

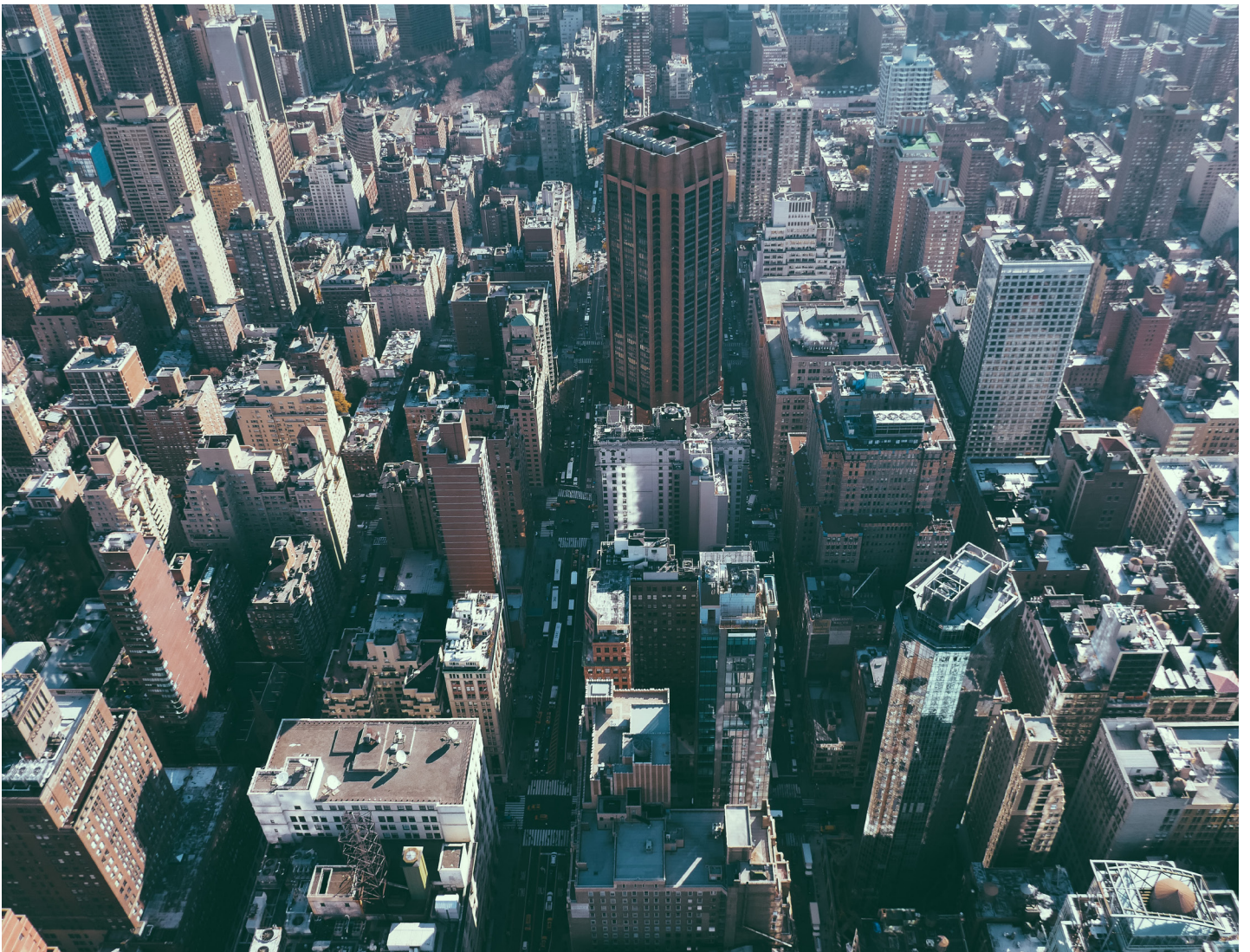
# The potential of on-demand shared transport in a socially distanced world

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How on-demand shared mobility operators can supplement and relieve pressure from public transport operators in light of the corona crisis.

**White Paper**  
June 2020

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**Published**

June 2020

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# Table of Contents

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Page 04	Preface
Page 05	Executive summary
	Findings at a glance
Page 06	Introduction
	Graph 1: Change in Movement Behaviour
	Graph 2: Interview partners (Extract of interview partners)
Page 07	Now is the right time
Page 08	The potential role of private-public partnerships
	Table 1: Journey Use Cases
Page 10	The right integration of mobility services
Page 13	There are major challenges
	Graph 3: Impact of subsidies on profitability of mobility services
Page 15	Recommended next steps
Page 17	Acknowledgements
Page 18	Citations



# Preface

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The goal of this paper is to outline the role that shared and sustainable modes of transport can play in a COVID-stricken future by alleviating the constantly increasing pressure on more traditional forms of public transport. It comprises a short introduction of the problem and then goes about outlining the most important findings on the basis of the authors' interactions with the most important mobility stakeholders from across the world.

The stakeholders were identified from the entire spectrum of mobility, including operators, service providers and international change driving organisations. The interactions were aimed at three major agenda points:

1. Understanding the impact this crisis has had at their end of the spectrum.
2. Uncovering the most important learnings that they have come across while leading adaptation efforts of their organisations towards this impact.
3. Interpret their perspective on the future of shared and sustainable modes of transport in this new reality.

In the pursuit of the paper's goal, the authors also consolidate the conversations and present a set of recommendations towards the next steps for mobility industry stakeholders.



The "new normal" experience of public transportation during the time of COVID-19.

# Executive summary

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The ongoing urban mobility revolution has been forced to undergo multiple pivots and acceleration simultaneously due to the global COVID pandemic. Collaborations between public and private institutions have shown signs of tremendous potential impact on the future of this industry and set some much-needed precedents. This white paper outlines the immediate effects, analyses mitigation strategies and makes attempts at identifying potential opportunities, on how on-demand shared mobility operators can supplement and relieve pressure from public transport operators. It gathers a variety of insights from market participants and aims to curate best practices from the industry.

While the mobility backbone of any city remains a public goal, authorities need to provide accessible as well as inclusive services to their citizens. In the past few years, public transport infrastructure has struggled to keep up with the rate at which cities are growing. The New Mobility Sector aims to create much needed positive impact on such infrastructure by addressing mobility behaviour under local implications throughout the world, providing valuable insights for Public Transportation Authorities (PTA). Based on these insights, authorities urgently need to think about how the extension of the established subsidy model to multiple and multimodal mobility business models can help reach overarching common interests and goals.

## Findings at a glance

### Capacity issues

The Corona crisis has had a severe adverse impact on the public transport sector as people are reluctant to travel by public transport (demand side effects) and lockdown policies have increased pressure on capacity through social distancing measures (supply side effects).

### Opportunities

Integration of mobility services into public transport offerings provides an opportunity to increase the attractiveness of existing struggling mass transit offerings and alleviate pressure on the public transport system.

### Holistic approach

isolated public-private partnerships in transportation cannot stand alone to drive a holistic transition towards a more efficient urban mobility ecosystem - what it takes is holistic policy approach, including broad and aligned regulation across all different transportation modes and infrastructure, including effective policies to ensure that private vehicle ownership does not flare up.

### Customer focused

To enable a customer focused approach to the designing of urban mobility transport strategies by public authorities, we need to adopt a view that public transport is any form of mobility provided by shared resources regardless of the legacy and ownership structure of the respective operators.

### Partnerships

To foster PPP with innovative shared mobility companies, policy makers are asked to re-imagine significant entry barriers into the sector: time-consuming tender procedures, elaborate IT integration and low degrees of entrepreneurial freedom.

# Introduction

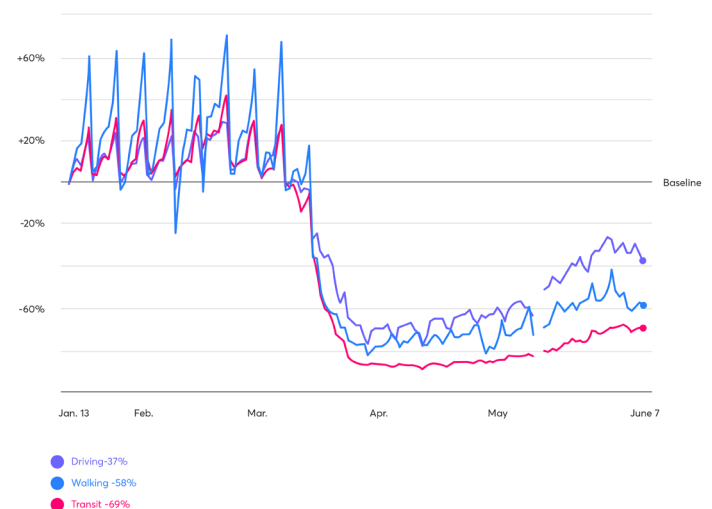
The COVID-19 crisis and resulting lockdowns have severely impacted the way that people move. During the crisis public transport (including scheduled buses and trains) was among the hardest hit modes of transport. To the high hopes already vested in public transit authorities everywhere, to help cities reduce transport-related carbon emissions, the gradual easing of lockdown restrictions is now adding the seemingly impossible task of providing safe – meaning compliant with socially distant requirements – mass-transportation. To address this entirely new set of challenges and ensure that the urban transportation systems of the future are well equipped to flexibly adapt to changing social and environmental conditions, new innovative approaches are urgently needed.

At the very top of each city's post-Corona agenda should be ensuring that private vehicle usage does not experience an inadvertent second renaissance. In the pursuit of this goal cities may find an unlikely ally sharing their vision: shared mobility services.

Berylls and Wunder Mobility have jointly produced the following study in an effort to analyse the potential of public-private partnerships between mobility service operators and public transport operators in the light following the corona crisis. The study is based on the analysis of urban transportation use cases and 15 expert interviews with a variety of stakeholders including public transport operators, policy makers and alliances, cities, and mobility service operators.

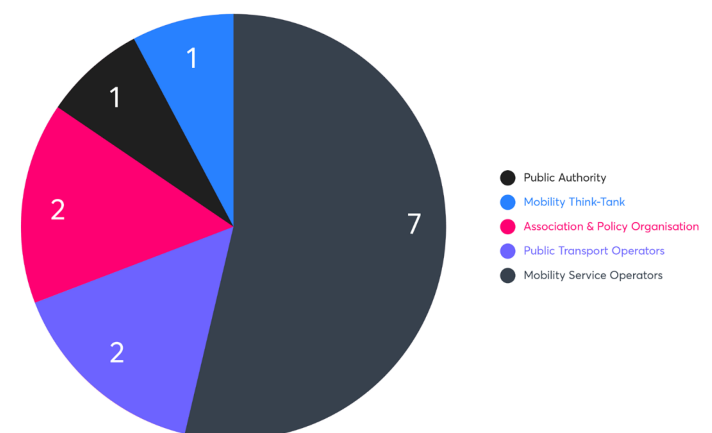
Graph 1

Change in Movement Behaviour, London, UK  
(Source: Apple mobility project)



Graph 2

Interview partners  
(Extract of interview partners)



Select Contributors



# Now is the right time for our industry to focus on this topic

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The Corona crisis has had a severe adverse impact on the public transport sector as people are reluctant to travel or commute by public transport. In the UK, the government even went so far as to actively discourage use of public transport for commuting purposes. Demand plummeted further as employers across the globe have called for their staff to work from home.

At the same time, social distancing rules have also created capacity restrictions for busses and trains. In Ireland trains can only run at 12-16% of their full capacity<sup>1</sup> to comply with social distancing legislation. In Australia initial calculations have shown that it would require ten times the number of buses to allow for normal operations to continue (based on a 4 sqm social distancing rule)<sup>2</sup>. New, COVID-19-related health and safety regulations have also increased operator costs as additional staff were hired to conduct regular hygiene checks or disinfections.

This has put significant financial stress on public transport systems, authorities, and operators. Sadiq Khan, the Mayor of London, recently warned that the financial health of TfL was down 90% and that a government bailout was needed to ensure services could continue<sup>3</sup>. In Germany transit companies have said that they expect to lose between 5 and 7 bn € in revenues<sup>4</sup> (~20-25% of annual revenues), depending on how long the lockdown continues, some studies expect a rebound to existing ridership numbers not until 2023<sup>5</sup>. The German government recently passed a stimulus package, which includes financial support of up to 2.5 bn EUR earmarked for public transport<sup>6</sup>. In the US, the CARES Act became the first federal public transit bailout bill designed to inject 25 bn USD<sup>7</sup> into the industry.

“

Serving the public good blew a hole in the balance sheet of many public transportation companies and that 'hole' keeps growing, with current restrictions in capacity. But the bigger problem may come in the future, if current operational losses force companies to postpone capital investments in maintenance, upgrading and expansion of the service.

Pedro Homem de Gouveia, Polis Network

While the EU has been at work preparing a massive investment package, the Commission has emphasized on keeping sustainability as a key cornerstone of this recovery. The advocated stimulus package that proposes 750 billion Euros and a revised proposal for the long-term EU budget until 2027<sup>8</sup>, centers around the "green deal" to stimulate the economy while simultaneously combating climate change. Up to 100 bn Euros could be made available for the transport and mobility sector.

In response to the crisis many cities across the globe have radically redrawn their public road networks and transport infrastructure. Cities like Berlin, London, Paris, for example, set up pop up bicycle lanes, many others like Hamburg, Milan or Munich plan to follow suit. Milan has led the charge, planning an extensive revamp of its urban mobility landscape including: expansion of sidewalks (at the cost of parking spaces), increase of speed limits, development of up to 35 km of bike lanes, subsidies towards the purchase of bikes and scooters<sup>9</sup>.

Cities are more than ever encouraging private sector companies to come forward with new ideas. This hasn't

always been the case. In fact, until quite recently the relationship between regulating authorities and shared mobility players has been somewhat antagonistic, as cities feared adverse impact on congestion, an increase in accidents or simply the disruption of existing public transport modes. However, with the level of experimentation currently going on in the transportation sector, the corona-crisis now presents a unique opportunity to re-think traditional models of private-public cooperation in the mobility space. Done right, this could radically rethink the idea of public transport as such and expand the trip types served by public modes of transport.

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# The potential role of private-public partnerships in the mobility industry

To identify concrete opportunities for the integration of mobility services into the existing public transport offering of cities, this study analysed urban mobility behaviour in the form of journey use cases (specific situations and intentions under which a journey is conducted by a consumer). To gain a holistic picture of trip types in urban environments, actors (passengers), triggers (travel intention) and the system (urban landscape with defined boundaries) are mapped. These enable the derivation of journey use cases, representing the kind of trip occurring within the system.

Based on this overarching analysis of urban movement patterns, we can identify four typical journey use cases, in which the most common existing modes of transport could be complemented or replaced through a shared mobility service. An additional comparative analysis was conducted between the new mode of transport against existing modes of transport based on 5 key evaluation criteria (ETA, price, comfort, sustainability, and transmission safety).



Select examples mobility alternatives against private car ownership. From left to right: Electric Scooters, Bicycles, and Carpooling.



## Journey Use Case Table

The benefits provided by the integration of mobility services in the selected journey use cases are examined in more detail to highlight the potential of private-public partnerships.

### Key

- Worse
- Slightly Worse
- 0 Comparative
- + Slightly Better
- ++ Better

Journey Use Cases	Geographical Distribution	Modal Options (Status Quo)	New Mobility Service Option	Effect of changing to new mode on Trip Type (end customer perspective)				
				ETA (Trip Time) <sup>1</sup>	Price <sup>2</sup>	Sustainability <sup>3</sup>	Comfort <sup>4</sup>	Transmission Safety <sup>5</sup>
<b>Suburban commuter trips</b> Journeys originating in suburban environments with trip destinations lying outside of city centres (i.e. business parks or logistic distribution centres). Currently widely covered by private vehicle usage due to lack of public transport coverage	Suburban	Public Transport (Multi-leg trip)	Large shared employee shuttles (30-50 seaters)	++	--	-	++	+
<b>Public Transport Feeder Trips</b> First mile trips acting as feeder journeys for public transport-based commuter journeys (i.e. journeys to centralized park and ride stations (Bus or train terminals)	Suburban and Urban	Local Bus	Micromobility (bikes, scooters) or Microtransit (5-15 seat shuttles)	+	0	0	0	+
<b>Suburban to urban commuter trips (peak time)</b> Suburban to urban commuter journeys. Long distance journeys with modal choices currently focused around private vehicles and public transport (trains and guided buses)	Suburban to Urban	Trains and Guided Buses	Larger scale shared shuttles (30-50 seaters)	--	-	-	++	+
<b>Intra-urban trips (non-peak times)</b> Journeys conducted within urban environments for commute and leisure reasons at non-peak times (i.e. post-work trips to bars and restaurants)	Urban	Busses and light rail (subway, and trams)	Microtransit (5-15 seat shuttles) or ride-pooling	+	-	-	++	+

### \*Metrics:

<sup>1</sup> **ETA (Trip Time):** An evaluation of the door to door trip time for a mode based on a standardized operational schedule and average expected traffic conditions

<sup>2</sup> **Price:** The expected end-user price for a journey (tariffs and subsidies are generally considered based on the as-is framework across Western Europe)

<sup>3</sup> **Sustainability:** Emissions and environmental impact of mode of transport per passenger

<sup>4</sup> **Comfort:** Perceived level of comfort and trip experience for passenger in a mode of transport

<sup>5</sup> **Transmission Safety:** The perceived and actual transmission likelihood of COVID-19 in a mode of transport (taking proximity to additional passengers, ability to conduct effective infection tracking and physical interaction with vehicle into consideration)

# The right integration of mobility services into existing infrastructure will help relieve stress of public transport operators

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## Help cities reduce inhabitant's reliance of on private vehicles

Cities' efforts to expand their public transport infrastructure have not been able to keep up with the rapid pace of urbanization and more recent changes in mobility behaviour. The difference in evolutionary speeds has created white spots that are currently not served by public transport. The development of logistical centres and business parks in suburban environments, for example, has left public transport authorities unable to react, forcing passengers to resort to private vehicles to complete these journeys.

*Suburban commuter trips* (Journey use case 1) represent a significant proportion of commuting behaviour and passengers heavily rely on private vehicles or multi-leg public transport journeys. Whilst passengers may be able to cover intra-urban / sub-urban journeys using public transport, private vehicles are required to complete commuter trips. Even in cities with a good PT system, only a small fraction of trips can be completed without changing. To enable inhabitants to give up their car, a suitable suburban commuting service is required, with

a high share of point-to-point connections. Designated micro and mass transit shuttles services provide a viable alternative to commuters at peak times and can be implemented without major infrastructural investments.

In the absence of suitable public transport, companies move to take things into their own hands. Pharmaserv is the operator of Standort Behringwerke, a pharmaceutical park in Marburg, Germany. When managing an ever-growing campus, the topic of parking is always relevant and top-of-mind, which is why Pharmaserv, while searching for new mobility solutions, implemented a car-pooling service as an offering for employees working the business park. Additionally mobility service operators such as ShareNow have created island solutions in the outskirts to enable seamless travel towards business parks and highly frequented suburban districts such as Bergedorf in Hamburg, Germany. These offerings provide passengers a viable alternative to the use of a private vehicle but are currently not considered to be part of public transport offerings.

Pharmaserv is the operator of Standort Behringwerke, a pharmaceutical park in Marburg, Germany.



## Make existing public transport offerings more attractive

*Public transport feeder trips* (Journey use-case 2) are an effective tool to increase the attractiveness and reach of public transport and reduce dependency on private vehicles. The integration of micro mobility services (bike- and scooter-sharing) into public transport offerings enables the provision of feeder services to buses and trains. Suburban residents can benefit from increased comfort levels and reduced ETA in comparison to the reliance on local bus services to train stations. Additionally, this provides a reliable alternative to the use of private vehicles for the complete suburban to urban commuting journey or the use of private vehicles to access park & ride facilities.

To increase the attractiveness of season tickets these offerings can be integrated into their scope of service.

Additionally, the integration of additional modes of transport into public transport platforms lays the foundation for city-driven holistic public 'Mobility as a Service' (MaaS) offerings. These bundled services present the first step towards the commodification of transport, as users pay a monthly flat-fee and are provided access to all available modes of transport (public and private) in one platform. Cities such as Amsterdam and Helsinki have led the charge, launching own aggregated mobility platforms or partnering with private operators such as WHIM to provide customers a 'one-stop-shop' for urban mobility.

Examples of public transport feed trip partnerships can already be observed in action (IOKI with Deutsche Bahn and VOI with the Hamburger Hochbahn) but further potential exists to expand these partnerships to suburban first mile journeys through cooperative partnership frameworks.

“

As the mobility demand continues to change and life in cities is opening up again, it is important to provide adaptable solutions. Public transport infrastructure is too rigid and too cost-intensive for these fast adaptations (esp. in the outskirts of cities). Our fleets are flexible to adapt quickly and to meet demand.

Kristina Hunter Nilsson, VOI

## Help cities reduce transmission risks during peak times

As cities begin to exit lockdown, commuting trips are beginning to increase again. In fact, peak time Suburban to urban commuter trips (Journey use case 3) public transport trips represent a significant proportion of journeys for middle- and low-income households. Workers who rely on public transport for commuting purposes could be exposed to a higher risk of infection, due to the high contact and capacity nature of public transport. The integration of dedicated commuter

shuttle services (on-demand micro and mass transit) have inherent benefits in terms of reducing transmission risk by providing trace tracking for passengers and door to door transport.

Zeelo, a UK based mobility start-up, with clients including Jaguar Land Rover, Amazon and Ocado, has developed a product to provide safe pre-booked mass transit shuttles for city-center and industrial-based companies during peak commute times.

“

Our offering is tailored towards providing pre-booked safe mass transit options during peak times, thus we are able to reduce the stress on existing public transport networks and provide employees with a safe mode of transport.

Sam Ryan, Zeelo

### Help cities better understand demand patterns & customer preferences

Data plays a key role in the mobility landscape of the future. To design efficient transportation systems, a holistic analysis of demand patterns and user behaviour is required. Mobility service operators have internalized this imperative and developed far reaching big data capabilities to draw value from the plethora of data generated by their services. On the other hand, public transport operators have historically struggled with the collection of data and attendant data management.

“

Best practices in public-private partnerships must include the sharing of data on user pain points, resistance to adoption and behavioural changes.

Mouchka Heller, World Economic Forum



*Intra-urban trips* (Journey Type 2) provide a great cooperation platform to facilitate the mutual analysis and breakdown of data. By combining data resources and analysis capabilities, private-public partnerships can promote a deeper understanding of movement patterns in cities at non-peak times. Enabling the development of offerings that are more tailor-made based on real-time occupancy and demand patterns.

The need for effective data management has become even more apparent in the light of the Corona crisis, as significant changes in movement patterns are expected, making the ability to spot and address these changes even more imperative. During the lockdown in Germany, the Hamburg transport authority "Behörde für Wirtschaft, Verkehr und Innovation" launched a joint service with MOIA and local taxi drivers to provide non-peak time transport services for essential workers. It was integrated into the price system of the local public transport network (Hamburger Verkehrsverbund), so that people with valid public transport tickets were able to use MOIA free of charge. Considerations exist whether to continue such partnerships following the end of lockdown, allowing a more efficient supply response catered to the actual demand in the market.



# There are major challenges that we need to be prepared to address for a successful implementation

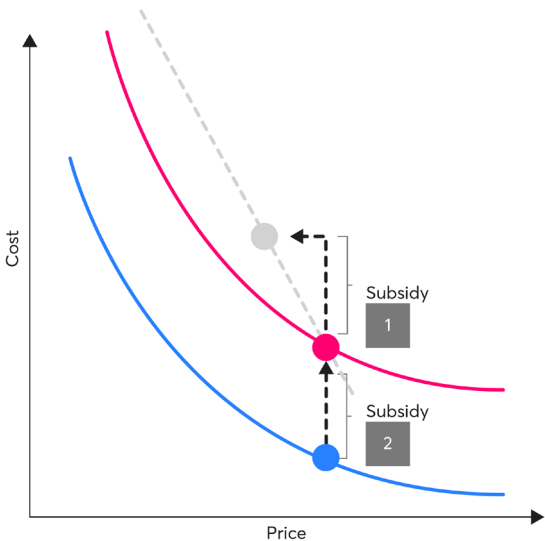
Public-private partnerships have a long history in public transport, but the crisis offers a unique opportunity to re-evaluate legacy transportation systems and question whether they are fit for purpose in light of the new challenges lying ahead.

In most cities public transport networks are run by privately-owned transport operators via multi-years concessions. In the shared mobility space, however, public-private partnerships are still rare. Most start-ups deliberately do not compete in the realm of public transport. Being revenue - and utilization - driven, they necessarily go for mobility areas where willingness to pay and demand are highest.

Cities, by contrast, look for broad and socially equitable coverage and are willing to absorb the losses public transport operators incur if their per-trip cost exceeds the regulated fare (subsidy case 1). In this model cities determine operator margins directly, usually by employing operational metrics set by the regulating public transport authority.

This kind of subsidy model is often seen as limiting or restrictive. In fact, it can even disincentivise operators from making long-term investments to improve their short-term margin position. Endemic under-investment in railway infrastructure during the early days of British railway privatization is a case in point and often held up as a cautionary tale against private-public partnerships in the transportation sector.

Graph 3  
Impact of subsidies on profitability of mobility services (Shared Mobility Margins)



Subsidy Cases			
	1 Subsidy-margin effect	2 Subsidy-volume effect	
Cost Structure			
	Cost	Cost	
	Margin	Margin	
	Subsidy	Price	
	Subsidized Price	Subsidy	
		Subsidized Price	
Operator P&L	If the service does not return a profit stand-alone.	The service returns a moderate profit stand-alone.	
Subsidy Role	Subsidies absorb losses associated with running the service.	Subsidies create additional volume by driving price up the demand curve.	

## However, this kind of model is far from being the only option

Subsidies can also be used to lower the price point of a service that is already operating profitably. In this case (subsidy case 2) the subsidy creates additional demand and scale beyond what the service would generate on its own. Too boot, a subsidized business model affords a level of stability that might appeal to investors against the current backdrop.

But there are practical limitations too. Most mobility service operators do not know how to navigate municipal procurement processes or find them too time-consuming, rigid, inflexible and by far too elaborate. Regulators, on the other hand, often seek long-term relationships and a proven track record, both of which are difficult to provide by start-ups, whose business models are not engineered for 5-10-year contracts. As start-up product development cycles are based on rapid product iterations, that enable pivots if product-market fit is not optimal, agreeing to a clear set of operating metrics when they are still testing their operating model becomes a significant hurdle. All combined, the current tendering processes and methods pose an almost insurmountable entry barrier for startups

and constitute a huge obstacle for technological and business model innovation.

Local authorities also tend to focus on solutions that address local needs and pain-points. Many mobility service operators who based their global expansion plans on a one-size-fits-all approach have had to learn this the hard way. As cities seek to protect sensitive customer data – or conversely avoid the appearance of trying to pry into their citizens' private lives – many are hesitant to cooperate with for-profit, private sector companies, fearing conflicts surrounding data ownership and handling. (Needless to say, many mobility service operators rely heavily on customer data to fuel and improve their business models.)

New mobility and technology companies need to understand the importance of cooperative long-term planning with cities: by 2030 we will find more and more city centers closing down for private vehicles and restricting access to only sustainable and shared alternatives. By providing insight into best practices of different use cases, technology companies can incrementally speed this process up in order to propose a working combination of holistic solutions with public transportation authorities.

## Action areas for authorities and businesses

### Re-design partnerships

Create platforms and funds to encourage rapid prototyping and piloting, while creating transparency on planning responsibilities and expectations to enable mobility service operators to adapt offerings to local demands. This includes the need to redesign public private partnership "contracts", operating models and relationships, and to clarify roles between all involved players.

### Make mobility services accessible

Accept that mobility service operators can only address certain niches within a PT system, adapt regulatory setting to enable financial or other support in case social benefit and access require specific and targeted solutions.

### Introduce rewards

Introduce a concept that rewards mobility service operators for reducing private vehicle traffic or reduces stress on other public transport operations, as well as trip type specific subsidy models (to support operations in underserved public transport areas).

### Provide data

In return, shared mobility service providers should provide transparency on data on end-to-end trip patterns and user preferences (of course while obeying privacy and data protection laws). Creating a joint city-wide platform would be of great social benefit, allowing analysis, interpretation of data (knowledge sharing rather than siloing), effective allocation of transit capacity and increased service levels. Fair data-sharing agreements between all stakeholders are a key foundation.

# Recommended next steps after analysing the bigger picture

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Private-public partnerships in the transport space present opportunities that greatly outweigh challenges - and now is the time to act. Changes will not occur overnight, as existing infrastructure and asset investments cannot be written off, but we are presented with a unique opportunity as a result of the corona crisis.

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The pandemic has not only brought people together to support each other, but also private and public partnerships have emerged faster to overcome the crisis.

Karen van der Linde, Hamburger Hochbahn

Mobility services will not replace public transport offerings but should rather complement them, if implemented correctly. By analysing and identifying the most suitable mode of transport and partner for different trip types, cities are able to optimize operations and provide inhabitants with a better urban trip experience. During peak times, a mix of both private and public offerings will be required but at non-peak times efficiently operated mobility services hold the potential to largely replace PT.

MaaS platforms are a great strategy to combine the power of public transport and private mobility service offerings, allowing the customer to choose the most suitable mode of transport for every journey. Only true MaaS solutions provide consumers with a 'digital car' alternative, making private vehicle usage obsolete. Adoption and roll-out of these require active involvement by regulators and cities should include these as a central part of any transportation strategy.

By no means can isolated public-private partnerships stand alone and drive a holistic transition towards a more efficient urban mobility ecosystem, further policies are required to ensure that private vehicle ownership does not flare up. First, a new, integrated approach to transit and infrastructure planning is needed, including cities and the surrounding counties which in general are part of the metropolitan transit system (and, by the way, cause most of the traffic issues in cities by their daily private car commutes). Second, additional policies dissuading people from using cars in urban environments are required. Increasing the attractiveness of mobility services needs to be coupled with 'nudging' policies decreasing the attractiveness of car usage. The corona crisis has triggered a vast number of cities to adopt policies to restrict private vehicle usage including car-free zones/reduction of car parking (e.g. London, Porto and Milan) and congestion charges. If effectively implemented, these policies provide an additional push factor towards the adoption of mobility services as viable alternatives to private vehicle usage in cities, and could be a role model for many more.

“

Cities need to develop their own, holistic mobility target picture in order to enable the establishment of effective public-private mobility partnerships and to provide mobility services operators a clear picture of where their pain points are

Leonhard von Harrach, Nextbike

The “new normal”, triggered by the corona crisis, presents an opportunity to broaden our mindset of how we define public transport. Adopting a view that public transport is any form of mobility provided by shared resources, enables a customer-focused approach to the designing of urban mobility transport strategies by public authorities. New “digital” operators are in a promising position to fill the gaps and white spots in the urban transit spectrum, leveraging the entire PT ecosystem through providing access to unprecedented, rich insights on customer needs and innovative business model ideas. Mobility service offerings should not be seen as an enemy within but rather as an opportunity to rethink the status quo and develop holistic public transport offerings.



Mobility can serve as a vessel for change coming out of this global pandemic.



# Acknowledgments

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We would like to express our sincere gratitude to our contributors, without who this white paper would not have been possible. Thank you all for taking out the time to provide us with your valuable insights about the status quo, future market development and your point of view on the most likely use cases that would emerge as a result of this dynamic shift. Special thanks go out to:

**Mouchka Heller**

Automotive and Autonomous Mobility Lead, World Economic Forum

**Karen van der Linde**

Innovation Manager for New Business Area, Passenger Transport, Hamburger Hochbahn AG

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