

**A Collection of Articles on Transportation
in a Post Covid-19 World
Assembled by IBTTA
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Is The Coronavirus The Transportation Industry's Opportunity?

<https://www.forbes.com/sites/timothypapandreou/2020/03/27/is-the-coronavirus-the-transportation-industrys-opportunity/#37af9bbb752b>

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2020 has started off in nightmarish biblical proportions- droughts, fires, floods, and a pandemic virus that has gripped the planet. The response by governments, companies and communities over the COVID-19 pandemic has suddenly impacted our way of life and that of our local, regional and global transportation systems. The speed with which these impacts have been felt is significant as global airlines, national railways and local subway and bus systems experience free-fall declines in customers. The resulting pressure to reduce service or even shut down operations altogether has thrown the systems into worst-case scenarios and un-chartered territory. It also offers us a unique once-in-a-lifetime opportunity to re-imagine the transportation system and move it towards a more resilient, equitable and seamless experience.

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Cities are the center of our economic life

Our way of life is based on physical interactions, we're social creatures—it's how we're built, function and thrive. With more than half the world's population living in cities, this is where we find the most opportunities to create ideas, exchange knowledge and celebrate unique cultures. With the concentration of people, ideas and the like, they are the powerhouses of our global economies. The pandemic's origins and its hopeful eradication are likely an urban one. Historically, ancient cities and their markets have been the epicenters for social interaction and cultural and economic activity. They're also where some of the public health issues have started from and society has generally taken those lessons to enact great social and public health advancements. It is believed the COVID-19 virus started at a city "wet" market (i.e., a market selling animal products and fresh produce versus a "dry" market which sells clothes, art equipment, etc.) in Wuhan, a thriving metropolis in China's rapidly urbanizing and industrial center.

Transportation the great enabler

Transportation has enabled the great movements of people and things to create a global transport network that is making the world smaller each day. The pandemic spread in a local-global-local transportation pattern. First with physical interactions in cities and towns via local transport networks then globally via international air travel and then again with locally on the

other end. Governments responded with travel restrictions and bans to minimize that spread from country to country. They've also enacted domestic measures such as social distancing minimums (six feet or about two meters) from each other, shelter in place (stay at home and only go out if essential) or mandatory curfews and lockdowns (cannot go out without special permission).

These restrictions are an effort to "flatten the curve" meaning reduce and slow down the escalating infection and mortality rate in the community while giving the medical teams the time and capacity to prepare and adequately care for those most vulnerable. Density, a precursor of successful cities, is being argued by some as the reason for the spread. The issue isn't density, it's the agility of the public response to the crisis that will determine containment and hopefully eradication in a city, suburb or rural area.

In transportation, we live with some very tragic numbers each year: 1.2 million people being killed on our streets by people driving and many more from vehicle air pollution. Recent comments about accepting these virus mortality numbers as a cost of doing business and comparing them to road fatalities are terrible analogies and no death should ever part of any business model. Every death is a system failure and the goal should always be zero.

Our way of life has been put on pause

Everything we do in our day to day way of life from going to work, education, shopping, restaurants, appointments, arts and culture, entertainment, celebrations, errands, that are accessed with various transportation networks are now being restricted or banned due to the virus. All major conferences, concerts, street fairs, parties and sports events and have been canceled or postponed. Places like markets are either limited access or are being strictly monitored.

We are all glued to the media nervously watching the global infection numbers rise and hearing how each region is being asked to stay home unless we are part of the essential workforce first responders (medical, utilities, public services, enforcement, supermarket and other critical supply chain providers, etc). All of a sudden super busy business travelers, bi-coastal travelers, hyper-scheduled parents and kids, and all out partygoers are grounded. If we can and do need to go outside, we are asked to keep our distance from each other and that's going to be our new normal for the time being. It's time for a pause.

Commute disrupted

Disruptions are impacting commuters differently depending on their job type. One of the biggest obsessions in the transportation industry is trying to solve congestion. It's the result of a finite amount of space or supply with too much demand causing delays for everyone. I've long argued that transportation congestion is not an infrastructure capacity problem, it's a work culture issue. People whose work requires a computer and internet connection don't need to go to the office every day. They do so because of outdated work culture and managers who

organize their teams based on headcount, seats and desks. When these workers are required to drive to the office they are the root cause of most of the congestion in cities. They're also the cause of public transit peak overcrowding and people in most regions spend at least 10 days of their lives commuting. For those that can (which is a lot of us), working from home frees up those commute hours to do other things and generally, people think that's a good thing.

Our road infrastructure is designed around the two peaks-one in the morning and one in the evening albeit at a great cost. Parking also takes up most of land of most suburban office developments.

Commuter transportation managers have long argued that working from home is ideal option for this group as they are a large part of the urban economy and a slight shift can minimize congestion and overcrowding on the transportation networks. Our road infrastructure is designed around the two peaks-one in the morning and one in the evening albeit at a great cost. Parking also takes up most of land of most suburban office developments. By not having to travel reduces peak demand and supply of expensive new roadway and

transit capacity freeing up space for everyone else that needs steady all-hours access. It also reduces the need for so much land-hungry parking. This is like flattening the curve for transportation supply and demand capacity. For these workers, this crisis has moved this from principle into practice. Managers who initially resisted these measures are now faced with the pressure to implement it company wide as work from home is becoming mandatory. Technologies like wifi and mobile-enabled video conferencing; cloud-based file sharing; collaboration and document management tools; have responded to the call. These platforms are seeing huge uptick in downloads and resulting swinging stock prices.

Working from home-some love it others don't

Now a few weeks in, it seems that the office is not as critical as we thought for managing staff and existing client work. Managers and teams are starting to see how these measures can actually be better for everyone including the company. For families with kids at home this poses another set of challenges and I'm hearing all sorts of perspectives including hilarious kid and pet cameos mid-video chat. Some companies I'm working with are seeing that moving their operations to fully remote home work hasn't been done before and was a reason for the resistance. Work phones as well as email have been intermittent until they could get their VPN (Virtual Private Networks) operational and stabilized. Also, new business development is generally more difficult to develop without that initial face-to-face meeting or previous relationship. With business-to-business travel restrictions that could be a key challenge for companies exploring new opportunities during this time.

For the designated essential workforce commuter, they still have to go to the worksite every day and many of them rely on each other's services to get in and out. For example, transportation and utilities staff provide the critical backbone service for many other essential workers to get to their jobs, care for those that are sick and deliver supplies. These commuters

keep our systems and supply chains running, many are at risk of exposure and we owe a great debt of gratitude to them for their services as we can comfortably shelter in place.

All the other customer-facing services including but not limited to food and beverage services, retail, arts, culture and entertainment, etc. are being asked to close or strictly limit access to the public. Some of these businesses are allowed to provide delivery, which is mostly performed by gig workers keeping things moving. Most of these workers have essentially been locked out of work and many have vulnerable employment and housing agreements.

Transportation industry impacts

The COVID-19 impact to our economy and the transportation system that enables it sounds like and is a nightmare scenario. The transportation manufacturing industry from autos, airlines and other vehicles were already experiencing flat or lower unit sales prior to this crisis. According to the commercial airlines' [announcements](#) they're preparing for a huge drop in passenger revenues and it turn cutting or eliminating domestic and global capacity. As oil prices free-fall, demand for fuel and electric vehicles may follow suit necessitating another bailout to the auto industry. And while the logistics industry is working to move goods, overall economic demand will see a drop in the coming months.

Urban transportation impacts are mixed

For cities the issue is more acute. Restricting local economic activity means less local taxes, fees and fines to pay for the operations, maintenance and expansion of our already expensive road transport systems. This pandemic will require us to address some truths about how we

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currently subsidize and operate a fractured and fragmented urban transportation system that is inequitable, not coordinated or integrated and is unsustainable to operate and maintain, let alone expand. This makes it quite vulnerable to these kinds of shocks. We need to get real and rethink our broken transportation business models and be better at understanding what it truly costs (all of them) to move a person or a thing around our cities and what we are willing to pay for that so everyone can benefit (*next article on that coming soon!*). As we dig a little deeper there is and will be a mixed set of impacts that will vary by region:

Driving: The work from home and shelter in place restrictions dramatically reduce the number of cars on the road resulting in a lot less fuel, paid parking, tolls and fewer fines. Most of these funds go to pay for expansion, maintenance and road repair, and some regions use a portion of these revenues to support the operations of their public transit systems. For those workers that need to drive and provide essential services, congestion is all but gone with some regions like

mine seeing up to 50% reduction even with people shifting out of public transit. Travel times have been reduced for deliveries and goods movement. Post crisis- very few may want to go back to the highway commute grind if they don't have to. That may mean less highway congestion at pre-crisis levels and less demand for expensive capacity expansion. As demand and traffic congestion are all but gone, the key focus now should be on maintenance and critical public transit service.

Public Transit: The dramatic and global drop in public transit patronage will further impact the ability of transit agencies to fund their services. Many have put in extra measures from disinfecting their rolling stock more often, protecting their drivers with the appropriate equipment, indicating where people should sit or not sit to keep the social distancing minimums while seated, and some have removed fare payment and front door boarding altogether to protect the driver. These measures aren't free and will have deep impacts on their already strained budgets. They will be faced with even harder choices over the next few months between providing essential coverage and reducing service frequency and service overall. Day and night coverage is most important as the essential workforce needs to get to work all hours of the day and night and that should be the priority of the service plan.

The pandemic raise old questions and some honest, needed reflection about the purpose and role of public transit as an essential public service—not a money-making enterprise. It also raises the question of what does public transit look like in a future that may not have the same peaks as before? In the US, Congress has included \$25 Billion for transit as part of the historic \$2 Trillion stimulus package which will ease some of the pain temporarily, but not solve the chronic issues with the industry.

Shared Mobility: For the plethora of services like ride-hailing (Uber, Ola, Didi etc.), micromobility (bike share, kick scooter and moped companies), car share, on-demand shuttles and other services, the impacts have been extreme. Some systems in some regions are seeing a temporary spike in demand as people shift out of public transit, others are suspending or eliminating offerings as demand has evaporated overnight. As movement becomes restricted, ride-hailing is being asked to pause pooling for social distancing reasons. Several startup and legacy companies in the space had existing operational and financial business model issues raising the question of how long can they sustain these tough times. The next 90 days will be critical to the survival of these companies, and for those that make it through this period, a post crisis economic recovery could be a historic growth opportunity (*more on this in my next article!*).

Walking and Bicycling: Residents are going back to basics. They're also pointing out to their city leaders that they have too narrow sidewalks and can't maintain the minimum social distance when out. As cities are limiting access to the public transit system, some like Bogota, Colombia, New York City and others are using this opportunity to create emergency lanes by re-appropriating what are now empty roads and making space so that walking and cycling are the

preferred way to get around. We're seeing sales for personal micromobility grow as people buy their own devices to get around.

Deliveries: E-commerce deliveries were growing at a rapid clip prior to the pandemic and now even higher demand as shelter in place restrictions are put in place. Amazon and Instacart alone need almost 400,000 people to meet the [growing delivery demands](#). Ridehailing companies have pivoted as drivers shift from moving people to delivering food and products. As people stay home and can't go out, they will be demanding more of their e-commerce and local food venues to deliver. Some cities are responding by allocating more space at the curb for these delivery services to keep access while maintaining social distancing. It's not yet clear how these services will manage over time but these allocations will help set the groundwork for more curb space management in the near future.

Is there an upside to all this?

While the restrictions have serious and material impacts to our workforce, transportation, and economy, there may be some temporary upsides that could endure. For the first time, we are experiencing a global and dramatic reduction in traffic congestion, air pollution and greenhouse gas emissions from transportation. We should also see lower numbers of traffic crashes and fatalities. It is by no means an ideal scenario even with the temporary upside and I can't underscore enough how serious this is.

Is this crisis, the opportunity we've been waiting for?

So how do we learn from this? Is the pandemic an opportunity to rethink our transportation priorities? We shouldn't have to choose between the economy, our lives and the planet. In

We're in the middle of one of the greatest if not most important "what if" transportation scenario experiments in well over a generation. This is our moment to use this as an opportunity to future proof our systems to be more flexible, equitable and resilient.

transportation, we know it's technically feasible and economically possible to make this a win-win, we just need to get our political mindset to shift our collective behavior and make the temporary upside permanent.

We're in the middle of one of the greatest if not most important "what if" transportation scenario experiments in well over a generation. This is our moment to use this as an opportunity to future proof our systems to be more flexible, equitable and resilient. The oil shocks of the 1970s required society to rethink the size and use of cars and their impacts to our cities with a greater push for vehicle efficiency and cleaner fuels. Most countries moved on and went

back to the status quo, while some like the Netherlands, used that opportunity to redesign it's road policies to focus on people not cars and prioritized the cheapest, quickest and easiest way to get around their cities and towns-mostly by bicycle linked with local and regional public

transit. Since then they have become arguably the greenest and healthiest commuters on the planet while their economy thrived. Many cities will be the first to say we're not like the Dutch cities, but in fact, most cities are- just the 1970s pre-shift version.

Our transportation system was already in transition, moving from privately owned, fossil fuel powered and person operated only model to various on-demand, shared, electric and (in future) automated models. This one-day-in-the-future ideal transportation state promises to fix all the negatives by creating a seamless experience reduces congestion and pollution, streets space freed up for more walking and cycling, new shared services and reduced crashes and fatalities and is sustainable to operate and maintain.

In some bizarre turn of events, our future ideal transportation scenario is being placed right in front of us. We don't need to wait for the future to imagine what it is, we can see the potential right now. Transportation demand management planners who have worked really hard to get a few percentage shift from people to work from home suddenly see a 90% shift. There is a growing number of cities with little or no congestion now that most professional services are working from home. Our essential services, goods movement and deliveries can now operate pickup and drop off and move freely without that congestion ensuring our stores are well stocked. When we don't have anywhere near the number of cars on our streets we can clearly see how there is plenty of room for other modes like walking and bicycling which in many cities has grown dramatically since the social distancing measures.

Seize the moment

Our economy is and will take a huge hit for sure and it will be tempting to go back to the status quo transportation system which many will push for. However, governments, communities and companies can and should spend this time to see how we got here, what no longer works, and ask how might we re-organize our transportation pieces so that it is more resilient, seamless and works for everyone including our planet moving forward.

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Reboot transportation 2.0

We can use this time to step back, listen and learn from our communities and companies to determine how we can utilize more inclusive and supportive policies and technologies and not go back to the mess we had before this pause. This is the time to reset and reboot our transportation system and look at from the lens of people, culture and our new reality. That means design, experiment and use cheap and quick tactical materials to close the gaps for the bicycle, transit and carpool lane networks, and try out the shared mobility pick up and drop off zones, delivery and loading zones. It means update the outdated procurement and other processes, digitize curbs and bring other manual systems online to manage assets better. Have

the meetings with the public and private operators to figure out that are the right partnerships moving forward to create that seamless experience. Use this breathing space to attend to the needed repairs, fill in the potholes and scope out the utility work, and basically anything that you know was hard to do before because there were just too many cars or any other reason that made it tough. It is also the time to think about how we create worksites for the implementation teams that are not only zero accidents, but zero infections too.

Post crisis when we start to recover people will slowly come back. If you have these new networks and spaces in-place people will utilize them and new travel behaviors will stick. ETA (my company) surveyed over 120 cities on six continents whose staff provided great transportation insights on their emerging mobility issues and needs. They all stated they were going to try to pursue several of these kinds of measures in some way and noted the difficulties of disrupting the status quo. This was before this pandemic hit so it will be interesting to see how many use this opportunity to try things out now (*report coming out soon*).

With the growing rate of system shocks from droughts, fires, floods and pandemics, things are going to be more disruptive from here on (our new normal). This is a rare opportunity of time for governments and companies to put in the necessary planning work to be better able to manage temporary shocks and sustain prolonged interruptions. Some of them have reached out for advice on how to manage the next 90 days and the year ahead and there is no one-size-fits-all approach but there are some hard decisions, revised assumptions and strategic steps that they all need to take to ensure they can come out of this better than before.

We have an opportunity on a global level to undo the wrongs of past transportation policies and practices and course-correct as we face other looming issues that will further impact transportation systems down the line. It may be the only time you get in your career to experiment and this widely and freely without the usual blockers. We can only hope that more of those in a position to lead will heed the call to action and seize this opportunity.

Follow me on [Twitter](#) or [LinkedIn](#). Check out my [website](#).

I'm the founder of Emerging Transport Advisors (www.emergingtransport.com) a global advisory firm preparing companies, startups, investors and governments to seize the shared, electric, connected and automated mobility transition.

Safer, More Sustainable Transport in a Post-COVID-19 World

<https://thecityfix.com/blog/coronavirus-public-transport-stimulus-packages-ben-welle-sergio-avelleda/>

By Ben Welle and Sergio Avelleda

April 23, 2020

The COVID-19 crisis has shown that effective public transport is vital to keeping cities running. By serving essential workers in health care, emergency services, food services, and other sectors, public transport has become a service not just for some people but for all urban residents.

But coronavirus pandemic lockdowns are also putting an incredible strain on public transit systems worldwide. Transit ridership is down between [50-90%](#), on top of a [long-term decline](#) in many places. San Francisco's BART system is losing [\\$55 million](#) a month, from decreased ridership and less sales tax revenue. In Brazil, [reports show](#) a daily loss of more than R\$1 billion (\$188 million). Some governments are beginning to intervene to protect public transit systems from going bankrupt: the U.S. CARES Act included [\\$25 billion](#) in emergency relief for transit agencies, for example.

While emergency interventions may be necessary to keep systems afloat in the short term, governments should also be thinking long term. Public transport is one investment that can create jobs quickly while reducing carbon emissions, making roads safer and improving people's access to jobs and other opportunities.

Public transport can create and maintain jobs more quickly than other transportation investments. A study of the effects of the last large economic stimulus in the United States, after the Great Recession, found that public transport investments generated [31% more jobs](#) per dollar than new construction of roads and bridges, and repair work on roads and bridges generates 16% more jobs per dollar than new bridge and road construction. In South Korea, investment in public transport, biking and railroads after the Great Recession created an [estimated 138,000 jobs](#), 15% of total jobs created under the entire program.

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Beyond being a green stimulus investment, public transport offers wider benefits to society, since it is [more efficient](#) than private vehicle use, emits less greenhouse gas per person and

spews less air pollution, which kills more than [7 million people](#) every year. It is also [much safer](#) than widespread use of private vehicles, which can help stem the [rising tide of road deaths](#).

Compact, transit-oriented development encourages walking and biking that can make for [healthier residents](#). And public transport can provide [more equitable access to jobs, education and services](#) than large highway networks – a boon to urban resilience, as the current COVID-19 crisis brings to light.

Here are five ways governments, development banks and agencies can make public transport an integral part of stimulus packages for economic recovery.

1. Ensure Stability Through Revenue Support to Transit Operations

As the coronavirus pandemic wanes, economic activity is expected to resume slowly, at least initially, and public transport will likely continue facing limited demand. Public transport will need reliable support to provide quality of service and revive confidence from riders who may have fears about sharing public space with others. National and state governments may need to provide continued cash infusions to provide reliable and quality public transport and ensure that systems are still around and effective once full demand returns. This will maintain crucial jobs for workers in a struggling economy. In the United States, public transport supports [430,000 jobs](#).

This is also a time to rethink the revenue model to support public transport.

Funding public transit with fares alone has been a continued challenge, and in a constrained economy, public funds to increasingly close this gap may not always be a viable solution, especially in developing countries. Economic stimulus programs could explore innovative and new approaches to revenues, such as congestion pricing and parking management, to raise money, reduce demand for private vehicles, and encourage use of public transport, walking and biking.

2. Create High-Quality Bus and Transit Infrastructure

With the [massive reduction in car traffic](#) throughout urban cores during the coronavirus pandemic, cities have an opportunity to use road space more creatively. Public transport riders want reliability, speedy service, low fares, safety and comfort. In addition to expanded cycling and walking infrastructure (see point 4), one way to improve the first two attributes is to implement exclusive or preferred bus lanes.

Dedicated bus lanes and [bus rapid transit](#) (BRT) systems can help improve travel times and access to jobs while reducing emissions and making roads safer. Mexico City has [built seven BRT corridors](#) over the last 15 years serving nearly 1.5 million riders every day. While growth in BRT globally [has slowed](#), larger cities can use this moment to consider strategic expansions. In Minneapolis-St. Paul, for example, [MetroTransit has built](#) two rapid bus lines that have decreased travel time through prepaid boarding, limited stops and specially designed stations.

An additional nine corridors are planned but awaiting funding that could come through economic stimulus.

In some countries, there may be other mass transport projects in the pipeline, such as metro or light rail, and speeding up transit projects may also make sense.

3. Modernize and Electrify Bus Fleets

With economic stimulus packages coming in many countries, there is a great opportunity to scale up the electrification of public bus fleets. Total lifecycle costs of electric buses are nearing the costs of traditional diesel buses, but electric buses have higher upfront costs, [creating a barrier to entry](#) for many cities. To help Shenzhen become the first city in the world to convert its entire public bus fleet to electric buses, China's national government provided a [subsidy of \\$150,000 per bus](#). Similar incentives could be included in new stimulus packages to help cities get over the initial procurement hump and begin to reap the significant air quality and greenhouse gas emission benefits of electric buses.

In some countries, support may be more helpful directed at the supply side. In the United States, e-bus supply from manufacturers cannot [keep up with demand](#). And Chile has [strong policies](#) and investments in electric buses already. Ramped up manufacturing could help meet existing demand and create new jobs.

In other places, more incremental upgrades may be the best investment, particularly in African cities, where [hundreds of independent minibus operators](#) are the dominant mode of transport. [Kigali, Rwanda](#), for example, has been introducing larger capacity buses featuring “tap-and-go” cashless payments, free Wi-Fi (a high demand item in many African cities) and covered bus stops. The digitalization of public transport systems in all cities is a huge area of investment that can help improve quality of service – and therefore ridership – significantly.

4. Invest in Cycling and Walking

Out of necessity, [cycling has surged in many cities](#) during COVID-19 lockdowns. It's simply the best way to get around for many essential tasks. The need for quality spaces for pedestrians has also increased, with some cities [turning over streets to walkers](#). These modes are not only resilient; they are affordable, promote healthy lifestyles, spur [regional economic benefits](#) and are integral to people's access to public transport.

Biking and pedestrian projects can [produce more jobs](#) than road projects as well, with one study in the U.S. showing that for every \$1 million invested, up to 11 jobs are created. Smart investments that [follow safe design principles](#) can significantly reduce the rate and severity of road crashes as well, from protected bicycle lanes on busy city streets to wider sidewalks and converting strategic streets to low-speed zones, bicycle boulevards or shared spaces.

Milan, one of Europe's most polluted cities and hardest hit by the coronavirus pandemic, recently announced plans to permanently convert [35 kilometers of streets to cycling and walking](#) as parts of efforts to reset its economy and encourage commerce over the summer.

5. Get Governance Right

The coronavirus pandemic has revealed the interconnected nature of the modern world, where [what happens in cities, does not stay in cities](#). Yet urban planning often remains fractured and uncoordinated, with significant consequences for public transport.

Now is the time to expand coordination between cities, city-regions and national governments, using the imperative of immediate COVID-19 responses as a steppingstone to address other long-standing harmonization issues.

In the São Paulo metropolitan region in Brazil, for example, there are 39 cities with 39 different mayors. The state government, meanwhile, manages intercity systems. Now is the time to expand coordination between cities, city-regions and national governments, using the imperative of immediate COVID-19 responses as a steppingstone to address other long-standing harmonization issues.

Lastly, investing in green stimulus packages can spur enhanced climate action in the [transport sector](#) toward achievement of the Paris Agreement as well as in meeting the [Sustainable Development Goals](#), which

include targets to halve road deaths and provide access to safe, affordable, accessible and sustainable public transport for all by 2030.

These principles can help ensure stimulus packages enable cities to not just build back after the coronavirus pandemic, but to [build back better](#) – to generate crucial jobs and increase access to opportunity for a greater cross-section of society; to increase ridership through better service; to continue reducing emissions, and to help roll back the scourge of road deaths and injuries.

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Five Ways COVID-19 May Impact The Future Of Infrastructure And Transportation

<https://www.forbes.com/sites/rudysalo/2020/03/31/five-ways-covid-19-may-impact-the-future-of-infrastructure-and-transportation/amp/>

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March 31, 2020,

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With each passing day, reports on rising total confirmed cases of COVID-19 continue to dominate the [global conscience](#), and the novel coronavirus is now present on every continent except for [Antarctica](#). And the resulting fear is more pervasive. Thousands of people have perished as the effects of COVID-19 touch us all: stock markets have cratered, millions have become unemployed (temporarily or soon-to-be permanently), the federal government has passed a multi-trillion-dollar aid package, and health care institutions are being stretched thin. To “flatten the curve,” millions of people around the globe are quarantined in their homes or elsewhere, while infrastructure and transportation systems that bonded us globally, nationally, and locally are being used [more sparingly](#), at least currently. Long-term, what could be the lasting effects on transportation and infrastructure in our post-COVID-19 world?

Public Transportation: Even though we are still in the first few weeks of what may be a prolonged quarantine throughout the United States, we have already seen a [travel advisory issued for the New York City area](#), where transit ridership ranks among the [highest](#) in the country. So what does the future of transportation look like through a mandatorily-quarantined window? It’s murky, both because the windows need “cleaning” and the future of everything is covered with a COVID-19 glaze at the moment. One helpful data point is that during prior SARS outbreaks in Taiwan, there was a material [drop in ridership](#) of public transportation. If a return to work and schools occurs before a vaccine is created, people may not feel comfortable riding public transportation. With [transit ridership dropping in Los Angeles](#) in particular, could transit agencies be [affected](#) permanently?

Assuming we remain quarantined in some form until successful treatments for COVID-19 are administered worldwide, Americans and others globally will be working from home for many months (if not for over a year).

Traffic: Assuming we remain quarantined in some form until successful treatments for COVID-19 are administered worldwide, Americans and others globally will be working from home for many months (if not for over a year). As some businesses may decide to permanently have their employees work from home to save on real estate costs, the number of commuters on the

roads may drastically drop. So, could that lead to more commuters taking advantage of less congested roads, perhaps even those who traditionally rode public transportation?

Driverless cars: Another possible (and perhaps positive) impact on transportation from the effects of the COVID-19 pandemic could be the acceleration of mass adoption of driverless cars, and, hopefully, the “[tweaks](#)” that are needed to our infrastructure to maximize the safety and efficiency of driverless cars to ensure they are connected to other driverless cars, road infrastructure, and their own designated lanes away from “human” drivers. Will the future of commuting consist of a double-down of personal vehicles, but driven by themselves and connected to our infrastructure so we don’t have to just work from home, but also from our cars?

Micromobility: As urban centers worldwide have emptied, micromobility companies have felt the severe pain. Bird has already laid off 30% of its [workforce](#). [Lime has cut its valuation](#) by over 600% in its latest funding round. Without pedestrians, commuters, and tourists traversing through our city streets, there are no users of the scooters and ebikes. In the post COVID-19 world, will city streets be littered with ghostly, unusable micro-vehicles?

Global Infrastructure Development: In the book *Going Viral: Zombies, Viruses, and the End of the World*, Dahlia Schweitzer notes that progress has made us sick: the proliferation of roads, airports, and other critical infrastructure has made us more globally connected and susceptible to being affected by events happening on the other side of the world. Put another way, our advancements in infrastructure not only provide us with the means we need to travel and deliver goods throughout the world, it also exposes us to diseases like COVID-19 that originate elsewhere. Critical infrastructure in developing countries is often financed, constructed, operated, and maintained using [public-private partnerships](#) (P3s). In the post-COVID-19 world, will private companies think twice about participating in P3s if future outbreaks could cause disruption to the development and operation of such P3s due to fears of developing abroad?

There is no crystal ball that could have predicted what the world would look like today. There is also no crystal ball that can predict what our world will look like in the next six, twelve, or eighteen months. One thing for sure is that COVID-19 has and will forever change our world, and it will likely forever change the future of infrastructure, transportation, and commuting. All that can be hoped for is that some changes will be for the better.

[Full coverage and live updates on the Coronavirus](#)

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COVID-19: The Questions Ahead for Future Travel and Transport

<https://www.rand.org/blog/2020/04/covid-19-the-questions-ahead-for-future-travel-and.html>

by [Charlene Rohr](#)

April 15, 2020

Many people are starting to think about the effect of the COVID-19 virus—or more precisely the social-distancing response to the pandemic—on future travel patterns. Will people continue to work from home and avoid commuting? Will they rush back to their offices for those much-missed interactions with colleagues? Will new ways to connect for video conferencing replace face-to-face business meetings on a more permanent basis, perhaps resulting in less rail or air travel? Will people switch to more individual modes of travel, like bikes or cars, shunning crowded public transport services? Or indeed, could these be redesigned to preserve personal space? Will future holidays be taken more locally, in places that people think are safer? Ultimately, is it possible that people will choose to move out of large cities to live in smaller towns and villages—or vice versa?

Answers to such questions are important, because if people travel less or travel differently after COVID-19, less investment could be needed for future transport infrastructure. [Some argue](#) that this means that the UK government should think again about its recently announced plans to spend £27 billion to curb road congestion and £100 billion on HS2, a public-sector initiative to connect the UK through faster train transport. Additionally, how much people travel, and the investments governments make, will have a substantial impact on carbon emissions and the environment.

Will people switch to more individual modes of travel, like bikes or cars, shunning crowded public transport services?

While it is too soon to find out the answers to these questions, there is a tool to help guide policymakers' thinking during these turbulent times. Future scenarios, a method for visualising different possible futures, can help inform decisions in deeply uncertain situations. In 2016, RAND Europe [developed a set of future scenarios](#) for Innovate UK, focusing on how technology may influence future transport patterns. In that work we envisaged three very different transport futures:

- Driving Ahead: Where economic growth and road travel continue to grow at high rates

Will people continue to work from home and avoid commuting? Will new ways to connect for video conferencing replace face-to-face business meetings on a more permanent basis, perhaps resulting in less rail or air travel?

- Live Local: Where there is more digital substitution for travel and hence lower levels of travel
- Digital Divide: Where high income inequality makes advanced technologies financially out of reach for many.

The point of developing scenarios is not to predict how the future will unfold, but to use them to think about policies and interventions that are important for people's quality of life regardless of how the future proceeds.

One conclusion from our scenarios work is that having access to high quality information and communication technologies, like good broadband services, is crucial, regardless of how the future unfolds. In the Live Local scenario, such services are necessary to connect individuals and businesses and services, facilitating activities such as working and doing business from home, organising delivery of food and groceries and appointments with doctors, providing education of children and communication between friends and families. The need for and use of information and communication technologies has been amplified because of COVID-19, perhaps pushing society towards a Live Local future.

However, the pandemic has also accentuated the problems identified in Digital Divide. It is becoming more evident that these services are not just nice-to-have, but they are essential across cities and rural areas—and for all in society.

The need for and use of information and communication technologies has been amplified because of COVID-19.

These trends point to the increasing need for government to support the roll out of next-generation information and

communication services and to ensure that these services are available to all. Unequal access to information and communication technologies may magnify inequalities within society. Those who do not have access to these technologies may not be able to access online services, like grocery deliveries or education for children.

This is a problem not only now, but also more long-term if society moves towards the use of more online services in future. It is therefore important that governments investigate and address inequalities in access.

On the other hand, it may be that at the end of the COVID-19 crisis, people may desire more face-to-face interaction in work, business activities and social engagements, leading to increases in travel more akin with our Driving Ahead scenario. However, even then, it may be that travel patterns will change.

Unequal access to information and communication technologies may magnify inequalities within society. Those who do not have access to these technologies may not be able to access online services, like grocery deliveries or education for children.

For now, such changes are only a matter of conjecture. However, no matter how the public ends up working, taking holidays, accessing services and what role transport and other infrastructure has in these activities, decisions taken in the short term need to be robust across a range of possible futures, however unthinkable they may be.

Charlene Rohr is a senior research leader at RAND Europe and co-director of RAND Europe's [Centre for Futures and Foresight Studies](#).

This commentary originally appeared on [Intelligent Transport](#) on April 15, 2020. Commentary gives RAND researchers a platform to convey insights based on their professional expertise and often on their peer-reviewed research and analysis.

How Might Personal Transportation Behaviors Change as a Result of COVID-19, and What Does That Mean for Policy?

<https://www.enotrans.org/article/how-might-personal-transportation-behaviors-change-as-a-result-of-covid-19-and-what-does-that-mean-for-policy/>

Brianne Eby

April 07, 2020 |

Over the past few weeks, people all around the world have been asked to drastically change their day-to-day behaviors in response to the COVID-19 outbreak. Social (or physical) distancing has been encouraged, and increasingly this distancing is enforced through stay-at-home orders and the closure of gathering places like businesses, museums, large event spaces, and parks. This event and the resulting economic effects will influence travel behavior due to changes in origins, destinations, modes, and routes. Since the way that policymakers respond to the crisis will play a considerable role in shaping the success or struggle of various transportation service providers, it's important for them to consider how individuals might shift their transportation behaviors as a result of the pandemic.

A number of historical examples provide insight to the breadth of potential changes in transportation patterns, at least in the medium term, as a result of a significant event. Consider September 11, 2001. The Bureau of Transportation Statistics [analyzed the effects of that event on transportation patterns](#) and found the following trends in the time immediately following 9/11:

- Immediate and continuing reductions in air travel
- Immediate but temporary declines in highway travel
- No effects on rail travel
- Travelers switched from air to highway travel
- No considerable decline in business travel
- No decline in trips by older Americans
- No change in the percent of air travel by individuals in urban areas

Eventually, the economy and travel rebounded. U.S. GDP began to grow again in the fourth quarter of 2001. There was an increase in the number of trips taken over short distances (between 50 and 99 miles) for privately-owned vehicles, buses, trains, and ferries. Air travel surpassed pre-9/11 levels, but not until July 2004.

More germane to the current COVID-19 situation are the transportation patterns that manifested in the wake of the 2003 severe acute respiratory syndrome (SARS) epidemic. While

that outbreak resulted in a smaller number of total cases and fatalities, it was estimated to cost the global economy [\\$40 billion](#). According to the [International Air Transport Association](#), air travel for Asia-Pacific airlines suffered a nine percent loss in annual revenue passenger kilometers immediately following the 2003 epidemic. Air travel rebounded to pre-outbreak levels after roughly seven months. With respect to transit, [75 percent of those surveyed](#) in five European and three Asian countries affected reported avoiding public transportation as a precaution. [A 2014 analysis](#) pointed to a 50 percent decrease in daily ridership for Taiwan's underground transit system during the peak of the epidemic there in March 2003. Transit ridership rebounded to pre-SARS levels in June 2003.

Of course, there are notable differences between the attacks on 9/11, the 2003 SARS outbreak, and the current COVID-19 outbreak. [Experts anticipate](#) the economic fallout from the current pandemic to be unprecedented, so it is important to consider that the full implications of the current situation cannot be anticipated at this point.

Experts anticipate the economic fallout from the current pandemic to be unprecedented, so it is important to consider that the full implications of the current situation cannot be anticipated at this point.

Similar to the two examples listed, the current pandemic has already produced considerable immediate shifts in transportation patterns. However, this time it is due to global instigation of social distancing practices. What is unknown is how long-lasting these effects will be, and whether patterns will return to business as usual.

Transportation choices and patterns are primarily influenced by two forces: [societal factors and psychological factors](#). Societal factors represent forces that are external to an individual, for example the geographic, political, and economic forces that influence a person's life. Societal factors encompass episodic events like public health emergencies or national security emergencies. Psychological factors represent how an individual's motivations, habits, and emotions uniquely influence his or her behaviors.

Though we can't currently anticipate the full effects, the following are three ways in which behaviors may change in the near and distant futures based on societal and psychological factors. In understanding the forces that contribute to a person's transportation patterns, policymakers can better design effective policy strategies to facilitate a return to mobility.

Observed short-term shifts in transportation patterns

After the beginning of community spread of COVID-19 in the United States but prior to widespread work-from-home policies, many people still maintained their typical commute patterns. For example, turnstile entries into New York City's MTA rail operations did not begin to fall [until roughly one week](#) after the first case of COVID-19 was reported in the City on March 1. With the shift to more individuals working from home just days later, commute patterns slowed to a near halt. On March 12, as more people began to voluntarily work from home, New

York's subways and buses [each saw about a 19 percent decline](#) in ridership compared to comparable dates in 2019. On March 24, when most people with non-essential jobs were working from home, ridership on the subway [was down 87 percent](#) compared to 2019.

Air travel patterns [have generally mirrored this trajectory](#). On March 1, TSA checkpoint numbers roughly matched those of the same day in 2019. One week later, the number of people passing through checkpoints was about 15 percent lower than levels seen in 2019. By March 29, checkpoint pass-throughs were roughly 93 percent lower than the same day in 2019.

These downturns reflect societal forces as people are responding to mandates to work from home and to avoid travel. But before transportation was restricted or services cut and stay-at-home mandates were put in place, travel declines likely reflected individuals' fears of exposure to the virus.

In the days leading up to widespread working from home, the opposite trends were seen for bikeshare systems. Ridership for bikeshare across the U.S. [increased](#), with New York's Citi Bike experiencing a 67 percent increase in trips between March 1 and March 11 compared to the same period in 2019, and Chicago's system ridership doubling in the same period. These trends may reflect a desire for people to engage in a mobility option that doesn't require close personal contact with others, as well as increased perceptions of safety with fewer cars on the road. While bikeshare ridership actually decreased in other cities, these decreases were not by the same magnitude. Ridership has since [fallen since people are staying home](#).

Expected medium-term shifts in transportation patterns

When social distancing is no longer a requirement and personal mobility resumes in the immediate months following the lift of travel restrictions, transportation patterns may be slow in returning to pre-outbreak levels. Here again, societal factors such as a gradual re-opening of businesses will shape the immediate availability of transportation options.

In the wake of massive ridership declines, transit agencies have seen a reduction in farebox and sales tax revenues. For example, San Francisco's BART system [stands to lose around \\$57 million in monthly revenue](#) if there is a continued 90 percent reduction in ridership and 50 percent reduction in economic activity. [Especially among larger transit agencies that obtain a higher percentage of their operating revenue from fares compared to other sources](#), revenue losses could mean that it takes agencies that much longer to get service back up and running. If this results in unreliable service, it may take time for riders to regain trust in transit systems. With respect to air travel, the immediate drops in air travel [can result in a number of ripple effects](#) as the entire aviation industry responds to lower demand.

In both cases, if service is slow to rebound to pre-outbreak levels, the public may lose confidence in aviation and transit systems. On top of this, psychological factors like fear of exposure to the virus may also shape individuals' willingness to return to these shared modes of transportation. [In an early March survey](#), 48 percent of Americans indicated that riding public transit poses a high health risk due to the virus. Two-thirds of respondents did indicate they

believed that airports and airlines were taking appropriate precautions, but 25 percent said they did not believe that any company associated with travel (inclusive of aviation and mass transit) were taking the appropriate steps to reduce risks.

Post-9/11 [psychological research](#) has indicated that fear can lead to higher perceptions of risk and increased precautionary behaviors. [Air travel](#) declined in the immediate months following 9/11 due to national security fears, but policy changes in [transit](#) (e.g. technical assistance, emergency preparedness, improved direct communication with agencies) and [aviation](#) (e.g. the creation of the Transportation Security Administration) have made these modes more secure and increased public confidence.

48 percent of Americans indicated that riding public transit poses a high health risk due to the virus. 25 percent said they did not believe that any company associated with travel were taking the appropriate steps to reduce risks.

On the opposite end of the spectrum, it's possible that there will be a surge in travel as people look to celebrate the ability to gather with friends and family again. Many of the large events and conferences that were postponed may be rescheduled. In China, transportation services are [beginning to return](#) in the aftermath of the outbreak. Yet the country is still grappling with the economic fallout of the outbreak with many citizens now unemployed, so mobility is likely to be affected for the foreseeable future.

Potential long-term shifts in transportation patterns

It is difficult to speculate on the precise effects the current pandemic will have on transportation systems over the long run. With respect to societal factors, not only will systems need time and resources to return to pre-outbreak levels of service offerings, but some services may never fully rebound. For example, newly-listed companies such as [ridehailing services](#), venture capital-funded shared [micromobility](#) (i.e. scooters and electric bikes), and [carsharing services](#), may find a post-outbreak economy inhospitable for their business models. Many of these companies were already struggling prior to the outbreak. Especially in the case of ridehailing, the workers themselves [may be especially hard hit](#).

For those whose work is primarily computer-based, those jobs have shifted to telecommuting during this period of social distancing. While most of these jobs will resume in-person when it is safe for people to reconvene, some employers [may choose to offer flexible work arrangements](#) on a more regular basis.

From a psychology perspective, current fears may last long into the future. While air travel patterns for the most part rebounded months after 9/11, a [survey ten years after the fact indicated that 24 percent of Americans were still less willing to fly](#) on airplanes. Fears about coming in close contact with others may especially reduce individuals' willingness to take shared modes.

Lingering fears of shared transportation modes may direct people to other modes. Some bike shops have [begun to see increases](#) in [sales and repairs](#). The mere act of purchasing or repairing a bicycle may serve as enough of a [commitment](#) to push some to longer-term behavior change.

Investing in a bike is also a more affordable option than buying a new automobile. Car sales have [decreased compared to last year](#), with auto analysts expecting the decline in sales to continue. Still, those who already own vehicles may begin to drive for local trips they would have otherwise taken on transit or longer-distance trips for which they would have otherwise flown.

Policy implications

While the long-term effects of the novel coronavirus on transportation are still unknown, the crisis is already affecting the way people move around in the immediate term. Transportation providers [should begin thinking about contingency plans](#) for unknown outcomes.

Understanding shifts in underlying behaviors is an important first step in planning for those future outcomes.

Though travel has been limited to the detriment of the economy, there have been [positive indirect effects](#) like better air and noise quality, improved roadway safety, and reduced emissions. In the midst of this crisis, we may see renewed pushes to enact policies and urban planning tactics that can maintain these benefits. Increasingly, there are [calls to shut down streets](#) so pedestrians and bicyclists have space. While temporary, this could create demand for permanent street closures.

The traveling public may be more inclined to take communal transportation modes like transit, airplanes, or shared services (e.g. ridehailing or bikeshare) if they feel that the authorities or companies providing those services have taken the appropriate precautions. This may mean that service providers need to allocate higher portions of their budgets toward cleaning supplies and campaigns that inform the public of health measures taken.

What Will Transportation & Logistics Look Like in the Post COVID-19 Era?

<https://mazarsusa.com/ledger/what-will-transportation-logistics-look-like-in-the-post-covid-19-era/>

By Remco Schoonderwoerd

April 22, 2020

The impact of the COVID-19 pandemic on transportation and logistics has been heterogenous, largely due to the diversity of and vast number of players in the sector. The cards have not been dealt evenly. Flightradar24 reports a 55% drop in commercial flights compared to March 2019 [1], while sales of food in supermarkets exceeded the Christmas shops many times over in the UK [2], with incidence on the related logistics. Business continuity has been the number one priority for most organizations, yet looking to the future and planning strategically for the post-crisis period should be at the top of the agenda too.

The breadth of the transportation and logistics (T&L) sector makes it difficult to draw generalist conclusions. We see large discrepancies between different types of players – passenger transport versus cargo transport for example. Various factors also need to be taken into consideration, such as transport by air, rail, road and sea. In times of confinement and tighter border restrictions, distinguishing between international and national players is equally pertinent. And finally, there exist many different types of cargo: container, bulk, liquid and general.

The most severely impacted is passenger transport. From cars, to trains and planes, to public transportation, everything is practically on standstill.

All players will require very specific and tailor-made solutions to navigate through the storm, adapted to each unique situation and needs. However, businesses should all reconsider their strategic plans for the next years as soon as possible, asking themselves “what are the lessons learnt and what does it mean for my organization?”.

A Sector of Contrasts

Looking at those who have managed to adapt the fastest to this unprecedented situation will highlight areas to consider when preparing for the post COVID-19 era. The remarkable agility of some players who have rapidly resumed activity by making use of technology to exchange capacity between various actors and to manage very large operations remotely is particularly noteworthy.

E-commerce players and the associated T&L are among those least negatively affected by the crisis. Logistic providers to supermarkets are equally in good shape, currently hiring in large numbers to respond to the exponential demand in food deliveries. The most severely impacted on the contrary is passenger transport. From cars, to trains and planes, to public transportation,

everything is practically on standstill. The world of cargo has also suffered losses, in particular due to tighter regulation and border controls, as well as the severe loss of traffic to and from China. The associated costs to this downturn are huge and include blank sailings, grounded planes, containers piling up on quays and demurrage to name a few.

Some sectors such as tourism, hospitality, construction and catering are also severely touched, which by domino effect has consequences on T&L. Will this have structural consequences on the sector? For instance, will cruise ships be as popular in the future as they were in the past?

Notable Trends: Getting Ready for a New Normal

In all cases, organizations should dedicate time and resources to prepare for the after crisis and to plan their post COVID-19 strategy. There will be a number of novel trends to take into consideration such as new business models, bankrupt players and the success of working remotely. Below are some observations – formulated as questions – to help think and prepare for a new normal:

- **Will the T&L sector revert back to how it was organized in the past?** So far, we have primarily witnessed a ‘modal shift’, with transport by road and sea moving to rail. For some train logistics companies, everything is already back to business-as-usual.
- **The way people are transported will structurally change?** We can already assume with a degree of certainty that video conferencing will replace many physical meetings. Similarly, in the close aftermath, we can imagine that people will travel less, both locally and internationally, which will continue to impact public and passenger transportation.
- **Might local consumption become the norm?** Countries are currently struggling to import food and goods, so it is likely that authorities will reconsider imports and start relying on more local sources of production, as to be more resilient if a new crisis were to happen in the future. In the private sector, these supply chain considerations will also be important.
- **A rise in the number of contract workers in T&L is likely?** Having a flexible scale and being able to rapidly decrease or increase the workforce has proven to be an advantage for many companies. However, governments will probably try on the contrary to protect independent workers, who have been among the most vulnerable in this crisis. Finding the right balance between stability and flexibility, as well as adopting new ways of working, will be some of defining challenges of the post-crisis world.
- **Contracts will automatically integrate a ‘force majeure’ clause?** Some players in the T&L sector have been heavily impacted by the missing ‘force majeure’ clause in contracts. Debates around this legal concept should see the light of day very soon.

- **Will there be a loss of value?** The current underutilization of fixed assets in the sector (i.e. vessels and airplanes), which has severe cash flow implications, will also most probably impair the value of these assets.
- **Can IT cope with the demands of the new normal?** A flexible and scalable IT function has proven to be a critical success factor. Clients are rethinking ways of doing business, and hence will have different expectations and requirements of their logistics and travel service providers. Besides, T&L companies and their teams may have adopted remote and different ways of working that will endure after the pandemic. This will require a thorough, structural rethinking of the organization's IT landscape, which requires vision and a roadmap to get there. This applies to IT systems and applications, where an accelerated change from legacy to new software solutions may need to be executed. But it also requires a close look at the IT-people, -roles and -governance that will be needed to manage and support this crucial digital transformation.

It is still too early to draw any solid conclusions on the long term effects of COVID-19 on the T&L sector. However, the economic downturn has had evident positive repercussions on the environment and we can suppose that the slowdown of T&L has played a part in this. In the future, this may impulse the wider integration of ecological and sustainability considerations into strategic planning.

- [1] <https://www.flightradar24.com/blog/charting-the-decline-in-air-traffic-caused-by-covid-19/>
[2] <https://www.business-live.co.uk/retail-consumer/supermarket-sales-smash-christmas-covid-18011745>

COVID-19 could forever change how we travel—for better or worse

<https://www.fastcompany.com/90489438/covid-19-could-forever-change-how-we-travel-for-better-or-worse>

BY DEVIN LIDDELL

April 13, 2020

Are we willing to be spied on—and even humiliated—for the hyperefficient, compulsively clean transportation of the future?

The good news: we are a resilient species and we'll get past this devastating COVID-19 pandemic, albeit far from unscathed. The bad news: the implications of climate change are [increasing the risks](#) of future pandemics involving both existing and brand-new infectious diseases, so the days of system shock followed by collective amnesia will need to end. The realities of a post-COVID-19 world will pose new challenges to cities and transportation systems in particular—from airlines and light-rail networks to ride-hailing platforms and even micro-mobility services. That's because, right now, human mobility is a *vector* for disease, hence the stay-at-home orders. Aviation and mass transit are also all about density, which is the antithesis of social distancing.

But there is an enormous opportunity here: pivoting away from being an *unintentional* vector toward an intentional set of interconnected systems with superpowers for preventing, detecting, and containing outbreaks. As a futurist at the design firm Teague, which specializes in transportation systems, I believe that achieving this pivot will require radical transformations, with both utopian and dystopian outcomes equally possible. With these divergent outcomes in mind, here are two of the likeliest transformations examined through their best-case and abuse-case scenarios.

Transportation becomes more automated than ever

Through a utopian lens, passengers who are increasingly repulsed by unnecessary queues, interactions with strangers, and touching anything would welcome the acceleration of automation across commercial aviation and urban mobility. This shift would be so pervasive that the term “touch point” would even disappear from design literature. Public health officials would do their part by creating “contactless accessibility” scores for systems—ranging from “filthy” to “pure”—that are posted on placards in terminals and stations, making automation rollouts a competitive endeavor. A new era of automation would extend from the basic—the eradication of all remaining doors requiring pushing or pulling—to the more advanced. These might include gesture- and eye-movement-based interactions with payment

Through a utopian lens, passengers who are increasingly repulsed by unnecessary queues, interactions with strangers, and touching anything would welcome the acceleration of automation across commercial aviation and urban mobility.

kiosks and in-flight entertainment screens; robots and drones equipped with UV lights that continuously sanitize surfaces; and artificial intelligences that govern our previously clumsy attempts at everything from bus scheduling and curb usage to security screening and aircraft boarding. Our automated systems of the future would be hyperefficient and compulsively clean.

But there's a dystopian side. With all of the unnecessary humans stripped out of our transportation systems—from drivers and information kiosk attendants to gate agents and security screeners—there would be plenty of efficiency but very little empathy. This would be especially true if you're a passenger or rider who suffers an anomaly in the system. Lost and found (let alone a lost pet), traveling with special needs, and the inevitable quirks of biometric

Airline passengers would simply walk through a series of tunnels, gardens, or other environments designed around new biometric-enabled security screening methodologies—without ever touching anything or even producing passports or other documents.

and AI systems would all be occasions that beget an elaborate, almost-mystical rite of *summoning a real person*. That real person would then have to wrestle with these systems designed to resist interruption and deter human intervention. Even when things might be humming along, some riders and passengers would bristle at a “Hygenie” robot bumping into them or unseen artificial intelligences telling them where to sit and where to walk and that intentionally interrupting an automated system is a finable offense. Our transportation systems would be cleaner and more efficient than ever, but the people they serve would silently muse that a few germs would be better than these punctuated moments of humiliation and alienation.

Mobility becomes a new surveillance state

Our pre-COVID-19 transportation infrastructure already includes lots of cameras and sensors inside terminals, stations, platforms, and gates. But the use of these technologies would be expanded to give both machines and remote humans greater sensorial capabilities in new efforts to minimize queues, human interactions, and shared surfaces. This would deliver very real benefits to riders and passengers, especially as they maneuver increasingly automated environments. Ride-sharing passengers would use in-vehicle cameras to see in advance who else is in the pool vehicle, including thermal cameras that detect if other passengers have fevers or other indications of disease. Airline passengers would simply walk through a series of tunnels, gardens, or other environments designed around new biometric-enabled security screening methodologies—without ever touching anything or even producing passports or other documents. Light-rail riders would view real-time seat maps for approaching cars to select those that are the least crowded.

There would be benefits for operators too. These surveillance systems would give transit systems powerful tools for managing risk well before an outbreak occurs. In partnership with public health systems, potentially ill passengers and riders would be assessed, and treated and quarantined if necessary. These surveillance-powered systems of the future would be omniscient in the face of previously invisible enemies.

But Orwell was right: We don't want Big Brother. All these cameras and sensors would be pervasive—and intrusive. While these technologies would be well-intended, they would have plenty of ugly abuse cases, some of which would be invisible themselves. Ride-sharing passengers might use cameras to avoid people who don't look like them, ushering in an unintended new era of racial segregation in transit. Queue-less and touchless airport security checkpoints and gates could work fine for some, but facial recognition's well-known race-bias problem might not be corrected fast enough to prevent very different travel experiences for white men compared to everyone else, with transgender and those wearing religious clothing especially marginalized. Thermal cameras looking for fevers might end up missing asymptomatic passengers and even encouraging sick passengers to conceal their fevers through medication and special clothing designed to evade detection. The sensation of being continuously monitored, plus all these apps that help passengers and riders avoid lines and crowds, could create pandemics of a different kind. A surge in enochlophobia (fear of crowds), agoraphobia (fear of open spaces, and leaving one's home), and other mental disorders could precipitate a decline in ridership across mass transit, which relies on density. The surveillance technologies meant to make us feel safer and more secure would just make us feel anxious and depressed.

Yes, some of these moments from the future are exaggerated for clarity. And while one person's utopia is another's dystopia, we can all agree that the post-COVID-19 world should be different—one way or another, and that our cities and transportation systems in particular will need to be different. There are important choices ahead for those systems. Ultimately, those choices will distinguish between the preferred and unpreferred futures for our airlines, mass transit networks, ride-hailing platforms, and other systems we rely on to get around and live meaningful lives.

How Covid-19 will kickstart the MaaS revolution

<https://www.traffictechnologytoday.com/features/feature-how-covid-19-will-kickstart-the-maaS-revolution.html>

[Web Team](#)

April 16, 2020

The Covid-19 virus pandemic has hit the world at a scale, pace and intensity like no other event in living memory. In the course of merely a few weeks, countries across the world have almost ground to a halt, as governments attempt to fight the outbreak.

Industries and governments have all been hit in one way or another, mostly for worse not better. One of the most dramatic changes has been in the transport section, with an almost overnight, unprecedented reduction in travel. At present, most countries are in some form of lockdown, with journeys severely restricted and reduced to essential trips only. The demand-side impact on public and private transport organisations has been severe, and no-one knows when restrictions will lift or how quickly people will start traveling en masse once again.

In the short term, this once-in-a-lifetime catastrophe clearly represents bad news for MaaS, a service area still in its infancy that largely revolves around revenue generated by journeys.

“During this current global crisis, which we expect to last until the summer months of 2020 at least, some of the most immediate questions are how to guarantee the safety of those travelling and how to take care of the financial capacity of companies directly affected,” says Piia Karjalainen (left), secretary general at MaaS Alliance . “Airlines, public transport companies

In the short term, this once-in-a-lifetime catastrophe clearly represents bad news for MaaS, a service area still in its infancy that largely revolves around revenue generated by journeys.

and micro-mobility providers seem to be at the frontline and hit the most, facing an immediate need to adapt their operations to a sudden and complete fall of demand.”

Yet, although there will sadly be casualties amongst the myriad organisations that make up MaaS, as with any crisis there will also be opportunities for those strong and positive enough to emerge from the turmoil.

“There is little doubt that the financial repercussions of this virus will deal a heavy blow to many businesses and MaaS will not be immune to this threat,” says John Nuutinen (right), CEO of MaaS API provider [SkedGo](#). “After all, in an emerging market segment, such as MaaS, the thin margins that sustain most businesses will not last long without government support or subsidies. However, for those businesses that emerge, after this threat has subsided, the world of MaaS will have changed... and likely not entirely for the worse.”

In order to thrive – not just survive – in a new world already awakening from the Covid-19 nightmare, it will be important to better understand the opportunities available for MaaS, for it to be a key societal building block in the future.

A New Normal

Ultimately, for MaaS to succeed in positively transforming the way people travel for the benefit of society, a major transformation of historic attitudes and behaviours was always required. Covid-19 has not changed this. While many gains have already been made – driven by organisations actively pursuing the goals of MaaS – progress has been relatively slow and incremental at a global level. Now, inadvertently, Covid-19 has generated a rapid change in the way people feel, think and act, which could pave the way for bigger changes to come.

“Disruption is the mother of transport behaviour change. Not only must we not assume that we will pick up where we left off, but we must also actively work to shape the new behaviours which will form in future”, says Beate Kubitz, Independent Transport Consultant.

“The extreme and protracted nature of the measures introduced to fight the pandemic is forcing us to re-evaluate almost every aspect of how we live. In turn, this could break down the habits and attitudes that underpin so many decisions at all levels as to how, where, when and why we travel.” [write](#) Marcus Enoch, Professor in transport strategy, Loughborough University and James Warren, senior lecturer, Engineering and Innovation, The Open University.

“More clear than ever is the validity of the core promise of MaaS: multimodal mobility. The more options there are to move about, from public transport to taxis and rental services to healthy underbrush of micro mobility, the more resilient the community and the society is. The central idea of MaaS is a promise that we will get you where you need to go, but how we get you there is not fixed. At a time of an emergency or a disruption, the need for alternative modalities and maybe new alternative packages is accentuated”, [writes](#) Sampo Hietanen (left), CEO and founder, MaaS Global.

This crisis has not simply meant a shut down of people travelling entirely. Rather, there are examples of individuals and companies using alternative forms of transport that they would previously not have considered. In the future, a willingness to look at alternatives may well increase.

Karjalainen says “we have seen some favourable changes, such as an increase in cycling and rapid take-off of teleworking habits that might bring along some long-lasting impact to our mobility behaviour. As a result, during the last few weeks, several studies have indicated improved air quality and less emissions in major metropolitan areas. In addition, people are relying more on local supply chains and communities. Times of isolation and physical distancing will build up even greater demand and joy of social interaction, when things get back to normal. This social aspect might gain in importance for our mobility system in the future. After the wave of pandemic, the world needs comfortable and smart mobility solutions, responding to users’ individual needs and prevailing circumstances more than ever before.”

It is not just transport users who are adapting and trialing different methods. Companies in the transport sector are reinventing their business models to reflect changing demands. Rideshare companies, for example, are expanding their roles as deliverers of food and goods, not just people.

“Ridehailing companies have pivoted as drivers shift from moving people to delivering food and products. As people stay home and can’t go out, they will be demanding more of their e-commerce and local food venues to deliver. Repurposing vehicles to be used as delivery service vehicles has also become commonplace among shared mobility providers”, [writes](#) Movmi on their blog.

Freedom of Space

One of the unintended consequences of global lockdowns is the sudden creation of space in what were previously busy, congested, crowded cities. Streets are empty, roads are quiet, pavements are less busy, public transport is almost deserted. Although people will likely return soon to the streets, it’s likely that for a long time overall numbers of people outside will drop.

This raises the topic of space, and how best it can be used, to higher levels of awareness amongst the public and policy decision makers. If there is a lot of space now, how best do we fill that space in the future? This could benefit a more diverse range of transport modes, with authorities prioritising more environmentally friendly, safety conscious or budget-minded modes. Indeed, cities are already offering more space to cycling, as a greener and more individual way of travelling.

“New York City is adding more space for cyclists, and micro mobility users, to support the sudden shift from public transportation to individual transport modes on their streets. Bogotá, Colombia has added 76 kilometers of cycle lanes practically overnight to accommodate more riders and social distancing. Cities such as Mexico City and London are seeing the benefits of many years spent growing their cycling networks, and are moving to make temporary cycling measures permanent. These relatively new individual methods of transportation have proven to be very successful in keeping the population safe during their commutes”, writes Movmi.

Tight Purse Strings

Companies, governments and individuals will doubtless all be impacted financially through loss of sales income, tax revenue and wages. Bankruptcies and unemployment are already skyrocketing, with worse yet to come. This will put a great focus on budget management for everyone. No longer will the fastest or easiest journey be the best, for many people it will be the cheapest and MaaS has a vital role in providing optimising expenditure for total journeys.

As Kubitz points out, “There will be direct and indirect consequences of the crisis. At the same time as we are released to travel, the economic impact may well be being felt. People – many of whom have barely used their cars for months – may well look to shed the costs of car ownership as they feel the pinch. It’s hard to predict at present but this may well play out as increasing demand for forms of MaaS, smart transport and new mobility.”

“With transportation system-wide closures become more and more pervasive, MSP’s [Mobility Service Providers] are becoming the most reliable source of mobility for people and goods. MSPs have risen to the challenge not only increasing food delivery services, but reducing costs and creating invaluable partnerships with community organizations serving the most vulnerable. Public-private partnerships are instrumental to keep the fleet of mobility services running as effectively as possible.” [writes](#) Sandra Caballero, Project Specialist, Autonomous and Urban Mobility and Maya Ben Dror, Lead, Autonomous and Urban Mobility, Centre for the Fourth Industrial Revolution at the World Economic Forum.

Public-private partnerships have the potential to create new, more efficient and cost effective services and business models that will be warmly welcomed in the new era. This could be a positive consequence of a COVID-19 fueled change in perspective.

Safety in Numbers

In a future transport landscape, user safety will be of paramount importance, if companies and operators are to convince the public to start travelling again. In rethinking transport systems from a safety perspective, companies and governments have an opportunity to radically redesign how they operate in totality.

“In future, public transport operators will need to reassure users that they will not be infected. This means more cleaning, protective screens, improved air filters and less dense seating. The crisis may well also lead to transport providers revisiting how services are being delivered at the route and network level”, write Enoch & Warren.

This presents a huge opportunity for MaaS, in the provision of information that can help plan safe journeys. Detailed travel information, such as crowding levels, time-in-transit and even frequency of cleaning, can be used to profile the risk level at a journey level, to enable better decision making.

“I feel MaaS will become more important than ever. MaaS has always been about personal choice and preferences and it has emboldened the MaaS community to provide travelers with the data they need to be able to choose routes where they know the public transport will be less densely populated, or a route that involves more micro-mobility in the urban area”, says Andy Taylor (left), strategy director, Cubic Transportation Systems.

John Nuutinen, CEO, SkedGo says, “The behavioural change will drive development of new features, functionalities, technologies and business models, as MaaS enablers engineer solutions with a greater emphasis on risk aversion, the ability to mitigate legal liability and focus on business sustainability.”

Sharing is Caring

Already we can see a more organised effort to provide data in light of the COVID-19 outbreak. In the UK, for example, the Department of Transport and ITS UK [work together](#) to collect “data

on traffic flow (count, not speed), traffic movements, parking, cycling and pedestrian movements” (...) “to help inform the Government’s policy response to the COVID-19 outbreak.”

There is also a potential consequence from the public wishing to travel less that encourages people to share information on the individual trips they are making, so people can pool activities together and share the load.

As an agile way of thinking, MaaS is in a good position to adapt to this change. It’s about personalisation, transparency and localisation, features that will help make MaaS the best tool to support future transport models.

Jenny Milne, Strategic Development Director at JLM, draws conclusions from her personal experience “Since returning home to my rural area I have managed to find a delivery of veg and fruit but that is it. The car is still an essential for shopping and medication. We have a child with underlying health conditions at home so would prefer not to be venturing out to shops, so if we had a true MaaS offering (services and people) I would indeed benefit. However it comes down to information... if I knew who in my community was going where and when now, I could piggy back this for our provisions. I am hopeful this will come and that we won’t go back to what ‘normal’ was before, and I look forward to seeing a new ‘normal’ which involves more collaboration, information and less silos.”

Even before COVID-19, it was clear we needed operators and authorities to share more and better (standardised) data, for the benefit of all mobility stakeholders. Looking at transport through the lens of the pandemic, we can see an increased requirement for data – for example real-time and occupancy.

Conclusion

While it is clear that transport will see lasting changes as a result of COVID-19 – even after the immediate crisis has passed – as an agile way of thinking, MaaS is in a good position to adapt to this change. A significant component of MaaS is about personalisation, transparency and localisation, and it is these features that will help make MaaS the best tool to support future transport models.

“MaaS can and will be one of the solutions that cities and regions turn to now to deliver mobility for their citizens, we may not see subscription models in the near term, but I firmly believe that this time of reflection for cities and transit agencies will show that an integrated public and private mobility solution will be something the majority of people will welcome.” says Taylor.Nuutinen adds, “Mobility-as-a-Service can provide unique value in a new world of social distancing, increased working from home, changed transport assets and commuters turning to increasingly varied and disparate transportation options. Therefore, it is important that we stay focused and positive. This is something we will get through together – it will make us stronger as an industry.”

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The Transportation World After COVID-19

<https://reason.org/transportation-news/infrastructure-stimulus-bill-highway-investment-and-covid-19/>

By [Robert Poole](#)

April 9, 2020

As with the 9/11 terror attacks, one's first reaction to a disaster like the COVID-19 pandemic is often, "This changes everything," or less apocalyptically, "The world will never be the same." The latter is closer to the truth, but I will amend it by saying that many things will likely change at the margin.

For example, there has been a lot written in recent weeks about a reversal of the emphasis on increasing urban density, which has been urged for ostensibly environmental reasons. Urban geographer Joel Kotkin has written a number of pieces on this, noting that coronavirus hot spots worldwide and in this country tend to be major cities like New York City and Milan. To be clear, we should not expect New York City, London, Paris, and Tokyo to be abandoned, but recent years have seen outmigration from New York and San Francisco for less-dense and more-suburban metro areas. As people realize the correlation between very high density and even the ordinary flu, there may be more outmigration, at the margin.

Another important change concerns all-electronic tolling. Across the country, numerous toll systems have announced "temporary" conversions to only electronic tolling, to shield customers and toll collectors from contagion.

The same personal calculations may increase the desire of (especially) families with children to move to less-dense suburbia, where they and their children are less-exposed to contagions of whatever source. This may reduce market demand for infill housing and increase demand for suburban and exurban housing. It might even reduce political support for policy measures that increase density, such as bans on single-family zoning.

Turning more to transportation, the large increase in online shopping, boosted considerably by recent lockdowns and required closures of retail stores, will likely accelerate the pre-existing trend in that direction, which is not good news for investors in malls. As more shopping shifts online, it is good news for the trucking industry (and possibly for railroads providing intermodal service hauling containers from seaports to major distribution centers). But all of the increase in merchandise ordered online will be delivered by trucks (drone delivery is a side-show). Already, U.S. DOT projections of truck vehicle miles traveled (VMT) were running at about twice the rate of growth in personal-vehicle VMT. That makes rebuilding and modernizing the Interstate highways all the more important, including the addition of dedicated truck lanes in key long-distance Interstate corridors like I-10, I-40, I-65, I-70, and I-81.

Another important change concerns all-electronic tolling. Across the country, numerous toll systems have announced “temporary” conversions to only electronic tolling, to shield customers and toll collectors from contagion. This is true statewide on Florida, Maryland, and

But a major drawback of virtual conferences is the lack of unplanned get-togethers in the corridors, impromptu lunch meetings, and the idea-hatching that later turns into a project or a serious policy proposal. I don't see how that can be duplicated online.

Illinois tollways (although the Ohio Turnpike has shifted to exact change only!), the Harris County (Houston) toll road system, the Dulles Toll Road in Virginia, and many smaller systems such as the Delaware River toll bridges in Pennsylvania, the Mackinac Bridge in Michigan, the Lake Ponchartrain Causeway in Louisiana, and others. If this pandemic goes on for many months as predicted, I expect many of these providers will scrap manual toll collection permanently.

Speaking of tolling, with traffic down significantly everywhere, rating agency Moody's released an outlook report on US toll roads on March 20.

Obviously, its near-term outlook is negative, with reductions in traffic and revenue for an unpredictable period. But the report's summary pointed out that “statewide or regional toll systems have significant scale and entrenched market positions with strong liquidity that enable them to absorb both short and prolonged traffic shocks.” Moody's also said, “[Debt] coverage will decline in 2020 compared with 2019 for nearly all toll roads, but liquidity will remain strong.” Additionally, Fitch has just reaffirmed its investment-grade ratings on nine major long-distance toll road systems.

The sharp reduction in driving is reducing gasoline sales, and hence gas-tax revenue. IHS Markit estimates that U.S. demand for gasoline could fall by as much as 50 percent during the response period to the coronavirus. This will accelerate the decline that was already under way in many states, and that could increase political interest in making the needed transition from per-gallon gas taxes to per-mile charges.

One change I think will be mostly temporary is online conferences. Of necessity, many events that were scheduled for this year will be either cancelled, postponed, or done in some kind of virtual fashion. We will likely see improvements in online meeting technology, as companies and organizations figure out ways to do this for larger groups of people, perhaps even up to the scale of the 14,000-participant Transportation Research Board annual meeting. But a major drawback of virtual conferences is the lack of unplanned get-togethers in the corridors, impromptu lunch meetings, and the idea-hatching that later turns into a project or a serious policy proposal. I don't see how that can be duplicated online, so I think business air travel will bounce back, as it did in the years after 9/11.

Mass Transit After COVID-19

<https://reason.org/transportation-news/infrastructure-stimulus-bill-highway-investment-and-covid-19/>

By Baruch Feigenbaum

April 9, 2020

COVID-19 has caused most transit agencies to enter crisis mode. Ridership, understandably, has declined between 50 and 95 percent in most major cities during the shutdown. Transit agencies are also spending more resources sanitizing buses and trains. And to protect drivers many transit operators are boarding bus passengers through the back door, foregoing the farebox revenue that is typically collected at the front door.

Transit ridership has been declining since 2014, long before COVID-19, however. Every major transit agency in the country lost ridership between 2018 and 2019—with the exception of Seattle, which has been building new light rail at a frantic pace. Per capita transit ridership has declined even faster, falling from 287 trips per urban resident in 1920 to 38 trips per resident in 2017.

The current problems provide transit agencies an opportunity to rethink how they fit into the mobility landscape. Many agencies cling to 20th-century operations in a 21st-century world. Transit managers are focused on short-term day-to-day operations as opposed to long-term strategies. And their short-term approach focuses on operating as much service as possible, sometimes at the expense of their employees' health and agencies' bottom lines.

Despite an 87 percent drop in ridership, New York's Metropolitan Transportation Authority (MTA) has cut service by only 25-to-35 percent. The Chicago Transit Authority saw ridership drop 82 percent recently but does not plan to cut any service. The Metropolitan Atlanta Rapid Transportation Authority (MARTA) reduced bus service 20 percent after ridership fell 55 percent. Among large transit agencies, only the Washington Metropolitan Area Transit Authority (WMATA) has made drastic reductions. It is now operating on its modified Sunday schedule on weekdays and operating only 27 "lifeline" bus routes on weekends.

Transit systems are going to need to make reforms to remain viable over the long-term. And this is the time to start making changes. First, transit agencies need to understand their mission. Transit's number one purpose is to provide service to low-income transit-dependent riders. The only rationale for subsidizing transit services is to provide these residents with an affordable and reliable trip to work. Political actors may see value in subsidizing trips of upper-middle-class commuters, but most researchers and transit industry staff think it is bad policy.

The way the Metropolitan Transit Authority of Harris County in Houston redesigned its bus service to focus on transit-dependent riders should be a model for other systems. These days, such riders are more likely to travel from suburb to suburb. Therefore, the agency changed its

service network from a radial design to a grid design that more effectively serves dispersed housing and employment locations. The agency eliminated stops that had proliferated over 50 years, even if they no longer served any riders. Finally, since transit-dependent residents don't all work 9-5 jobs, the agency increased transit service on Saturday and Sunday up to 40 percent and decreased service slightly on weekdays. Many agencies including L.A. Metro are following Houston's lead. But some of the redesigns fall short because agencies are spending limited resources building light-rail lines instead of operating better bus service.

Second, transit agencies are an integral part of the new mobility universe, but they are only one part of it. Providing mobility is not about expanding the agency; it is about serving the customer. Transit agencies need to transition into mobility agencies, overseeing and coordinating service rather than operating it.

The Regional Transit District (RTD) of Denver, for example, functions as a partial service coordinator. It coordinates service across the metro area, eliminating duplication. RTD oversees special services such as the ride-home program for folks who use transit to commute to work and have an emergency and need a vehicle to commute home.

Third, transit agencies need to issue requests for proposals to the private sector for building and operating service, maintaining vehicles, developing IT services, writing transit grant applications, and entering into transit-oriented development. Often times the private sector can operate better service. Sometimes the transit agency will have the advantage. But transit agencies that don't examine private contracting will never know.

Few large transit agencies contract out most of their services. Denver's RTD entered into the design-build-operate-maintain Eagle P3 to build its A Line, Gold Line, Northwest Rail Line, and a commuter rail maintenance facility. But RTD is not interested in contracting with private providers to operate its existing service despite the potential for improved performance and cost savings.

Fourth, agencies can partner with Uber and Lyft and private transit providers to operate services. Many transit agencies contracts with Uber and Lyft for first-mile/last-mile service in areas with low population and employment densities where fixed-route bus service is not practical. The Massachusetts Bay Transportation Authority (MBTA) pilot program, in which Uber and Lyft provided paratransit service, was more popular with riders than any paratransit service in the country.

Unfortunately, most agencies have typically been hostile towards private transit operators. In San Francisco, Leap provided supplementary private bus service on certain routes. Yet the city

Finally, transit subsidies are not endless. The transit industry was fortunate to receive \$25 billion in bailout funding. Yet, even that may not be enough for many transit agencies. Mass transit agencies need to make reforms today to become less dependent on subsidies in the future.

shut the service down for operating without a permit. Leap had applied for the permit, but the city refused to provide it. And private bus service is a developing model; Kansas City's partnership with Bridj ended and the company dissolved. But it would be more helpful for parties to work with each other instead of protecting their own turf.

Finally, transit subsidies are not endless. The transit industry was fortunate to receive \$25 billion in bailout funding. Yet, even that may not be enough for many transit agencies. And as the COVID-19 crisis plays out, policymakers focused primarily on health care and the economy. In a post-COVID world, nothing is guaranteed, including state and local subsidies. Mass transit agencies need to make reforms today in an effort to become less dependent on subsidies in the future.