3.6

Shared Mobility Services

Key findings

Demand trends

- Car-sharing membership doubled between 2016 and 2018, surpassing 30 million globally, with 70% of members registered with services in Asia.
- Use of ride-hailing services has spiked since 2016, increasing passenger vehicle travel an estimated 10-20% in urban areas and 45-60% in suburban areas globally.
- The peak popularity of bike-sharing systems was reached in 2017, and by late 2020 a quarter of originally launched bike-sharing systems were no longer in operation. Africa is highly underrepresented in the bike-sharing market with just six services launched since 2016.
- System installations of shared e-scooter services, which were widely launched in 2018, increased 580% in 2019, including expansion in several countries in Europe and Latin America and the Caribbean.
- The initially strong venture capital backing enjoyed by global micromobility companies declined 64% from 2018 to 2019, leading services to cut staff or cease operations entirely.
- Autonomous vehicles, widely used in shared applications, have not seen increased market momentum, with 80% fewer cities introducing vehicle trials during 2019 than in 2017.

Emission trends

- According to some studies, electric scooter and bike-sharing services have reduced emissions by shifting trips from polluting transport modes; in contrast, ride-hailing services increase vehicle-kilometres travelled and result in more emissions.
- Many ride-hailing operators have accelerated the roll-out of electric vehicles to achieve zero-emission fleets, and some sub-national governments have adopted electric vehicle regulations and targets. Replacing conventional ride-hailing vehicles with electric vehicles has the potential to deliver three times the emission reductions compared to conventional vehicles.

Policy measures

- Regulation of new services and business models has been a key determinant of the pace of deployment of shared mobility services, with a number of cities and countries enacting stricter controls.
- New partnerships, tools and guidelines have emerged to increase co-ordination among public and private actors in planning and operating shared mobility services.
- Africa has been prominent in a surge of tech-based improvements in analysis, information and operating platforms for formal and informal shared mobility services.

Impacts of the COVID-19 pandemic

- Several ride-hailing services lost ridership during pandemic lockdowns, leading to job losses in the sector, with ride-hailing company Ola cutting 35% of its workforce in India, and Uber cutting 23% of its global workforce.
- Demand for bike-sharing services increased sharply in a number of cities in 2020, while in other cities, demand for bike sharing struggled to reach 2019 levels due to lockdowns and service restrictions.

Overview

"Shared mobility" is the deployment of innovative transport services using emerging technologies and original business models , based on shareability and the provision of on-demand service. Shared mobility services include car sharing, ride-hailing, micromobility (bike sharing, shared electric kick scooters) and on-demand micro-transit. Shared autonomous vehicle applications are also a rapidly emerging area, as many autonomous vehicles are likely to be initially deployed in the context of shared mobility services.[1]

When shared mobility services are well deployed, managed and regulated, they have the potential to reduce the demand for private cars, thus reducing associated emissions.[2] However, the impacts of shared mobility can vary depending on the kind of service, the specific operating context (including walking and cycling infrastructure), access to public transport and the general built environment. Enhanced data and information on these services, and a greater array of services for different purposes, have the potential to improve the economic conditions of lower-income populations.

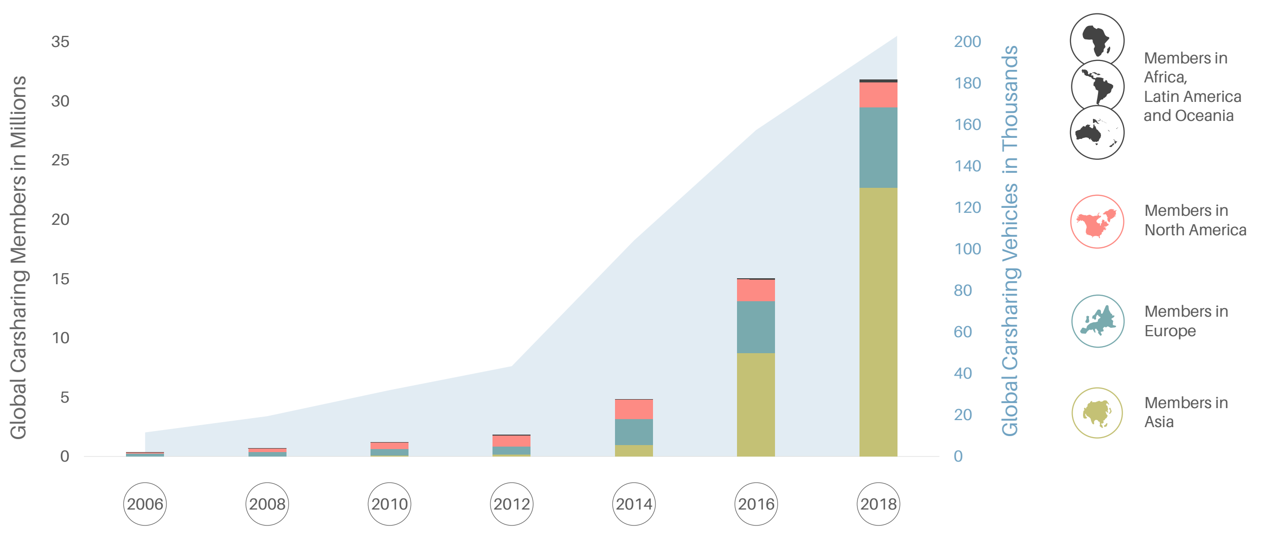
The development and positioning of shared mobility services has been mostly led by the private sector. However, in recent years there has been an increase in alliances and partnerships led by both the private sector and non-governmental organisations, indicating a shared agenda towards increasing the presence of shared mobility services and improving their environmental performance. Yet in many cases, shared mobility services are still struggling to find a well-established regulatory framework in which to operate.

In response to the COVID-19 pandemic, many ride-hailing companies shifted their activities from moving people to moving goods (especially food delivery) in Asia and North America. The pandemic has had an asymmetric impact across shared mobility services, with bikes and e-scooters generally faring better than ride-hailing services (*see Box 1*).[3] Recent reductions in funding (often linked to drops in revenue spurred by the pandemic) have put into question the financial sustainability of current shared mobility services business models.

Demand trends

Car-sharing membership doubled between 2016 and 2018, surpassing 30 million globally, with 70% of members registered with services in Asia (*see Figure 1*).[4] The total number of car-sharing vehicles increased from 157,000 to 198,000 during this period, and by 2019, 236 car-sharing services were operating in 59 countries.[5]

Figure 1. Global car-sharing membership by region and total number of vehicles, 2006-2018



Source: See endnote 4 for this section.

- **China**, **India** and the **Republic of Korea** lead in car sharing, accounting for more than three-quarters of the Asian market since 2015.[6] Overcrowded public transport facilities and population growth are the main variables explaining the switch to shared cars.[7] Worsening air pollution has also driven Asian governments to adopt measures aimed at reducing the overall number of vehicles on the road.[8]
- Major car-sharing players in the Asia-Pacific region include **Car2Go**, **CarShare Australia**, **Hertz Corporation**, **Locomute** and **Zipcar.** These companies often propose innovations to expand their regional presence.[9]

Use of ride-hailing services has spiked since 2016, increasing passenger vehicle travel an estimated 10-20% in urban areas and 45-60% in suburban areas globally.[10] A study in Denver, **United States** (**USA**) found that ride-hailing leads to around 83.5% more vehicle-kilometres travelled than if ride-hailing did not exist.[11]

- In **Bangladesh**, 10 companies were awarded ride-hailing service licences in July 2019; that year, the country's USD 26 billion ride-hailing industry represented 23% of the transport sector, recording more than 7.5 million trips per month.[12]
- Ride-hailing led to a dramatic increase in motorbikes and cars in **Dhaka**, Bangladesh, with 40 new cars being registered every day.[13]
- Based on a survey in Santiago, **Chile**, ride-hailing services increase the number of vehicles kilometres travelled, but this effect can be lessened if occupancy rises to at least 2.9 passengers per vehicle.[14]
- A study on the impacts of ride-hailing services in Bogotá, **Colombia** found that 33% of public transport trips could potentially shift to ride-hailing, increasing the vehicle-kilometres travelled by 14.5 times.[15]
- In early 2020, **Nigeria** banned the commercial use of motorcycles and tricycles operated by ride-hailing companies in Lagos, claiming the need for urgent measures to improve security and safety on the road. These so-called okadas provide access to zones where public transport is not fully deployed.[16]

The peak popularity of bike-sharing systems was reached in 2017, and by late 2020 a quarter of originally launched bike-sharing systems were no longer in operation.[17] **Africa is highly underrepresented in the bike-sharing market with just six services launched since 2016** (*see Figure 2*).[18] Since 2017, the major expansions in the bike-sharing market were in free-floating systems. The use of e-bikes in shared systems has also grown strongly since 2017 (*see Figure 3*), and a study found that 35% of shared electric bike trips substituted car travel, while 30% substituted walking.[19] As of August 2020, some 2,015 bike-sharing systems were in operation around the world.[20]

- An electric bike sharing system was launched in Kigali, **Rwanda** in 2019.[21]
- Dubai, **United Arab Emirates** aims to roll out 3,500 public shared bicycles with 350 stations between 2020 and 2025.[22]
- Of the 39 million trips using shared bicycle systems in the **USA** in 2019, 35% were undertaken to connect to public transport.[23]
- **Uber** purchased Jump Bikes in 2018 and then sold it to **Lime** in April 2020, greatly reducing the service's staff and operations.[24] Lime ceased operations in 12 major cities in Latin America and the Caribbean by the end of 2019.[25]

System installations of shared e-scooter services, which were widely launched in 2018, increased 580% in 2019, including expansion in several countries in Europe and Latin America and the Caribbean.[26] In total, around 265 cities worldwide had e-scooter services as of 2020, most of them in the **USA** and **Europe** (*see Figure 4*).[27]

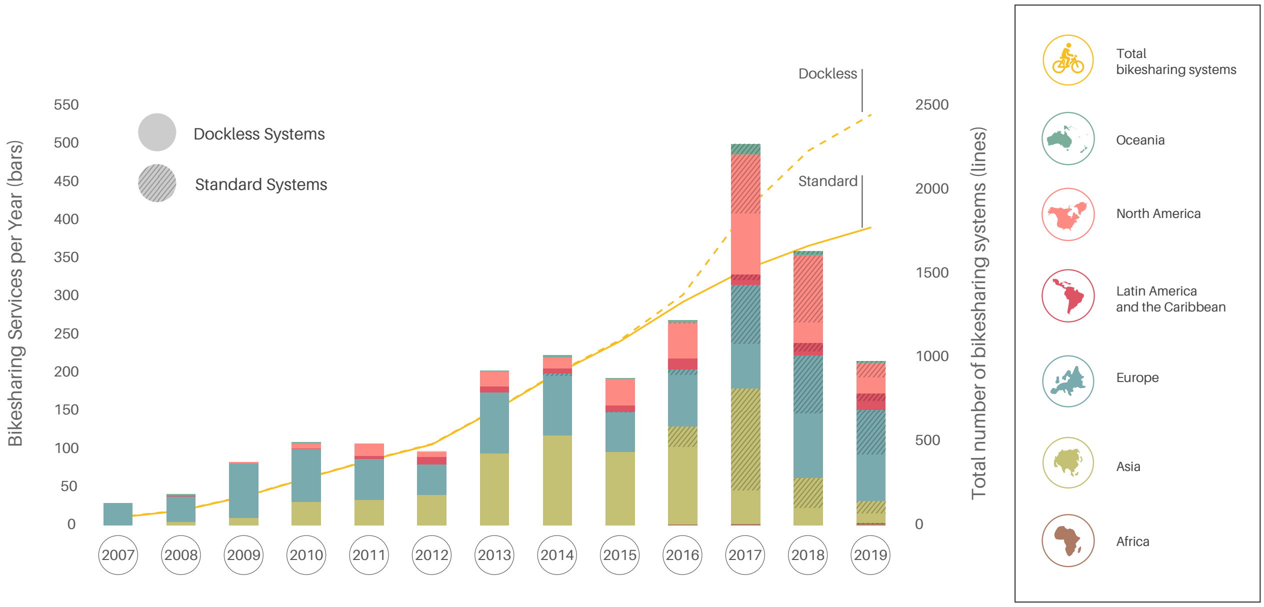
In the past few years, e-scooter services have overtaken bike sharing with large-scale deployment across many major cities. By the beginning of 2020, the e-scooter phenomenon was accompanied by the reduced presence of dockless bicycle services, leading to a reduction in micromobility services overall. Some companies argue that the limitations on the number of devices a company can introduce force them to follow popular trends and to prioritise e-scooters over shared bicycles.[28]

- In **Europe**, nearly 100 cities across 27 countries had an e-scooter sharing scheme as of 2020, and in Latin America and the Caribbean 32 cities across 7 countries had such a scheme.[29]
- In the **USA**, the number of trips using micromobility (shared bikes, e-bikes and e-scooters) increased from 84 million in 2018 to 132 million in 2019.[30] Between 2010 and 2019, a third of the total 1 billion trips made in the **USA** were done on e-scooters and shared bikes.[31]
- The most popular use of e-scooters in the **USA** in 2018 was to commute to work (28%).[32]

The initially strong venture capital backing enjoyed by global micromobility companies declined 64% from 2018 to 2019, leading services to cut staff or cease operations entirely.[33] Investors appear to have reached an inflection point in the micromobility market segment, pivoting from subsidised companies aiming to gain users towards profitable and revenue-oriented businesses.[34]

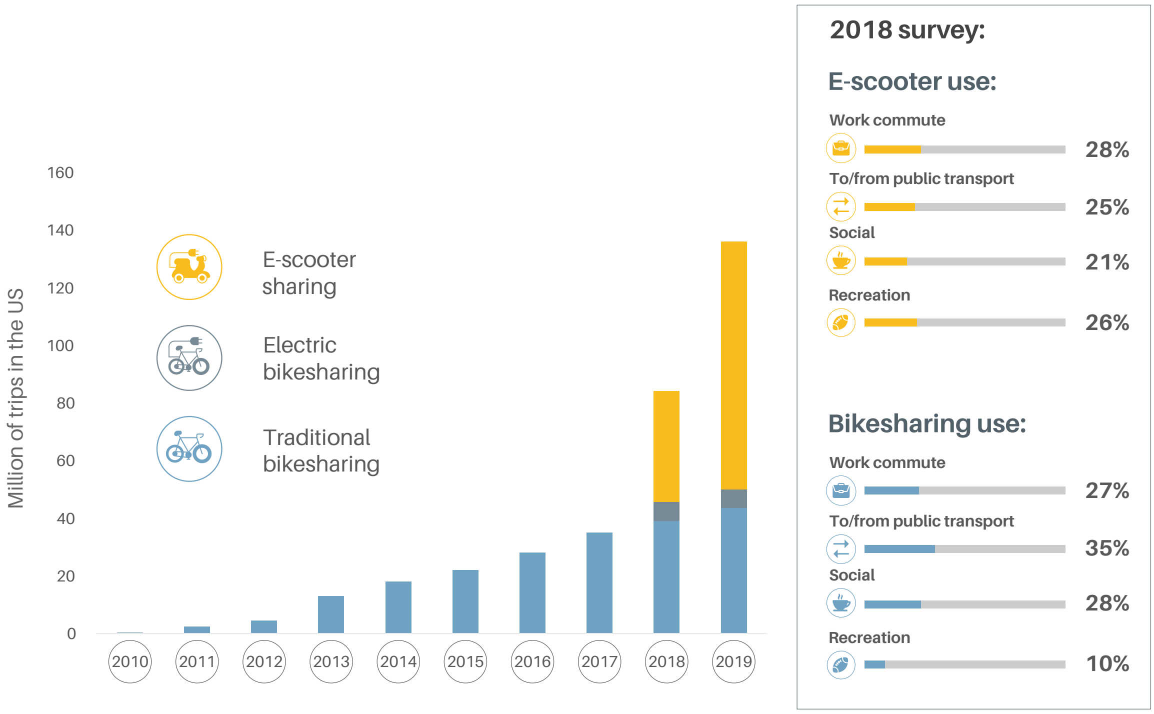
- More than 40 micromobility companies were founded in 2018, but in 2019 and 2020 this fell to only 17 and 8 companies respectively starting operations.[35]
- In 2019 and 2020, four e-scooter sharing companies representing more than USD 190 million in combined venture funding were acquired, three companies closed, and two others merged.[36]
- In early 2020, **Lime** announced that it would lay off 14% of its staff (100 people) and cease operations in dozens of **USA** cities, including Atlanta, San Diego, San Antonio and Phoenix. By that time, **Scoot**, **Lyft** and **Skip** had already announced similar measures.[37]
- **Bird** shed 30% of its employees in late March 2020, after having brought USD 75 million in venture capital a few months before.[38]

Figure 2. Total number and annual additions of bike-sharing systems, by region, 2007-2019



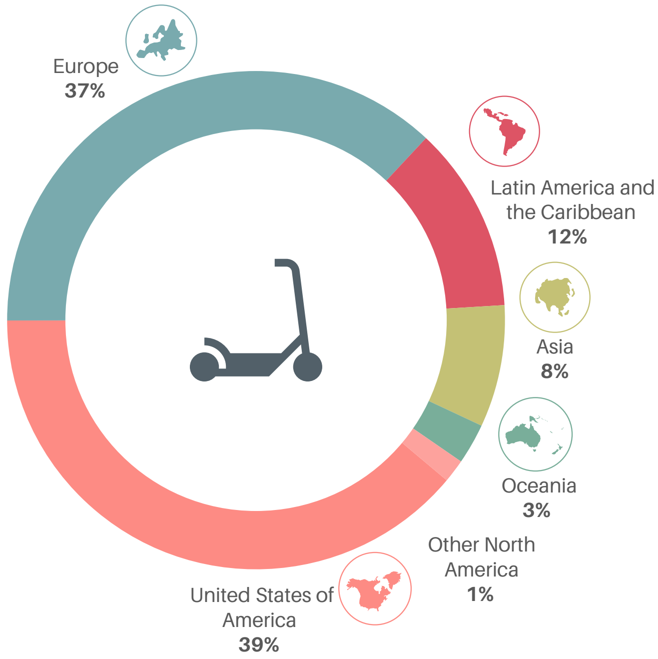
Source: See endnote 18 for this section.

Figure 3. Number and purpose of bike sharing, shared e-bike and shared e-scooter trips in the USA, 2010-2019



Source: See endnote 19 for this section.

Figure 4. Urban scooter services by region, early 2020

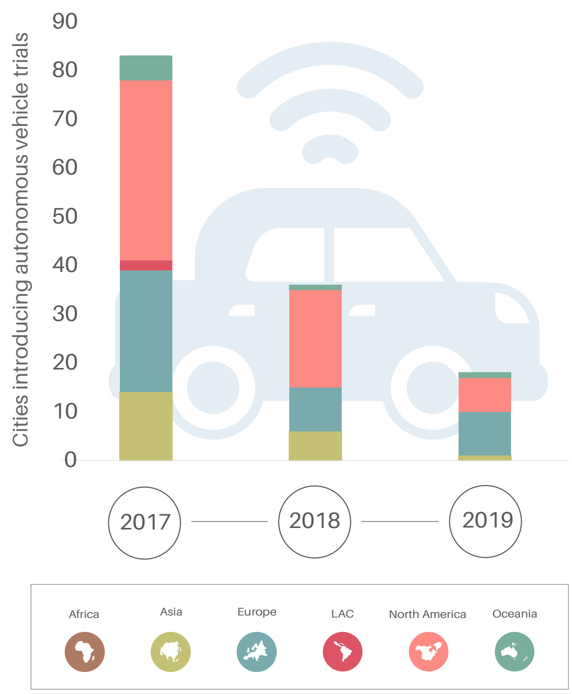


Source: See endnote 27 for this section.

Autonomous vehicles, widely used in shared applications, have not seen increased market momentum, with 80% fewer cities introducing vehicle trials during 2019 than in 2017 (*see Figure 5*).[39] Towards the end of 2018, the deployment of autonomous vehicles in many cities around the world was seen as a rising trend.[40] However, technical problems with the vehicles and mistrust from users, coupled with road safety concerns and a slow-moving regulatory environment, have slowed this growth.[41] Prospects surrounding the future of automated freight (both long-haul travel in trucks and short last-mile delivery by small robots) have been delayed for similar reasons.

- In countries where autonomous vehicles have been tested (**China**, **Germany** and several **USA** states), significant deployments occurred in cities between 2018 and 2020, and regulatory oversight was strengthened.[42]
- **Frankfurt**, Germany started operating a public autonomous shuttle on a 700-metre closed street in 2019.[43]
- In **Singapore**, a full-sized autonomous bus began testing on the campus of Nanyang Technological University in March 2019.[44]
- In the freight sector, a self-driving truck completed the first successful cross-country trip in the **USA** in December 2019.[45]
- Automaker **GM** announced in January 2020 its allocation of USD 2.2 billion for electric and autonomous vehicle production.[46]

Figure 5. New autonomous vehicle trials in cities, by region, 2017-2019



Source: See endnote 39 for this section.

Emission trends

While there is potential for shared mobility services to reduce emissions from the transport sector, there is no clear consensus on the environmental impact of these services. Improved monitoring, measuring and evaluation can ensure that research results are valid and can make the case for increased investment in shared mobility across new geographies and market segments.

According to some studies, electric scooter and bike-sharing services have reduced emissions by shifting trips from polluting transport modes; in contrast, ride-hailing services increase vehicle-kilometres travelled and result in more emissions. Shared mobility appears to offer a solution for providing first- and last-mile connectivity to and from public transport, increasing its access and use.

However, validating data on shared mobility and its impacts is challenging: most services are fairly new, and data series are limited. Private sector studies tend to focus on specific providers' data and show potential bias; academic studies often lack comprehensive datasets; and life-cycle analyses often make assumptions that are not reliable. Government-led studies appear to have greater validity but generally rely on less data and are based mostly on surveys. Further research by independent centres and academic institutions is needed.

Positive reported impacts on emission reductions

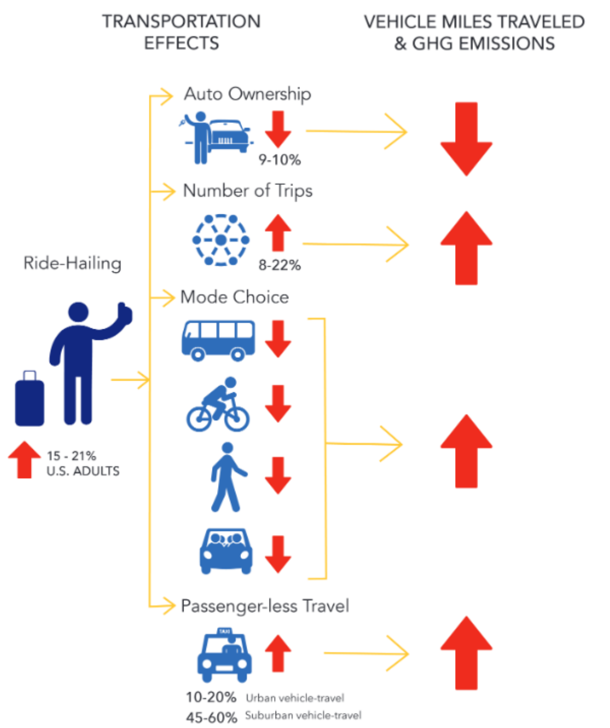
- E-scooters emit 75% fewer CO_2 emissions than passenger cars (based on life-cycle analysis that includes production), according to **Bird**.[47]
- **Lime** estimates that its e-scooter services in **Paris**, France replaced 1.2 million vehicle trips and avoided more than 330 tonnes of CO_2 between 2018 and 2019, while representing between 0.8 to 1.9% of all trips.[48] **Lime** estimates that this is the equivalent of taking 1,320 cars off the road.[49]
- A shift to lightweight electric vehicles (scooters and electric bicycles) results in mitigation levels of up to 68% by 2030, according to a case study of Paris, **France**.[50]
- An official report on an e-scooter pilot in Portland, Oregon, **US** found that the scooters replaced around 301,856 vehicle-miles and prevented around 122 tonnes of CO_2 emissions, equivalent to removing nearly 27 average passenger vehicles from the road for a year.[51]

Negative reported impacts on emission reductions

- A 2019 life-cycle analysis of e-scooter use by **North Carolina State University** reported much higher emissions than other modes of transport such as high-ridership buses or electric bicycles. The main sources of pollution are the vehicles used to redistribute the scooters and the materials used to manufacture them.[52]
- One study found that ride-hailing leads to around 83.5% more vehicle-kilometres travelled than if ride-hailing had not existed.[53]
- Another study found that ride-hailing accounts for a 10-20% increase in vehicle travel in urban areas and a 45-60% increase in vehicle travel in suburban areas (*see Figure 6*).[54]
- In a study of cities with large concentrations of ride-hailing services, carpooling trips led to at least a doubling of vehicle-kilometres travelled when compared to the transport modes they replaced.[55]
- Research indicates a slight increase in emissions when implementing car sharing because it provides access to automobiles to those who did not own them.[56]

Many ride-hailing operators have accelerated the roll-out of electric vehicles to achieve zero-emission fleets, and some sub-national governments have adopted electric vehicle regulations and targets. Replacing conventional ride-hailing vehicles with electric vehicles has the potential to deliver three times the emission reductions compared to conventional vehicles.[57] Due to impacts caused by the increasing use of ride-hailing systems, both public and private sector actors have taken recent action to electrify shared fleets.

Figure 6. The effects of increased ride-hailing on transport trends, vehicle-kilometres travelled and greenhouse gas emissions in a USA study



Source: See endnote 54 for this section.

Public sector actions

- **California**, USA passed a regulation targeting 100% electrification of ride-hailing fleets by 2030.[58]
- In **London**, UK, new licenced private-hire vehicles must be zero emission beginning in 2021.[59]
- **Shenzhen**, China set a goal for 100% of its ride-hailing fleet to be electric by 2020.[60]

Private sector actions

- **Lime** has committed to 100% zero-emission operations for its fleet vehicles (e.g., the trucks transporting the e-scooters) by 2030.[61]
- The ride-hailing service **Lyft** has committed to electrifying its entire fleet by 2030.[62]
- In Singapore, the ride-hailing service **Grab** added 200 electric cars to its fleet in 2019.[63]
- **Uber** aims for 50% of its rides in seven European capitals to be in zero-emission vehicles by 2025, and globally it aims for all rides to be in zero-emission vehicles, public transport and micromobility by 2040.[64]

Policy measures

During 2019 and 2020, funders showed greater caution towards shared mobility services. Overall, the integration of shared, electric and autonomous transport services has fallen short of its potential, given the challenges related to achieving a proper balance between the public and private sectors, developing adequate regulations and identifying appropriate market deployment. However, some regions have developed shared mobility services policies, stringent regulations and mobility standards.

Regulation of new services and business models has been a key determinant of the pace of deployment of shared mobility services, with a number of cities and countries enacting stricter controls. Because shared mobility services are generally market-led, regulations have typically been protective. Differences between the public and private sector, the need for clearer goals for these services, and the difficulty in creating adequate regulations (or the lag between market-led deployment and reactive regulations in different levels of government) have made it more difficult to move towards a well-co-ordinated environment for shared mobility services. This has reduced the initial interest of many companies to deploy such services, and of governments to implement decisive policies.

- In **Estonia**, an amendment to the Traffic Act passed at the end of 2020 put e-scooters in a new category of "light mobility vehicles" and created a set of comprehensive regulations for scooter use.[65]
- Between 2019 and 2020, European countries including **Germany**, **Italy** and **North Macedonia** enacted sidewalk bans, age restrictions and speed limits for e-scooter use.[66]
- In March 2019, **São Paulo**, Brazil enacted a law limiting the use of e-scooters to only roads and bicycle lanes with a maximum speed of 20 kilometres per hour.[67] Several other Latin American and Caribbean countries (**Chile**, **Colombia**, **Mexico** and **Peru**) implemented similar regulations in 2019.[68]
- **Singapore** prohibited the use of e-scooters on all footpaths from November 2019. Since the policy discouraging the use of personal mobility devices on roads is still in place, e-scooters can be used only on cycling paths and park connector networks.[69]
- In 2019, **Los Angeles**, USA began requiring operators of shared two-wheelers to submit real-time location data, using a shared mobility data specification programme that enables the city to track the location of each unit.[70]
- E-scooters were regulated in 46 of 50 **USA** states as of the end of 2020, and were illegal to use on sidewalks in 11 USA states.[71]

New partnerships, tools and guidelines have emerged to increase co-ordination among public and private actors in planning and operating shared mobility services. A substantial redefinition of several aspects of shared mobility services (for example, partnerships, data collection, regulations) has demonstrated the need to expand these services to a larger share of the population in order to achieve significant and measurable positive impacts on emission reductions.

- The **New Mobility Alliance** (**NUMO**), launched in 2019, brings together cities, non-governmental organisations, companies, mobility service operators and community advocates from diverse sectors to operationalise the Shared Mobility Principles for Livable Cities to increase urban equity and accessibility.[72]
- The World Economic Forum's **Global Future Council on Mobility** has created a set of guidelines to help strengthen partnerships among cities and mobility companies through greater collaboration on sharing trip data, managing public space and addressing community needs.[73]

Africa has been prominent in a surge of tech-based improvements in analysis, information and operating platforms for formal and informal shared mobility services that provide access to transport for those with internet connectivity. Regional models and tools are being developed to facilitate better organisation of paratransit (sometimes called "informal transport") services in Africa. These tools hold promise for increasing information about services deployed and for improved user connectivity to existing transport networks (e.g., providing solutions for first- and last-mile trips to access public transport).

- Between 2010 and 2019, 180 mobility-related start-ups were launched across **Africa**. Shared mobility accounted for 57% of these companies, including ride-hailing and ride-sharing services and app-based motorcycle services, such as **SafeBoda**.[74] Other initiatives address product innovation, commuter experience and data-driven decision making. Additional apps include **GoMetro** and **WhereIsMyTransport** (travel maps and planning), **Little** (to request services such as matatus and boda bodas) and **Epesi** (trip planning).[75]

- **SWVL**, a start-up founded in Egypt, merges tech with Africa's established traditional mobility offering. It provides better demand forecasting, market accessibility and certainty to ride-hailing suppliers, while giving users planned rides, app-supported transactions and seat bookings in minibus taxis.[76]
- Efforts have been undertaken in **Nairobi**, Kenya; **Gaborone**, Botswana; and **Accra**, Ghana to leverage GPS-enabled smartphones, open crowdsourced databases and other technologies to enhance paratransit operation.[77]

Initiatives supporting shared mobility services

- The **Shared Mobility Principles for Livable Cities**, launched in 2017, include 10 principles to support the development of sustainable, inclusive, prosperous and resilient cities and are endorsed by countries, international organisations and mobility service providers.[78] This initiative constituted the starting point for the New Urban Mobility Alliance.
- The **New Urban Mobility Alliance** (**NUMO**) is a global alliance that "channels tech-based disruptions in urban transport to create joyful cities where sustainable and just mobility is the new normal".[79] As of late 2020, NUMO had more than 280 allies (cities, non-governmental organisations, companies, mobility service operators, and community advocates from diverse sectors) to leverage the significant mobility revolutions to address urban challenges such as equity, sustainability, accessibility and labour, among others.[80]
- The **Global New Mobility Coalition**, curated by the World Economic Forum, is a diverse community of more 150 global experts, non-governmental organisations and companies. It aims to accelerate the shift to a Shared, Electric and Autonomous Mobility (SEAM) system that provides for healthier cities, reduces carbon emissions 95%, improves mobility efficiency 70%, and decreases commuting costs 40%, while tapping into a USD 600 billion business.[81]
- The **Innovative Mobility Research Group** at the **Transportation Sustainability Research Center** at the University of California, Berkeley explores innovative mobility technologies and services that could improve transport options while reducing their negative societal and environmental impacts.[82] The group publishes research on the environmental and social impacts of innovative and emerging mobility technologies, such as shared mobility.
- The **Shared-Use Mobility Center** is a public interest partnership working to foster collaboration around shared mobility and helping to connect the growing industry with public transport agencies, cities and communities across the USA.[83]
- The **Mobility as a Service** (**MaaS**) **Alliance** is a partnership aiming to establish the common principles for mobility as a service by facilitating a single, open market and full deployment of these services. It brings together the public and private sectors as well as associations willing to centre mobility on users' needs.[84]
- The **Mobility on Demand Alliance**, launched by the Intelligent Transportation Society of America, aims to shape the future of mobility by promoting the benefits of mobility-on-demand services and sharing ideas and opportunities around it.[85]
- The **New Mobility Services Initiative**, part of the Sustainable Urban Mobility Action Cluster, intends to integrate and manage urban transport, develop collective systems for multi-modal mobility, and create an open and collaborative marketplace for new mobility services in Europe.[86]

Key indicators

	2017*	2019*	% change
Policy Landscape Indicators			
Countries with shared mobility regulations (# of countries)	N/A	17	–
Market Development Indicators			
Car-sharing services (# of services in cities)	N/A	4,139	-
Bike-sharing systems (# of systems)	1,766	2,015	+14%
Car-sharing vehicles (# of vehicles)	157,357 (2016)	198,418 (2018)	+26%
Autonomous vehicle systems in trial (# of countries)	26	44	+69%

(*) Data are for the indicated year unless noted otherwise.

Source: See endnote 87 for this section.

Box 1. Impacts of the COVID-19 pandemic on shared mobility services

Several ride-hailing services lost ridership during pandemic lockdowns, leading to job losses in the sector, with ride-hailing company Ola cutting 35% of its workforce in India, and Uber cutting 23% of its global workforce. During the pandemic, the transport sector has faced the challenge of balancing user safety with the financial stability of services. The need for social distancing and the imposition of lockdowns in 2020 led to a surge in deliveries, which was made more dynamic through the use of mobile apps to improve the seamlessness between the customer and the delivery service. For Grab, the demand for its food delivery services overtook demand for its ride-hailing services.

Demand for bike-sharing services increased sharply in a number of cities in 2020, while in other cities, demand for bike sharing struggled to reach 2019 levels due to lockdowns and service restrictions (*see Figure 1*). CitiBike in New York City, **USA** saw a 67% year-on-year increase in usage before the spring 2020 lockdowns went into effect, and, afterwards, usage quickly increased to levels similar to 2019. However, many shared mobility systems suffered. As of July 2020, some 137 operations had been relaunched after being previously suspended, 285 operations remained suspended, and 56 operations ceased to exist. In March 2021, New York City, **USA** lifted its ban on e-bikes and e-scooters in order to support food delivery.

In a 2021 survey on transport mode choices in the USA, the UK, France, Germany, Italy, Spain, Singapore and China , respondents said they aimed to maintain or increase their use of micromobility and ride-hailing services compared to pre-COVID-19 levels.

Lessons learned from the COVID-19 pandemic can be applied in order to preserve the improvements of app-based shared mobility services. Ongoing deployment of tactical urbanism measures ((local, short-term, low-cost activities that are city- and citizen-led) can also increase flexibility in shared mobility implementation, which can help to increase mobility options and enhance economic resilience.

Source: See endnote 3 for this section.

Figure 7. Changes in bike-sharing use during the COVID-19 pandemic, in selected cities

Annex: Methodological Note

Data usage

Time period for data:
The report strives to utilise the most recent publicly available data and information just prior to the time of publication (as of 31 May 2021). The figures in the report were developed between September and December 2020 using the most recent data available.

Secondary data:
SLOCAT relies on secondary data and information collected and provided by SLOCAT partners and other entities and does not make use of any internal modelling tools.

Data on sustainable mobility: A call to action

The report benefits directly from data collected by a wide range of stakeholders working in different areas of transport.

Data are important for providing a comprehensive picture of the status of sustainable, low carbon transport and are essential for both policy and investment decision making. In these times of change, it is critical to upgrade data and policy collection and interpretation capacities to better understand progress and the hurdles that must be addressed.

The data limitations mentioned below are not new. Obtaining regular, reliable and public data across regions and transport modes remains an outstanding issue. When an increasing number of stakeholders are collecting data and policy information, more and better open-access data and capacity building efforts for data interpretation are supported by many multi-stakeholder partnerships in the sustainable, low carbon movement.

If you share our passion for open-access data and knowledge towards greater impact on policy and investment decision making worldwide and/or would like to contribute data or knowledge to our collective efforts on this report, **please reach out to the research team in the SLOCAT Secretariat at tcc-gsr@slocatpartnership.org**.

Specific data used in this report

Data on emissions

The data in this edition of the report point to the direct carbon emissions from transport activity; they do not cover the indirect emissions and land-use impacts associated with certain modes of transport. The report primarily utilises CO_2 emission data compiled in the Emissions Database for Global Atmospheric Research (EDGAR) from the Joint Research Centre of the European Commission, as this represents the most recent, comprehensive dataset on transport CO_2 emissions. However, this global dataset does not convey in full detail the unique situations of individual countries.

EDGAR provides estimates for fossil CO_2 emissions from all anthropogenic activities with the exception of land use, land-use change, forestry and the large-scale burning of biomass. The main activities covered are CO_2 emissions emitted by the power sector (i.e., power and heat genertion plants), by other industrial combustion (i.e., combustion for industrial manufacturing and fuel production) and by buildings and other activities such as industrial process emissions, agricultural soils and waste. Transport activities covered within EDGAR include road transport, non-road transport, domestic aviation, and inland waterways on a country level, as well as international aviation and shipping.[1]

For the world, regions and countries, the CO_2 emission data (provided by EDGAR) span through 2019. In a few places in the report, CO_2 data for 2020 are shown to illustrate the impact of the COVID-19 pandemic; however, these data are based on a different methodology than the EDGAR dataset and should not be compared directly with the data from previous years.

The latest CO_2 emission data for individual transport modes are for 2018 and have been compiled only at the global level. For passenger and freight transport, the data on global CO_2 emissions are for 2017, as this is the latest year with robust data. Data on passenger activity (passenger-kilometres) and freight activity (tonne-kilometres) – provided mainly in the country fact sheets – are based on the latest available year, as indicated in the report analysis.

Information on greenhouse gas emissions – provided in CO_2 equivalent (CO_{2eq}) – include not only CO_2 but also methane, nitrous oxide, and industrial gases such as hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride.[2] These data are less up-to-date. As of 31 May 2021, data on greenhouse gas emissions were not readily available for the period 2019-2020. In some cases, additional data sources were used to provide detailed information about other climate pollutants besides CO_2.

All data on CO_2 and other greenhouse gas emissions, as well as CO_{2eq}, are provided in metric tonnes.

Data on car ownership

Information on car ownership rates is based on a global dataset from the International Organization of Motor Vehicle Manufacturers (OICA), with the latest release (as of 31 May 2021) dating from 2015.[3] Although newer information is available for some individual countries, using these data would hinder accurate global comparisons. Data on passenger and commercial vehicle sales were available only up to 2019.

Policy landscape data

The policy-related information presented in this report is not intended to be comprehensive. The data for the policy landscape indicators provided in Section 3 were gathered through desk research unless otherwise indicated. Barriers to accessing such information include language and limited availability of information through online media (e.g., websites, press releases and news articles).

Data in country fact sheets

Information in the fact sheets is based on desk research and on contributions from the national focal points. The data were collected to the best of the authors' knowledge and based on data availability, and thus may not be complete or show the most recent status. When no information was available for a given indicator, the term "Not available" is used.

Data gaps

Major data gaps exist in areas where there is no globally accepted data collection methodology. For example, the mapping of cycling and walking infrastructure is not currently done in all regions. Also, the modal share can be surveyed through different methods, leading to inconsistencies in available data. In addition, data on paratransit (informal transport), a predominant form of transport in many parts of the world, are largely lacking. This results in an incomplete picture of the impact of transport on climate change and sustainable development.

Methodological approach

Countries and regions

The report follows the M49 Standard of the United Nations Statistics Division.[4] In total, 196 countries have official United Nations membership and are also party to the United Nations Framework Convention on Climate Change. The available data have been put in a common structure for the United Nations member countries, regions and income groups to enable a consistent assessment. Income groups are based on the World Bank's classification of 2019.[5]

Economic calculations

The per capita and gross domestic product (GDP) calculations are based on the United Nations World Population Prospects 2019 and on World Bank GDP data using constant 2010 USD.[6]

Spatial and temporal scales

The geographic scale (global, national, city-level, etc.) as well as time scale (annual, monthly, daily) used in this report depends largely on the available dataset, as noted in the relevant figures and text. The detailed data forming the basis of the calculations and analysis are provided in the SLOCAT Transport Knowledge Base.[7]

Criteria for selection

The report covers policies, targets, emission reductions (achieved or envisioned) and market measures. To merit inclusion in the analysis, the policies, projects and trends must have been announced or completed between 2018 and 2020. Significant developments from January through May 2021 were included when deemed relevant, with the understanding that the next edition of the *Transport and Climate Change Global Status Report* will cover a period starting in 2021.

Pre- and post-COVID-19 pandemic trends

The year 2020 was pivotal for the world, and the COVID-19 pandemic has had substantial impacts on many of the transport trends monitored in this report. This edition attempts to differentiate between long-term trends and impacts due to the pandemic. To the extent possible, the analysis notes "pre-pandemic" (up to the end of 2019 or latest by February 2020) and "during pandemic" trends (starting in March 2020 until the end of 2020), as in some cases the pandemic led to reversals in long-term trends, at least for a specific period of time. In each section, a box describes the impacts that the pandemic has had on specific regions and sub-sectors.

Assembling the report

Global Strategy Team

This edition of the report was guided by a global strategy team consisting of 20 experts in the field who provided inputs over the span of six meetings between September 2019 and October 2020. Additionally, small group consultations were organised in February 2021, following the peer review process.

Authors and contributors

The report was collaboratively drafted by 22 authors and contributors from 16 organisations, led by the SLOCAT Secretariat. This includes additions and high-level inputs from the copy editor and from the special advisor who also co-authored the Executive Summary. Authors researched and compiled relevant facts and figures for the five sections of the report, including the Focus Features, with supporting review and inputs from several other organisations.

Peer review: A peer review process was carried out from 18 December 2020 to 20 January 2021 with 1,700 comments received from 74 reviewers. Each comment was individually reviewed by the SLOCAT Secretariat and considered in finalising the report.

National focal points: The report benefited from the contributions of voluntary national focal points, or experts from various regions and countries who have been essential to overcome language and information barriers. A public call for participation to provide information on policies and data resulted in several hundred initial registrations. Out of these registrations, 78 national focal points provided inputs through a first survey from 24 January to 3 February 2020; and through a second survey (focused on the country fact sheets) from 6 to 30 August 2020. All national focal points that contributed to the surveys are listed in the Acknowledgements.

Endnotes

3.6 Shared Mobility Services

1 A compilation of studies on shared autonomous vehicles and a discussion of expected demand patterns and required policy frameworks is found in S. Narayanan, E. Chaniotakis and C. Antoniou (2020), "Shared autonomous vehicle services: A comprehensive review", *Transportation Research Part C: Emerging Technologies. Vol. 11, Elsevier Ltd, pp. 255-93,* https://www.sciencedirect.com/science/article/abs/pii/S0968090X19303493?via%3Dihub.

2 See, for example, J. Edwards (2019), "Carpocalyspe now: Lyft's founders are right – we're in the endgame for traditional 'car ownership'", Business Insider, 3 March, https://www.businessinsider.com/carpocalypse-cars-automobile-sales-data-us-europe-2019-3.

3 **Box** based on the following sources: Reuters (2020), "Ola to cut about 35% workforce amid COVID-19 crisis", The Wire, 20 May, https://thewire.in/business/ola-to-cut-about-35-workforce-amid-covid-19-crisis; Reuters (2020), "Food delivery overtakes ride-hailing as Grab's biggest business in Covid-19 crisis", The Straits Times, 14 August, https://www.straitstimes.com/business/companies-markets/covid-19-delivers-to-grab-its-first-crisis-lessons; Kuntzman (2020), "BOOM! New Citi Bikes stats show cycling surge is real – but mayor is not acting", StreetsBlog NYC, 12 March, https://nyc.streetsblog.org/2020/03/12/boom-new-citi-bike-stats-show-cycling-surge-is-real-but-mayor-is-not-acting; July 2020 status from New Urban Mobility Alliance (NUMO) (2020), "NUMO New Mobility Atlas Update – July 1 2020", 1 July, https://www.numo.global/news/new-mobility-atlas-update-july-1-2020; D. Meyer (2020), "NYC suspends e-bike crackdown as eateries move to takeout, delivery-only", *New York Post*, 16 March, https://nypost.com/2020/03/16/nyc-suspends-e-bike-crackdown-as-eateries-move-to-takeout-delivery-only; T. Bellon (2020), "New York City legalizes electric bikes and scooters, will create e-scooter pilot program", *Reuters*, 25 June, https://www.reuters.com/article/us-new-york-city-scooters/new-york-city-legalizes-electric-bikes-and-scooters-will-create-e-scooter-pilot-program-idUSKBN23W3GR; M. Kelley (2021), "Micromobility Is thriving in the new 'safety economy'", Brink, 17 March, https://www.brinknews.com/how-bicycle-and-scooter-sharing-are-likely-to-thrive-in-a-new-safety-corona-virus-economy. **Figure 1** from SLOCAT Partnership on Sustainable, Low Carbon Transport calculations based on bike-sharing data from individual cities; see SLOCAT (2021), Transport Knowledge Base, https://www.slocat.net/trakb.

4 **Figure 2** from S. Shaheen and A. Cohen (2020), *Innovative Mobility: Carsharing Outlook; Carsharing Market Overview, Analysis, and Trends*, University of California, Berkeley, https://escholarship.org/uc/item/61q03282.

5 Ibid.; S. Phillips (2019), "Carsharing market and growth analysis 2019", Movmi, 10 July, https://movmi.net/carsharing-market-growth-2019.

6 P. Wadhwani and P. Saha (2020), *Car Sharing Market Size by Model (P2P, Station-Base, Free-Floating), By Business Model (Round Trip, One Way), By Application (Business, Private), Industry Analysis Report, Regional Outlook, Application Potential, Price Trend, Competitive Market Share and Forecast, 2020-2026*, Global Market Insights, Selbyville, https://www.gminsights.com/industry-analysis/carsharing-market.

7 Ibid.

8 Movmi (2018), "South East Asia", 16 October, https://movmi.net/shared-mobility-south-east-asia.

9 Graphic Research (2018), *Asia Pacific Car Sharing Market Size by Model (P2P, Station-Base, Free-Floating), By Business Model (Round Trip, One Way), By Application (Business, Private), Industry Analysis Report, Regional Outlook (China, Japan, South Korea, India, Taiwan, Malaysia, Singapore, Australia), Growth Potential, Competitive Market Share and Forecast, 2018-2024*, Pune, https://www.graphicalresearch.com/industry-insights/1001/asia-pacific-car-sharing-market.

10 C. Rodier and J. Michaels (2019), *The Effects of Ride-Hailing Services on Greenhouse Gas Emissions*, University of California, Davis, https://escholarship.org/uc/item/4vz52416.

11 A. Henao and W. E. Marshall (2019), "The impact of ride-hailing on vehicle miles traveled," *Transportation*, Vol. 46/6, Springer, pp. 2173-94, https://doi.org/10.1007/s11116-018-9923-2.

12 O. R. Tarek and S. Amit (2020), "With 7.5m rides a month, ridesharing services take over Bangladesh", The Business Standard, 17 February, https://tbsnews.net/economy/75m-rides-month-ridesharing-services-take-over-bangladesh-45453.

13 N. Akter, F. N. Rahman and M. I. Hossain (2019), "Transforming ride-sharing into sustainable business", The Daily Star, 29 October, https://www.thedailystar.net/business/news/transforming-ride-sharing-sustainable-business-1820065.

14 A. Tirachini and A. Gomez-Lobo (2020), "Does ride-hailing increase or decrease vehicle kilometers traveled (VKT)? A simulation approach for Santiago de Chile," *International Journal of Sustainable Transportation*, Vol. 14/3, Taylor and Francis Ltd., pp. 187-204, https://doi.org/10.1080/15568318.2018.1539146.

15 D. Oviedo, I. Granada and D. Perez-Jaramillo (2020), *Ridesourcing and Travel Demand: Potential Effects of Transportation Network Companies in Bogotá*, Multidisciplinary Digital Publishing Institute (MDPI), Basel, https://www.mdpi.com/2071-1050/12/5/1732/pdf.

16 Y. Kazeem (2020), "Lagos has banned its most effective methods of transport – including bikehailing startups", Quartz Africa, 28 January, https://qz.com/africa/1792504/lagos-bans-okada-oride-gokada-keke-tricycles.

17 C. Moon-Miklaucic et al. (2019), *The Evolution of Bike Sharing: 10 Questions on the Emergence of New Technologies, Opportunities, and Risks*, World Resources Institute, Washington, D.C., https://wrirosscities.org/sites/default/files/the-evolution-bikesharing.pdf; J. Zhang et al. (2021), "Life duration of bike sharing systems", *Case Studies on Transport Policy*, Vol. 9/2, Elsevier Ltd, pp. 674-80, https://doi.org/10.1016/j.cstp.2021.03.005.

18 **Figure 3** from SLOCAT calculations based on P. Demalo et al. (2020), "The Meddin Bike-sharing World Map", PBSC, https://bikesharingworldmap.com.

19 **Figure 4** from National Association of City Transportation Officials (NACTO) (2020), *Shared Micromobility in the U.S.: 2019*, New York, https://nacto.org/shared-micromobility-2019, and from NACTO (2019), *Shared Micromobility in the U.S.: 2018*, New York, https://nacto.org/wp-content/uploads/2019/04/NACTO_Shared-Micromobility-in-2018_Web.pdf. D. Fitch, H. Mohiuddin and S. Handy (2020), *Investigating the Influence of Dockless Electric Bike-share on Travel Behavior, Attitudes, Health and Equity*, University of California Institute of Transportation Studies, Davis, https://escholarship.org/uc/item/2x53m37z.

20 SLOCAT, op. cit. note 18.

21 B. B. Kabeja (2019), "E-bikes to revolutionize mobility in Rwanda", Clean Leap, 15 March, https://cleanleap.com/e-bikes-revolutionize-mobility-rwanda.

22 International Association of Public Transport (UITP), "Mena", https://mena.uitp.org/dubai-rta-and-careem-operate-3500-bikes-and-350-stations (accessed 31 May 2021).

23 NACTO (2020), op. cit. note 19.

24 K. Canales and G. Rapier (2020), "The rise and fall of the Jump bike, the electric machine that wooed Uber into a $200 million sale and is now being discarded by the thousands", Business Insider, 26 June, https://www.businessinsider.com/what-happened-to-jump-bike-rise-and-fall-uber-2020-6.

25 M. López (2020), "E-scooter startup Lime retreats in Latam, a warning sign for Grow?" Contxto, 10 January, https://www.contxto.com/en/brazil/electric-scooter-startup-lime-retreats-latam-warning-sign-grow.

26 Esferasoft Solutions, "Global e-scooter market trends and statistics: Increasing popularity of e-scooter sharing services to boost market growth", https://www.esferasoft.com/blog/global-escooter-market-trends-statistics-and-micromobility-report (accessed 31 May 2021).

27 **Figure 5** from NUMO, "New Mobility Atlas", https://www.numo.global/new-mobility-atlas#2/51.94/12.25 (accessed 31 May 2021).

28 A. Schmitt (2018), "Is pedal dockless bike share going extinct", StreetsBlog USA, 10 October, https://usa.streetsblog.org/2018/10/10/is-pedal-dockless-bike-share-going-extinct.

29 NUMO, op. cit. note 27.

30 NACTO (2020), op. cit. note 19; NACTO (2019), op. cit. note 19.

31 NACTO (2020), op. cit. note 19.

32 NACTO (2019), op. cit. note 19.

33 L. Hodgson (2020), "Investors bet on micromobility's post-COVID-19 future", PitchBook, 1 June, https://pitchbook.com/news/articles/investors-bet-on-micromobilitys-post-covid-19-future.

34 K. Wilson (2020), "Why do micromobility companies keep losing money?" StreetsBlog USA, 14 January, https://usa.streetsblog.org/2020/01/14/why-do-micromobility-companies-keep-losing-money.

35 J. Eliasen (2021), "The future of micromobility", Medium, 15 January, https://medium.com/swlh/the-future-of-micromobility-2d4d96d4e2dd.

36 Ibid.

37 Red Herring (2020), "Layoffs hit hard as unicorns place new focus on profitability", 13 January, https://www.redherring.com/north-america/layoffs-hit-hard-as-unicorns-place-new-focus-on-profitability.

38 Hodgson, op. cit. note 33.

39 **Figure 6** from Bloomberg Philanthropies (2020), "Initiative on Cities and Autonomous Vehicles", https://avsincities.bloomberg.org (accessed 8 October 2020).

40 Reuters (2019), "Elon Musk on Telsa's self-driving capabilities", 22 April, https://www.reuters.com/article/us-tesla-autonomous-factbox/fact-box-elon-musk-on-teslas-self-driving-capabilities-idUSKCN1RY0QY. For predictions from Elon Musk and others, see D. Faggella, "The self-driving car timeline – predictions from the top 11 global automakers", Emerj, 14 March, https://emerj.com/ai-adoption-timelines/self-driving-car-timeline-themselves-top-11-automakers.

41 J. Plautz (2019), "Survey: 57% of people willing to ride in AV's", Smart Cities Dive, 5 June, https://www.smartcitiesdive.com/news/survey-57-of-people-willing-to-ride-in-avs/556194; A. Short (2019), "Brake time: Autonomous vehicle testing endangers pedestrians", StreetsBlog USA, 21 August, https://usa.streetsblog.org/2019/08/21/brake-time-automatic-vehicle-testing-endangers-pedestrians; K. Wiggers (2019), "11 companies propose guiding principles for self-driving vehicles", Venture Beat, 2 July, https://venturebeat.com/2019/07/02/self-driving-car-report-safety-first-for-automated-driving; Daimler (2019), "Safety First for Automated Driving (SaFAD)", 2 July, https://www.daimler.com/innovation/case/autonomous/safety-first-for-automated-driving-2.html; P. Koopman (2019), "An overview of draft UL4600: 'Standard for Safety for the Evaluation of Autonomous Products'", Medium, 20 June, https://medium.com/@pr_97195/an-overview-of-draft-ul-4600-standard-for-safety-for-the-evaluation-of-autonomous-products-a50083762591; H. Grabar (2019), "The hyperloop has taken a detour", Slate Group, 31 May, https://slate.com/technology/2019/05/elon-musks-hyperloop-is-borrowing-ideas-from-trains-and-cars.html.

42 M. Bayern (2020), "Autonomous vehicles: How 7 countries are handling the regulatory landscape", Tech Republic, 5 February, https://www.techrepublic.com/

article/autonomous-vehicles-how-7-countries-are-handling-the-regulatory-landscape.

43 FFM Aktuell (2019), "Getting on board for the future – test operation for autonomous vehicles in Frankfurt", Frankfurt-Tipp, 10 January, https://www.frankfurt-tipp.de/en/news/s/ugc/getting-started-in-the-future-test-operation-for-autonomous-vehicles-in-frankfurt.html.

44 Sustainable Bus (2019), "Artificial Intelligence under the bonnet. Volvo Buses unveiled the first driverless bus in Singapore", 6 March, https://www.sustainable-bus.com/news/artificial-intelligence-under-the-bonnet-volvo-buses-unveiled-the-first-driverless-bus-in-singapore.

45 A. Dellinger (2019), "Self-driving truck completes first cross-country freight delivery", Mic, 11 December, https://www.mic.com/p/self-driving-truck-completes-first-cross-country-freight-delivery-19440102.

46 A. J. Hawkins (2020), "GM will spend $2.2 billion to build electric and autonomous vehicles at Detroit plant", The Verge, 27 January, https://www.theverge.com/2020/1/27/21083356/gm-cruise-ev-av-production-announcement-detroit-hamtramck-origin.

47 Bird Cities Blog (2020), "Life cycle analysis reveals vast CO2 emissions gap between cars and scooters, 27 April, https://www.bird.co/blog/life-cycle-analysis-co2-emissions-gap-between-cars-scooters.

48 Lime (2019), "New report examines the sustainability impact of e-scooters in Paris", 10 October, https://www.li.me/second-street/new-report-examines-sustainability-impact-e-scooters-paris.

49 Lime (2019), "E-scooters and Earth Day: Measuring micromobility's impact on the environment", 22 April, https://www.li.me/second-street/e-scooters-earth-day-measuring-micromobility-impact-environment.

50 A. Schuller and M. Aboukrat (2019), *White Paper: The Role of E-scooters and Light Electric Vehicles in Decarbonizing Cities*, Carbone 4, http://www.carbone4.com/wp-content/uploads/2019/09/Carbone-4-for-Bird-E-Scooter-and-Cities-decarbonization.pdf.

51 Portland Bureau of Transportation (2018), *2018 E-Scooter Findings Report*, Portland, Oregon, https://www.portlandoregon.gov/transportation/article/709719.

52 North Carolina State University (2019), "Shared e-scooters aren't always as 'green' as other transport options", ScienceDaily, 2 August, https://www.sciencedaily.com/releases/2019/08/190802104535.htm.

53 A. Henao and W. E. Marshall (2019), "The impact of ride-hailing on vehicle miles traveled", *Transportation*, Vol. 46/6, Springer, pp. 2173-94, https://doi.org/10.1007/s11116-018-9923-2.

54 **Figure 6** from Rodier and Michaels, op. cit. note 10.

55 B. Schaller (2021), "Can sharing a ride make for less traffic? Evidence from Uber and Lyft and implications for cities," *Transport Policy*, Vol. 102, Elsevier Ltd, pp. 1-10, https://doi.org/10.1016/j.tranpol.2020.12.015.

56 S. Shaheen et al. (2019), *Shared Mobility Policy Playbook*, Transportation Sustainability Research Center, University of California at Berkeley, Berkeley, https://escholarship.org/uc/item/9678b4xs.

57 J. Khurana (20201), "Ride-hailing platforms will lead the global EV transition", World Business Council for Sustainable Development, 25 January, https://www.wbcsd.org/Overview/News-Insights/WBCSD-insights/Ride-hailing-platforms-will-lead-the-global-EV-transition.

58 D. Gardiner (2021), "California requires Uber, Lyft to switch mostly to electric cars by 2030", San Francisco Chronicle, 21 May, https://www.sfchronicle.com/politics/article/California-requires-Uber-Lyft-to-switch-mostly-16194997.php.

59 D. Hall, M. Nicholas and M. R. Bernard (2021), *Guide to Electrifying Ride-hailing Vehicles for Cities*, International Council on Clean Transportation (ICCT), https://theicct.org/sites/default/files/publications/Ride-hailing-cities-guide-mar2021.pdf.

60 D. Hall et al. (2020), *Electric Vehicle Capitals: Cities Aim for All-electric Mobility*, ICCT, Washington, D.C., https://theicct.org/sites/default/files/publications/ev-capitals-update-sept2020.pdf.

61 Lime (2020), "Lime commits to 100% zero-emissions operations fleet vehicles", 6 February, https://v1.li.me/second-street/lime-commits-to-100-zero-emissions-operations-fleet-vehicles.

62 Lyft (2020), "Leading the transition to zero emissions: Our commitment to 100% electric vehicles by 2030", 17 June, https://www.lyft.com/blog/posts/leading-the-transition-to-zero-emissions.

63 Connected to India (2019), "Singapore's Grab adds 200 electric vehicles to its fleet", 10 January, https://www.connectedtoindia.com/singapores-grab-adds-200-electric-vehicles-to-its-fleet-4970.html.

64 E. Bannon (2020), "Uber to electrify half of its rides in Europe after T&E public appeal", Transport and Environment, 8 September, https://www.transportenvironment.org/press/uber-electrify-half-its-rides-europe-after-te-public-appeal; Uber, "Millions of rides a day. Zero emissions.", https://www.uber.com/be/en/about/sustainability (accessed 31 May 2021).

65 M. Beedham (2020), "Estonia is finally gearing up to regulate e-scooters on its roads – EU adoption increasing", TNW, 7 May, https://thenextweb.com/news/estonia-government-amend-laws-that-pave-way-for-e-scooters-uk-trials.

66 A. Tidey (2019), "Germany legalizes e-scooters but bans them from the pavement", Euronews, 20 May, https://www.euronews.com/2019/05/17/germany-legalises-e-scooters-but-bans-them-from-the-pavement; Uffici di Diretta Collaborazione del Ministro Dipartimento per I Transporti (2019), *Il Ministro delle infrastrutture e dei transporti*, Governo Italiano, http://www.mit.gov.it/sites/default/files/media/notizia/2019-06/schema%20DM%20micromobilit%C3%A0%20229_2019%20%283%29.pdf; Republika (2019), "Driving electric scooters to be regulated by law, Government decides", 29 October, https://english.republika.mk/news/macedonia/driving-electric-scooters-to-be-regulated-by-law-government-decides.

67 Library of Congress (2019), "Brazil: City of São Paolo enacts decree regulating use of electric scooters", 23 May, https://www.loc.gov/law/foreign-news/article/brazil-city-of-so-paulo-enacts-degree-regulating-use-of-electric-scooters.

68 Unagi, "The Comprehensive Guide to Electric Scooter Laws", https://unagiscooters.com/articles/the-comprehensive-guide-to-electric-scooter-laws (accessed 31 May 2021).

69 Land Transport Authority Singapore (2019), "E-scooters to be prohibited on all footpaths following safety review", 4 November, https://www.lta.gov.sg/content/ltagov/en/newsroom/2019/11/1/e-scooters_tobe_prohibited_on_allfootpaths_following_safety_review.html. For an analysis of the regulations around micromobility, see J. Halfon (2019), "A lawyer explains why electric scooter laws don't work", Bloomberg CityLab, 28 June, https://www.bloomberg.com/news/articles/2019-06-28/electric-scooter-laws-are-defective-a-lawyer-says.

70 For a review of this standard and some of the concerns related to it, see A. J. Hawkins (2019), "New startup aims to bring controversial scooter tracking system to more cities", The Verge, 23 September, https://www.theverge.com/2019/9/23/20872421/lacuna-startup-mds-scooter-tracking-ladot-data-collection.

71 Unagi, op. cit. note 68.

72 NUMO, "About NUMO", https://www.numo.global/about (accessed 2 June 2021); R. Chase (2017), "Shared Mobility Principles for Livable Cities", https://www.sharedmobilityprinciples.org.

73 NUMO (2020), "World Economic Forum releases guidelines for city mobility: Steering towards collaboration", 17 March, https://www.numo.global/news/world-economic-forum-releases-guidelines-city-mobility-steering-towards-collaboration; World Economic Forum (2020), *Guidelines for City Mobility: Steering Towards Collaboration*, Geneva, https://www.weforum.org/reports/guidelines-for-city-mobility-2020.

74 B. Welle and T. Fried (2019), "Tech startups offer new answers to African transport woes. How can cities capitalize?" The City Fix, 14 November, https://thecityfix.com/blog/tech-startups-offer-new-answers-african-transport-woes-can-cities-capitalize-ben-welle-travis-fried.

75 GoMetro, http://www.getgometro.com (accessed 31 May 2021); WhereIsMyTransport, "Trusted Mobility Data and Solutions for Emerging-Market Cities", https://www.whereismytransport.com (accessed 31 May 2021); SafeBoda, "Why SafeBoda?" https://safeboda.com/ng (accessed 31 May 2021); A .L. Dahir (2019), "Ride-hailing services want to disrupt – and bring order to – Kenya's unruly public bus system", Quartz Africa, 23 January, https://qz.com/africa/1531062/kenyas-matatu-buses-face-disruption-by-little-swvl-safiri; J. Mueni (2019), "Matatu hailing app launches for Nairobi commuters", Capital Business, 7 March, https://www.capitalfm.co.ke/business/2019/03/matatu-hailing-app-launched-for-nairobi-commuters.

76 D. Taylor (2020), "How technology is upgrading traditional mobility services in Africa", World Economic Forum, 27 November, https://www.weforum.org/agenda/2020/11/south-africa-mobility-technology.

77 T. Fried and I. Abubaker (2019), "In African cities, mapping paratransit makes for smarter mobility", The City Fix, 27 May, https://thecityfix.com/blog/african-cities-mapping-paratransit-makes-smarter-mobility-travis-fried-iman-abubaker.

78 R. Chase (2017), "Shared Mobility Principles for Livable Cities", https://www.sharedmobilityprinciples.org (accessed 31 May 2021).

79 NUMO, https://www.numo.global (accessed 31 May 2021).

80 For a good overview of global initiatives, see Micromobility Industries (2021), "The Micromobility Landscape", https://micromobility.io/landscape (accessed 31 May 2021).

81 World Economic Forum, "Global New Mobility Coalition", https://www.weforum.org/projects/global-new-mobility-coalition (accessed 31 May 2021).

82 Innovative Mobility, "About IMR", http://innovativemobility.org/?page_id=47 (accessed 31 May 2021); University of California at Berkeley, "About TSRC", https://tsrc.berkeley.edu/about (accessed 31 May 2021).

83 Shared-Use Mobility Center, "About us", https://sharedusemobilitycenter.org/about-us (accessed 31 May 2021).

84 MaaS Alliance, "Join MaaS Alliance", https://maas-alliance.eu/join (accessed 31 May 2021).

85 Mobility on Demand Alliance, "Why an Alliance?" https://static1.squarespace.com/static/5b1e8a4be2ccd113109d86d9/t/5d214a189813d8000 1c21546/1562462744462/MOD+Alliance+Fact+Sheet+July+2019.pdf (accessed 31 May 2021).

86 European Commission (2018), "1st Partner Meeting of the EIP – SCC New Mobility Services Initiative", 26 February, https://smart-cities-marketplace.ec.europa.eu/news-and-events/news/2018/1st-partner-meeting-eip-scc-new-mobility-services-initiative.

87 If not stated otherwise, then the assessment of policy landscape indicators is based on desk research with a focus on the 31 country factsheets and information outlined in the section. More countries might have such policies in place or similar policies implemented. SLOCAT, op. cit. note 18; Carsharing Association (2021), "Carsharing World Map", https://carsharing.org/carsharing-world-map (accessed 20 April 2021); S. Shaheen and A. Cohen (2020), "Innovative mobility: Carsharing outlook", https://escholarship.org/uc/item/61q03282 (accessed 20 October 2020); Bloomberg Philanthropies, op. cit. note 39.

Annex: Methodological Note

1 M. Crippa et al. (2020), *Fossil CO2 Emissions of All World Countries*, *JRC Science for Policy Report*, Publications Office of the European Union, Luxembourg, https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/fossil-co2-emissions-all-world-countries-2020-report.

2 US Energy Information Administration (2020), "Energy and the environment explained: Greenhouse gases," https://www.eia.gov/energyexplained/energy-and-the-environment/greenhouse-gases.php (accessed 14 April 2021).

3 International Organization of Motor Vehicle Manufacturers (OICA), "Definitions", https://www.oica.net/wp-content/uploads/DEFINITIONS-VEHICLE-IN-USE1.pdf (accessed 20 May 2021).

4 United Nations Statistics Division, "Standard country or area codes for statistical use (M49)", https://unstats.un.org/unsd/methodology/m49 (accessed 20 May 2021).

5 World Bank (2021), "World Bank Country and Lending Groups", https://datahelpdesk.worldbank.org/knowledgebase/articles/906519 (accessed 20 May 2021).

6 United Nations (2019), "World Population Prospects 2019", https://population.un.org/wpp (accessed 20 May 2021); World Bank, "GDP (constant 2010 US$)", http://data.worldbank.org/indicator/NY.GDP.MKTP.KD (accessed 20 May 2021).

7 SLOCAT (2021), "Transport Knowledge Base", https://slocat.net/our-work/knowledge-and-research/trakb (accessed 20 May 2021).

Tracking Trends in a Time of Change: The Need for Radical Action Towards Sustainable Transport Decarbonisation

SLOCAT Transport and Climate Change Global Status Report 2nd Edition

This report should be cited as:

SLOCAT (2021), *Tracking Trends in a Time of Change: The Need for Radical Action Towards Sustainable Transport Decarbonisation*, Transport and Climate Change Global Status Report – 2nd edition, www.tcc-gsr.com.

The development of this report was led by Maruxa Cardama, Angel Cortez, Nicolas Cruz, Angela Enriquez, Emily Hosek, Karl Peet, Nikola Medimorec, Arturo Steinvorth and Alice Yiu from the secretariat of the SLOCAT Partnership.

For a full list of acknowledgements, please visit the the online page here.

Explore more online

Download the full report

Download the full endnotes

Contact us

SLOCAT Partnership on Sustainable, Low Carbon Transport

#TransportClimateStatus