26/03
Additional $120 Million SGD to Help Taxi and Private Hire Car Drivers Affected by Covid-19

Obligatory Quarantine cases: the city of Buenos Aires

General	Public transport	Pedestrians	Bikes and shared mobility	Cars and motorways	Taxis
Everyone is required to remain in their homes.

One can only leave their home in order to go to the pharmacy, supermarket, and other essential services. | **Functioning but theoretically only for those deemed essential workers.**

Buses: one must travel seated and with a minimum distance of 1.5 metres between themselves and the driver.

Tubes and trains: Modified service. Multiple stations are closed. Key stations remain open in order to access medical services. | Residents may only leave with a special form stating justifying why they have left their home. | Public bicycle system (Ecobici) closed.

Scooters: suspended. | There are 111 access points into the city; 56 are closed. De los 111 accesos a la Ciudad, se cerraron 56. Solo quedan 29 abiertos, de los cuales 26 son exclusivamente para transporte público.

Tolls in urban motorways have been suspended.

A special permit is required in order to use the motorway. | It is forbidden to travel in the front passenger seat. The number of passengers per vehicle is capped at three.

Only workers with permit are allowed to use taxi services.

It is recommended that people comply with the new hygiene norms (as much as physically possible). |

Annex 2: Case study

COVID-19 and Public Transport in Tunisia

(Dr Saerom Han and Rania Houiji, via https://transportandyouthemploymentinafrica.com/in-the-field/2/ , as of March 27, 2020)

~I was scared of the virus particularly when I took bus. I used to be feeling bad because of harassment, but now the virus is more threatening than harassment. When someone slightly touched my hand, I felt myself dead and cried for no reason. I started using collective taxi or private taxi because they are safer than bus…" **(Fatma, woman in her 20s living in Tunis)**

As the situation with COVID-19 was getting worse in Tunisia, Fatma, who is quoted above, stopped using taxis and started commuting to work via a private bus rented by her company for workers. She is one of many Tunisians who, while wanting to stay at home, has to go continue to work because she lives from hand-to-mouth. Many Tunisians have no choice other than to take overly crowded public means of transport, despite the current danger of being infected, because of not being able to afford a car or private taxi.

The number of the COVID-19 cases in Tunisia has been rising continuously since the first case was confirmed on March 2, 2020. The government reported 114 infection cases with four deaths as of March 25, but the actual number of cases is likely to be far higher than what was reported given Tunisia's limited testing capabilities. So far it has only carried out 69 tests per million people. Like many other countries, Tunisia's medical infrastructure is poorly prepared for infection control and treatment as marked by the presence of only three hospital beds per 1,000 people. The state is trying to prevent further spread of the virus mainly through social distancing measures. Two days after the state decided to close borders for all commercial travels and ban public events and gatherings on March 16, it also imposed a two-week curfew between 6pm and 6am to restrict the mobility of people.

Many doctors have warned against the risk of the spread of the virus via buses and metros as they are so over-crowded. The interview data [collected prior to the arrival of COVID-19] in the *~Youth Engagement and Skills Acquisition within Africa's Transport Sector"* project in Tunis supports this concern. Many public transport workers and passengers alike complained about the shortage of buses and metros particularly in peri-urban areas. The interview data also indicates that public transport in general is not hygienic, and is poorly managed and unsafe.

Amid the growing concern about the safety of passengers and workers, the public transport sector initiated several measures to combat the spread of infection. The Ministry of Transport and Logistics said that all public transport modes will be sanitized regularly and encouraged people to avoid unnecessary travel. In accordance with the government's curfew decision, the national public transport company TRANSTU announced that it will provide 160 additional buses and 17 additional metro trips during the late afternoon time in order to avoid peak-time congestion during the curfew hours. However, the sudden imposition of curfew created chaos at bus and metro stations as they became much more crowded than usual with

30

people trying to head home before 6pm. Although public transport companies attempted to prevent high congestion, metros, buses and collective taxies were severely overloaded and delayed.

The dire situation of public transport is making not only passengers but also transport staff vulnerable to the infection. Criticizing the authorities' slow response to the pandemic, a representative of metro conductors, Rachid, said that all public transport in Tunis must stop operating if they are to protect their staff and passengers. On March 20, he called for the general lockdown of the country via his Facebook post, warning that metro workers will stop working if the government fails to do so. The situation with buses is even worse as, unlike metros, bus drivers and ticket sellers have to share the space with passengers. TRANSTU has recently installed ad hoc plastic curtains to protect drivers.

As the situation with COVID-19 evolved, Tunisia finally entered into a two-weeks of general quarantine on March 22 with the exception for those who work in vital sectors including security, health, water, electricity and public transport. Prime Minister Elyes Fakhfakh announced that only around 15 percent of Tunisians who work in vital sectors are allowed to go out for work, and military and police officers will be deployed on streets to control the mobility of people. However, all Tunisians can leave their house for a short walk and for grocery shopping.

Following the government's decision, TRANSTU reduced the service of metros and buses to every 30 to 45 minutes. It still remains to be seen whether public transport will meet the needs of citizens while limiting the spread of the virus. But, the picture below, widely circulated on social media on the first day of the nationwide lockdown, reflects the current challenges and limitations of the public transport sector in Tunisia.

Figure 25 – Ad-hoc plastic curtain in TRANSTU , Source: Transtu facebook page

Figure 26 – Crowded bus entry, Source: Medea Bachene

Annex 3: COVID-19 and Public Transport in Costa Rica

The State, the bus operators and the media

Context as of May 2020

The Corona pandemic reached Costa Rica late, the government did not react before the first cases were reported. Since the first case was reported on March 6th, the government has been increasing measures to control the spreading of the disease.

As of May 5th, Costa Rica reported less than 750 people infected. The rate of daily increase has been less than 10 new cases being reported during the last month. The mortality rate is one of the lowest on the continent. On April 17th, for the first time, more cured patients were recorded than new infections; the number of active cases has been decreasing since then.

So far, it has been possible to avoid an exponential spread of the disease. According to an analysis of mobile phone data, the frequency of visits to shops, resorts, beaches and parks in Costa Rica fell by 82-84 percent.

Figure 27: Drop in passenger demand, Source: Diana Ramirez Chaves

Regular bus routes have experienced drops in demand of up to 80 percent, leading to reduced services and - in some cases - dismissal of personnel. In the taxi sector, drivers are demanding help from the State due to a severe drop in users. Special transport services for students and tourists is paralyzed. Special transport services for workers are only allowed on routes with exclusive contracts between company and bus operator.

Measures by the state

The country's borders were closed on March 16th with the declaration of a national state of emergency - a deep cut for a country whose economy depends heavily on tourism. Public life was reduced to a minimum. Employees of public institutions were sent to home office and the private sector was called upon to follow this example. Beaches, national parks and schools were closed. At the same time, the country refrained from imposing a total curfew and concentrated on restricting vehicle traffic, especially at night and during weekends. During the Easter Week there was a complete ban on driving to prevent Costa Ricans from travelling to the beaches during the main holiday season.

Specific measures in the transport sector

March 17th: Bus operators are informed that the schedule may be adjusted while ensuring that the services in peak time as well as the first and last ride remain but that the frequency of the service in off-peak hours may be adjusted. Passengers must be informed.

March 19th: General guidelines for owners and managers of public transportation nationwide (buses, taxis, porters, boats, trains and similar) in the context of the health alert for Coronavirus were released:

- Medical check-up of staff with symptoms
- Increased vehicle and terminal station cleanliness
- Publishing COVID19 information for passengers
- Vehicles (buses and trains) must not carry more than the capacity of seated passengers.

April 1st: In the context of the Easter Week, the Government reinforces measures to reduce the spread of COVID-19

- From April 3rd to 7th, the nighttime vehicle restriction will be extended throughout the country from 5:00 pm to 5:00 am. Long distance public transportation very restricted.
- From April 8th to April 12th, the circulation of vehicles and public transport is restricted, with some exceptions.

April 11th: Reduced public transport services during the period of April 13th to 30th

- Regular public transport will be provided between 4 am and 11pm
- At least 2 percent of the regular bus service must be provided during the same timeframe
- Taxis permitted 24/7

April 13rd - May 15th: Vehicle plate restrictions (exceptions apply)

- Nighttime restrictions: no circulation during the week between 7pm and 5am and during the weekend between 5pm and 5am.
- Daytime restrictions: during the week, 20 percent of the vehicles may not circulate on specific days, during the weekend 50 percent of the vehicles may not circulate per day
- Weekend limitations: at the weekend only trips to the supermarket and for medical reasons are allowed. Since May 3rd selected further trip purposes are allowed, e.g. beauty salon, hardware store, sports.

April 29th: The National Council of Public Transport recommends drivers and passengers to use face masks in public transport.

Figure 28: Empty highway, Source: Diana Ramirez Chaves/GIZ

Impacts and measures taken by bus operators

Operators indicate that their demand has decreased up to 80 percent and that they are operating between 20 percent and 60 percent of the normal supply. The companies have opted for various measures of hygiene, cleaning, equipping their employees and users, screens, closure of seats near the drivers, gloves, masks, among others. They also have a quite complicated situation to keep all their staff hired due to the decrease in demand and therefore in revenues.

One of the larger bus operators (165 units) reported the following impacts as of May 4th:

- The buses operate 54 percent less than during pre-COVID-19 times
- The number of passengers has reduced by 62 percent
- Most of the staff continues working part-time (the reduction of salary lies between 15 percent for bus drivers, 35 percent for maintenance personnel up to 50 percent for administrative staff)
- Due to own calculations, an increase of the tariff of 105 percent extra would be necessary to maintain financial viability of the company.

On April 22nd the National Chamber of Transport (Canatrans) reported 1,500 dismissals in the public transport sector, as well as 60 percent of employees working part-time. In addition, approximately 25 percent are in the process of suspending their employment contracts. In Costa Rica, less than 2 percent of the public transport companies have a fleet of more than one hundred buses. Most of them do not exceed five or ten units. Especially those small and medium-sized enterprises have limited means to compensate the impact of the crisis. It is important to mention that there are no subsidies for public transport in Costa Rica; the price of the bus ticket covers all expenses of operating the system.

Decision making during the corona crisis

In addition to the solid health care system, the key factors for success were the fast and consistent response of the government, strong inter-institutional cooperation of various authorities and the extensive compliance of the population with the guidelines. The most prominent actors in this crisis are the Minister of Health, and the Chairman of the Costa Rican Social Security Fund (Caja Costarricense de Seguridad Social – CCSS). In the meantime, the Minister of Health is even being considered a presidential candidate for the 2022 elections.

President Carlos Alvarado gives the experts a largely free hand in crisis management of health policy. He focuses on coordinating the cooperation between various authorities, works with the relevant actors on measures to mitigate the economic and social impacts, and represents Costa Rica's interests towards multilateral institutions.

Impacts on the export of agriculture products during the COVID-19 crisis

The Ministry of Agriculture and Livestock (MAG) made the first estimates of the impact of the coronavirus on the agricultural sector, estimating the damage in losses and affectations at more than USD 25 mio. In addition, 6,885 producers and 266 companies are affected (as of April 26th).

Free zones, bananas, coffee and shipments to Central America remain, so far, without heavy implications since the road freight transportation

keeps in operation (as of April 14th). Most of the logistics remain without major interference, especially transportation on the road, maritime transport and aviation. Port and airport activities as well as services of State entities are still provided.

However, the producers of pineapple, melon and watermelon are already throwing out crops since the demand has decreased massively. The situation in the United States is a threat to Costa Rica's sales abroad since the U.S. market accounted for 38.6 percent of the total export value in 2019. Cancellation of pineapple orders, for example, were between 25-30 percent from the US and up to 40 percent from Europe.

Other products such as fish, mango, roots and tubers as well as plants and flowers are those which are directly affected because they are intended for immediate consumption and strongly linked to the entertainment and tourism sector.

Costa Rican flower farmers have started destroying lilies, roses and chrysanthemums after the coronavirus outbreak led to the suspension of flights to markets in North America. According to estimates, Costa Rica's sector lost $10 million in February and March 2020, alone from not being able to sell cut flowers, and $25 million in total when factoring in lost sales of other types of flowers.

[2] Sources Case Study in Costa Rica

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Annex 4: In-Depth Country Observation Brazil

Decrease in passenger demand in Brazil puts the transportation sector on alert [2]

General situation as of May 2020

Different from several Asian and European countries, COVID-19 epidemic infections in Brazil are still growing. It seems that the epidemic has reached the structurally weak Northern and North-Eastern regions and the urban periphery of the large cities in South-Eastern Brazil. Due to regional different dynamics, the federal states and the municipalities adopt different strategies to contain the increasing transmission. While some cities recently decreed (Belem, São Luis) or plan (Rio de Janeiro) a more rigid lockdown due to increasing infections and the collapse of the health system, the Federal District (Brasilia) pretends to re-open some establishments since the curve has flattened. However, some general trends of the impact of the social distancing measures and the decrease of the demand for public transport can be observed:

1. **New rules for use of public transport and adoption of measures to protect public transport staff**

   In most of the cities, the use of masks for public transport users became mandatory from the beginning of May on. Manufacturers developed glass barriers to protect bus drivers and ticket collectors and started to sell these kits. In some metro stations in São Paulo, there were installed body sanitization cabins in partnership with a pharmaceutics company.

2. **Decrease of demand for public transport and impact on bus operators**

   Bus services are the backbone of public transport systems in Brazil, even in metropoles like São Paulo and Rio de Janeiro. In mid-April, the national Transport Association NTU that assembles the bus operators published a report on the impact of circulation restrictions on bus operations. According to this report, there was an average decrease of passengers of 80 percent, representing a reduction of 32 million passengers transported daily. The offered service was reduced by 25 percent in average in Brazilian cities. From mid-March to Mid-April, the losses of public transport by bus accumulated BRL 2.5 billion (EUR 400-450 million), about 3,500 bus drivers and ticket collectors were dismissed or their contracts temporally suspended and some few bus operators already went bankrupt. The temporary suspension of public bus services in some municipalities in the Northeastern state of Bahia led to an increase of informal transport services.

3. **Impact on municipal public households**

   Obviously, the epidemic has a huge impact on public households. An estimation for the

48 Brazilian cities with more than 500,000 inhabitants, that represent 32 percent (66.5 million) of total Brazilian population, predicts a decrease in revenues of 21.2 billion BRL and an increase in spending of 9.5 billion BRL compared to 2019 in 2020. While the health sector has the largest absolute increase (from 57 to 64 billion BRL), the transport sector will have the largest relative increase of 46 percent, jumping from 8.4 to 12.3 billion BRL. This shows that the current restrictions challenge the private bus operators as well as public households.

4. Need for financial support for public transport as critical infrastructure

Before epidemic outbreak, only 11 bus transport systems, mostly in large cities like São Paulo, Curitiba and Brasília, had some kind of public subsidy, mostly for funding social policies (costing gratuities for students, the elderly and people with special needs). This means that the systems are financed by fares paid by passengers, and directly depend on the relationship between the service and demand met. The epidemic turned this logic upside down since less passengers mean less income from fares and less subsidies linked to passenger numbers. Some large cities recently passed laws with an emergency regime for public transport that allows the public to assume variable and administrative costs (such as fuels and lubricants, according to the mileage traveled), taxes and the payroll of the system workers. The federal government is discussing a financial support program of 120 billion BRL that will benefit the federal states and the cities. The Minister of Economy stressed the importance of the support for public transport right after the public health sector. However, the cities will be free to decide how to spend best these resources.

5. Need for broader discussion of public transport, social inequalities and resilience

The restrictions to contain the spread of Covid-19 most likely will provoke a huge negative impact on urban mobility in Brazil that already had to deal with challenges such as a decreasing number of public transport passengers and an increasing number of car use. Very likely, this trend will continue after the end of the epidemic since increasing unemployment will reduce demand for public transport by the lower classes and the share of the middle and upper class that may not be affected severely will continue to privilege individual transport over mass transport as a measure to prevent infections. While home office may be an option for middle class with white-collar jobs, the lower class with blue-collar and domestic service jobs depends on a critical infrastructure such as public transport. The increase of infections and deaths in the periphery of urban agglomerations may be an indicator that social inequalities and the spatial segregation increase the vulnerability of the lower class, which is also the backbone of public transport and other essential services. Thus, if resilience during large-scale epidemic outbreaks shall increase in the future, the current situation should led to a broader reflection on urban development t and mobility policies in Brazil.

[2] Sources Case Study Brazil:

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Annex 5: Case Study: COVID-19 and Public Transport in Peru

The government moves towards the prevention of the contagion chain

(as of May 2020)

In Peru, the first case of COVID-19 was reported on March 6th in the city of Lima. Since that time the virus has spread exponentially reaching all inner cities. For this reason, on March 15th, the government declared a state of national health emergency (quarantine) in which the population prepared to comply with obligatory social isolation measures to protect the population's health and control the spread of the virus. In line with this, only people working in essential activities, public services, consumers of essential goods and users of financial institutions or other services are allowed to transit. This effort is essential to keep the number of COVID-19 cases within a manageable level for the Peruvian health system. All these actions were proposed under a "Stay at home" strategy. Nonetheless, the virus continues to spread rapidly throughout the national territory.

Public transport in the state of emergency has continued to operate, except in hours of compulsory social lockdown (in which no one may be out on the street) which go from 6pm to 4am in Lima, and from 4pm to 4am in the northern regions of Tumbes, Piura, Lambayeque and Libertad. Consequently, on March 18th, due to the increase in the circulation of private vehicles, a nationwide provision was made to restrict the use of private vehicles during the state of emergency, making public transport units and authorized taxis the only options to travel long distances.

Urban transport and also the public urban transport, was reduced by approximately 85 percent.

Still, the service while being essential for the necessary movement of health, security and food supply staff, is also an exposure risk for the spread of COVID-19. With this in mind, the government has approved sectoral health protocols to assure the continuity of transport services in a safe manner for transport operators and public transport users, with the aim of reducing the spread of the COVID-19 chain of infection and protecting the health and life of citizens.

The sanitary protocols in the public transport service establish rules and procedures for the operation of transport services carried out by a variety of modes, such as taxis, auto-rickshaws, buses and minibuses. In order to provide a safe service, the operator, driver and transport user must comply with a minimum set of measures.

Transport operators must provide drivers with equipment for washing and disinfecting hands on the premises providing the transport service; vehicles must be disinfected and washed using paper towels and alcohol gel, before the beginning of circulation on a daily basis. Additionally, transport operators must verify that every driver uses alcohol gel, wears a face mask, and has access to cleaning cloths and disinfectants throughout the duration of their shift. Vehicles must be adapted to isolate the driver from passengers and should not operate at maximum capacity, so passenger capacity must be limited. Furthermore, transport operators are obliged to monitor the temperature of each driver before they set out every day. If a driver should present any symptoms, they must be suspended from service.

It was established that operators must follow the cleaning and disinfection protocols of vehicles providing transport services, and it is important that units have proper ventilation during the hours of service to avoid the spread of COVID-19.

Drivers must comply with a set of requisites such as disinfect and wash their hands for at least 20 seconds before and after the service, wear a facemask during the service, provide the service only to passengers who also wear a facemask, as well as maintain overall cleaning habits. They must ensure that the natural ventilation of the vehicle is provided, must disinfect door handles, handrails, seatbelts, devices for operating doors after each ride and must also use a vehicle with a transparent division to be isolated from passengers. They must also refrain their selves from certain activities like touching their eyes, nose and mouth or eating during rides. If any driver has symptoms of COVID-19, they should not work and seek medical assistance instead, following Health Ministry's instructions.

Figure 29 – Rules for taxi services, Source: MTC Facebook page.

Figure 30 – Disinfection of buses, Source: MTC Facebook page.

Public transport users must wear a mask. If they cough or sneeze, they must do so within the facemask and covering their mouth and nose with their elbow. They should immediately disinfect their hands with alcohol gel. Passengers must also respect reduced capacity limits of vehicles and keep the minimum social distance with others.

Figure 31 – Rules for plastic shields in taxis, Source: Ministerial Resolution No. 0258-2020 MTC/01
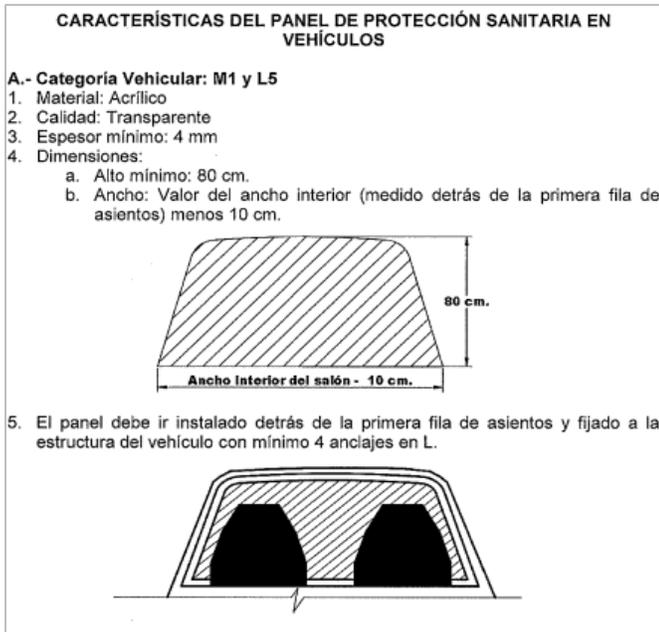
Figure 32 – Recommendations for public transport, Source: MTC Facebook page.

As a measure of the health protocol associated with social distancing to prevent the spread of COVID-19, the redistribution of seats in the different modes of transport has been graphically established, keeping minimum distances to ensure safety of drivers and passengers, and reduce crowding of users in these vehicles.
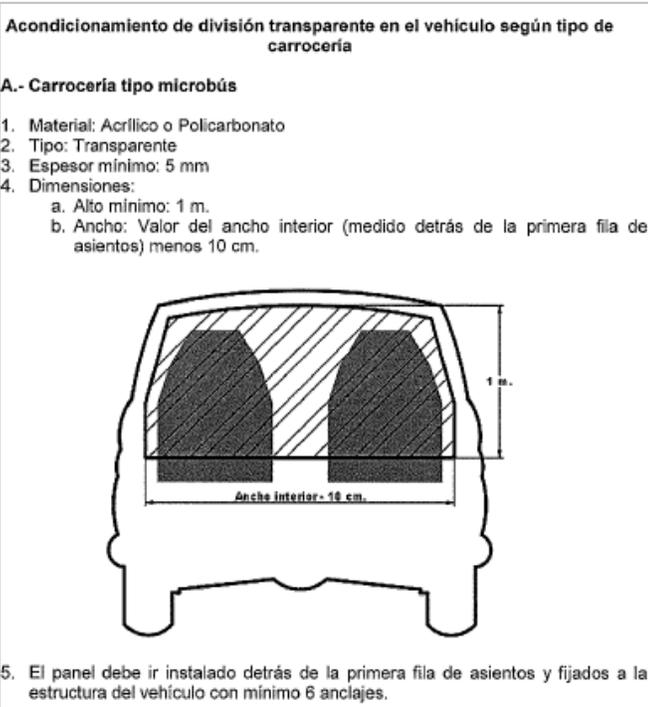
Furthermore, passengers may not dispose of garbage inside the vehicle. They must avoid the consumption of food and drinks, touching their eyes, nose and mouth, as well as the surfaces of the vehicle.

DISTRIBUCIÓN DE ASIENTOS PARA EL SERVICIO DE TAXI EN VEHÍCULOS DE CATEGORÍA M1

Plano tipo de distribución de asientos a ser empleados (en blanco) y asientos a ser marcados para limitar su uso (en rojo) en vehículos de categoría M1.
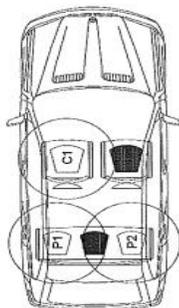
DISTRIBUCIÓN DE ASIENTOS PARA EL SERVICIO ESPECIAL DE PERSONAS MEDIANTE VEHÍCULOS DE CATEGORÍA L5

Plano tipo de distribución de asientos a ser empleados (en blanco) y asientos a ser marcados para limitar su uso (en rojo) en vehículos de categoría L5.
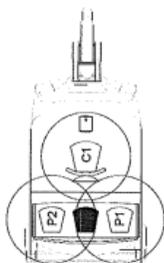
C: Conductor
P: Pasajero

Distribución de asientos para el servicio de trabajadores en vehículos de categoría m3 (Modelo Referencial)

Plano tipo de distribución de asientos a ser empleados (en blanco) y asientos a ser marcados para limitar su uso (en rojo) en vehículos de categoría M3 del Reglamento Nacional de Vehículos.

C: Conductor P: Pasajero

Figure 33 – Recommended seating for passengers, Source: Ministerial Resolution No. 0258-2020 MTC/01
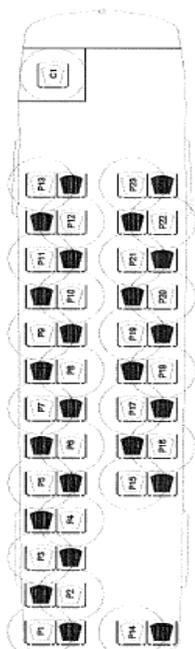
At the national level, it is established that all public transport vehicles must be provided with an information notice on the recommendations and prevention measures of COVID-19 in transport, which should be placed on plain sight for passengers to see.

Figure 34 – General anti-COVID-regulations, Source: Ministerial Resolution No. 0258-2020 MTC/01

RECOMENDACIONES PARA PREVENIR EL COVID-19

Abre las ventanas del vehículo en el que te transportas. Debe estar ventilado.

Mantén tu distancia con otros pasajeros y solo ocupa los asientos permitidos. 1 metro

Si te trasladas en bicicleta, hazlo siempre con mascarilla.

Durante todo tu viaje usa mascarilla.

Si toses o estornudas no te quites la mascarilla. No te toques la cara ni los ojos.

Si tienes fiebre, tos seca o dificultad para respirar, repórtalo inmediatamente para descartar la enfermedad.

Recuerda: Lávate las manos siempre con agua y jabón por 20 segundos.

PERÚ Ministerio de Transportes y Comunicaciones

EL PERÚ PRIMERO

Crowding in public transport can be reduced by applying health protocol measures, but this also means that other modes of travel can be promoted: cycling is one of them. As a non-motorized mode of transportation, it plays an important role in reducing CO_2, improving air quality and therefore reducing the spread of the virus and is important for an effective integrated transport system.

It is essential to make cycling accessible and safe for cyclists, therefore on April 24th the Minister of Transport and Communications, Carlos Lozada announced that exclusive bike lanes will be implemented to prevent crowding in mass transportation vehicles and comply with social distancing. This measure also promotes the use of non-motorized transportation, which is safe and accessible for distances of up to 10 kilometers.

The Peruvian Ministry of Transport and Communications will be responsible for guiding the provincial municipalities in the definition of guidelines, operation and promotion of cycling within the framework of the state of national health emergency. Granting resources to cities exceeding one hundred thousand inhabitants must therefore be considered, since in those cities their economic activities would demand more travel. If only mass public transport units are used it would agglomerate and put passengers at risk for COVID-19. The implementation of bicycle lanes is an opportunity to strengthen the presence of cyclists on the roads. The most important aspect of this measure is that it helps to prevent and cut the chain of contagions.

Annex 6: Case Study: COVID-19 and Public Transport in Liberia

(as of 10th April, based modification of https://bushchicken.com/government-issues-new-measures-on-transportation-to-curtail-spread-of-coronavirus/)

After Liberian health authorities announced the second case of the Coronavirus disease on the 17th of March 2020 [the first confirmed case was on the day before], the Ministry of Transport of Liberia (MOT) in collaboration with the Liberia National Police (LNP) has issued new restrictions for public transportation.

The list of new measures that passengers and vehicle operators must observe to curtail the spread of the Coronavirus. The measures require that motorcycle taxi operators wear protective masks and accommodate only one passenger per ride. Additionally, commercial vehicles may now only carry one passenger in the front passenger seat and a maximum of three passengers in the back seats. Previously, sedans would carry four passengers in the back and one in the front, although for highway trips (e.g. Monrovia to Gbarnga) drivers frequently carried two passengers in the front seat.

Meanwhile, commercial tricycles, also known as keh-keh, can now carry only two passengers per ride (instead of usual three passengers at the back, and often having an additional passenger who would crouch down next to rider.

The Liberia National Police and MOT stressed that full enforcement of the above preventive measures shall commence effective on the same day, March 17, 2020, the statement said.

The new restrictions are part of several measures, authorities have instituted to contain the country's Coronavirus cases. Earlier, Pres. George Weah has announced the cancellation of his planned nationwide tour. The Ministry of Education has also suspended all schools, including institutions of higher learning, for one week beginning Tuesday, March 17.

Later, on April 8, Pres. George Weah announced the State of Emergency starting on the April 10, 11:59 PM, allowing residents to leave home "only for essential journeys like reasons of health and food" which should be restricted to the local communities only and be limited to a single person per household for a maximum of one hour. There is a curfew or lockdown after 3PM. Originally imposed for two weeks, the lockdown was prolonged two times, now making it six weeks altogether. It is not clear yet if the State of Emergency will be prolonged.

Lawmakers (both the *House of Representatives* and the *Liberian* Senate) approved the lockdown and quarantine imposed by Weah, but added that anyone "appearing in public streets and buildings must wear a protective device that covers at least the nose and mouth".[3]

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[3] http://www.rfi.fr/en/africa/20200419-liberia-imposes-60-days-state-of-emergency-to-contain-coronavirus-george-weah-covid-19-lockdown

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