# BUILDING SAFE, RESILIENT, AND RELIABLE MOBILITY AGAINST THE IMPACT OF COVID-19

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# CONTENTS



All image are for illustration purposes.

# INTRODUCTION



# 01 INTRODUCTION

With COVID-19 (C19) spreading worldwide, many countries are still experiencing a third or fourth wave of infections. The spread of the virus has had a serious impact on the transportation sector in many countries, and due to a combination of factors such as lock-downs, teleworking and online classes, the number of public transportation users in each country has fallen significantly.

On the other hand, due to public transportation playing an extremely important role as a means of transportation for essential workers, including healthcare professionals, governments and public transportation operators in each country are implementing various infection prevention and control measures to ensure that transportation can continue to run smoothly.

Considering this situation, this brochure aims to share insights on how other countries are dealing with the pandemic through innovative countermeasures, highlighting the adoption of new transportation-related initiatives, technologies and services. Initiatives introduced in this brochure vary greatly, from basic infection prevention to measures for advanced financial and operations management.

It should be noted that the examples described in this brochure are just examples of measures undertaken in each country, and their effectiveness against C19 has not been verified.




# 02 EXECUTIVE SUMMARY

In order to prevent the spread of C19 infection on public transportation, governments and local authorities worldwide have issued operations manuals and guidelines to encourage passengers to wear masks and maintain social distancing. Furthermore, many countries limit the number of passengers on trains and buses in order to ensure public transportation does not become overcrowded.

As a key to successfully reducing the risk of infection on public transportation, the adoption of new technologies is quite effective. For instance, contactless payments are being proactively introduced in industrially developing countries, and for African countries where few people have bank accounts, mobile banking systems like M-pesa play a significant role in increasing opportunities for all citizens to access contactless payment services.

At the same time, strengthening the revenue base has become a pressing issue for transportation operators, with most taking measures to establish a sustainable financial base that does not depend on government subsidies, such as promoting the use of flexible multi-ride tickets (UK) and conducting special campaigns for commuter passes (Japan) to restore constant revenue, or leveraging ride-hailing companies to provide food delivery services (Indonesia) as a means of business diversification to secure new revenue sources.

Additionally, the reform of existing operations to adapt to new demand for mobility during the pandemic is highly necessary in order to maintain operations as well as to improve customer experience. In this process, the use of technologies like artificial intelligence (AI) is helpful to project and control passenger density and ideal operations in real time.

In summary, it is important to note that each country has set the development of public transportation infrastructure as a priority national agenda, and that measures vary depending on the macro background of a specific country.

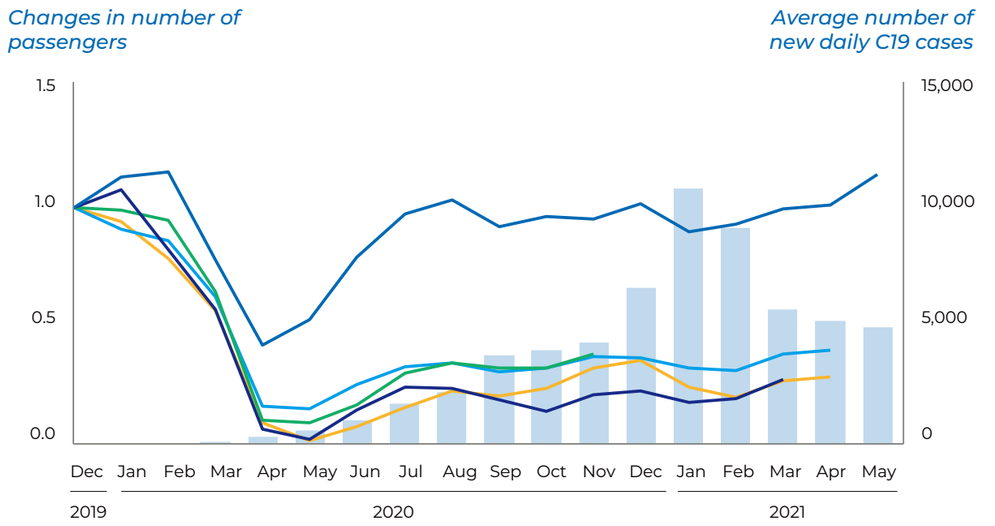
# 03 IMPACT OF COVID-19 ON PUBLIC TRANSPORTATION DEMAND

C19 has had a significant impact on mobility patterns of people, resulting in severe ripple effects for public transportation operators in many countries worldwide. In Indonesia, for example, the number of national railway and TransJakarta users has dropped dramatically to approximately 15% of December 2019 levels, with this trend continuing through March 2021 even though passenger numbers recovered slightly (Exhibit 1). On the contrary, the number of users of road transportation such as buses and cars also significantly decreased in April 2020, however, numbers have greatly recovered and exceeded pre-C19 levels. This is because more people preferred to use cars or motorcycles to avoid contact with an unspecified number of other people in trains. In Panama, Exhibit 2 shows that utilization of decreased by 59% in the metro of Panama City during 2020 compared to pre-COVID situation in 2019. Prior to C19, the entire metro transported 15,138 thousands passengers in May 2019, however, during C19, the number of transported passengers in May 2020 decreased to 1,190 thousands. (Exhibit 2)

As stated above, transportation operators have been severely impacted by the pandemic and "new normal" lifestyles of people. In order to mitigate the damage, it is highly necessary to take new action to survive such uncertain times.

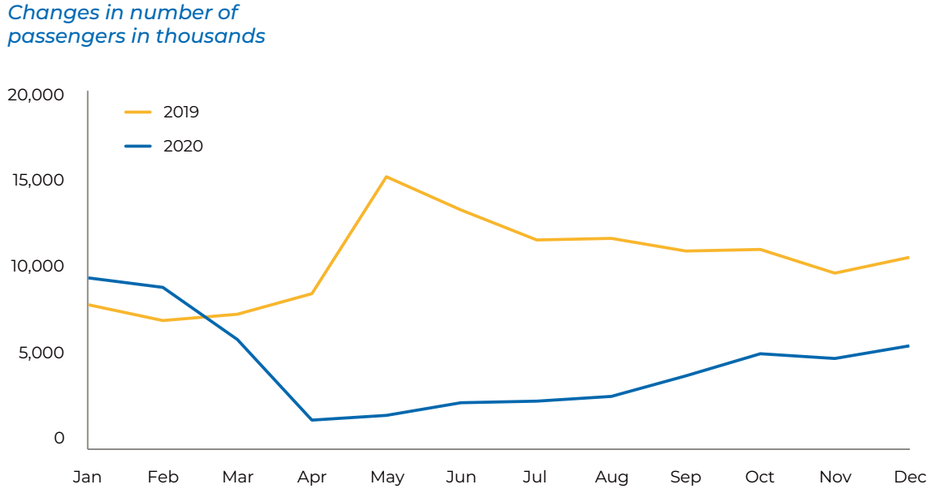


## EXHIBIT 1:
## CHANGE IN TRANSPORTATION MODES IN INDONESIA




Source: BCG analysis

## EXHIBIT 2:
## CHANGE IN TRANSPORTATION CAPACITY-PANAMA METRO




Source: BCG analysis



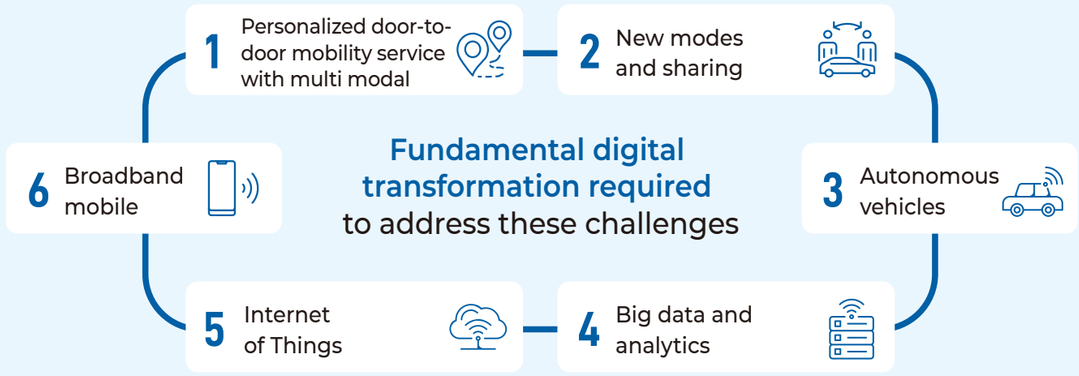

# 04 COVID-19 COUNTERMEASURES

Due to prolonged lockdowns, social distancing and hygiene requirements, demand for public transportation has plummeted dramatically while operational complexity has increased. With growing health concerns towards public transportation constituting the most serious issue, more people have felt a sense of discomfort in sharing transportation with strangers in confined spaces and fear becoming infected. Under such a situation, ensuring the safety of passengers is an urgent agenda for transportation operators to attract passengers back to stations.

However, it is not enough to simply provide sustainable transportation services as decreasing demand among passengers is inevitable given the “new normal” lifestyle of teleworking and more flexible working hours. These changes have resulted in fewer opportunities for commuting or traveling. For transportation operators, in addition to health and safety management, a diversified business portfolio will likely be vital to maintaining profitability. Moreover, current operations need to be more flexible based on changes in demand for public transportation during C19.

As a key to success, the adoption of new technologies has been explored worldwide. For instance, artificial intelligence (AI) is widely utilized to monitor whether people are wearing masks or maintaining social distancing as well as to provide more effective transportation services, and to measure and forecast transportation demand. Such digital trends are now perceived as essential to boosting transportation service efficiency and improving customer experience. Against this backdrop, digital transformation has considerably shaped the transportation industry and critical requirements for better mobility.

## 6 KEY DIGITAL TRENDS IN RAIL AND PUBLIC TRANSPORTATION SECTORS



# OVERVIEW OF COUNTERMEASURES

The table below (Exhibit 3) provides an overview of public transportation-related C19 countermeasures across 27 countries: Australia, Bangladesh, Canada, the Democratic Republic of the Congo, Dominican Republic, Germany, India, Indonesia, Israel, Japan, Kenya, Lao People's Democratic Republic, Malaysia, Mozambique, New Zealand, Panama, Peru, Philippines, Saudi Arabia (Neom), Serbia, Singapore, Tanzania, Thailand, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Viet Nam.


## EXHIBIT 3:
## OVERVIEW OF PUBLIC TRANSPORTATION-RELATED C19 COUNTERMEASURES

Source: BCG analysis

| MAIN TARGET | PURPOSE | ACTION | | INITIATIVE EXAMPLES |
|---|---|---|---|---|
| A **INDIVIDUAL LEVEL** p.12- • Users • Crew | • *Minimize the risk* of infection when using public transportation | • Prevent infected people from boarding | Detecting infected people in advance | • Auto temp screening • Negative PCR test result |
| | | | Prevention of boarding after detection | • Auto ticket gate responding to negative cert passport |
| | | • Prevent onboard infection | Prevention of person-to-person infection | • No conversation • Mask mandate • Partitions • Social distancing |
| | | | Prevention of infection via goods | • Contactless operation (e.g. payment) • Car disinfection |
| | | | Prevention of infection via air | • Car ventilation |
| B **OPERATOR LEVEL** p.16- • Transportation operators | • *Establish* a sustainable *operational* structure | • Supply mgmt. | Goods perspective | • Car maint./parts mgmt. • Stable power supply • Signal system maint. |
| | | | People perspective | • Stable employment (Temporary allowance/side jobs) • Provision of safe working environment |
| | | • Demand mgmt. | Promotion of increased usage (Per person) | • Communication (Safety) • New service (New pricing) |
| | | | Seating occupancy rate mgmt. | • Train frequency mgmt. based on occupancy rate • Incentive design (e.g. dynamic pricing) |
| | • *Establish* a sustainable *financial* foundation | • External support | Financing (Increase) | • Gov't support (for companies/employees) • Support from private banks |
| | | | Exemption (Decrease) | • Tax exemption • Exemption measures |
| | | • Internal efforts | Increase in sales | • Business diversification |
| | | | Reduction of costs | • Shorter ops hours • Reduced frequency • Workforce reduction |
| | | | Asset sell-off/usage | • Use of assets (train/stations, etc.) for non-transportation purpose |
| C **LOCAL/ CENTRAL GOV'T LEVEL** p.22- • Local gov'ts • Central gov't | • *Shape new forms* of mobility that meet new mobility needs during/ after the pandemic | • Maintenance of the mobility system | Flow of people | • Transportation of essential workers (med personnel) • Migrating workers/students, etc. |
| | | | Flow of goods | • Maintenance of logistics network • Response to new logistics needs |
| | | • Evolution of the mobility system | Qualitative changes in transportation | • Modal shift • Promotion of active mobility |
| | | | Quantitative changes in transportation | • Urban development (e.g. compact cities) • Teleworking |

# A COUNTERMEASURES TO PROTECT INDIVIDUALS

In this section, five countermeasures to protect individuals who both use public transportation and work for transportation operators are presented. All initiatives described here adopt new technologies like AI to increase efficiency and accuracy for prevention or detection of infection.

## LIST OF GOOD PRACTICE

● : Good practice candidate

**INDIVIDUAL LEVEL**

| ACTION | INITIATIVE EXAMPLES | Country | Enacting entity: Central gov't | Enacting entity: Local gov't | Enacting entity: Transportation operator | |
|---|---|---|---|---|---|---|
| Detecting infected people in advance | Mandatory submission of negative test result before boarding (long distance travel) | | ● | | | |
| | Automated temperature screening robot | | ● | | | A-1 |
| Prevention of boarding after detection | Mandatory presentation of health mgmt. app Health Code when passing gate | | ● | | | |
| Prevention of person-to-person infection | Passenger capacity restriction to 50% | | | ● | | |
| | Car delivery service by car-sharing operator Socar | | | | ● | A-2 |
| | Contactless payment via SMS using mobile money M-pesa | | | | ● | |
| | Real-time traffic visualization using traffic app AT Mobile | | ● | | | A-3 |
| Prevention of infection via goods | Disinfection of train carriages using UV lamps | | ● | | | A-4 |
| | Automatic face mask detection using AI | | | | ● | A-5 |
| | Automated face mask detection and contact tracing of infected people using AI | | | | ● | |
| Prevention of infection via air | Thorough car carriage ventilation using 99% virus removal system | | | | ● | |



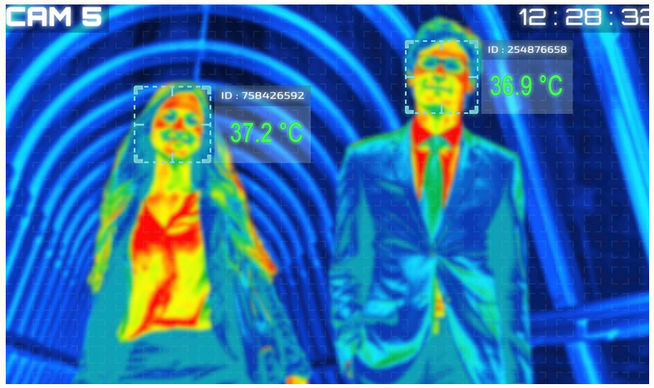

A-1

## KENYA

### Automated temperature screening robot

This initiative started in January 2021 in Jomo Kenyatta International Airport in Kenya to ensure efficient health and safety measures.[1] Robots donated by Japan and the United Nations Development Programme (UNDP)[2] automatically check the temperature of arriving passengers at the international airport, confirm they are wearing a mask and ensure they maintain social distancing. With robots, up to 200 people can be checked every minute from around 3.5 meters away.[3]

"Jasiri's (Robots) role in this airport is to enhance the safety of international travel." (Simon Peter Njoroge Airport Operations Manager)[4]



A-2

## MALAYSIA

### Car delivery service by car-sharing operator Socar

This initiative was widely introduced in major cities across Malaysia such as Kuala Lumpur starting in 2020. Socar, a car-sharing service provider, launched its Socar-2-you service that delivers sanitized rental cars to the homes of customers, who can lock and unlock the vehicle using a dedicated app. After use, customers can park their rental car at a designated location and let the app know of the location so that Socar can pick up the vehicle.[5]

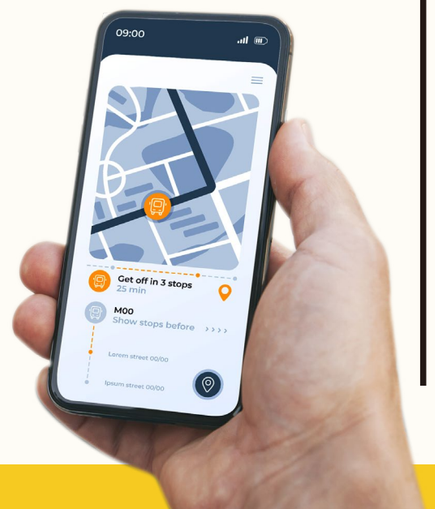
The entire process from pickup to return of rental cars can be completed via app without any physical contact, thereby reducing contact opportunities and travel time.

A-3

## NEW ZEALAND

### Real-time traffic visualization using traffic app AT Mobile

In 2020, after the outbreak of C19, the Auckland Transport Authority released a new feature for their mobile transportation app AT Mobile. The app displays real-time occupancy levels on trains and buses and allows users to see if the recommended physical distancing is assured. Around 15,000 essential trips are currently being made per day on average across the Auckland Transport Authority's network.[6] Data is generated through a smartcard-based ticketing system called Hop cards for buses.[7] For trains, the system is designed differently: an automatic passenger counting (APC) solution by Dilax was installed, which counts passengers as they enter and exit through train doors.[8]

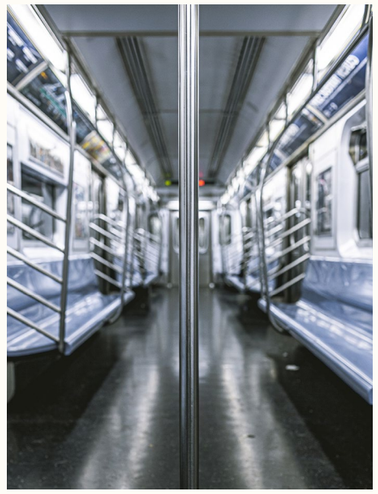




A-4

## USA

### Disinfection of train carriages using UV lamps

In collaboration with a manufacturer named Puro, the Metropolitan Transportation Authority (MTA) installed 150 UV lamps for disinfection in New York City subways, buses and stations in May 2020 to verify whether they can replace the conventional spraying approach to disinfection. MTA conducted a pilot test of C19 prevention measures that involved disinfecting the inside of subway carriages and buses with UV light, using C-wave (UV-C) light with a wavelength of 280 nm or less.[9] The study conducted by the Radiation Research Center at Columbia University found that very short wavelengths of C-waves approximately 205-230 nm in length are effective in inactivating C19.[10] However, there is a potential risk of damaging DNA in the skin and causing cancer if the human body is exposed to the light either with a naked eye or in an unprotected state.[11]



A-5

## VIET NAM

### Automatic face mask detection using AI

In Hanoi, Viet Nam, electronics manufacturer, the Bình Anh Electronic Technology Development Co (BA GPS), started to provide an AI system to detect unmasked passengers to bus operators in June 2021.[12] The system is installed in Hanoi bus security cameras and alerts the driver when a passenger who is not wearing a mask is detected. This initiative enables the operator to minimize infections because the system can detect not only if someone is wearing a mask or not, but also whether they are wearing it properly.[13]

# B COUNTERMEASURES TO PROTECT OPERATORS

This section introduces countermeasures to protect transportation operators from operations and financial management perspectives. As illustrated here, the utilization of new technologies is also crucial for realizing more efficient operations. In respect to financial management, various measures are being implemented such as more diversified business portfolios or asset maximization.


## LIST OF GOOD PRACTICE

● : Good practice candidate

| ACTION | INITIATIVE EXAMPLES | Country | Enacting entity: Central gov't | Enacting entity: Local gov't | Enacting entity: Transportation operator | |
|---|---|---|---|---|---|---|
| B OPERATOR LEVEL | | | | | | |
| Goods perspective | Auto mgmt. of parts required for vehicle maintenance system via online banking and SNS | | | | ● | |
| People perspective | Employee secondment during tenure and acceptance of side jobs | | | | ● | B-1 |
| | Employee health mgmt. using Bluezone contact-tracking app | | ● | | | |
| Promotion of increased usage (Per person) | Promotion of multi-ride Flexi Season tickets | | | | ● | B-2 |
| Seating occupancy rate management (Per carriage) | Occupancy rate mgmt. based on demand forecast using AI | | | | ● | B-3 |
| | Incentive for passengers who change from trains to buses during peak time | | ● | | | B-4 |
| Financing (Increase) | Subsidy for drivers of buses/ jeepneys carrying medical personnel | | ● | | | |
| | Provision of pre-charged transportation passes | | ● | | | B-5 |
| | Proposal competition of smart city to local government | | ● | ● | | B-6 |
| Exemption (Decrease) | Cutting of gasoline prices by the government | | ● | | | |
| Increase in sales | Opening a café using unoperated train cars | | | | ● | |
| | Delivery service using car hailing service provider Blue Bird | | | | ● | B-7 |
| | New business in collaboration with players in other industries using customer data | | | | ● | |
| Reduction of costs | Employee secondment during tenure and acceptance of side jobs (Recap) | | | | ● | |
| | Occupancy rate mgmt. based on demand forecast using AI (Recap) | | | | ● | |
| Asset sell-off/usage | Reusing out-of-service train seats for C19 patients | | ● | | ● | B-8 |
| | Remodeling and use of buses as mobile vaccination sites | | ● | | ● | B-9 |

B-1

# JAPAN

## Employee secondment during tenure and acceptance of side jobs

This initiative started from companies severely impacted by C19 such as airlines, railroad companies, and travel agencies in Japan. Such companies allow their employees to be seconded to other companies based on a mutual agreement that the host company covers the salary of secondees. An innovative aspect of this measure is that it is based on an "enrollment-type" secondment program where employees are still registered with the original company and seconded to another company as an effective way to reduce labor costs since the company can retain the employee while having the host company cover their salary. [14]

B-2

# UK

## Promotion of multi-ride Flexi Season tickets

With a decrease in the number of passengers and opportunities to use public transportation during the C19 pandemic as more people work remotely, the British Department for Transport started promoting the use of multi-ride Flexi Season tickets, which offer a bundle of eight day passes for a specific journey to be used in 28 days, in 2021. This initiative was especially designed for passengers who take the train two to three times per week. Using a Flexi Season ticket can reduce transportation cost significantly as follows[15]:

–Woking to London: over £260 savings
–Liverpool to Manchester: over £260 savings
–Stafford to Birmingham: over £170 savings

B-3

# PANAMA

## Occupancy rate mgmt. based on demand forecast using AI

Digital solutions provider, Alstom, implemented its multimodal supervision and mobility orchestration solution, Mastria, for Panama Metro in 2019. Mastria uses AI to anticipate and control passenger density and ideal operations in real time, adapting train frequency, capacity and the required number of trains, as well as passenger flow into stations.[16] Since implementation, the journey time of passengers has decreased by 8%.[17] During the pandemic, the system has also helped to address various social distancing and public gathering requirements.

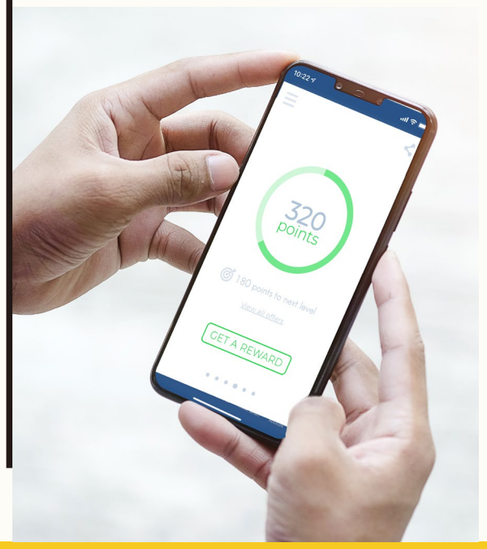
PHOTO BY JICA

B-4

# SINGAPORE

## Incentive for passengers who change from trains to buses during peak time

The Land Transport Authority (LTA) of Singapore launched a new public transportation incentive called Travel Smart Journeys (TSJ) in February 2020.[18] LTA offers incentives via app to passengers who transfer from trains at stations along the North-East line to bus services between 7:00 a.m. to 9:00 a.m. Commuters earn 150 points (equivalent to 1.50 SGD) for every qualified trip.[19] This initiative is helpful in reducing peak demand for trains through varied ticket pricing as well as ensuring safe trips for passengers.




B-5

# PANAMA

## Provision of pre-charged transportation passes

This initiative is overseen by the Panamanian Solidarity Fund, which provides financial support to all Panamanians affected by the C19 pandemic. From monthly financial support provided to citizens (120 USD), 10% can be used to pay for public transportation tickets. As a part of this support, a pre-charged pass (12 USD) that can be used on the metro and MiBus services in Panama is provided.[20] This measure started in June 2020[21] and one month after launch, as many as approx. 800,000 Panamanians had used both financial stimuli.[22]

B-6

## CANADA

### Proposal competition of smart city to local government

The Government of Canada carried out a proposal-based competition entitled Smart Cities Challenge for local governments with the aim of expediting consideration and realization of a smart city concept that will evolve cities further based on the mobility needs newly emerging amid the C19 pandemic.[23] As a benefit of this initiative, partnerships between participants and businesses or innovators were expanded and enhanced.

B-7

## INDONESIA

### Delivery service using car hailing service provider Blue Bird

Indonesian taxi operator, Blue Bird, launched a delivery service called BirdKirim in Jakarta in 2020. Users can place orders via a mobile app or Blue Bird Chat-Order-Delivery (COD) service and have items such as documents and household products delivered to their homes.[24] The company also expanded their logistics delivery service scope by enabling customers to place orders through the MyBlueBird app.[25]

Fares for metered taxis can be paid in cash or using non-cash methods such as via Easy Ride feature on the MyBlueBird Taxi app, while payments for goods are made directly to the merchant.[26]


PHOTO (BOTTOM RIGHT) BY SHINICHI KUNO/JICA




B-8

## INDIA

### Reusing out-of-service train seats for C19 patients

Indian Railways has made available a fleet of more than 4,400 C19 care isolation coaches equipped with about 70,000 beds as well as stretchers, masks, disinfectants, and ventilators.[27] The suspension of all railway services on April 14 was a first in Indian Railways' 167-year history, with 7,349 stations that normally operate more than 20,000 local and long-distance trains per day halted nationwide.[28] The Indian Ministry of Health announced a plan to temporarily use nursing care facilities and hotels (44 locations) as well as banquet halls (77 locations) as hospitals.[29]

PHOTO (TOP LEFT) BY OSAMU FUNAO/JICA

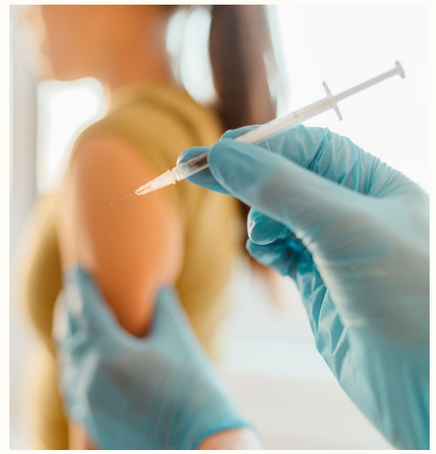
B-9

## UK

### Remodeling and use of buses as mobile vaccination sites

Vaccination bus services were rolled out in some areas in the UK such as Greenwich, Crawley, Horsham, Sussex, Surrey and London. In collaboration with the National Health Service (NHS), an NGO, and bus operators, this mobile vaccination service is provided in areas with lower vaccine uptake and for people on the highest priority list, especially those who are housebound or shielding.[30]

"We've already provided more than 395,000 vaccinations across the country and we hope that by taking the vaccination bus even closer to where people live, we'll be able to reach many more people who may have found it difficult to get to a clinic so far." (NHS staff member)[31]



# C INITIATIVES TO REFORM AND DEVELOP MOBILITY

This section presents wide-range of initiatives beyond countermeasures against C19 from initiatives of quickly responding to mobility needs under the pandemic to ones of reforming mobility pattern of people based on changed demand of mobility.

## LIST OF GOOD PRACTICE

● : Good practice candidate

LOCAL/CENTRAL GOV'T LEVEL

| ACTION | INITIATIVE EXAMPLES | Country | Enacting entity: Central gov't | Local gov't | Transportation operator | |
|---|---|---|---|---|---|---|
| C Flow of people | Special train operation for migrating workers and students | | ● | | | |
| | On-demand shuttle service for medical personnel | | | ● | | C-1 |
| Flow of goods | Agricultural delivery and ordering system via online banking and SNS | | | | ● | C-2 |
| Qualitative changes in transportation | Promotion of "45-minute city, 20-minute towns" | | ● | | | C-3 |

C-1

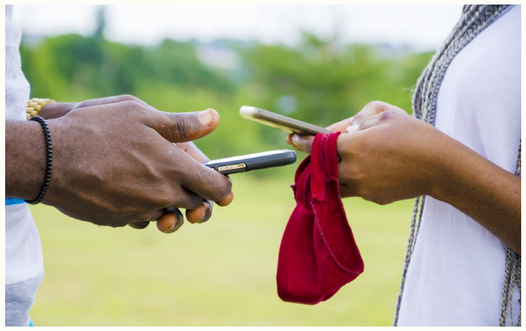
## UAE

### On-demand shuttle service for medical personnel

In the United Arab Emirates, Abu Dhabi's Integrated Transport Center (ITC) debuted the all-new Abu Dhabi Healthcare Link app in April 2020.[32] As an on-demand shuttle bus service for healthcare workers during the pandemic, it is completely free and easy to use. Employees simply enter a rider code provided by the hospital at which they work in the mobile app, and they'll instantly be able to book a ride to and from their home and place of work.[33] This service uses small buses with a maximum capacity of 14 passengers, but now, only allows up to six users per bus to ensure social distancing is maintained.[34]

"I used to commute daily using a public bus, but there were fewer seats available as they limited the number of passengers. It's great that they are taking the necessary steps to keep a safe distance but it makes it difficult for me to find a ride back home."(Nurse)[35]





C-2

## BANGLADESH

### Agricultural delivery and ordering system via online banking and SNS

Bangladesh-based agricultural Producer Organizations (POs) started 57 Virtual Call Centers (VCCs) in eight high-poverty districts to establish an ecosystem linking farmers with offtakers and customers.[36] The POs use mobile transfers like bKash, Rocket and Nagad to avoid paper currency transactions, and share information and transaction records via Facebook and Messenger.[37] Through the virtual call centers, farmers have sold products worth more than Taka 34.4 million to buyers including private companies.[38] Furthermore, the virtual call centers have benefitted about 30,000 small-scale farmers of which 46% are women.[39]

C-3

## SINGAPORE

### Promotion of "45-minute city, 20-minute towns"

In Singapore, a master plan for urban development called "45-minute city, 20-minute towns" was created by the Land Transport Authority (LTA) in 2019. This master plan aims to create an urban transportation structure that enables travel to the center of the city within 45 minutes, and travel to major facilities in the city within 20 minutes during rush hours.[40] This initiative aims to make Singapore's land transportation system more inclusive, ensuring that transportation is accessible to all.[41] The LTA also plans to design more pleasant, welcoming and safe streets to encourage walking, cycling and the use of public transportation as healthier lifestyle choices.[42]

# INITIATIVES FOR FUTURE MOBILITY



05

# INITIATIVES FOR FUTURE MOBILITY

## For more resilient and safer mobility

As lockdowns and restrictions on travel and movement due to C19 have been enforced in each country, the popularization of teleworking and online classes has sharply reduced the number of transportation users while public transportation operators have been severely impacted, consumer behavior has changed, and the ideal state of public transportation has been called into question. In view of such factors, a dynamic reform of the mobility landscape will be inevitable in order to force governments and transportation operators to engage in collaborations with emerging transportation or non-transportation players. Among the countermeasure examples presented, most innovative and advanced measures that are being implemented go beyond just primitive prevention to utilize new technologies like AI and involve various players. Additionally, in order to reform existing operations or business models, some measures aim to adapt to new demand for mobility during the pandemic, while others are centered on diversifying business portfolios or making new rules for employees. On top of prevention measures, initiatives for both financial and operations management will be crucial to ensuring more sustainable and resilient mobility.

## Message from JICA

C19 has had a tremendous negative impact on public transportation worldwide because of a decline in public transportation passenger due to the limitations and restrictions on movement.

However, it is noted that the public transportation plays an important role not only for essential workers, e.g. doctors and nurses, and but also for daily users, e.g. commuters and students.

Both government authorities and public transportation operators around the world implement various countermeasures against C19 to realize safer and reliable public transportation operation.

Therefore, JICA has created this brochure to introduce efforts for sustainable operation and infection prevention measures against C19 in the public transportation sector, supporting practical measures by government authorities and transportation operators.

JICA hopes that we will further implement collaboration projects in order to achieve a safer, more resilient and reliable public transportation system together with partners!

JICA supports the Sustainable Development Goals

1

2

3

1. Technical assistance project to establish of the Philippine Railway Institute (source: JICA)
2. The project for improvement of public bus operation in Phnom Penh (source: JICA)
3. The project on improvement of railway service and rolling stock maintenance (source: Japan International Consultants for Transportation Co., Ltd.)

# ACKNOWLEDGEMENTS

This report could not have been written without the invaluable contribution and support from the key stakeholders we have spoken. We hope this report will be helpful for all key stakeholders of transportation in order to deal with this pandemic as well as improve transportation service as an essential infrastructure.

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# SOURCE

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