



# SHARED MOBILITY'S GLOBAL IMPACT



An economic, social and  
environmental analysis

Independent Study Commissioned by Bolt





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# CONTENTS

<b>Executive summary</b>	<b>1</b>
<b>Introduction</b>	<b>5</b>
<b>Chapter 1: The shared mobility industry</b>	<b>7</b>
<b>Chapter 2: Economic impact</b>	<b>12</b>
2.1 Income opportunities	13
2.2 Focus topic: Driving for ride-hailing services	18
2.3 Indirect economic effects	27
<b>Chapter 3: Social impact</b>	<b>35</b>
3.1 Affordability of shared mobility	37
3.2 Accessibility of shared mobility	45
3.3 Safety of shared mobility	48
<b>Chapter 4: Environmental impact</b>	<b>54</b>
4.1 Environmental impact of changes in modal mix	56
4.2 Impact assessment: Singular mobility modes	59
4.3 Impact assessment: Multimodality	61
<b>Conclusion</b>	<b>70</b>
<b>Appendix: City archetypes</b>	<b>73</b>
Methodology and overview of city archetypes	75
Status quo assessment of city archetypes	77
The road forward: Optimization of shared mobility impact	81
Deep-dive: Berlin, an active mobility city	84
Deep-dive: Lagos, an emerging city	89
<b>Endnotes</b>	<b>101</b>



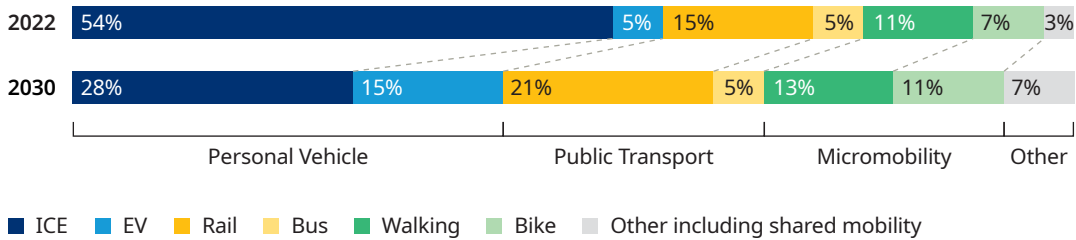
# EXECUTIVE SUMMARY



Today, more than 4 billion people live in cities. By 2050, the United Nations (UN) estimates that this number will grow to 6 billion (70% of the world population) and that cities will account for 85% of the world’s economic output.<sup>1</sup> This expansion is having a critical impact on urban transport systems. While economic growth and urbanization continue, only half of the world’s population currently has convenient access to public transport.<sup>2</sup> This limits access to jobs, education, and overall social inclusion — unless an individual can afford to travel by car — in which case they are likely contributing to congestion, pollution and greenhouse gas emissions.

Authorities, institutional bodies and other stakeholders now seek a more sustainable model which can solve transport hurdles with efficient long-term urban planning. Shared mobility (encompassing ride-hailing, car-sharing, e-bikes and e-scooters) has emerged as a potential solution offering sustainable, efficient, safe and affordable transport on demand. Shared mobility is projected to continue its rapid growth and more than double its share of the urban transport mix from 3% in 2023 to an estimated 7% in 2030. By then, its total market size is forecast to reach close to \$400 billion.<sup>3</sup>

**Exhibit 1: Oliver Wyman modal mix estimate**



Source: Oliver Wyman analysis

The impact of shared mobility on the urban environment is becoming ever more noticeable. When suitably implemented, it has the capability to increase transport efficiency and flexibility, enhance social inclusion by increasing accessibility, and reduce transport emissions.

But it has also faced criticism. Shared mobility has been blamed for contributing to congestion and emissions by adding more trips to already congested roads.<sup>4,5</sup> Safety concerns have been raised over e-scooters, which pose accident risks for riders and pedestrians. In addition, the platform economy has been criticized for poor working conditions and unfair competition with traditional modes of transport. As a result, cities such as London have cautiously renewed operating licenses for ride-hailing companies and offered limited trials for rental e-scooters. After a backlash, Paris banned e-scooter rental services as of 1 September 2023.



The objective of this report is to evaluate the current and future impact of shared mobility on attaining a more sustainable urban living environment. The report focuses on urban economics, social inclusion, and environmental impact, looking at factors such as income opportunities, accessibility, safety, affordability, and emissions. The report offers a global perspective, investigating differences between developed markets in Europe and rapidly emerging ones in Africa. The analyses are based on a comprehensive set of studies, surveys, databases, and primary research, including proprietary data provided by Bolt, a global mobility company.

This report has five sections: the first gives a comprehensive overview of the shared mobility industry, focusing on the megatrends behind changing consumer preferences and the current and expected growth of the sector. The next three sections explore the economic, social, and environmental impact of shared mobility on the urban living environment. The final section presents four distinct city archetypes and examines how each one can best implement and grow its shared mobility offerings based on comprehensive relevant criteria.

The impact of shared mobility is examined in three dimensions.

## **1. ECONOMIC IMPACT**

More than 9 million people worldwide are estimated to earn an income from shared mobility services in 2023, and the number is forecast to grow to 16 million by 2030. Asia (including the Middle East) accounts for 71% of the jobs, while Africa has the strongest growth: jobs are expected to increase by 113% from 2023 to 2030. Ride-hailing drivers typically earn above the minimum wage in Europe (+37% in Berlin and +91% in Tallinn) and above the wages for jobs with comparable skill levels in Africa (up to +130% in South Africa and Nigeria).

Challenges related to safety and the lack of employment benefits need to continue to be addressed, but drivers are generally satisfied (70% to 80% agreement levels) with the work: it is autonomous and flexible, and half of drivers work part-time while pursuing other income opportunities.

In addition to their direct economic impact, shared mobility services have a positive impact on commuting, leisure, and tourism. They also have the potential to reduce the economic costs of air pollution and traffic congestion.

## **2. SOCIAL IMPACT**

The report focuses on three social impacts: affordability, accessibility, and safety. Shared mobility can provide affordable alternatives to private-car ownership and is particularly beneficial for individuals with lower incomes because of the lower upfront costs. Even if a driver covers as much as 15,000 km a year, a transition from private-car ownership to shared mobility can yield substantial cost savings. Given the continued decrease in commuting



distances in Europe, the cost advantage of shared mobility will grow. In addition, car ownership is becoming less convenient due to a continuous reduction in public parking spaces: Berlin has only 230,000, while there are 1.2 million cars in the city.

In regions with limited public transport, options such as bike-sharing can increase accessibility, particularly for vulnerable groups and in economically disadvantaged areas. However, some challenges remain in meeting the needs of people with disabilities, and some regions are underserved. Safety concerns also affect regulation and user perceptions. The potential social impact of shared mobility can be realized through infrastructure improvements, the orchestration of a variety of offerings and services, and active cooperation among stakeholders.

### **3. ENVIRONMENTAL IMPACT**

Passenger transport contributes about 40% of global transport emissions. The report examines the potential of shared mobility services to reduce these emissions, in line with global commitments such as the Paris Agreement and the United Nations Sustainable Development Goals (SDGs).

While shared mobility has the potential to significantly reduce urban emissions, the overall impact is currently mixed. It depends on consumer behaviour, mode switching, and coordination with other transport modes. For instance, personal cars in Europe now cover 1,700 km less distance per year than a decade previously, yet the level of vehicles registered per household has remained roughly the same. This suggests that people are driving less but are not yet willing to give up their personal cars. However, up to a quarter of people who frequently use car-sharing and ride-hailing services indicate that they will either delay their purchase of a new vehicle or are thinking about getting rid of their current one.

E-scooter usage patterns show that roughly 10% of rides directly replace car journeys. Consequently, e-scooters on their own have contributed to a reduction of up to 120 million car-kilometres travelled, helping to reduce car-related Scope 3 emissions by an estimated 30,000 tons of CO<sub>2</sub>e on a European level. The positive effect holds even when accounting for the substitution of emission-friendly modes such as walking and biking for micromobility services.

Taking into account the growth of multimodal transport, the report's proprietary mobility emissions model shows that shared mobility will play an important part in reducing personal car usage by up to 20% by 2030 in cities such as Berlin. An emissions-optimised scenario for Berlin results in significant growth in kilometres travelled in 2030 for all shared-mobility modes within the scope of this report. This scenario yields a 40% reduction in emissions, from 4.1 million tons today to 2.5 million tons in 2030. To achieve this, it is essential to carry out holistic, multimodal planning involving all stakeholders, to continue to adopt electric vehicles, and to develop complementary infrastructure.





# INTRODUCTION

Transport systems are closely linked to the prosperity of cities. They affect quality of life, economic growth, social cohesion, and the environment. Transport systems will also determine how far cities will be able to contribute to global targets such as the Paris Agreement to combat climate change and the United Nations' Sustainable Development Goals (SDGs)<sup>6</sup> for a more prosperous, equitable future. The SDGs emphasize the interconnected environmental, social, and economic aspects of sustainable development by putting sustainability and sustainable transport at their centre.<sup>7</sup>

This report aims to evaluate the current and future impact of shared mobility on sustainable urban living. It focuses on urban economics, social equity, and environmental impact, analysing factors related to shared mobility such as income opportunities, accessibility, safety, affordability, and emissions. It also identifies city archetypes based on shared mobility's magnitude of impact, and outlines how that positive impact can be maximized for each archetype. Offering a global perspective, the report looks at differences between developed markets in Europe and rapidly emerging ones in Africa.

As stated in the executive summary, the report contains five sections. The first gives a comprehensive overview of the shared mobility industry, focusing on the megatrends behind changing consumer preferences, and presenting the sector's current and expected future growth. The next three explore the economic, social, and environmental impacts of shared mobility on cities. Each looks in-depth at the factors shaping the industry, using detailed case studies, analyses, first-hand databases, and proprietary models. The final section presents four city archetypes and examines how each can best implement and promote its shared mobility offerings.





## CHAPTER 1

# THE SHARED MOBILITY INDUSTRY

## CHANGING CONSUMER PREFERENCES DRIVE GROWTH

Shared mobility has undergone substantial growth in recent years due to several transformational trends in cities and society overall. Some of these trends are:

- Growing environmental consciousness has propelled adoption, as shared mobility aims to reduce the overall number of vehicles on the road and total emissions. For instance, more than half of Europeans (54%) feel bad about the ecological footprint linked to the use of their car.<sup>8</sup>
- Affordability remains a concern for consumers: 48% of respondents to the Q1 2023 Oliver Wyman Global Consumer Survey stated price/affordability as the top factor for selecting a transport mode.<sup>9</sup> Shared mobility aims to provide cost-efficient alternatives to traditional modes of transport.
- Advances in technology — particularly the widespread use of smartphones and mobile apps — have made shared mobility services more convenient and accessible for users. Today, 68% of the global population own a smartphone.<sup>10</sup>
- Attitudes to ownership and the sharing economy have changed, helping foster a culture of collaborative consumption and shared resources. Younger Europeans (40% of those aged 18-34) are more likely to abandon personal cars: 12% say they would definitely do so. Similarly, 32% of European car owners can imagine not having a personal car in the future. Urban residents show a higher inclination to do without their own car, at 35%, compared to 31% for residents of smaller towns and rural areas.<sup>11</sup>
- The marked increase in urban congestion has led commuters to spend hours in traffic which has encouraged people to use new — and quicker — forms of transport, particularly e-scooters and e-bikes.



## SHARED MOBILITY: DEFINITION AND SEGMENTS IN SCOPE

This report focuses on shared transport that can be pursued individually by consumers. The definition includes ride-hailing, car-sharing, bike-sharing, and scooter-sharing.

**Ride-hailing** enables passengers to request rides through a mobile app. Users enter their pickup and drop-off locations, and a nearby driver is assigned. Rides can be requested on demand or scheduled in advance. Payment can be handled electronically via an app or by cash on a per-usage basis. This report differentiates between ride-hailing and traditional (offline) taxi services.

**Car-sharing** allows individuals to rent vehicles for short periods. Users can book a car through a mobile app or website, choose the duration of their rental, and pick up the vehicle from a designated location. Free-floating car-sharing allows users to pick up and drop off vehicles at a location within a designated service area, offering flexibility and convenience. In contrast, stationary car-sharing requires users to pick up and return vehicles to a designated station or hub, limiting flexibility but often resulting in lower costs and making availability easier to manage. Car-sharing services often offer a variety of vehicle options, from compact cars to SUVs, catering to different needs.

**Micromobility** refers to the use of small, lightweight vehicles, usually e-scooters and e-bikes, for transport. These electric machines have gained popularity in urban areas as alternatives to traditional modes of transport. E-scooters are compact, stand-up scooters equipped with an electric motor. E-bikes are bicycles equipped with electric motors to provide pedal-assist propulsion. Users can rent e-scooters and e-bikes through mobile apps, which allow flexible and convenient access. As with car-sharing, this report focuses on free-floating services.

Commonly associated with shared mobility but not the focus of this report, are mass-transit options such as **public transport**, **car-pooling**, and **bus pooling**. **Moped-sharing** and futuristic topics such as **air taxis** currently have a limited market and are also excluded.

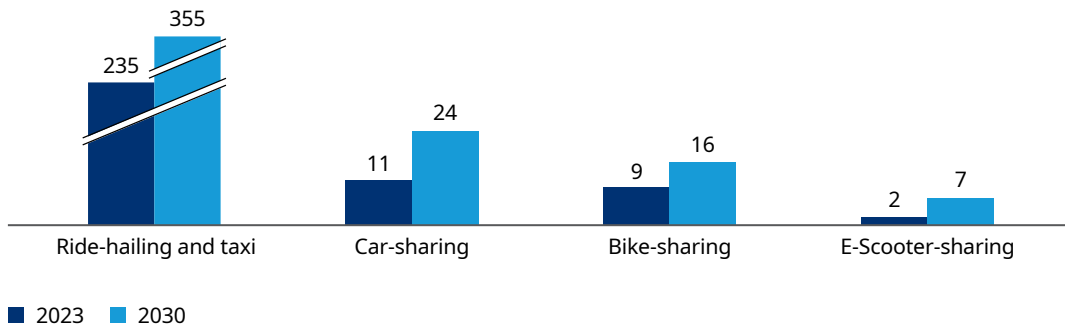
## **GROWTH IS STRONG IN ALL SEGMENTS OF SHARED MOBILITY, WITH AFRICA AND ASIA SHOWING THE STRONGEST PROJECTED GROWTH RATES**

- The global shared mobility market is expected to grow from \$258 billion in 2023 to \$401 billion in 2030 (a compound annual growth rate, or CAGR, of 6.5%).<sup>12</sup> Some of the segments that were only introduced more recently are among the fastest growing. These include micromobility, expected to grow from \$11.4 billion in 2023 to \$22.6 billion in 2030 (CAGR of 10%) and car-sharing, with a forecast annual growth rate of 11%, taking the market from \$11.3 billion in 2023 to \$23.6 billion in 2030.<sup>13</sup> While the market is growing fast, it still represents less than 5% of overall global mobility spending, which is more than \$10 trillion.<sup>14</sup>
- Growth in shared mobility is expected in all regions of the world. However, Asia stands out as a main driver, with a CAGR of 8% between 2023 and 2030 and a forecast total market size of \$254 billion in 2030, roughly two-thirds of the global market.<sup>15</sup> The region's rapid industrialization and urbanization are stimulating demand for cars, which is fuelling the car-sharing market because of strict regulations on personal vehicle ownership in many cities. Furthermore, urban population density and the popularity of cycling provide fertile ground for the adoption of micromobility services.
- North America and Europe have comparable market sizes and are anticipated to grow at similar rates in the coming years. In 2023, they each had shared-mobility market values of around \$50 billion, which are projected to reach \$70 billion by 2030.<sup>16</sup> However, the transport landscape differs between the two regions. In relatively car-dependent<sup>17</sup> North America, ride-hailing dominates (~93% of total market in 2023). However in Europe, micromobility solutions and car-sharing services are more popular, partly the result of European cities' high population densities. Nevertheless, ride-hailing services, including taxis, are still forecast to grow in Europe, from \$44 billion in 2023 to almost \$56 billion in 2030.<sup>18</sup>
- Africa represents only a small part of the global shared-mobility market, with an estimated market size of \$4.2 billion in 2023. However, between 2023 and 2030, the African market is expected to grow by 9% per year on average, a higher growth rate than the other regions. By 2030, the market size is expected to have nearly doubled compared to 2023, to as much as \$7.8 billion.<sup>19</sup> While its market size is currently small, Africa will be home to much of the future potential. The share of its population that is rural is the highest in the world, but its urban population is the world's fastest growing, and it has the world's largest percentage of population under 30. Africa is expected to be home to five out of the world's 41 megacities by 2030.<sup>20</sup> (One of these will be Lagos. See the Deep-dive in the Appendix.)



**Exhibit 2: Global shared mobility market sizes, by service**

In billions of US\$



Source: Oliver Wyman Forum and University of California Berkeley value pool report

**PLATFORM PROVIDERS HAVE PUSHED THE FAST GLOBAL ROLLOUT OF SHARED MOBILITY SERVICES**

Large shared-mobility providers have played a significant role in driving the industry growth since they were launched more than a decade ago. They include Uber (global), Bolt (global, with a focus on Europe and Africa), Lyft (North America), Didi Chuxing (global, with a focus on China), Ola (India), and Careem (Middle East and Africa). These providers offer a portfolio that encompasses ride-hailing, car-sharing, and micromobility options, and they have also expanded into additional services such as food delivery (which is not the focus of this report). Their diverse range of services provide consumers with convenient and flexible transport solutions. They cater to different needs and preferences on a single platform, thereby aiming to revolutionize the way people move around urban areas. In Europe, more than 700,000 shared e-scooters were available at the end of 2022,<sup>21</sup> up from virtually none in 2017. As shown in the market growth projections above, this trend is growing, and shared mobility will continue to transform the way people move.



## CHAPTER 2

# ECONOMIC IMPACT

## 2.1. INCOME OPPORTUNITIES

### KEY TAKEAWAYS

- In 2023, more than 9 million people are estimated to earn an income through shared mobility. The number is forecast to grow to around 16 million in 2030.
- Asia (including the Middle East) is forecast to account for 71% of all people working in shared mobility in 2030, while Africa is expected to be the fastest-growing region.
- Shared mobility is creating access to transport in areas and for individuals that were previously underserved. The reduced costs of certain modes will make transport more affordable.
- Around 95% of people working in shared mobility will be in ride-hailing. However, autonomous vehicles — the use of which is already being planned in the US — have the capacity to significantly reduce the number of human drivers if successfully introduced.

If integrated properly into an end-to-end multimodal framework, shared mobility has the potential to realize various economic impacts. This section of the report focuses on income opportunities and job creation as the most direct economic impacts. Other effects are detailed in the contexts of social and environmental impact.

### SHARED MOBILITY HAS THE POTENTIAL TO CREATE AN ECOSYSTEM OF INCOME OPPORTUNITIES

Four types of income opportunity from shared mobility can be defined:

- **Consumer-facing opportunities:** Mainly drivers providing ride-hailing services. In most markets, these drivers are independent contractors rather than employees of the shared-mobility companies.<sup>22</sup>
- **Direct jobs at mobility operators:** Companies that operate one or more shared mobility service via their own or third-party platforms employ a range of functional roles. These include software engineers, UX (user experience) and UI (user interface) designers, data scientists, operations managers, customer support staff, and finance and HR departments.
- **Complementary services:** Shared mobility operators often partly rely on operational support from third-party operators. For example, e-scooters and e-bikes need to be regularly redistributed in cities; damaged vehicles must be repaired; and batteries need to be recharged. Car-sharing fleets require cleaning, refuelling and recharging, and maintenance. To cater for this need, an entire service network has evolved around mobility services.



- **Indirect effects:** Shared mobility has an indirect effect on additional income opportunities, such as the production of ride-hailing vehicles and e-scooters. These indirect effects, while important, are not in the immediate scope of this report.

## THE NUMBER OF INCOME OPPORTUNITIES IS PREDICTED TO GROW UNTIL 2030

The number of people earning an income in shared mobility in 2023 is estimated at around 9 million. It is expected to increase to around 16 million in 2030 — more than doubling in the span of a decade. The forecast number represents the number of individuals who derive their primary or additional income from work within the realm of shared mobility.<sup>23</sup> The growth in income opportunities is impacted by four macro trends:

- **Overall mobility demand:** Overall mobility demand: Growing populations and increasing urbanization are driving the demand for mobility, especially in developing economies. Globally, urban passenger mobility demand is expected to grow from 21 trillion kilometres in 2020 to 33 trillion kilometres in 2030.<sup>24</sup>
- **Increased access to transport:** Shared mobility is creating access to transport in areas and for individuals that were previously underserved. Globally, less than half of the population has convenient access to public transport: In the US and Europe, about 75% of the population does, while in sub-Saharan Africa, the figure is only 33%.<sup>25</sup> Rising urbanization, especially in Europe and Asia, is increasing the share of people living in proximity to various mobility services.<sup>26, 27</sup> Furthermore, the reduced costs associated with certain modes (to be covered in Chapter 3) make transport more affordable, especially for lower-income households.



- **Channel transition:** There is a notable shift from offline taxi services to online ride-hailing services<sup>28</sup> driven by changing consumer behaviour and encouraged by rising global smartphone penetration (68% in 2022).<sup>29</sup> This transition varies significantly across regions and markets, influenced by local preferences and regulations, as well as internet and smartphone access. Globally, 66% of the population now use the internet (a growth rate of slightly above 5% in recent years). But only 40% of Africa's population has access, with the percentage share only in the mid-thirties in the least developed countries. That compares to almost 90% penetration in Europe and the Americas.
- **Autonomous driving:** Mobility providers could automate their ride-hailing fleets going forward, particularly in the United States. According to a UBS report, the global robotaxi fleet could grow from fewer than 1,000 vehicles today to around 850,000 vehicles in 2030. By 2040, the global fleet could grow exponentially to up to 19 million fully autonomous vehicles.<sup>30</sup> For example, Uber recently announced a multiyear partnership with Waymo with the goal of offering autonomous ride-hailing services.<sup>31</sup> The scaling of autonomous vehicles would significantly reduce the need for human drivers. In Europe, this could be much further down the line due to a more cautious regulatory approach. In Africa, automation efforts are hindered by a lack of digital infrastructure and paved roads, as well as poor maintenance of existing road networks.<sup>32</sup>

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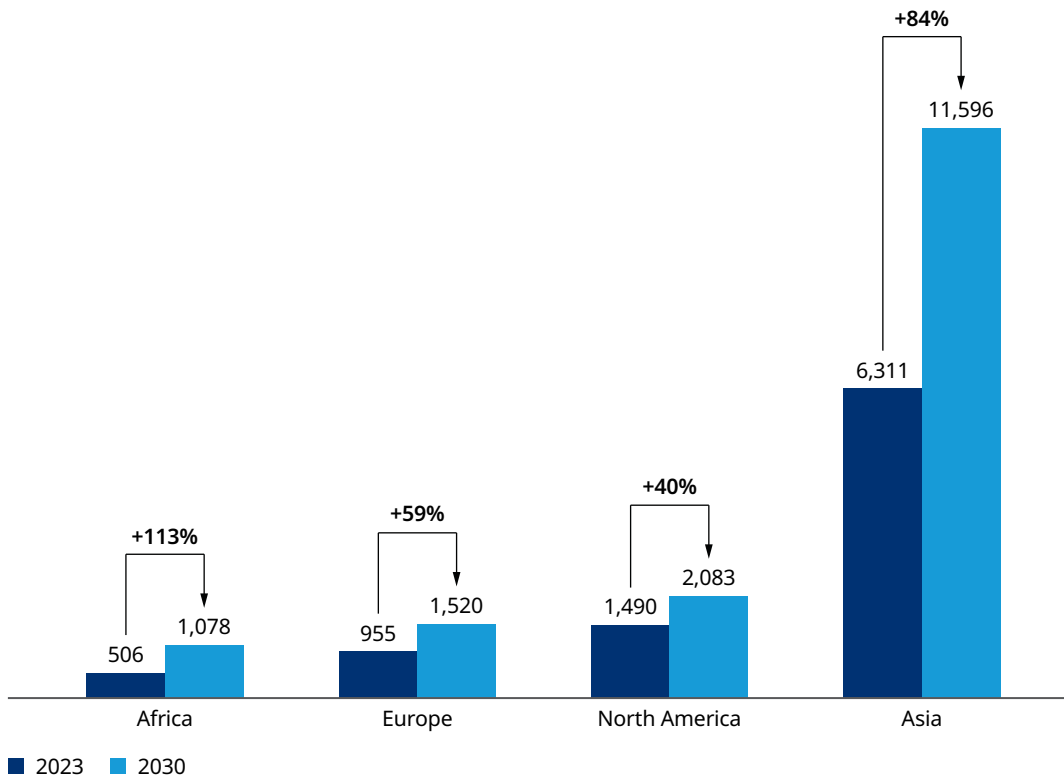
The number of people earning an income in shared mobility will more than double in the next 10 years

## THE HIGHEST NUMBER OF INCOME OPPORTUNITIES ARE IN ASIA, BUT THE STRONGEST GROWTH IS IN AFRICA

Asia (including the Middle East) has by far the largest share (68%) of the 9.3 million income opportunities in 2023, and this is forecast to rise 71% in 2030. Africa currently has the smallest number of income opportunities of all the regions. In absolute terms, more than 5 million income opportunities will be created in Asia between 2023 and 2030. However, Africa is expected to be the region with the highest growth rate. The number of roles in shared mobility is forecast to increase 113% from 2023 to 2030 — although from a comparably low starting point. Europe and North America will also see sizeable growth of 59% and 40% respectively, together adding over a million income opportunities from 2023 to 2030. As ride-hailing continues to shift from offline to online,<sup>33</sup> a significant portion of the anticipated increase in income opportunities (more than 350,000) can be attributed to the transition from traditional taxi drivers to platform-based ride-hailing. An increasing number of drivers work in both sub-segments, using multiple ride-hailing apps as well as offering traditional taxi services.

### Exhibit 1: Number of income opportunities in shared mobility

Yearly totals, in thousands, 2023 and 2030, % change 2030 vs. 2023



Note: Actual number of ride-hailing drivers might be higher as some only work part-time in ride-hailing, or to supplement their regular income.

Source: Oliver Wyman analysis, Bolt data used to estimate average drivers earnings per region



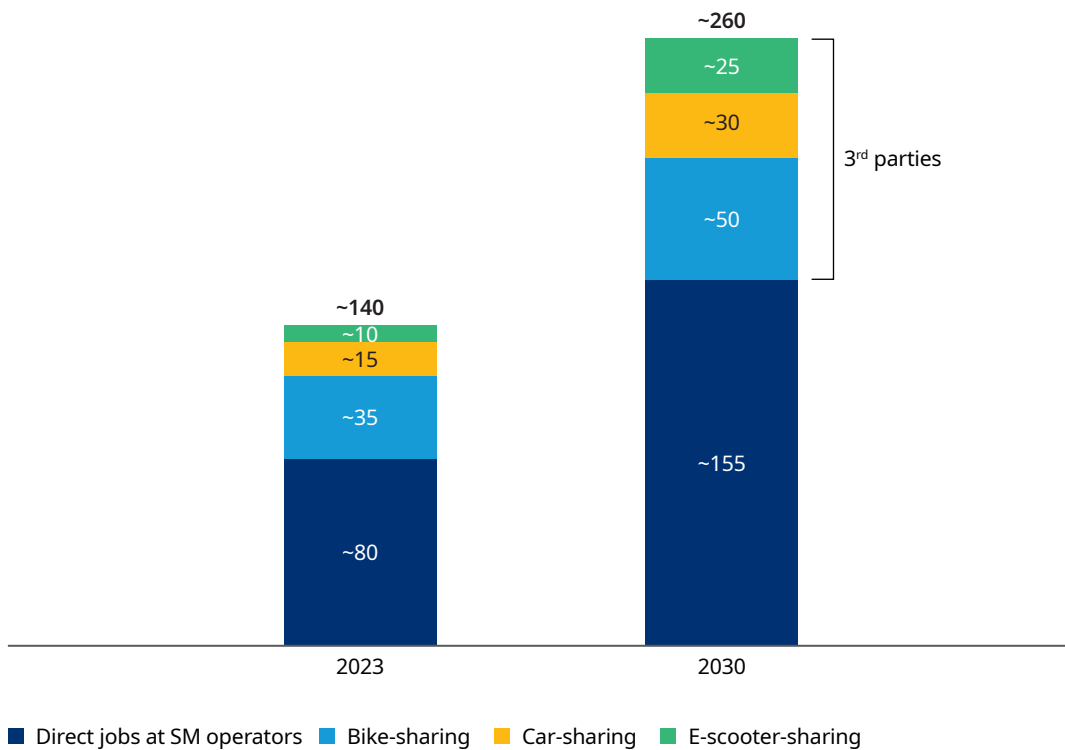
## MOST INCOME OPPORTUNITIES ARE RELATED TO DRIVING FOR RIDE-HAILING SERVICES

The largest share of income opportunities in the sector is expected to relate to people working in ride-hailing, who will account for more than 95% of all income opportunities in the field. By 2030, there will be an estimated 16 million income opportunities related to ride-hailing worldwide, a significant increase from the 9 million in 2023. One limitation to this forecast is that it assumes that autonomous vehicles will not play a role in ride-hailing fleets in the analysed period. However, large mobility providers and incumbents have announced plans, mainly in the United States, to use autonomous vehicles in their fleets.<sup>34</sup> As described above, the use of autonomous vehicles does not currently seem feasible in Africa, and it seems further in the future in Europe.

In addition to ride-hailing, an estimated 120,000 income opportunities will be created in other roles from 2023 to 2030, representing growth of almost 90%. About 60% will be found directly in shared-mobility providers, often in the form of highly qualified and well-paid jobs such as software and repair and maintenance.

### Exhibit 2: Number of income opportunities in shared mobility

In thousands, excluding ride-hailing drivers



Source: Oliver Wyman analysis

## 2.2. FOCUS TOPIC: DRIVING FOR RIDE-HAILING SERVICES

### KEY TAKEAWAYS

- Work in ride-hailing tends to have relatively low entry barriers and, therefore, a high degree of inclusiveness. For people new to a country or city, driving for a ride-hailing service can serve as a first job and a stepping stone towards a higher income.
- Drivers in ride-hailing have the potential to earn significantly above the minimum wage or more than workers in jobs with comparable skill levels.
- Ride-hailing often offers drivers the freedom to decide the hours, areas, and specific times they work. Many drivers work part time in ride-hailing, and they can also balance their ride-hailing work with obligations such as caregiving responsibilities. At least half of ride-hailing drivers in the countries surveyed indicate that they have qualifications sufficient for alternative careers.
- People working in ride-hailing are generally satisfied due to the autonomy and flexibility of the work, and it seems to be a conscious career choice in many cases. However, there remain concerns related to job safety and the lack of employment benefits.

### LOW ENTRY BARRIERS FACILITATE NEW INCOME OPPORTUNITIES

The growth in ride-hailing and associated jobs in many markets is due to the accessibility of the work thanks to the following characteristics:

- **Low set-up costs:** Shared mobility platforms typically have minimal prerequisites for individuals to start earning an income. In many cases, all that is required is a car (which can be rented, shared by drivers, or leased if ownership is not feasible, often with structural support from the platform), a valid driving licence, car insurance, vehicle registration, and a driving license. In some markets however, the entry costs associated with obtaining a private-hire licence can be prohibitively expensive.
- **Low language barriers:** Ride-hailing platforms employ app-based communication, which minimizes language barriers. There is also limited need for drivers and passengers to communicate verbally, as the app facilitates the coordination of pickups and drop-offs.
- **Ease of access:** Ride-hailing trips are facilitated through smartphone apps, which are widely accessible to a broad range of individuals, as 68% of the global population own a smartphone.<sup>35</sup>
- **Flexibility:** Ride-hailing offers drivers (if working independently of a fleet) the freedom to select working hours, the journeys they accept, and the ride-hailing platform they use. These drivers can therefore decide the total hours, areas, and specific times they work. This flexibility enables individuals to balance their ride-hailing work with other obligations, such as caregiving responsibilities or second jobs (see data in sections below).

## RIDE-HAILING AS A STEPPING STONE FOR MIGRANTS

The demographic profiles and backgrounds of drivers vary significantly between markets. However, data from ride-hailing providers and external surveys reveals some typical characteristics:

- **Ethnic background:** A high proportion of ride-hailing drivers come from minority groups:
  - A Bolt survey conducted among UK drivers shows that 80% of ride-hailing drivers have an immigrant background, and 45% don't speak English at home.
  - A Bolt survey in the Netherlands shows that 50% of drivers were born in the country, while 85% of all residents were born in the country.<sup>36</sup>
  - Africa is a contrast: 95% of drivers were born in the country that they drive in. This is because of low levels of official migration in the region.
  - Overall, work in ride-hailing can serve as a first job and a stepping stone towards other employment for people new to a country or city, who often have limited knowledge of the local language.<sup>37</sup>
- **Life situation:** More than half of drivers support or provide care:
  - 72% of UK drivers surveyed by Bolt support a family.<sup>38</sup>
  - In North America, 53% of Lyft drivers routinely provide care for family members or other loved ones.<sup>39</sup>
- **Gender:** Ride-hailing is male-dominated work in all markets:
  - In Africa and Europe, the share of women drivers is below 5%.<sup>40</sup>
  - The proportion of women drivers is significantly higher in the US, at around 19% in New York<sup>41</sup> and 20% in California.<sup>42</sup>

### Exhibit 3: Selected key results of ride-hailing driver survey

Drivers based in the UK



Source: Bolt UK Driver Survey, 2023



## **RIDE-HAILING DRIVERS EARN ABOVE MINIMUM WAGE BUT WITH REGIONAL VARIATIONS**

While accessibility and inclusiveness are important, they alone do not suffice as strong arguments for pursuing work in ride-hailing. Financial reward and qualitative factors are key. The belief that ride-hailing drivers are not paid well has firmly taken root in the minds of many people. Reports and analysis have made headlines stating that drivers in the US make less than minimum wage after all costs are deducted.<sup>43</sup> Drivers are most commonly independent contractors — typically working through three or four ride-hailing operators and accepting the trips that suit their schedules. As a result, they typically lack the benefits customarily found in traditional employment, and their earnings fluctuated during the pandemic, further contributing to a negative image.<sup>44</sup> Yet surveys clearly indicate that the drivers prefer self employment, direct remuneration, and even upfront cash. In addition, some platforms have started to offer fixed hourly pay or minimum-pay schemes in some markets.<sup>45</sup>

## **ANALYSIS: BENCHMARKING THE EARNINGS OF AN AVERAGE RIDE-HAILING DRIVER**

### **METHODOLOGY**

**Cities in scope:** Berlin (Germany), Tallinn (Estonia), Lagos (Nigeria), Nairobi (Kenya), and country average South Africa

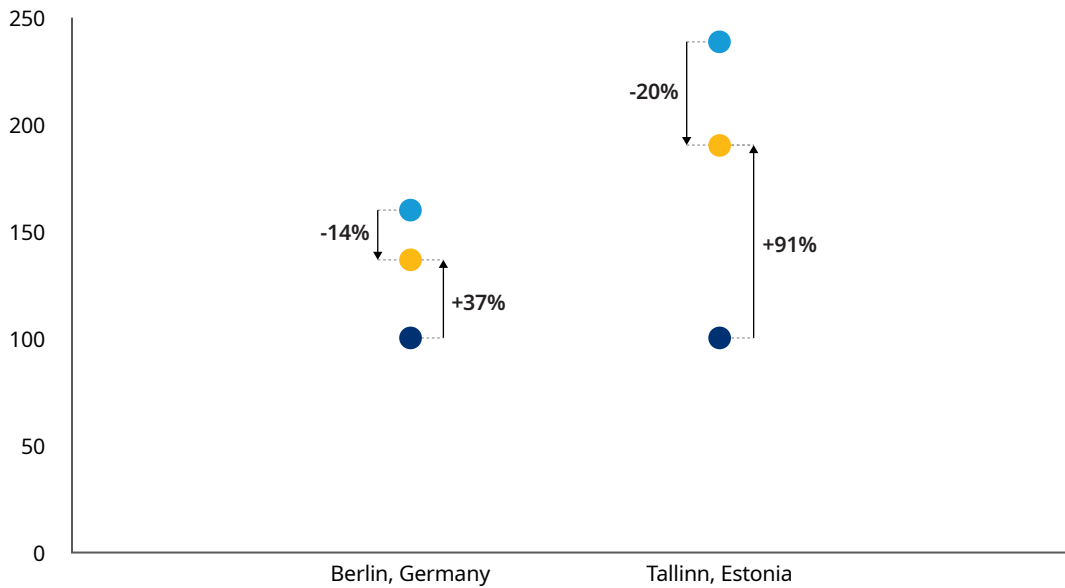
**Top-line earnings:** Calculation based on actual Bolt ride price data, accounting for commission percentage subtracted by Bolt, driver utilization, and estimated rider acceptance rate

**Bottom-line earnings:** Top-line earnings minus vehicle operating costs including depreciation, insurance, maintenance, fuel (assuming 40 hours utilization per week), and sales taxes (if relevant)

**Further consideration:** Tailoring of model to local specificities, for instance the prevalence of the driver operating model (rented car vs. owned vehicle vs. fleet model)

**Exhibit 4: Driver income<sup>1</sup> compared to selected wage benchmarks in selected European countries**

Indexed, minimum wage = 100, before personal income tax, 2023 values



● Minimum wage ● Median wage ● Driver income

1. Earnings on a 40-hour week basis, accounting for differences in driver utilization, after all operating expenses.

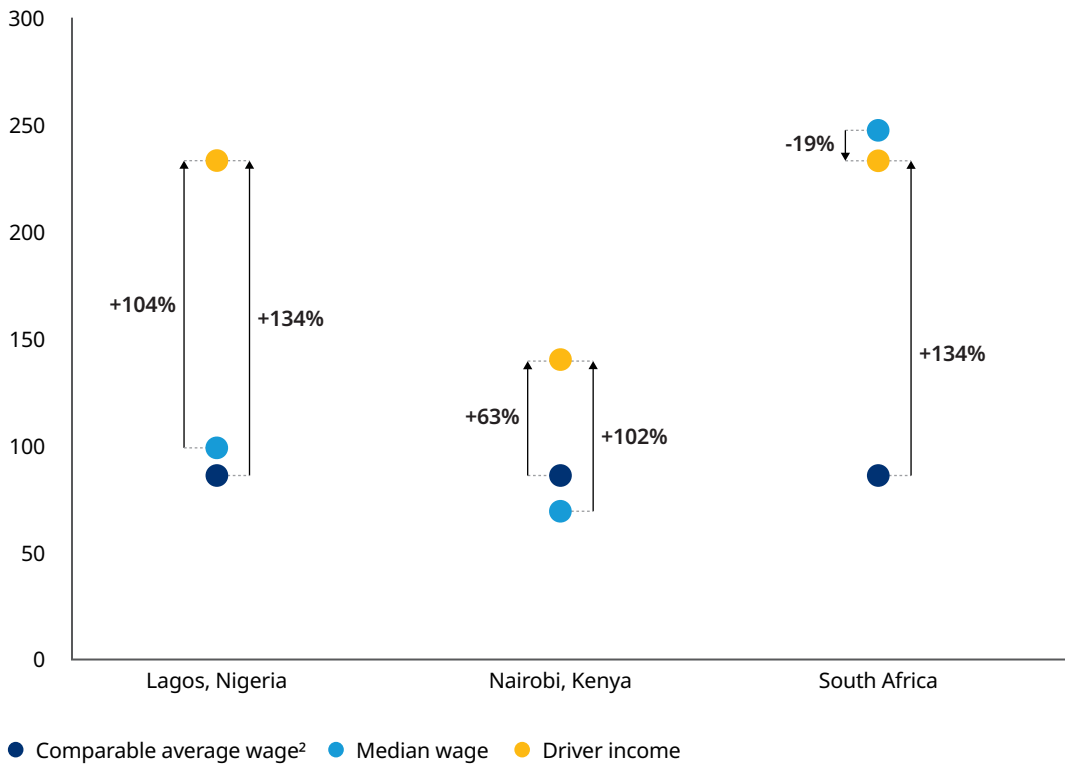
Source: Bolt, Statistisches Bundesamt, OECD, Oliver Wyman analysis

**IN EUROPE, DRIVERS EARN SIGNIFICANTLY ABOVE MINIMUM WAGE BUT NOT ABOVE MEDIAN INCOME**

In Europe, the driver earnings model shows that on average, ride-hailing wages are significantly above national minimum wages, for example 91% higher in Tallinn and 37% in Berlin. However, earnings fall short of the national median wages in those cities, at 14% lower in Berlin and 20% lower in Tallinn. This is expected, as ride-hailing in both Germany and Estonia competes with a wide range of well-paid, qualified jobs such as those in the tech sector. Nonetheless, the stereotype that ride-hailing drivers cannot earn a living wage is somewhat disproven, as driver income opportunities surpass the minimum wage in these developed markets, and minimum wages in such countries are typically calculated so that they at least cover living expenses.

**Exhibit 5: Driver income<sup>1</sup> compared to comparable wage<sup>2</sup> benchmarks in selected African countries**

Indexed, comparable wage<sup>2</sup> = 100, before personal income tax, 2023 values



1. Earnings on a 40-hour week basis, accounting for differences in driver utilization, after all operating expenses.
2. Median wage for Kenya; based on skill level 2 classified types of employment (incl. drivers) according to "International Standard Classification of Occupations" by the International Labour Office, based on Employer Skills and Occupations Survey 2022 (Ministry of Labour & Social Protection, Kenya) for Kenya and International Labour Office 2019 data (average wage, adjusted for inflation) for Nigeria, South Africa.

Source: Bolt, OECD, Oliver Wyman analysis

**IN AFRICA, RIDE-HAILING CAN BE AN ATTRACTIVE INCOME OPPORTUNITY, THOUGH VEHICLE OWNERSHIP IS A CRITICAL DETERMINING FACTOR**

The context in Africa is different. There is greater variation in salaries between rural areas and cities, and national minimum wages often do not represent living wages, especially for urban populations. Therefore, a more useful benchmark is to look at occupations with comparable skill levels. The International Labour Organization classifies the spectrum of different occupations into four skill levels:<sup>46</sup> Managers are at the highest level, group 4, while elementary occupations are classified as group 1. Drivers of any kind are classified as skill level group 2, so this has been used as the benchmark group for ride-hailing drivers.



An analysis of all three African markets in the scope of the study shows significant variations in earnings between ride-hailing drivers who own their vehicle and those who rent one. The driver earnings model shows that drivers who own their vehicle can earn significantly more than (even double) wages in skill group 2. (See appendix for detailed overview of comparable wages for each skill group in African countries.) This indicates that the relative financial rewards from ride-hailing can be higher in developing countries than in developed countries.

But facilitating greater levels of vehicle ownership is key to unlocking this opportunity. For operators such as Bolt, it is crucial to actively engage in partnerships to support vehicle ownership as a way to capitalise on the economic opportunities presented by the ride-hailing sector. These partnerships can be with local and central governments and with key private sector stakeholders such as car manufacturers, asset financing companies, and developmental agencies.

The likely explanation for the higher relative rewards in developing countries is the generally higher income levels and the range of job opportunities in developed countries. This finding is in line with surveys, in which the rate of respondents saying that ride-hailing allows them to earn a living in a reliable and predictable way is significantly higher in Nigeria (71%) and South Africa (75%) than in the Netherlands (57%).<sup>47</sup>

**Exhibit 6: Selected key results ride-hailing driver survey**

% of respondents agreeing to question

“Unlike other means, ride-hailing driving is a reliable and predictable way to earn a living”



Source: Bolt Driver Survey (2023)

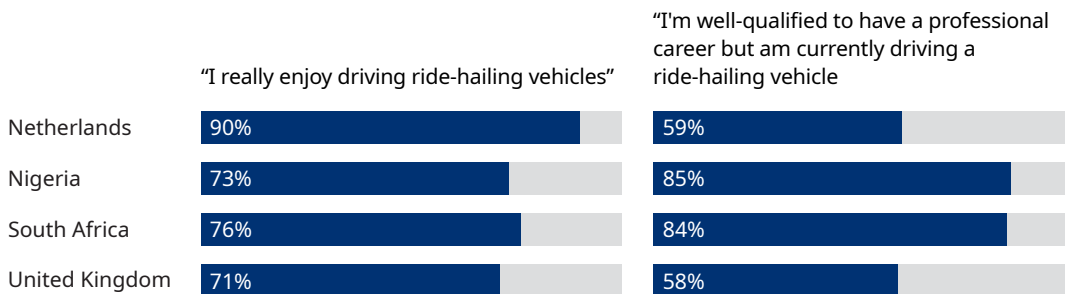
Utilizing multiple ride-hailing apps, especially in mature markets, allows drivers to balance demand fluctuations and maximize their earnings by accessing a larger customer base and taking advantage of surge pricing opportunities. Based on a Bolt driver survey, 75% of Dutch and 85% of UK drivers use multiple platforms.<sup>48</sup> In Africa, the share of Bolt drivers using multiple apps is considerably lower: 32% in Nigeria and 17% in South Africa.<sup>49</sup> Driver earnings are assessed by comparing them to national minimum or median wages. However, wages in cities where ride-hailing companies predominantly operate are often significantly higher than national average wages, particularly in developing countries. Nevertheless, it remains true that ride-hailing driver earnings are significantly above minimum and median wages, when driver earnings are compared to publicly available salary data. This is the case when a comparison is made with civil service pay in Nigeria, for example, where the majority of pay grades fall below average driver earnings.<sup>50</sup>

## MOST DRIVERS ARE SATISFIED WITH THEIR WORK, AND USING RIDE-HAILING PLATFORMS IS OFTEN A DELIBERATE CAREER CHOICE

Across all regions and countries, at least 70% of drivers using the Bolt platform express high satisfaction with their role, while less than 10% express dissatisfaction.<sup>51</sup> Despite the perception that ride-hailing work primarily attracts individuals who would otherwise struggle to find employment, Bolt survey data paints a different picture. In all surveyed countries, at least half of ride-hailing drivers indicate that they have qualifications sufficient for pursuing alternative careers. In Africa, this percentage even exceeds 80%. However, this doesn't account for a potential failure to pursue alternative career opportunities in the case of adverse employment market conditions, which might weaken the overall validity of the statement.

### Exhibit 7: Selected key results ride-hailing driver survey

% of respondents agreeing to question



Source: Bolt Driver Survey (2023)

## DRIVERS SEEM TO APPRECIATE THE FLEXIBILITY OF THE WORK

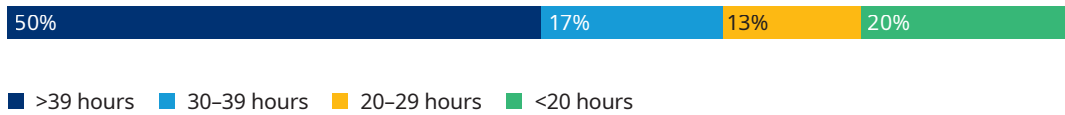
The primary motivation for individuals opting to work in the shared-mobility industry seems to be the desire for a flexible income that aligns with their personal circumstances, rather than conforming to traditional norms:

- According to a survey conducted by Uber, 76% of its drivers expressed high satisfaction with the flexibility and independence offered by the platform.<sup>52</sup>
- A Lyft impact report revealed that 65% of drivers would cease driving for app-based platforms if they lost their independence.<sup>53</sup>
- In a survey conducted within an American-based community of ride-hailing drivers, flexibility emerged as the second-most important aspect of the job after pay, with 37% of respondents citing it.<sup>54</sup>
- This flexibility also expresses itself in the distribution of hours worked by drivers. While an average of 50% of drivers work full-time in the Netherlands, Nigeria, and South Africa,<sup>55</sup> half the drivers use ride-hailing in a part-time manner, enabling them to pursue other income opportunities and work.<sup>56</sup>

**Exhibit 8: Respondents agreeing to statement as % of total**

2023, Netherlands, Nigeria, and South Africa; % of responses to question

“How many hours per week in total do you typically drive with ride-hailing companies?”



Source: Bolt Driver Survey (2023)

**SAFETY AND LACK OF EMPLOYMENT BENEFITS REMAIN PAIN POINTS**

The focus on safety has predominantly been on the well-being of passengers, and this has often overshadowed the importance of driver safety. Drivers face risks such as encounters with unruly or aggressive passengers, late-night shifts in unfamiliar areas, and unpredictable traffic conditions. A focus group study among drivers on the Bolt platform in the UK, of whom 80% have a migrant background, has shown that many drivers have experienced racist behaviour and verbal abuse from passengers, and that this leads to anxiety when accepting new rides. In the same vein, 66% of Dutch, 76% of Nigerian, and 77% of South African drivers stated that inappropriate or unsafe passengers are a major concern. Drivers themselves have clear suggestions for how to feel safer when driving. The most common is to have CCTV in the car, photo ID verification for passengers, and/or an audio recording function in the app during the ride.<sup>57</sup> Some platforms have already started introducing relevant features: Bolt and Uber offer audio recording in some markets. However, increased security through in-car surveillance must be balanced with customer and data privacy, especially under strict regimes like the General Data Protection Regulation in Europe.

**Exhibit 9: Selected key results of ride-hailing driver survey**

% of respondents agreeing to question

“Inappropriate or unsafe behaviour from passengers is a major concern for me”



Source: Bolt Driver Survey (2023)

Although drivers typically express high satisfaction with their job and pay, particularly when compared to similar employment alternatives, research indicates that the absence of traditional job benefits contributes to heightened levels of anxiety.<sup>58</sup> Benefits offered to ride-hailing drivers vary across regions and countries, and can include holiday pay, pension schemes, parental leave, or sick pay. In the absence of such benefits, drivers may find themselves in uncomfortable situations, where they must choose between prioritising their health or earning an income. Data from the UK reveal that drivers strongly desire additional benefits, placing higher importance on social protection, sick leave, parental leave, or paid leave compared to increased ride fares.<sup>59</sup> Nevertheless, the offer of traditional benefits is slightly more complex in the shared-mobility sector. Various surveys indicate that drivers are keen to maintain their self-employment and favour direct cash-out, upfront pay, as well as the ability to work flexibly across numerous apps.<sup>60</sup>

### Exhibit 10: Nigerian driver profile



#### ADEMOLA

Driver based in Lagos, Nigeria

**Ademola, a driver based in Lagos, enjoys the flexibility and financial benefits of his work, especially compared to his previous job as a truck driver. Despite the benefits, safety is a major concern for him.**

Ademola is a trained truck driver and had worked as one for years before becoming a ride-hailing driver in Lagos. In his previous job, he could be on the road for many weeks at a time, with pay fluctuating each trip. Long trips meant he was unable to be at home with his large family, and the intense work was affecting him, most notably in the form of back pain. That's why he decided to become a ride-hailing driver. He now carries passengers in Lagos up to six times a week, still putting in long hours to maximize his income.

But he states that an important difference to truck driving is that he can take breaks whenever he wants or needs, lessening the toll the driving hours take on him. Further, he is now able to see his family most days, has gained flexibility, and is much better off financially — all of which benefit his family. Despite the advantages, safety is a major concern. Ademola often encounters passengers who want to take rides offline or drive to dangerous areas, which he declines. He wishes the Lagos city authorities would do more to protect drivers and increase security on roads. Ademola plans to continue working as a ride-hailing driver for as long as he can, although he hopes to do it in a country with better financial compensation one day.



## 2.3. INDIRECT ECONOMIC EFFECTS

### KEY TAKEAWAYS

- Increased access to shared mobility helps to match supply to demand in labour markets and makes the workforce more geographically flexible.
- Shared mobility can reduce the economic costs to society from air pollution and traffic congestion.
- Tourists find shared mobility affordable and reliable, so that apps add value to a city's tourist offering.
- Shared mobility has the potential to reduce the space a city dedicates to cars, freeing up space for pedestrians and cyclists.

In addition to providing income opportunities for drivers, shared mobility also brings a range of indirect economic benefits to cities and regions.

Efficient transport options have long been the heartbeat of local economies. By improving the efficiency and connectivity of the overall transport system, shared mobility has the potential to make an impact on key areas of the economy including commuting, retail and leisure, and tourism. The case studies below highlight these impacts. Shared mobility also has the potential to mitigate the impacts of air pollution and congestion, both of which carry significant costs.

Here we take a closer look at five of the key areas of indirect economic impact, along with specific initiatives being taken by shared-mobility operators.

### 1. COMMUTING

The strongest potential indirect impact of shared-mobility services is their integration into a high-functioning commuting ecosystem, which makes the workforce more geographically flexible.

Shared-mobility services can play a key role in commuting, either by enabling whole journeys or through connections with public transport. Studies from Bolt on scooter usage in the Nordics show clear commuting patterns: Scooter drop-offs and pickups are closely correlated to the movement of people from residential areas in the morning and back to those areas in the evening. These findings closely mirror the findings of other operators such as Lime in the UK: 38% of journeys were related to commuting,<sup>61</sup> with many of these originating from areas of lower income or public-transport accessibility.

**Exhibit 11: Stockholm scooter redistribution: morning vs. evening**



- Recipient area in a given timeslot — more scooters entering it than leaving it
- Donor area in a given timeslot — more scooters leaving it than entering it

Note: The bigger the circle, the greater the imbalance between arriving and departing scooters.

Source: Bolt Order Data — June–September 2023

Whilst some cities have dense central business districts, others locate new commercial hubs away from the centre in order to diversify economic growth. Shared mobility can flexibly deploy vehicles and infrastructure, enabling it to play a key role in increasing the connectivity of these areas to existing public transport infrastructure.

In June 2022, Bolt partnered with Martin Hikel, District Mayor of Neukölln in Berlin, to provide ‘last-mile’ connectivity between public transport stations and five business parks, increasing accessibility for people living in Neukölln by incorporating a fleet of 400 e-scooters and e-bicycles into the commercial area.<sup>62</sup> This enabled employees to be better connected to public transport and encouraged them to reduce personal car usage. The district became the best performing district in terms of shared vehicle utilization in Berlin after the pilot and an extension of the business area.<sup>63</sup>

Whilst newer micromobility services have been the subject of recent analysis, studies of longer-standing shared mobility services also indicate a strong integration into commuting. Bolt’s internal surveys show that 50% of its car-sharing customers in Tallinn use the service during a commute, whilst 36% of German ride-hailing customers use the service at least once a month when commuting.

## 2. RETAIL AND LEISURE

One of the arguments put forward for private car ownership is its positive impact on retail and leisure spending. However, cars don't spend money, people do. The case for shared mobility to play a key role in promoting leisure spending in city centres has emerged strongly in recent years.

A study by Volterra Partners, commissioned by Voi, recently presented evidence of numerous ways in which shared e-scooters encourage people to travel to city centres and play a role in combating the decline of high streets. The same study estimated a potential €1.38 billion of additional spending, as well as significant redistribution of spending from out-of-town retail parks towards high streets.

This argument was supported by Voi's rider summer survey (2022), which found that around 25% of 3,493 survey respondents used a shared e-scooter to get to or from a social engagement, and that a further 14% used a shared e-scooter to run errands or go shopping. This trend is backed up by Bolt's analysis of ride-hailing, in which 27% of German ride-hailing customers used services for shopping.

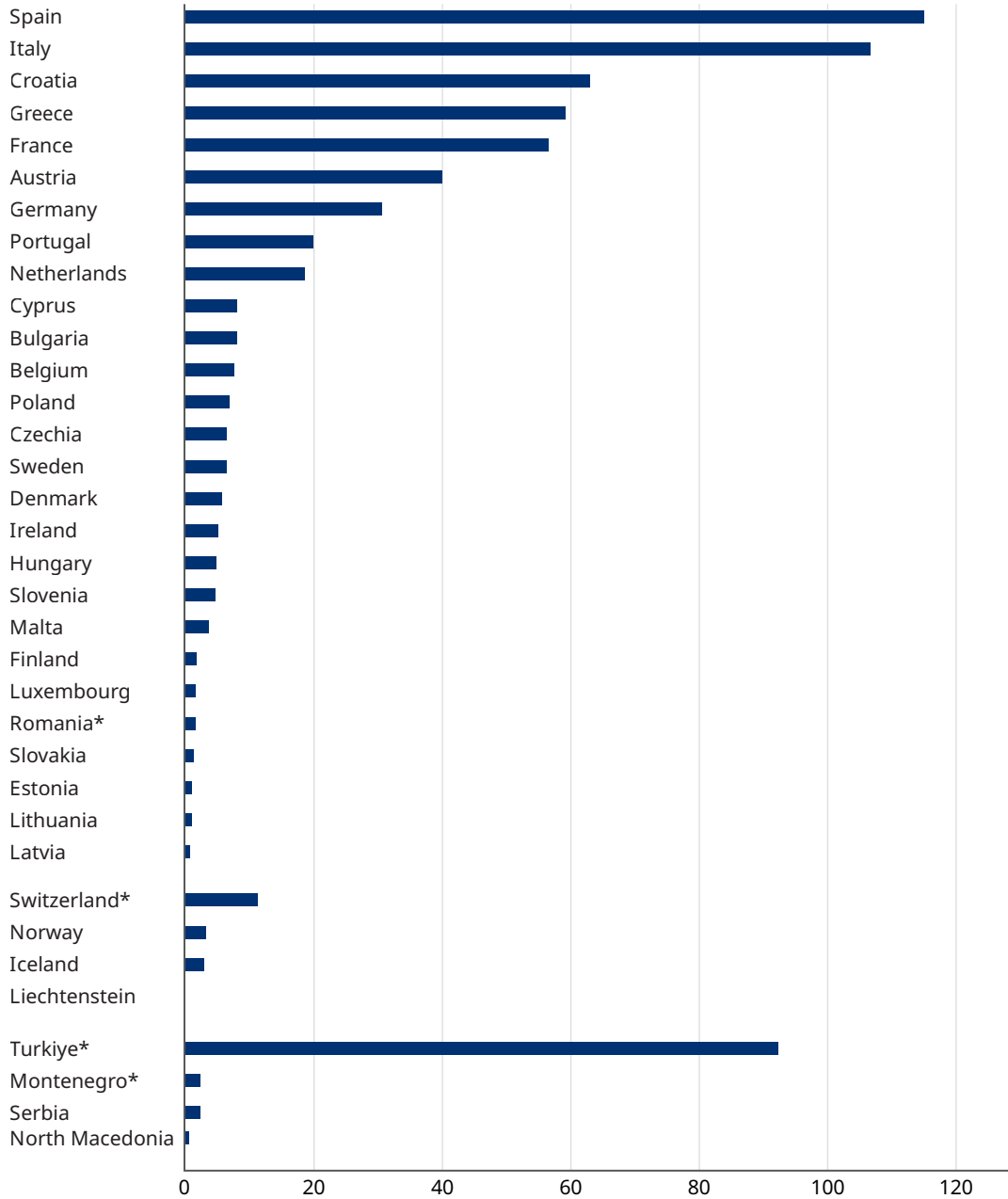
Operators can further accelerate the impact on targeted areas of local business through parking collaborations. Bolt launched eBikes in Sligo, a small town on Ireland's west coast, by building out a wide range of parking locations in close collaboration with local businesses such as the Sligo Park Hotel. Utilisation of the service is amongst the highest of any Bolt operation, and it shows that small towns too can offer car-free travel options.

## 3. TOURISM

An underrated impact of shared mobility apps is their ability to reduce consumer friction and make it easier to move around whilst travelling abroad. The latest figures from the World Travel and Tourism Council show that tourism makes up 9.3% of the economy in Europe and around 7% in Africa. Shared mobility apps, which operate across borders with similar payment details, are increasingly used by travellers to save money and have become essential parts of the tourist infrastructure in many cities.

**Exhibit 12: Tourism destinations — nights spent by interntional guests at tourist accommodation, 2021**

Million nights spent in the country by non-residents



\* Estimated using 2021 monthly data  
 Source: Eurostat (online data code: tour\_occ\_ninat)

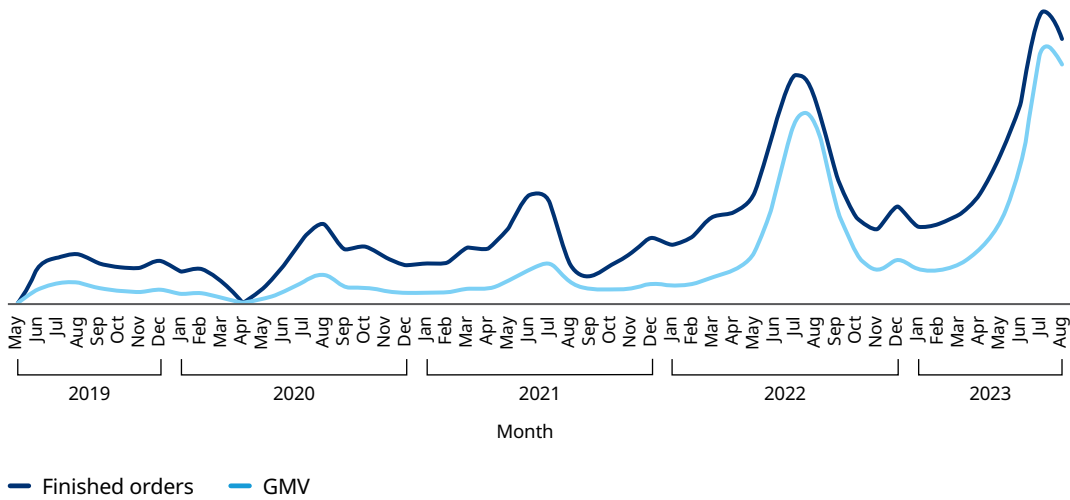


Figures from Bolt in Croatia show the direct impact. Croatia is estimated by Eurostat to be the third largest tourist economy in the EU measured by overnight stays. In 2022, Croatia had 18.9 million international tourist visits and 104.8 million overnight stays. Income from tourism is important for the country, accounting for 19.5% of GDP. Being a coastal country, Croatia relies on the summer season to attract visitors.

Split, Dubrovnik, and Zadar are some of the most visited cities in Croatia, especially during the summer months, and Bolt is present in them with its ride-hailing service. Bolt's ride hailing data shows clear spikes in the number of finished orders (completed trips) within these cities in the summer.

**Exhibit 13: Croatia (Split, Zadar, Dubrovnik)**

Total finished orders and total GMV, €

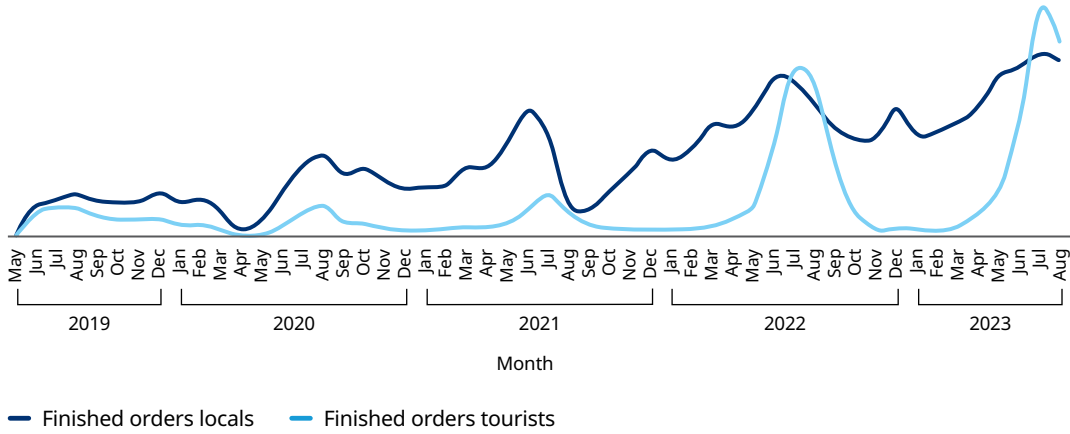


Source: Bolt Order Analysis 2023

The impact of tourism can be further analysed using riders' phone numbers. In the chart below, the dark blue lines represent customers with Croatian phone prefixes and the light blue those with overseas numbers. Tourists completed more rides than local customers.

**Exhibit 14: Croatia (Split, Zadar, Dubrovnik) finished rides**

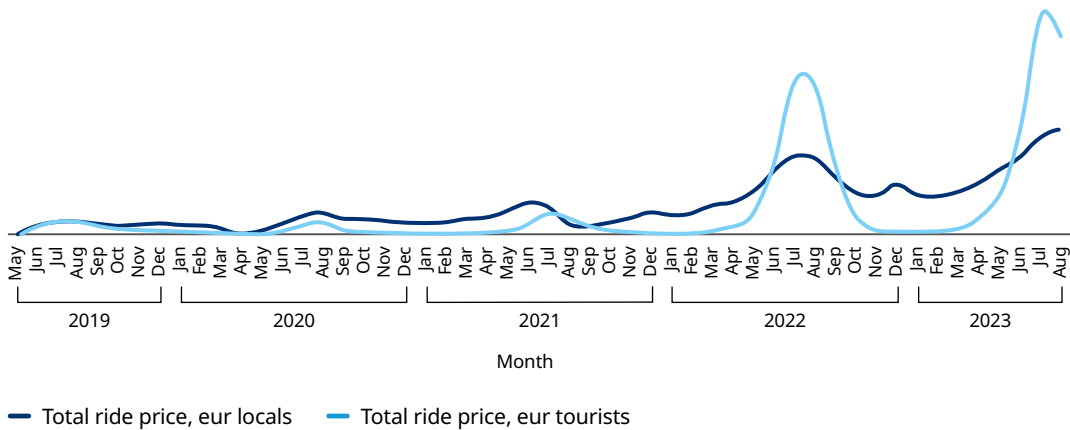
If the phone prefix of users is same as the country (+385 Croatia) where they are taking the ride, then they are considered locals. Otherwise they are tourists.



Source: Bolt Order Analysis 2023

**Exhibit 15: Croatia (Split, Zadar, Dubrovnik) GMV**

If the phone prefix of users is same as the country (+385 Croatia) where they are taking the ride, then they are considered locals. Otherwise they are tourists.



Source: Bolt Order Analysis 2023

The data shows that tourists find shared-mobility apps an affordable, reliable, and easy way of moving around a destination, indicating that the apps add value to its overall tourist offering. A survey conducted by Bolt through YouGov shows that 81% of Bolt’s German ride-hailing passengers use its services while travelling abroad. (Croatia, interestingly, ranks consistently in the top 10 overseas destinations for German holidaymakers).

## 4. CONGESTION

The average American commuter wastes 54 hours per year due to traffic delays.<sup>64</sup> In some European cities, the number is even higher. In London, the average driver spends 156 hours in traffic per year, in Paris 138, and in Berlin a more moderate 71.<sup>65</sup>

Despite lower rates of car ownership in African countries, the situation is worse in some ways. Johannesburg records some 61 hours of delay for a driver per year. Lagos has one of the world's worst congestion problems, with its residents reportedly spending 30 hours per week in traffic.<sup>66</sup>

The economic costs of traffic congestion are high. They amount to an estimated £5.7 billion (€6.59 billion) in London and close to €1 billion in Berlin,<sup>67</sup> based on fuel costs and the hourly value of people's time. Chapter 4 argues that a full portfolio of shared-mobility services can reduce traffic congestion and, consequently, its economic costs. Again, the overall effect on traffic congestion depends on how people switch modes.

Shared mobility also has the potential to reduce the overall space that a city dedicates to cars. Space can be freed up for pedestrians and cyclists, for example, by placing bike-sharing stations in areas that would otherwise be used for parking spaces.

## 5. AIR POLLUTION

Chapter 4 analyses how shared mobility can decrease car usage and accelerate the adoption of electric vehicles (EVs) by substituting combustion car trips for cleaner transport options, primarily ride-hailing in EVs, car-sharing, and micromobility. EVs and micromobility vehicles produce zero tailpipe emissions and do not emit pollutants such as nitrogen oxides (NOx), particulate matter (PM), and carbon monoxide (CO) that have negative health effects. In this way, shared mobility can reduce the costs of mobility to society.

In 2023, air pollution is expected to have a cost of \$5.7 billion in London, \$3.2 billion in Berlin, \$900 million in Johannesburg, and \$72 million in Nairobi. It will also lead to the death of 4,100 people in London, 2,100 in Berlin, 2,200 in Johannesburg, and 470 in Nairobi.<sup>68</sup> Globally, the number of premature deaths each year due to air pollution is estimated at 4.5 million, while costs are estimated at \$8 billion daily. These costs are due to reduced life expectancy, premature birth, illnesses that result in hospital visits, missed work, and the financial burdens of illnesses.

Shared mobility services also have the potential to reduce serious accidents and car-related deaths, because they can help reduce drunk driving, distracted driving, speeding, and potentially the overall distance travelled by car.

However, as pointed out in Chapter 4, the impact of shared mobility will depend on how people switch modes, the adoption rate by providers, and corresponding regulatory guidance. If people use ride-hailing and car-sharing mostly to replace public transport or other clean forms of transport, the positive effects might be significantly reduced.

## **CONCLUSION ON ECONOMIC IMPACT OF SHARED MOBILITY**

Shared mobility is set to generate millions of income opportunities in the coming years, improving the economic well-being of people directly or indirectly engaged in or affected by the sector, especially in developing countries. Despite the relatively high level of financial reward, the driver population might benefit if employment benefits were greater.

The vast majority (around 95%) of people working in shared mobility will be in ride-hailing. However, the adoption of autonomous vehicles by ride-hailing providers would significantly limit the number of human drivers. Large operators, especially in the US, have already announced plans to use autonomous vehicles.

Work in ride-hailing has relatively low entry barriers in many markets and therefore a high degree of inclusivity. For people new to a country or city, driving for a ride-hailing service can serve as a first job and a steppingstone towards a higher income, even though some markets have regulatory entry requirements such as language tests or special driving permits. However, providers should focus more on the inclusion of women, including through ways of fostering driver safety.

In addition to jobs directly related to the shared mobility value chain (in areas such as R&D, maintenance, and payment), an increased access to mobility makes the workforce more geographically flexible. It therefore helps to match supply to demand in labour markets and yields an indirect job creation effect. Shared mobility can, if implemented effectively, also help reduce the economic costs to society from air pollution and traffic congestion, and it can help cities to improve urban mobility.





## CHAPTER 3

# SOCIAL IMPACT

Affordable, accessible, and safe transport can connect communities and enable access to jobs, healthcare, and education. When transport is implemented efficiently, it enables mobility for people, which is pivotal for achieving a more inclusive and prosperous society. The introduction of new mobility solutions provides a great opportunity for operators and authorities to design them in an accessible way and fast-track progress. Shared mobility also has the potential to become what the UN calls a “cross-sector accelerator”,<sup>69</sup> in effect not only getting people faster and more conveniently from A to B, but also enabling progress towards other SDGs to eradicate poverty, reduce inequalities, and protect human rights.<sup>70</sup>

In the past 10 years, the UN, the European Union,<sup>71</sup> and various local mobility ecosystems have been addressing the issue. For instance, the County of San Francisco has made social equity enhancements the main objective of its legislation on (shared) mobility services.<sup>72</sup>

In the following section, we evaluate how shared mobility can achieve its potential for overall social impact.

■

**Safe, affordable, and accessible transport can connect communities and enable access to jobs, healthcare, and education.**



## 3.1. AFFORDABILITY OF SHARED MOBILITY

### KEY TAKEAWAYS

- Lower upfront costs make shared mobility a viable alternative for people who cannot afford to buy a car. It therefore has the potential to bring transport within reach of lower-income households.
- By combining shared mobility with other modes, such as public transport, people can optimize individual travel patterns and further reduce their transport expenses.
- Fully transitioning from private car ownership to shared mobility can lead to substantial cost savings, even when driving high annual distances of up to 15,000 km.
- However, personal car usage offers benefits such as convenience and accessibility. Shared mobility services are also subject to capacity constraints, and prices might face upward pressure.

### AFFORDABILITY IS A KEY FACTOR IN TRANSPORT DECISIONS

According to an Oliver Wyman global consumer sentiment survey,<sup>73</sup> 48% of consumers name affordability as the most important factor when making transport decisions. This is understandable, given that the least privileged — especially in least-developed countries (LDCs) — have to spend a disproportionate amount of their income and time to get to employment or other crucial places, according to the UN.<sup>74</sup>

The overall distance travelled in vehicle-kilometres increased 35% from 1990 to 2022 and is expected to continue to grow in the future,<sup>75</sup> increasing the amount people spend on travel. A lower cost of accessing mobility through shared services can make mobility more affordable and help reduce personal spending. It can thus increase access for additional parts of society.

In a case-by-case comparison with individual, privately owned modes of transport, shared mobility options are more affordable. However, public transit remains the cheapest mobility mode, given that access and usage are highly subsidized.



## THE FINANCIAL HURDLE TO PRIVATE INDIVIDUAL MOBILITY IS SUBSTANTIAL

Private car ownership and usage has long been a popular choice of transport mode, especially in developed markets. It accounts for up to 83% of passenger-kilometres travelled in the European Union and provides individuals with convenience and a sense of autonomy.<sup>76</sup> However, car ownership entails significant upfront and running costs. In 2022, the average purchase price of a new vehicle in Germany was €42,790, while the average used car changed hands for €18,800.<sup>77</sup>

Because of the high costs, individuals in lower income brackets are less likely to be able to afford a personal vehicle. In Europe, 33 million people were unable to afford a car in 2017, which is roughly 7% of the population.<sup>78</sup> Matters are significantly worse in the developing world, especially sub-Saharan Africa, where in most countries (except for South Africa), there are fewer than 100 vehicles per 1,000 inhabitants. That compares to 580 in Germany.<sup>79</sup>

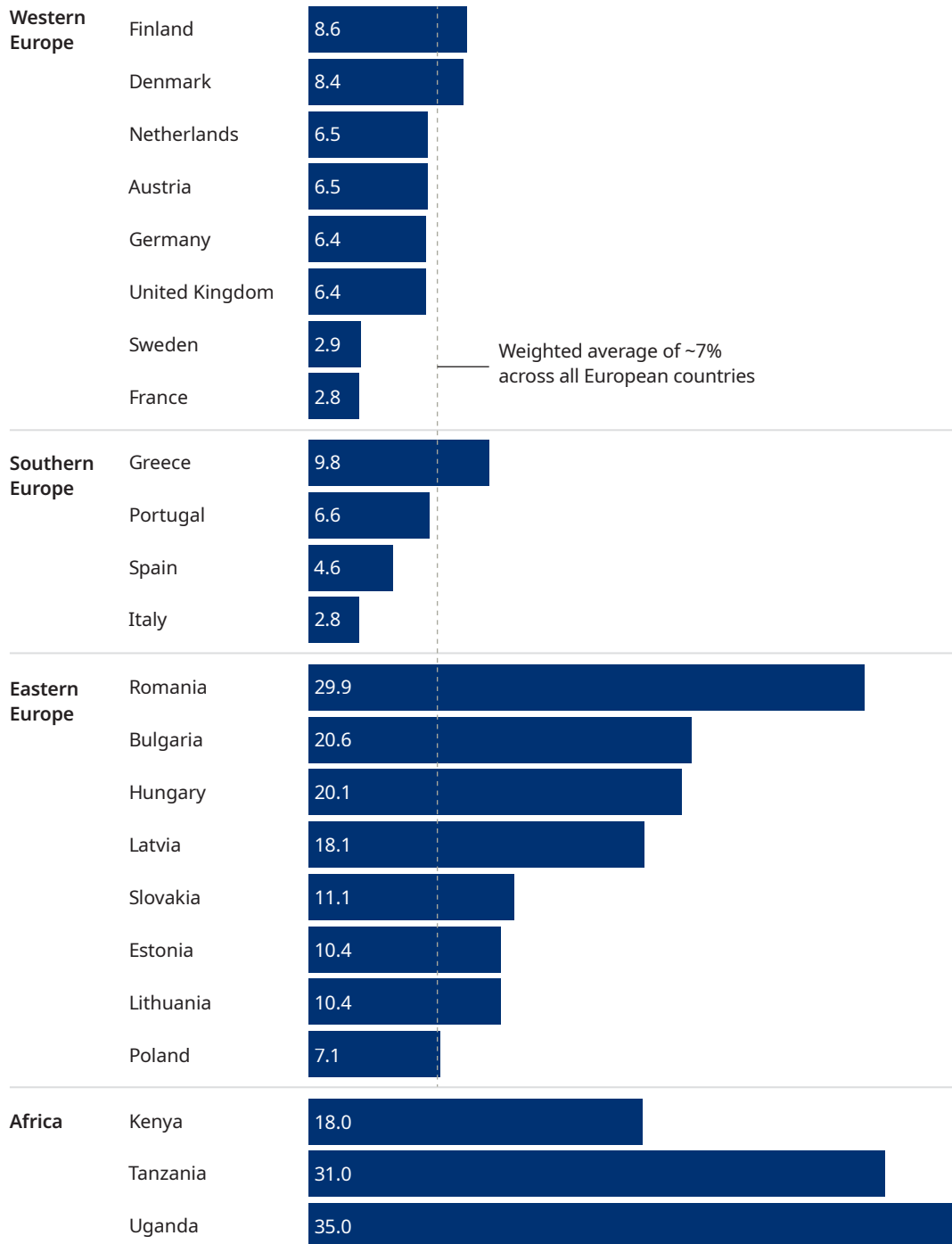
The average price of an e-bike has surged significantly over the last five years, with 25% of e-bikes in the US currently priced above \$4,000 and fewer than 5% priced below \$1,000.<sup>80</sup> In Germany, the average e-bike cost €2,800 in 2022, 27% more than in 2019.<sup>81</sup>

E-scooters are more affordable, with entry-level commuter models costing between €450 and €1,500, and high-performance models starting at €2,500 in the US and European markets. However, many countries prohibit private usage and limit e-scooters to city-approved rental schemes.<sup>82</sup>



**Exhibit 1: Share of people unable to afford a car**

In % of total population, 2017



Source: Eurostat, Deloitte

## SHARED MOBILITY OFFERS A LOWER FINANCIAL BARRIER TO INDIVIDUAL CAR USAGE

It is possible to have access to a car without buying one, especially in the developed world. **Car subscriptions** offer a flexible approach to vehicle access. A fixed monthly fee covers insurance and maintenance, making such a plan attractive to people seeking flexible access to transport without a long-term commitment. In 2022, the average monthly subscription rate in Germany was €639 for a term of 11.5 months, according to the FAAREN Auto-Abo Report (2023).

**Car rental** is aimed at shorter periods of use, from a few hours to several days. The financial entry barrier usually amounts to the total costs of the rental plus fuel. In addition to time and duration related flexibility, most rental offerings include a one-way option, which lets the renter leave the car at a different station to the one they picked it up at, so avoiding the need for an unnecessary round trip.

While both subscription and rentals have significantly lower financial entry barriers than ownership of a private car, individual shared mobility services have still lower barriers to entry. A user simply needs to download an app and pay per trip, which is often transparently priced per minute or kilometre or both. Shared-mobility car services therefore provide a viable alternative for individuals who cannot afford the upfront cost of a personal vehicle, and they increase participation in transport, especially for lower-income households.

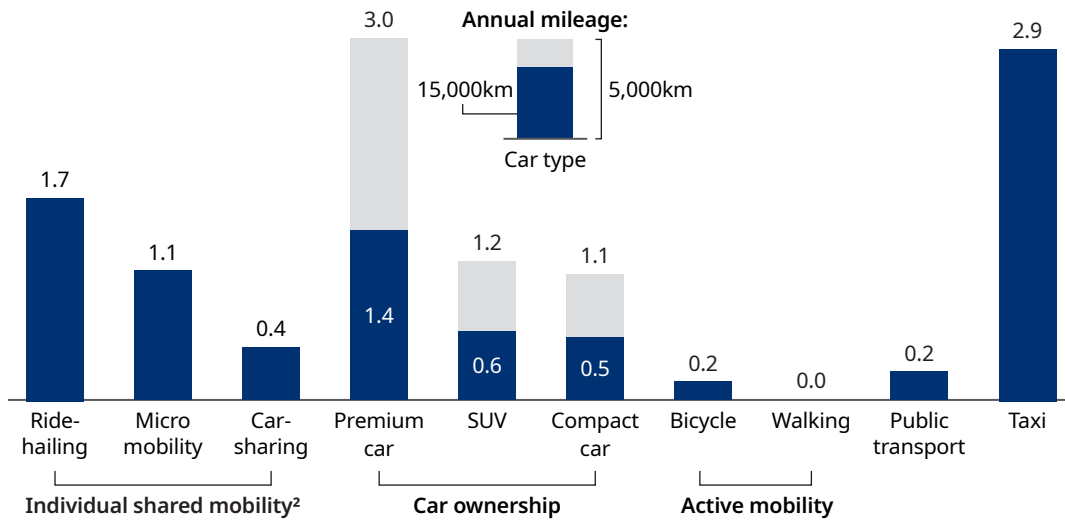
## WHILE TOTAL TRANSPORT COSTS PER MODE DEPEND ON DISTANCE TRAVELLED, CAR-SHARING PROVIDES A CHEAPER ALTERNATIVE TO PRIVATE CAR USAGE

The per-kilometre cost (total cost of ownership, or TCO) of a private vehicle depends heavily on the annual mileage. For a distance of 5,000 km per year, the TCO for a compact car is €1.1 per kilometre, while for an SUV, it is €1.2 per kilometre. For both types of car, ownership is more cost-efficient than using ride-hailing services for the same distance in Germany, which work out at an average of €1.7 per km. However, ride-hailing is significantly cheaper in, for instance, Eastern Europe (€0.9 per km), which might make it a cheaper option at a certain annual mileage (about 6,000 kilometres). Shared micromobility, with an average cost per kilometre of €1.1, equals the cost of owning and using a private car in Germany for an annual mileage of 5,000 km. But car-sharing costs less than all these other modes, at an average of €0.4 per kilometre. It remains cheaper than a private vehicle even at an annual mileage of 15,000 km, when the cost per kilometre drops to €0.5 for a private compact car and €0.6 for an SUV.

However, a comparison of total cost of usage per kilometre must consider that a substitution of car usage depends on mileage per trip and might not be suitable for all use cases. In addition, when comparing the total costs of different modes against driving a private car a certain mileage each year, it needs to be considered that shared mobility services can reduce overall use of an individual vehicle. The lower the annual mileage, the higher the overall TCO of a privately owned car becomes compared to the cost of shared modes of transport, making a switch to a sharing service more cost-efficient.

**Exhibit 2: Cost per kilometre travelled by various modes in Germany<sup>1</sup>**

In €/km



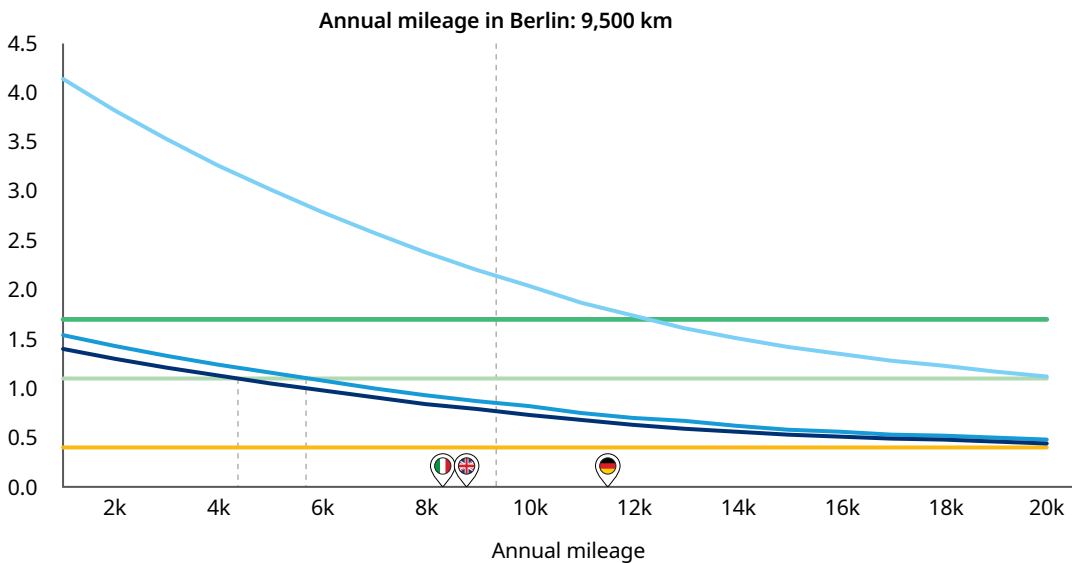
1. Cost for private vehicle measured by TCO, incl. depreciation, operating costs, fixed costs, service and maintenance costs, tire costs and assumes 5 years of ownership.

2. Based on Bolt data.

Source: Shared mobility based on Bolt data (Car sharing proxied by data for France), TCO car data from Athlon, radfahren.de, deStatis, taxi-rechner.de, Oliver Wyman analysis

**Exhibit 3: Cost per kilometre travelled by shared mobility, compact and premium car and SUV by annual mileage<sup>1</sup>**

In €/km



— Compact car — SUV — Premium car — Ride-hailing — Micro mobility — Car-sharing

📍 Annual average mileages

1. Cost for private vehicle measured by TCO, incl. depreciation, operating costs, fixed costs, service and maintenance costs, tire costs and assumes 5 years of ownership.

Average mileages: ADAC (Berlin), Kraftfahrt-Bundesamt (Germany), National Travel Survey statistics (UK), Enerdata (Italy).

Source: Shared mobility based on Bolt data, TCO car data based on Athlon and OW extrapolation

## CASE STUDY

### **An average car owner in Berlin could reduce mobility spending through the use of shared mobility services**

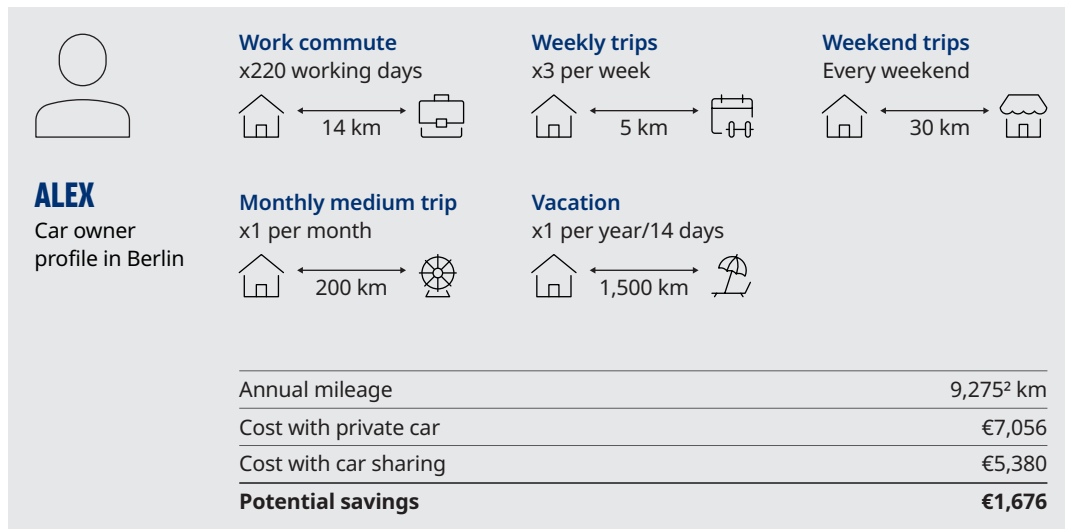
As an example, let's consider an illustrative Berlin resident. Their daily commute to work is 7 km one way, which they drive in their own compact car.<sup>83</sup> In addition, they take three trips per week to visit the gym, attend personal appointments, and buy groceries, with each trip a total of 5 km. On weekends they like to go hiking and swimming, or visit friends, driving 30 km per weekend to do so. Once per month they visit relatives in Frankfurt (Oder), which is 100 km one way. For their annual vacation in the Alps, they drive 1,500 km round-trip to Berchtesgaden. In sum, their total driving distance amounts roughly to the annual average for a Berlin resident of 9,500 km.<sup>84</sup>

Driving this annual distance in their own compact car leads to an annual TCO of €7,056.<sup>85</sup> However, if they switched to time-based car-sharing offers for their daily commute to work and for the three weekly errands, and to daily rentals for the weekend trips, the monthly trip to Frankfurt, and the vacation, the cost per year would amount to €5,380.<sup>86</sup> That would save them roughly €1,700, indicating that it could make financial sense to forgo car ownership and switch to car-sharing.

In addition to the commutes and other regular trips mentioned above, smaller ad hoc distances can be considered too. Distances up to 3 km can easily be covered by even cheaper modes of transport, further increasing the potential savings. For instance, the average distance travelled by e-scooter in Germany is slightly below 2 km, and e-scooters can conveniently replace short car trips.<sup>87</sup>

Another factor is that only 230,000 public parking spaces are available for 1.2 million cars within the Berlin S-Bahn Ring. That limits the convenience factor of direct access to a private vehicle compared to the varying, free-floating locations of a car-sharing service.

**Exhibit 4: Overview of annual transport cost savings of an illustrative Berlin resident<sup>3</sup>**  
 Private vehicle usage vs. car-sharing<sup>1</sup>, illustrative



1. Assumes 100% coverage of kilometres travel by one mode.  
 2. 9,500 km is the average mileage of a car owner in Berlin (ADAC data).  
 3. Profile is exemplary and illustrative, however roughly in line with average yearly mileage of a Berlin citizen.  
 Source: Car sharing based on Bolt data, TCO car data based on Athlon and Oliver Wyman extrapolation

**COSTS ARE NOT THE ONLY MOTIVE WHEN PURCHASING A CAR**

Despite the potential cost savings, other factors could limit the transition of consumers to shared mobility services:

- The capacity and availability of car-sharing vehicles is sometimes limited. Depending on the location and time of day, it may not always be possible to find an available vehicle when needed. This limited accessibility can be a significant inconvenience for individuals who rely on transport for their daily activities.
- The personal convenience benefits of having a personal car cannot be neglected. Owning a private car provides a sense of autonomy and flexibility, allowing individuals to travel spontaneously and according to their own schedules and preferences (if not stuck in traffic). Also, car ownership is still perceived as a status symbol.
- Certain lifestyles and specific needs may not be adequately met by car-sharing services alone. Families with young children or individuals with special requirements — due to disabilities, for example — may require a car with specific features or configurations that are not typically available through car-sharing providers. This is important, considering that 24% of European households include children,<sup>88</sup> and 24% of people in the EU live with some form of disability.<sup>89</sup>



- Considerations such as these mean that, while car-sharing has helped to reduce the annual mileage driven in personal vehicles (from a European average of 13,000 km p.a. in 2000 to 11,000 km p.a. in 2020),<sup>90</sup> it has so far had only a limited effect on actual personal car ownership. In 2021, there were 249.5 million cars on the roads in the European Union — more than ever before.<sup>91</sup> As a result, given the trend towards urbanization and the growing population density in cities, many metropolitan areas are increasingly congested and face long traffic jams. At some point, users will start to value efficient and timely transport over lifestyle and status considerations, and shared mobility will become more attractive. Moreover, cities will become more attractive if car-focused city design, which has led to the “hollowing out” of some large cities, gives way to urban planning that prioritizes people over cars.<sup>92</sup>
- Finally, although shared-mobility options currently have the potential to be more cost-effective than personal car ownership, many shared-mobility companies are facing profitability challenges. If economies of scale based on service volume and breadth (that is, offering various shared-mobility modes) cannot be realized, operators may be under pressure to raise prices in the future, which would impact the affordability of their services. It remains to be seen how shared mobility companies will navigate this balancing act between providing cost-effective transport and ensuring their own financial sustainability.



## Shared mobility can generate substantial financial benefits for consumers

## 3.2. ACCESSIBILITY OF SHARED MOBILITY

### KEY TAKEAWAYS

- Shared mobility has the potential to improve transport accessibility for underserved customers, including people with disabilities and the elderly. This effort entails active collaboration between shared-mobility service providers and cities, end-users, and experts to design vehicles and to expand mobility infrastructure and mobility services.
- Shared-mobility providers can improve their services through real-time tracking of vehicles, wheelchair access, and voice notifications.
- Shared mobility has the potential to increase the economic accessibility of people living in areas not well connected to public transport infrastructure, enabling them to become mobile and increasing their access to jobs. Economic empowerment is particularly important in less developed countries with poor urban transport infrastructure.
- Economic accessibility can reach full potential through a comprehensive and inter-modal service orchestration to match labour supply and demand in metropolitan areas.

### CASE STUDY

#### Using shared mobility to increase access to transport for vulnerable groups in the United States

A collaboration between the Massachusetts Bay Transportation Authority and two ride-hailing companies used a paratransit program to address accessibility gaps for individuals with temporary or permanent disabilities. The service is available to disabled people who are not capable of using public transport. It gives them the possibility to book an on-demand ride-hailing service one day in advance at a lower cost than usual. The initiative resulted in a 30% increase in trips for those groups and a 27% reduction in costs for riders with disabilities.<sup>93</sup>

In another example, a ride-hailing company collaborated with the US National Federation of the Blind during the pandemic to enhance accessibility and mobility options for blind and visually impaired people.<sup>94</sup> The partnership set up training programmes to increase ride-hailing drivers' awareness and understanding of the needs of blind passengers. The operator also improved its app, introducing features such as VoiceOver support and detailed pickup and drop-off instructions to better assist blind riders.

## SHARED MOBILITY SERVICES ARE NOT YET INCLUSIVE

More than 1 billion people worldwide live with disabilities, according to the World Health Organization (WHO),<sup>95</sup> of whom 80% live in low-income countries.<sup>96</sup> In the European Union, one in four citizens over the age of 16 reports some form of long-term limitation in usual activities. In addition to people with long-standing disabilities, people with temporary impairments due to injuries also face mobility barriers. Lack of accessibility to transport affects people's quality of life. It restricts their travel, limits leisure opportunities, and can exacerbate poverty by restricting access to opportunities for education and employment.<sup>97</sup>

Shared-mobility services are relatively new, presenting an opportunity to design them from their inception to be more accessible than legacy transport modes. Nevertheless, a recent analysis of ride-hailing requests in San Francisco showed that 53% of all wheelchair-accessible trip requests were declined by platform drivers.<sup>98</sup> Similarly, a recent online study conducted by the European Transport Research Review of 553 disabled people in 21 European countries, suggests that shared mobility services are still in the early stages of ensuring full reliability and accessibility for customers with disabilities. During interviews, respondents mentioned ideas for improvement, including real-time tracking of vehicles, the need for wheelchair access and voice notifications, and enhancing the affordability of the services. The study concluded that for shared mobility to unleash its full potential, providers and authorities need to collaborate and engage with end-users with disabilities and field experts, to develop vehicles and to expand mobility infrastructure and mobility services.<sup>99</sup>

## SHARED MOBILITY CAN INCREASE ACCESS TO MOBILITY FOR PEOPLE LIVING IN AREAS THAT ARE NOT WELL CONNECTED TO PUBLIC TRANSPORT

In the US and Europe, roughly a quarter of the population have no convenient access to public transport, while the figure for sub-Saharan Africa is two-thirds.<sup>100</sup> In those areas, ride-hailing is likely to increase mobility options for consumers, especially those who cannot afford a personal vehicle. Micromobility can improve first-mile and last-mile connectivity to public transport infrastructure — which is especially relevant for the urban European population, of whom 80% are well connected to public transport.<sup>101</sup> An October 2018 analysis of 3.5 million completed ride-hailing trips in several European and US cities showed that between 20% and 40% of the trips had no viable public transport alternative.<sup>102</sup>

From the summer of 2022 to May 2023 Bolt partnered with TH Wildau to investigate usage in the outskirts of cities Berlin-Lichtenrade, Berlin-Zehlendorf, and Erkner (Brandenburg). Between 24 and 35% of users in the pilot areas used e-bikes and scooters several times a week to reach the S-Bahn, primarily due to the absence of bus services in the early morning and late evening. Sharing services were cited as an alternative to bus services by 70–90% of participants, with key reasons being bus delays and cancellations, an absence of bus routes, and overall congestion.

Another study has evaluated the effects of shared micromobility on job access in the San Francisco Bay Area, Minneapolis-Saint Paul, Cairo, and Mexico City. In the Bay Area and Minneapolis-Saint Paul, the study found that micromobility improved job access more for lower-income residents than for the average resident. In San Francisco, micromobility led to a more equitable distribution of job access across the city.<sup>103</sup>

## **INCREASED ACCESS TO MOBILITY ENABLES ECONOMIC AND SOCIAL INCLUSION**

Shared mobility, when effectively integrated in the transport mix, can increase transportation inclusivity, improving urban economic and social prosperity. According to a study by the American Public Transportation Association, every \$1 invested in enhanced transportation offerings generates approximately \$4 in economic returns, creating job opportunities and stimulating local economies. The World Bank also estimates that every 10% improvement in accessibility to jobs results in a 3-4% increase in economic productivity. In addition, the American Association of Retired Persons highlights that access to transport is essential for older adults to remain active and engaged in their communities, which reduces their social isolation.

## 3.3. SAFETY OF SHARED MOBILITY

### KEY TAKEAWAYS

- Safety is a major concern when cities regulate micromobility, as can be seen in Paris' rental e-scooter ban and London's micromobility trials. The incident rate and severity of e-scooter collisions depend heavily on factors such as infrastructure and shared-mobility services' safety measures.
- The most effective measure to increase micromobility safety is to change mobility infrastructure, so that it does not primarily serve cars and orient it towards modes such as e-bikes, e-scooters, and walking. Shared mobility providers should continue to improve their products' quality and educate riders.
- Women generally feel more unsafe than men when using ride-hailing services, and perceived safety is a larger concern in developing countries. Providers can introduce safety features such as women-only services, in-car CCTV, and an audio-recording function in the app during the ride.

### SAFETY IS A MAJOR CONCERN FOR CITIES WHEN REGULATING MICROMOBILITY

Cities' focus on safety when regulating micromobility has been frequently highlighted in the media through coverage of e-scooter accidents, the ban of rental e-scooters in Paris because of safety-related concerns, and the ongoing safety-focused trial of e-scooters in London. Thus, it is important to look at how e-scooters compare to other modes of transport in terms of safety.

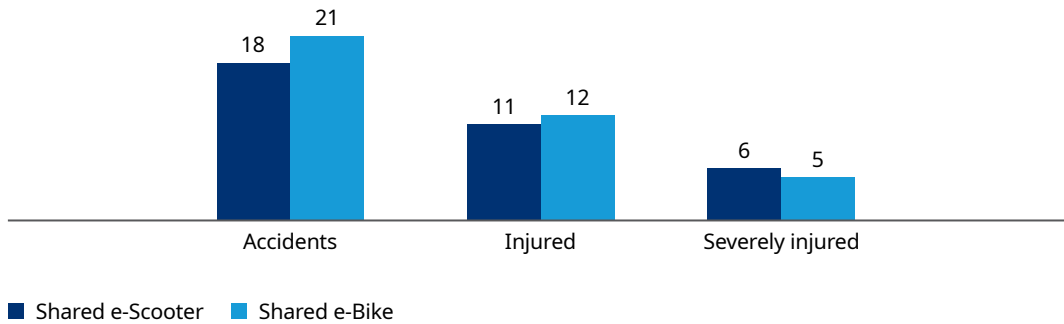
### E-SCOOTERS HAVE FEWER ACCIDENTS PER KILOMETRE THAN E-BIKES BUT A SLIGHTLY HIGHER CHANCE OF SEVERE INJURY

The overall accident rate for e-scooters is lower than for e-bikes (18 versus 21 per million kilometres travelled). But, if injuries do occur, they tend to be slightly more severe for e-scooter riders (six severe injuries versus five for every million kilometres).<sup>104</sup> However, users seem to learn and adapt to new modes of transport such as e-scooters. In Europe, the number of e-scooter injuries requiring medical treatment per million kilometres decreased by 19.2% in 2022 from 2021 (4.1 per million km versus 5.1 per million km in 2021). These figures are based on more than 350 million trips in 2022, an increase of 45.7% from 2021.<sup>105</sup>



### Exhibit 5: Accident and injury rate by micromobility mode

In incidents per million kilometres, 2022



Source: Bolt data

### RIDER INJURIES TEND TO BE CAUSED BY BEHAVIOUR, INFRASTRUCTURE, AND QUALITY OF E-SCOOTER

- Infrastructure:** Falls were often reported as the most common (75% to 80.2%) cause of injuries for e-scooter riders.<sup>106</sup> These are most commonly caused by hazardous surface features, such as potholes, and infrastructure, such as curbs.<sup>107</sup> The majority of fatalities resulting from e-bike and e-scooter crashes involve motor vehicles, making clear the need to create a safer mobility infrastructure that accounts for the increase in individual and flexible mobility modes.<sup>108</sup> Current urban infrastructure prioritizes motor vehicles over other modes of transport, particularly modes that take up less space, such as walking, biking, and scooters. Reversing the urban mobility pyramid to put individual users at the centre of infrastructure layout can significantly increase the safety of the urban mobility ecosystem.
- E-scooter quality:** This pertains to the limited roadworthiness of e-scooters;<sup>109</sup> however, operators have constantly been improving the quality of their vehicles. The effect of improved e-scooter quality was demonstrated in the recent London trial of 2023. Transport for London reported a significant decrease in e-scooter accidents as a result of rental scooters in London going beyond the UK's national safety standards. The standards included a speed limit of 12.5 mph (20 kph), larger wheels, and lights that are always switched on. Recent data show that only 0.001% of trips resulted in serious injury, and there were no fatalities.<sup>110</sup>
- Behaviour:** Traffic violations are an underlying cause of common injury patterns in e-scooter accidents.<sup>111</sup> Accidents are more common at weekends and are often associated with alcohol consumption.<sup>112</sup>

## KEY TO IMPROVING SAFETY IS MAKING CITIES LESS CAR-CENTRIC

Some micromobility providers have already implemented measures to improve e-scooter rider safety. Cities must also foster responsible riding through appropriate rules, and they must invest in the necessary infrastructure. They should create an environment in which micromobility services can be operated safely, and heavy motor vehicles are not the primary consumer of urban infrastructure. This implies reversing the urban mobility pyramid.

### What shared mobility providers can do:

- Improve e-scooter roadworthiness, for instance through bigger wheels, hydraulic suspension, controlled stopping towers, and front and rear lights. Some operators have already incorporated these features and more — for example, Bolt's Generation 5 e-scooter. (Bolt is currently on Generation 6).
- Steer rider behaviour, for instance by introducing beginner modes, maximum speeds, how-to-ride tutorials, safety tips, guides to parking restrictions, and in-app safety features such as a test to prevent riding while intoxicated. Many of these have already been implemented by operators.

### What cities can do:

- Invest in infrastructure, for instance dedicated e-scooter/e-biking lanes and smoother road surfaces to reverse the urban mobility pyramid (as mentioned above). Ensure that micromobility and active mobility are prioritized when planning infrastructure.
- Set riding rules, for instance banning vehicles from all or selected sidewalks.
- Closely cooperate with shared-mobility providers and data-sharing services to better address safety concerns. This can include understanding which intersections and sidewalks have large numbers of accidents.

## TAXIS AND PUBLIC TRANSPORT ARE PERCEIVED AS SAFER THAN RIDE-HAILING IN GERMANY

In German cities, taxis are perceived as a safer mode of transport at night than public transport. Data from a survey conducted by Bolt (with 55% of respondents men and 45% women) indicate that, at night, 61% of people feel more secure using a taxi than public transport. Evidence is less conclusive for ride-hailing: Only 47% of people feel safer than on public transport, while 33% do not, and 20% do not know. As public safety is generally lower in developing regions, people who hail rides are likely to perceive ride-hailing as safer than public transport or walking in the street.

**Exhibit 6: Selected key results consumers survey**

Germany, % of respondents agreeing to question

“At night I feel more secure **using ride-hailing** than public transport”



“At night I feel more secure **using a taxi** than public transport”



■ Fully or largely agree ■ Largely disagree ■ Fully disagree ■ Don't know

Source: Bolt customer survey (2023)

**THE PERCEIVED SAFETY OF RIDE-HAILING DIFFERS ACCORDING TO GENDER AND REGION**

Perceived safety — defined as the feeling of safety when using different modes of mobility — has a significant impact on choice of travel mode.<sup>113</sup> In ride-hailing, perceived safety is affected by driver behaviour, trackability and traceability, exposure to criminal activities, emergency use, and reliability of services.<sup>114</sup> In a Bolt study, the average safety score for ride-hailing indicated by women (on a scale of 1 to 10) is lower (7.1) than the overall average (7.3), indicating that women feel less safe than men when using ride-hailing. The average safety score indicated by riders in Nigeria (7.2) is below the global average and even lower for women (6.9). The reasons riders in Nigeria gave most frequently for feeling unsafe were, “the driver’s car was different to the one shown in app” (11%), inappropriate statements (10%), and “the driver looked suspicious” (7%).

**Exhibit 7: Selected key results customer survey**

Ride-hailing users, perceived safety score (0-10)

“How safe do you feel on a ride-hailing trip?”



■ Total ■ Females

Source: Bolt customer survey Q3 2022

## **MORE DRIVING, MORE ACCIDENTS — BUT RIDE-HAILING HAS POTENTIAL TO IMPROVE PEDESTRIAN SAFETY**

The evidence and prospects for pedestrian safety in the context of ride-hailing present a mixed picture. More vehicles on the road in the short term may contribute to a higher rate of accidents. The arrival of ride-hailing is associated with an increase of approximately 3% in the number of fatalities and fatal accidents, for both vehicle occupants and pedestrians.<sup>115</sup> On the other hand, increasing substitution of private cars for car-sharing would likely lead to a decline in fatalities (see Chapter 4). Ride-hailing drivers undergo driver safety tests, which enhance their skills and awareness on the road, and it can be assumed that their extensive annual mileage translates into greater experience than typical drivers. They may also be less likely to drive erratically, since the rating system for drivers provides an incentive to provide a pleasant service. In addition, ride-hailing vehicles are often smaller than average, which generally reduces the severity of injuries in the event of an accident with a pedestrian. These factors show the potential for ride-hailing services to improve pedestrian safety, in spite of the short-term risk of increased accidents.

## **OPERATORS CAN TAKE MEASURES TO INCREASE THE PERCEIVED SAFETY OF RIDE-HAILING**

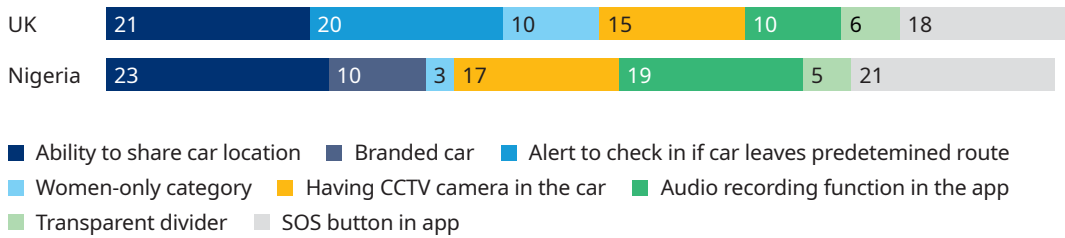
To further improve safety in ride-hailing and to boost riders' safety perceptions, ride-hailing companies can take measures to address current safety concerns. These should specifically target the unique safety challenges of women and of riders in particular regions.

In the UK, 15% name a CCTV camera in the car as a preferred safety measure; 10% list a woman-driver-only category; 10% choose an audio-recording function in the app during the ride (a feature already implemented by operators in some markets); and 6% would choose a transparent divider between driver and passenger.<sup>116</sup> But safety features that include surveillance need to take into account data privacy regulations, as discussed in Section 2.2. Even if shared-mobility service providers offer a variety of safety measures, users and drivers need to opt in and agree to be recorded.

In Nigeria, 23% of riders reported that they would feel safer using ride-hailing with the ability to share a car's location; 19% mentioned an audio recording function in the app during the ride; and 21% would like an SOS button to be incorporated into the app.<sup>117</sup>

### Exhibit 8: Ride-hailing safety measures preferred by customers

In % of customer answers



Source: Bolt customer survey Q3 2022

Finally, regulators and ride-hailing companies can address pedestrian safety concerns by implementing rigorous driver training programs, fostering continuous driver education, renewing their tests of drivers, and encouraging the use of advanced safety features in their vehicles.

## CONCLUSION ON THE SOCIAL IMPACT OF SHARED MOBILITY

Shared mobility can have a positive social impact. It increases access to and participation in transport, as it offers cost-effective alternatives with low financial hurdles. Some consumers can leverage shared mobility services, such as car-sharing, to reduce their total spend on mobility. Another social impact is the creation of new jobs and earning opportunities.

Shared-mobility providers should continue to work with public authorities to improve the access to transport of underserved groups such as disabled and elderly people and other city residents not well connected to public transport. However, these efforts are still in their early stages, and the services have not yet led to significantly increased accessibility overall. Shared mobility is already contributing to economic accessibility, including enhanced access to jobs and healthcare, particularly in less-developed countries with inadequate public transport.

The key to improving safety is to make urban areas less car-centric. E-scooters are performing better than generally perceived, but both providers and cities must continue to implement measures to alleviate concerns. Ride-hailing is perceived to be less safe than taking a taxi and slightly safer than public transport. However, perceived safety differs according to gender and region, and operators can tailor safety features to the needs of their target groups to make riders feel safer.





## CHAPTER 4

# ENVIRONMENTAL IMPACT

Passenger transport represents almost 40% of global transport emissions and is associated with high levels of air pollution. The WHO's thresholds are exceeded in 90% of countries.<sup>118, 119</sup> According to the International Energy Agency, in order to reach net-zero by 2050, passenger transport sector emissions must be halved by 2030 and reduced to one-seventh of their current level by 2040.<sup>120</sup>

Environmental concerns are especially pertinent considering that the global production of light vehicles (vehicles that carry small groups of passengers) was 76 million units in 2021 and is projected to grow at a CAGR of 10% between 2022 and 2027 to reach 135 million units.<sup>121</sup> Shared-mobility services can help reduce emissions-intensive mobility by offering environmentally sustainable solutions.

The following section examines whether shared mobility can help to reduce greenhouse gas (GHG) emissions and thereby contribute to the Paris Agreement emission reduction targets and UN SDG (Sustainable Development Goal) 13 on climate action and SDG 11 on sustainable cities and communities.

**In order to reach net-zero by 2050, passenger transport sector emissions must be reduced ~2x by 2030 and 7x by 2040.**



## KEY TAKEAWAYS

- Shared mobility has the potential to significantly reduce greenhouse-gas emissions. A Berlin-specific model shows that a far-reaching implementation of shared mobility services would be one of the most effective levers to reduce the city's emissions.
- The impact of shared mobility on emissions reduction is mixed so far. But substitution from a sustainable mode of transport (such as walking or biking) to an emissions-intensive mode (such as a car) can be avoided through holistic planning. The effects of multimodality — the utilization of multiple transport modes in the same journey — must be taken into account.
- E-scooters in Europe may have eliminated up to 120 million kilometres travelled by car on city roads, according to one estimate. This likely helped to alleviate traffic congestion, lower air pollution and reduce car-related emissions by up to 30,000 tonnes of CO<sub>2</sub>e.
- The positive environmental impact of shared mobility relies on the continued adoption of electric vehicles, the development of a complementary charging infrastructure, and the decarbonization of the electric grid.

## 4.1. ENVIRONMENTAL IMPACT OF CHANGES IN MODAL MIX

### THE IMPACT OF SHARED MOBILITY ON THE ENVIRONMENT METRICS DEPENDS ON THE CHANGES IN MODAL MIX

To understand the overall impact of shared mobility services on urban GHG emissions, three main effects have to be considered: individual mode substitution, changes in overall mileage, and the overall intermodal effect.

1. **Individual mode substitution:** Assuming overall mobility demand as a constant, individual trips are undertaken using alternative modes of transport.
  - **Environmental potential:** Distances travelled by emissions-intensive modes such as personal cars are reduced through a broad range of mobility services. An indication of this trend is the consistent decrease in the average annual distance driven per vehicle. Since 2020, the European annual average has decreased by around 1,700 km (to 11,000 km p.a. in 2022) — even normalised for a “Covid effect.”<sup>122</sup> However, the number of vehicles registered per household remains constant, indicating that people are using their vehicles less but are not yet prepared to get rid of their personal cars. First studies indicate that this might change in the near future. One recent report showed that 34% of Lyft-users in the US would consider foregoing car ownership



depending on the availability of shared-mobility services.<sup>123</sup> Similarly, a YouGov survey commissioned by Bolt revealed that 33% of respondents would be more inclined to relinquish their private car if taxi services were more affordable. In Tallinn, 83% of car-sharing users have delayed buying a new car because they use a sharing service.<sup>124</sup>

- **Risk:** Upward substitution — swapping a lower-emission travel mode (such as walking or biking) for a higher-emission mode (such as an e-scooter) — is a risk when shared-mobility services are introduced without a comprehensive multimodal approach.

## 2. Changes in overall mileage:

- **Risk:** The convenience, availability, and reduced access costs of shared mobility mean that it might lead to an overall increase in miles travelled in a city. As most shared-mobility modes do not (yet) have a net-zero footprint, their use will contribute to CO<sub>2</sub> emissions.<sup>125, 126</sup>

## 3. The overall intermodal effect:

- **Environmental potential:** An end-to-end optimization of multimodal service offerings will provide the greatest potential to reduce overall emissions. An Organization for Economic Co-operation and Development (OECD) study conducted in 2021, covering 247 cities in 29 OECD countries, found that shared-mobility services, once integrated on a large scale, have the potential to reduce passenger transport emissions by an average of 6.3%.<sup>127</sup>
- Recent data on e-scooter usage in Berlin emphasize the effect of an inter-modal offering. Bolt e-scooter data from 2023 show that the most frequented scooter pickup and drop-off spots tend to be located near or at public transit stations.

### Example 1: Top e-scooter pickup spots in Berlin, June 2023



#### Top 5 spots and share of overall rides:

- Brandenburger Tor (6%)
- Hauptbahnhof (5%)
- Alexanderplatz (5%)
- Herman Strasse/ Neukölln: BSBI (4%)

Source: Bolt e-scooter sharing service usage patterns, June 2023

### Example 2: Top e-scooter drop-off spots in Berlin, June 2023

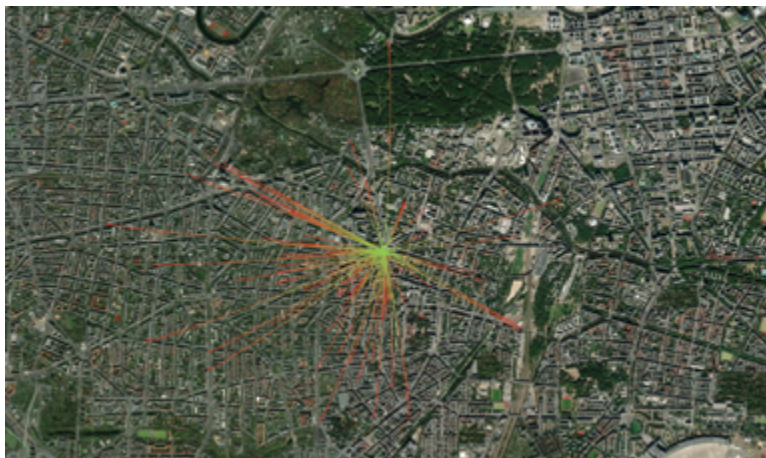


#### Top 5 spots and share of overall rides:

- Hauptbahnhof (6%)
- Brandenburg (5%)
- Alexanderplatz (5%)
- Warschauer Straße (5%)
- Herman Strasse/ Neukölln: BSBI (4%)

Source: Bolt e-scooter sharing service usage patterns, June 2023

### Example 3: Deep-dive into e-scooter usage from Berlin subway station Station Berlin-Nollendorfplatz, June 2023



Source: Bolt e-scooter sharing service usage patterns, June 2023

Analysis of usage from and to the highly frequented subway station Berlin Nollendorfplatz indicates that people use e-scooters to overcome first- and last-mile access problems when using public transport. More than 550 rides were generated in June 2023 alone. This is significantly above the general drop-off and pickup frequency.



## 4.2. IMPACT ASSESSMENT: SINGULAR MOBILITY MODES

### EXAMPLE OF E-SCOOTER USE AND MODE SWITCHING

In the fourth quarter of 2022, Bolt asked its users to indicate the mode of transport they would have used if they had not taken an e-scooter ride. From 7,000 responses, approximately 60% of trips would have been made on foot or by bicycle, which are more sustainable and emission-friendlier modes of travel. However, about 10% of trips replaced car journeys, including both private cars and taxi/ride-hailing services.

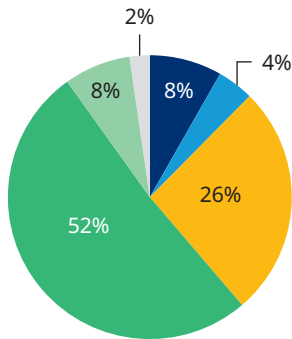
Based on Scope 3 CO<sub>2</sub> emissions per passenger-kilometre, the positive effect (primarily emissions saved by replacing car trips) overcompensates the negative effects (additional emissions from trips replacing greener modes of travel). In detail, the survey shows that e-scooters replace mainly low-emission modes such as walking (52%) and biking (8%). But the substitution of high-emission modes, namely cars (8%), in favour of e-scooters results in an overall reduction of the carbon footprint by 15.3 gCO<sub>2</sub>e per passenger kilometer or by 14.6 gCO<sub>2</sub>e per passenger kilometer if accounting for additional (“new”) trips due to the availability of e-scooters. The results also indicate the potential for further sustainability optimization if e-scooter sharing is integrated into a broader multimodal offering, for instance by solving the first-mile and last-mile access challenges of public transport. Further, the continuous and fast-moving improvement of e-scooter technology offers additional potential to improve the overall substitution effect.

Regardless of the overall emissions impact, the mode-switching data show that e-scooters alone have contributed to a reduction in kilometres travelled by car. According to statistics from Micro-Mobility for Europe, more than 700,000 e-scooters were available in European cities. Combining this number with the average number of trips per day and the average trip length suggests that e-scooters in Europe could have eliminated up to 120 million kilometres travelled by car on city roads. Based on the results summarized in Exhibit 26, this likely helps alleviate traffic congestion and air pollution in cities and reduces emissions by up to 30,000 tons of car-related CO<sub>2</sub>e on a European level.

However, to fully evaluate the long-term potential of shared mobility, the direct and indirect effects of multimodality need to be taken into account.

**Exhibit 1: Mode-switching and CO<sub>2</sub>e impact of e-scooter rides**

In % of total trips, N = 6,958 trips



Substituted mode	g CO <sub>2</sub> e / pkm <sup>1</sup>	Weighted effect g CO <sub>2</sub> e / pkm <sup>1</sup>
Private car <sup>2</sup>	245.5	-17.7
Taxi/ride-hailing <sup>2</sup>	245.5	-8.9
Public transport <sup>3</sup>	55.7	-6.5
Walking	0	+16.1
Bike <sup>4</sup>	11.1	+1.7
New trip <sup>5</sup>	31.2	+0.7
<b>Sum (including new trips)</b>		<b>-14.6</b>
<b>Sum (excluding new trips)</b>		<b>-15.3</b>

1. Scope 3 lifecycle emissions including emissions relating to use, fuel production and vehicle production. Does not include calorie consumption during usage.
  2. Based on International Council on Clean Transportation (ICCT) data.
  3. Based on mix of bus and rail; mix based on Office for Statistics of Berlin-Brandenburg data, emissions based on UK department for Business, Energy & Industrial Strategy.
  4. Based on study by Fraunhofer Institute.
  5. Based on external Lifecycle Carbon Accounting for Bolt 6th generation e-scooter, adjusted for Berlin energy mix.
- Source: Bolt survey data Q4 2022



## 4.3. IMPACT ASSESSMENT: MULTIMODALITY

### BERLIN-SPECIFIC 2030 MOBILITY EMISSIONS OPTIMIZATION MODEL

#### METHODOLOGY

To assess the potential impact of shared mobility on emissions, the Oliver Wyman Forum has developed a proprietary optimization model. For each city, the model incorporates baseline mobility demand in 2022, including the total distance travelled in the city by various modes. It segments trips into different distance buckets and calculates the existing modal mix for each distance bucket. The model then projects overall growth in mobility demand based on forecasts of macro-economic factors such as GDP, population density, and growth. It optimises the modal splits for a minimum-emissions scenario for Berlin in 2030.

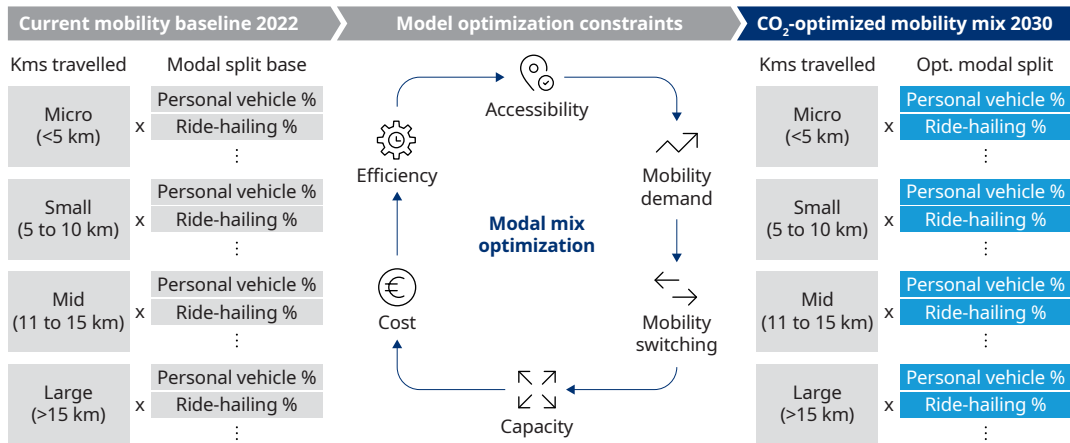
We calculate two different 2030 projections, starting from the 2022 baseline quantification. The first is a mere “as-is” continuation of currently visible trends, for instance the gradual electrification of mobility and the increase in overall mileage travelled. The second 2030 projection reflects the target picture of a modal mix optimised to minimise overall Scope 2 GHG emissions while accounting for the various constraints outlined below. The model employs a multivariate regression optimization algorithm to project the 2030 target state.

Model outputs consist of the corresponding changes in kilometres travelled for each mode and distance bucket. To ensure the feasibility of the model's optimised scenario, several key constraints are set. These play a crucial role in maintaining the practicality and viability of any proposed scenario and include:

- **Costs:** The overall cost of mobility per kilometre travelled stays equal enough for mobility to remain at its current level of affordability.
- **Speed:** The overall time spent on mobility per kilometre stays equal enough for travel efficiency to remain at its current level.
- **Capacity:** Constraints are placed on the maximum increase in usage of the respective modes. In the case of bicycle use, for instance, this is based on the maximum bicycle lane infrastructure.

In addition, the algorithm accounts for the maturity of the city's mobility infrastructure as well as the energy mix used to run different mobility modes — including the city's energy sourcing footprint.

**Exhibit 2: Overview of optimization model methodology**



Source: Oliver Wyman Forum Mobility Optimization Model, Oliver Wyman analysis

**MODEL RESULTS: SHARED MOBILITY PLAYS A SIGNIFICANT ROLE IN THE EMISSION-OPTIMIZED SCENARIO**

The model is based on projections of consumer behaviour and overall demand for mobility in combination with the ambition to minimize emissions. Compared to the 2022 baseline, it shows significant growth in distance travelled for all shared-mobility modes within the scope of this report.

A Scope 2 emissions-optimised scenario<sup>128</sup> for Berlin results in significant growth in kilometres travelled in 2030 compared to the 2022 baseline for all shared-mobility modes within the scope of this report. The optimised scenario yields a significant 40% reduction in emissions, from 4.1 million tons CO<sub>2</sub>e today to 2.5 million tons CO<sub>2</sub>e in 2030. Total distances travelled using both ride-hailing and micromobility — e-scooters and e-bikes — increase more than 80% from their levels in 2022. The distance covered using car-sharing increases more moderately (+39%).

These increases occur primarily at the expense of personal-car usage, which decreases by roughly 21% from the baseline. Overall, car usage (irrespective of mode) is reduced by 19%, which suggests the positive impact of reduced traffic congestion. The availability of shared mobility services can therefore play a significant role in reducing car ownership. The orchestrated and multimodal availability of shared mobility services, coupled with lower access and usage costs (as discussed in Chapter 3), help make people less dependent on personally owned cars. A Bolt survey focusing on its car-sharing service found that 58% of participants considered car-sharing a viable alternative to car ownership. Moreover, 36% of respondents who sold their cars in the past year said that using car-sharing services had a high influence on their decision to sell their car. These results imply that shared mobility plays a significant role in paving the way to a more sustainable mobility future in cities.



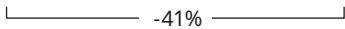
In Berlin, the optimised scenario leads to a 40% reduction in Scope 2 CO<sub>2</sub> emissions compared to the 2022 baseline, decreasing from 4.1 million tons CO<sub>2</sub>e to 2.5 million tons CO<sub>2</sub>e in 2030. The portion of shared mobility in the overall reduction is roughly 1%, or around 19,000 tons of CO<sub>2</sub>e. This is achieved through a significant reduction in personal vehicle usage by 20% in total miles travelled, in combination with a push to electrify mobility modes and to use shared mobility to enable mass transit: The overall mileage travelled by train, metro, and tram increased by 30%.

This reduction is a crucial contribution in the journey towards the Paris Agreement goal of reducing emissions by at least 70% from 1990 levels. The need for action is urgent, as most cities are currently not on track to achieve this goal.<sup>129</sup> However, even when considering the increase of shared-mobility modes depicted in the model results, shared mobility still plays a relatively small role in the overall modal mix (only 2.5% of overall kilometres travelled). Also, the overall impact might vary between cities. It might be lower, for example, in less-developed cities like Lagos, where most travel is covered by public transport or walking, and shared mobility tends to replace modes with a lower carbon footprint.<sup>130</sup>

### Exhibit 3: Summary model results

In million passenger kilometres travelled

Berlin	Kilometres travelled		% change
	Baseline 2022	Optimized scenario 2030	
<b>Total</b>	<b>39,632</b>	<b>40,423</b>	<b>2.0%</b>
<b>Car</b>	<b>23,408</b>	<b>19,092</b>	<b>-18.4%</b>
<b>Personal vehicle</b>	<b>22,748</b>	<b>18,040</b>	<b>-20.7%</b>
<b>Ride-hailing</b>	<b>320</b>	<b>579</b>	<b>81.1%</b>
<b>Car-sharing</b>	<b>340</b>	<b>473</b>	<b>38.9%</b>
<b>Rail</b>	<b>6,923</b>	<b>8,923</b>	<b>28.9%</b>
<b>Bus</b>	<b>1,547</b>	<b>1,934</b>	<b>25.0%</b>
<b>Walking</b>	<b>5,518</b>	<b>7,471</b>	<b>35.4%</b>
<b>Bike</b>	<b>1,766</b>	<b>2,384</b>	<b>35.0%</b>
<b>Personal bike</b>	<b>1,763</b>	<b>2,378</b>	<b>34.9%</b>
<b>Shared bike</b>	<b>3</b>	<b>6</b>	<b>86.8%</b>
<b>E-scooter</b>	<b>78</b>	<b>144</b>	<b>84.7%</b>
<b>Motorbike/Moped</b>	<b>391</b>	<b>415</b>	<b>6.0%</b>
<b>Ferry</b>	<b>0</b>	<b>0</b>	<b>40.0%</b>
<b>Air mobility</b>	<b>0</b>	<b>60</b>	<b>-</b>
<b>Public transit</b>	<b>8,471</b>	<b>10,857</b>	<b>28.2%</b>
<b>Total missions in tonnes CO<sub>2</sub>e<sup>1</sup></b>	<b>4.1mn</b>	<b>2.5mn</b>	


  
**Reduction of ~19k by shared mobility**

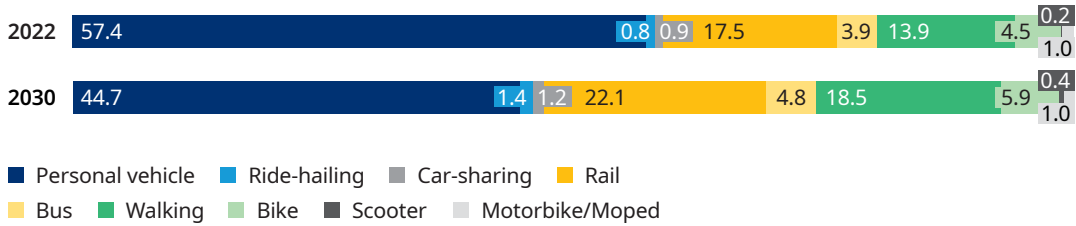
1. Scope 2 emissions relating to use (tailpipe emissions)

Source: Oliver Wyman Forum Mobility Optimization Model, Oliver Wyman analysis



### Exhibit 4: Modal split shift in optimized Berlin 2030 scenario

In % of total kilometres travelled, vs. 2022 baseline



Source: Future Mobility Value Pool Report, Oliver Wyman Forum & University of Berkeley, 2022

## HOW TO UNLOCK SHARED MOBILITY'S FULL EMISSIONS REDUCTION POTENTIAL

- End-to-end multimodality concept:** Integrating shared mobility offerings with low-emission transport options such as public transit, biking, and walking optimises the overall footprint. This furthers the potential of shared mobility to reduce GHG emissions, as discussed in the previous sections. For instance, micromobility can significantly enhance mass public transport usage through first- and last-mile optimization. Therefore cities should include strategic hubs and infrastructure in line with their overall mobility patterns as part of their intermodal offerings.
- Micromobility infrastructure:** Adequate infrastructure is crucial for the successful operation of micromobility services. Such infrastructure encompasses designated lanes, bike-sharing stations, and parking areas (especially near public transport stations) tailored to accommodate micromobility vehicles. Charging stations could also help to minimize the work of managing micromobility fleets. Micromobility can further expand only when cities, in collaboration with other stakeholders, actively invest in creating such an environment.
- Decarbonization of electric grid:** Electric vehicles can fully realize their potential for emissions reduction only if they are powered by electricity from increasingly lower-carbon sources. At present, a considerable portion of global electricity production relies on fossil fuels, including coal and natural gas, which emit carbon dioxide when burned, contributing to GHG emissions. Doubling down on emissions-free energy sources will boost shared services' impact on sustainability, as most shared-mobility modes are already powered by electricity.

- Regulatory guidance:** City infrastructure can prioritise the most sustainable individual mobility modes and thus make them more attractive. As an example, dedicated ride-hailing and car-sharing lanes in cities where public transport is underdeveloped will draw users away from personal cars and towards shared vehicles. Cities can also accelerate the electrification of shared mobility vehicles by prioritising zero-emission taxi, ride-hailing, and car-sharing fleets. For instance, only fully electrified taxis and ride-hailing fleets are allowed to serve Amsterdam Airport Schiphol. More broadly, electric vehicles will be the only ones available after the sale of new internal combustion-powered cars is phased out in many countries: Norway (in 2025), Austria (2030), and the UK (2035). The EU plans to ban the sale of new ICE vehicles by 2035.<sup>131</sup> While Africa accounted for only 3% of the global market for new vehicles in 2020, imports of used vehicles and a growing vehicle fleet are fuelling increases in GHG emissions and affecting air quality. According to the report “Used Vehicles and the Environment,” by UNEP, about 1.5 million used vehicles are imported into Africa every year. Consequently, no significant electrification of the African car fleet is expected in the next few years, either driven by private demand and usage or by regulation. For example, of Kenya’s total of 3.5 million registered vehicles in March 2023, an estimated 350 were electric.<sup>132</sup> Hence, shared-mobility service providers can lead the transformation to zero-emission mobility in the region through comprehensive electrification of their fleets.<sup>133</sup>

**Exhibit 5: Existing EV policies for selected African countries**

		South Africa	Kenya	Morocco	Cape Verde	Mauritius	Zimbabwe
<b>Phase-out target</b>					●		
<b>Regulations</b>	CO <sub>2</sub> standard						
	ZEV regulation						
<b>Incentives</b>	Subsidy/tax		●	●	●	●	
	In-use				●		
<b>Infrastructure</b>	Strategy/support	●	●	●	●	●	●
<b>Demand</b>	Special fleet	●		●	●		●
	Shared mobility	●		●		●	●
<b>Industrial development</b>	Manufacturing	●		●			
	Assembly	●		●	●		●
<b>Others</b>	R&D and capacity building	●	●	●			
	Business model	●					●
	International support	●	●		●	●	●


● Indicates that a given country has at least some policy actions for the given policy category

Source: The International Council on Clean Transport Briefing, Zero-Emission Vehicle Deployment Africa 2022

## **FASTER ELECTRIFICATION OF CAR-SHARING AND RIDE-HAILING FLEETS CAN BOLSTER THE CASE FOR SHARED MOBILITY**

The adoption of EVs in Europe and worldwide has been relatively slow despite the increasing focus on sustainable transportation. While some policies aim to expedite the process, such as the EU ban on sales of new internal-combustion-engine vehicles from 2035 (with the exception of those that run on e-fuels), the composition of existing fleets will naturally change slowly. In Africa, many countries still do not have the necessary charging stations and power grids in place to support widespread EV use. For example, Tesla — a pioneer in charging infrastructure investments — only entered Africa in 2021, installing two supercharger stations in Morocco. Zimbabwe started investing in public charging infrastructure in May 2022, while most countries have yet to initiate it on a large scale.<sup>134</sup>

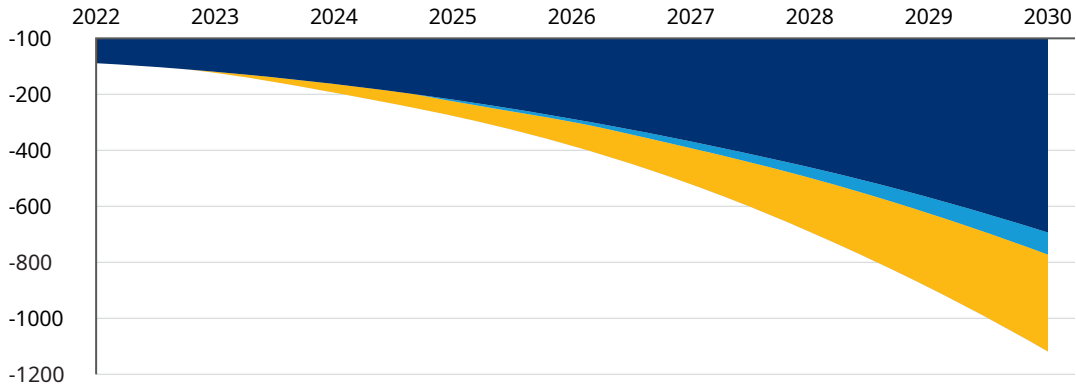
However, given that EVs are a major contributor to the reduction of road transport-related GHG emissions, regulators should focus on accelerating their penetration. In 2022, EVs enabled a net reduction of about 80 Mt in global GHG emissions. The biggest savings were achieved through the use of EVs in China: Almost 30% of global emissions reductions have come from the electrification of passenger cars in the country.<sup>135</sup>



**In 2022, EVs enabled a net reduction of about 80 Mt in global GHG emissions.**

**Exhibit 6: Net avoided greenhouse gas emissions from EV deployment and share of avoided emissions by mode, 2022-2030**

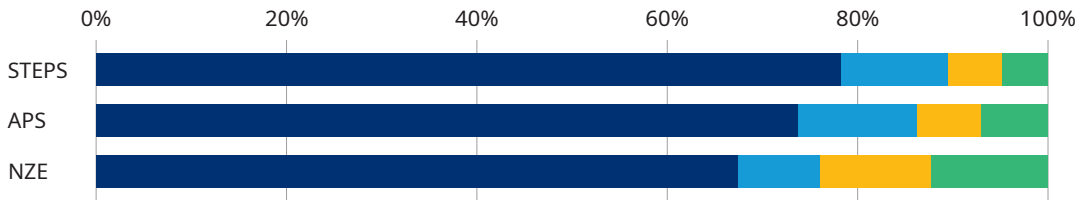
**Net avoided GHG emissions by scenario**



Net GHG emissions (MI)

■ STEPS ■ APS ■ NZE

**Shared of cumulative (2022–2030) emissions savings by mode**



■ LDVs ■ 2/3Ws ■ Buses ■ Trucks

Notes: GHG = greenhouse gas; STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario; NZE = Net Zero Emissions by 2050 Scenario; LDVs = light-duty vehicles; 2/3Ws = two/three-wheelers. Net avoided GHG emissions are calculated from the total emissions from electricity generation, transmission and distribution and the negative (i.e. avoided) emissions that the equivalent ICE fleet would have generated (both upstream and at the tailpipe) if running on fossil fuels. Projections include fuel economy improvements of ICE and electric vehicles as well as the growing share of renewable electricity generation, as described in the World Energy Outlook 2022.

Source: Global EV Outlook 2023, International Energy Agency

As ride-hailing and car-sharing services are expected to grow substantially in the coming years, particularly in urban areas (as discussed in Chapter 1), the composition of their fleets will have a significant impact on the overall propulsion mix of car trips. EVs offer notable advantages in ride-hailing economics, including reduced maintenance expenses and generally lower fuel and charging costs, depending on local prices.

The greater adoption of EVs in shared mobility car fleets strengthens the case for shared-mobility services as a crucial element in achieving a more sustainable mobility mix in cities worldwide. This is particularly the case in developed regions, where charging infrastructure is expected to be rapidly deployed and energy to be generated from green sources. These electric shared-mobility fleets are a lever for reducing emissions, minimizing air pollution, and mitigating noise levels (EVs can be up to 20 decibels quieter than ICE vehicles).<sup>136</sup> In 2020, Uber announced that 100% of its rides in cities in the US, Canada, and Europe would take place in EVs by 2030. By 2040, 100% of its global rides and deliveries would be in zero-emission vehicles.<sup>137</sup> In early 2023, Lyft pledged that 100% of vehicles on its platform would be EVs by the end of 2030.<sup>138</sup> The European car-sharing provider Miles has also set itself the goal of converting 50% of its total fleet to electric cars by 2025.<sup>139</sup>

Both cities and mobility service providers must play significant roles in incentivizing and promoting the faster adoption of EVs in shared mobility. Car-sharing providers can decide to shift their fleets towards EVs, but in ride-hailing, the choice of vehicle ultimately rests with individual drivers. Nonetheless, providers can nudge drivers towards EVs by setting up categories for these and other low-emission vehicles. Some providers have gone a step further and already set rules for their drivers: Didi Chuxing in Shenzhen, for instance, mandates 100% EVs based on local regulations.<sup>140</sup>

Some operators have set goals for full fleet electrification by 2030, and cities are also encouraging EV usage. One way is to build out charging infrastructure to alleviate drivers' range anxiety. They can also provide dedicated parking spaces for car-sharing EVs, implement low-emission zones, or grant congestion-charge exemptions. Such initiatives support EV adoption and enhance convenience for users.

## **THE ENVIRONMENTAL IMPACT OF SHARED MOBILITY IN LAGOS IS LIKELY NEGATIVE — BUT VEHICLE ELECTRIFICATION CAN CHANGE THAT**

A multimodal model as used above for Berlin is less useful for Lagos, where ride-hailing is currently the only significant shared-mobility service. Fuelled by an exploding population, as Nigeria urbanizes, demand for (individual) mobility — and therefore ride-hailing — in Lagos will continue to grow. One study in Ghana showed that roughly one-third of ride-hailing trips substitute public transport, while virtually all other trips substitute either private-car or taxi trips.<sup>141</sup> This share is likely to be even higher in Lagos, as commuters there rely heavily on public buses called “danfos”.



As public transport is less emissions-intensive, the overall impact of shared mobility on GHG emissions in cities like Lagos can be mixed, and it depends on what type of transport the shared-mobility solutions are replacing. Nevertheless, as in Berlin, a faster adoption of EVs in ride-hailing fleets can bolster the case for a positive environmental impact from shared mobility. EVs are currently being adopted only very slowly in Africa, especially Nigeria. But some ride-hailing operators have set ambitious electrification targets for 2030, aiming at 25% of all kilometres to be driven in EVs. As more shared-mobility mileage is driven in EVs, the environmental impacts are more positive. If, for instance, 25% of mileage was carried out in EVs, the resulting reduction in GHG emissions would be 256,000 t CO<sub>2</sub>e in Lagos alone. That is the equivalent of 143,000 return flights from Berlin to New York.

## CONCLUSION ON THE ENVIRONMENTAL IMPACT OF SHARED MOBILITY

Shared mobility, particularly when integrated with EVs, can significantly reduce emissions and so has great potential as a transformative force for urban life. The increase in e-scooters, e-bikes, car-sharing, and ride-hailing services lowers dependency on personal vehicles, reducing traffic congestion and improving air quality. In Berlin's optimized scenario, shared mobility plays a crucial part in reducing CO<sub>2</sub> emissions by 40%.

However, the impact of shared mobility varies according to regional factors. While Berlin's model showed significant positive results in terms of greenhouse gas emissions reduction, the environmental impacts in cities like Lagos are mixed, due to the replacement of low-emission public transport by higher emission ride-hailing services. Yet, even in such scenarios, the swift electrification of ride-hailing fleets can offset the negative impacts, emphasizing the importance of EV adoption.

Several strategies can help unlock the full potential of shared mobility. These include integration with other low-emission transport modes, the development of robust micromobility infrastructure, decarbonization of the electric grid, and regulatory guidance. Cities, in partnership with mobility service providers, should prioritize, expedite, and facilitate the adoption of EVs in shared mobility to maximize the environmental benefits.

For shared mobility to fully realize its potential to reduce emissions, a collective global effort is required. Stakeholders — ranging from city planners and policymakers to shared mobility service providers — need to collaborate, innovate, and act with urgency.



**CONCLUSION**

## THE POTENTIAL

As cities around the globe continue to grow at a rapid pace, shared mobility can be an important part of the solution to the growing challenges faced by urban transport. Shared mobility can also have a positive economic, social, and environmental impact on the urban living environment.

The services are set to generate millions of income opportunities in the coming years, directly or indirectly improving the people's economic well-being, especially in developing countries. The vast majority of people working in shared mobility will be in ride-hailing, though autonomous vehicles would reduce the number of human drivers. The work has relatively low entry barriers in many markets and therefore a high degree of inclusivity. For people new to a country or city, driving for a ride-hailing service can serve as a first job and a step towards a higher income.

Shared mobility can have social benefits in the form of lower transport costs — whether by facilitating last-mile access to public transport or letting people use cars without the upfront costs of ownership. It therefore makes the workforce more geographically flexible and helps to match supply to demand in labour markets, indirectly creating jobs — also an economic benefit. Shared mobility enhances access to healthcare and education, particularly in less-developed countries with inadequate public transport. Some consumers can leverage shared-mobility services to reduce their total spend on mobility.

If implemented effectively, shared mobility can reduce air pollution and traffic congestion, which constitute both environmental problems and economic costs to society. All services lower dependency on personal vehicles, reducing traffic congestion and improving air quality. Those that use EVs can significantly reduce emissions. In Berlin's optimized scenario, shared mobility reduces CO<sub>2</sub> emissions by 40%, a significant contribution. However, the impact of shared mobility varies among regions. The environmental impact in cities such as Lagos is mixed, as low-emission public transport is sometimes replaced by higher-emission ride-hailing services. Even there, however, the swift electrification of ride-hailing fleets can offset the negative impacts.

## WHAT MORE IS NEEDED

To realize the full potential of shared mobility requires a collaborative approach involving providers, regulators, and users. With the industry projected to grow to a \$400 billion market by 2030, addressing issues such as congestion, emissions, safety concerns, and working conditions will be crucial.

Despite the relatively high level of financial reward, the driver population might benefit from employment benefits. Measures are also needed to make it easier for women to become drivers, including through ways of fostering driver safety. Providers are working

with public authorities to improve the access to transport of underserved groups such as disabled and elderly people and of other underserved parts of society. However, these efforts are still in their early stages, and the services have not yet led to significantly increased accessibility overall.

To reduce crashes, in particular involving micromobility, cities should make urban areas less car-centric. Ride-hailing is perceived to be less safe than taking a taxi and slightly safer than public transport, but perceived safety differs according to gender and region. Operators can tailor safety features to the needs of their target groups to make riders feel safer.

Several strategies can help unlock the full environmental potential of shared mobility. These include integration with other low-emission transport modes, the development of robust micromobility infrastructure, decarbonization of the electric grid, and regulatory guidance. Cities, in partnership with mobility service providers, should prioritize the adoption of EVs to maximize the environmental benefits. For shared mobility to fully realize its potential to reduce emissions, a collective global effort is required.

As cities continue to expand and global efforts to promote sustainability intensify, shared mobility stands as a pivotal component in achieving urban transport and a living environment that are more efficient, accessible, and environmentally friendly. This in turn, can also accelerate progress towards achieving key UN SDGs and the emission targets of the Paris Agreement.



**APPENDIX**

# **CITY ARCHETYPES**



## KEY TAKEAWAYS

- The socio-economic and environmental impact of shared mobility depends heavily on factors such as a city's existing infrastructure, urban planning, travel patterns, and wealth. It therefore helps to look at different city archetypes and assess mobility behaviour and the impact of shared mobility in the context of their distinct characteristics.
- Each archetype has its own mobility paradigm and incorporates shared-mobility offerings in a different manner. Shared mobility thus has different environmental, social, and economic impacts.
- For all city archetypes, shared mobility has already had a positive effect on either the economy, society, or the environment.
- However, the characteristics of some cities mean that shared mobility has had some detrimental effects. These must be taken into account, as the path to optimizing the impact of shared mobility differs between city archetypes.
- To maximize its potential, a city should focus on comprehensive intermodal trip planning; the integration of shared mobility into current infrastructure to prevent negative trade-offs; and the creation of safe features such as secured bike lanes.
- There are several ways cities can benefit from shared mobility's potential: smart-mobility concepts; rethinking urban infrastructure — for example, by designing 15-minute neighbourhoods; adjusting the modal hierarchy; and incorporating new modes of transport, such as urban air mobility.
- Case study on Berlin: Berlin is an example of an active mobility city with a highly developed infrastructure and a high share of active mobility such as walking and biking. Shared mobility is already positively impacting environmental sustainability and social equity. Going forward, Berlin should promote pedestrian-friendly initiatives; improve mobility apps, so that they cover a journey from end to end to optimize shared mobility offerings; and make targeted investments in an enhanced cycling/ e-scooter infrastructure.
- Case study on Lagos: Lagos is an example of an emerging city characterized by a growing but limited public transport network that still requires investment to support its inhabitants. The rollout of shared mobility services implies a trade-off between efficiency and economic optimization, on the one hand, and emissions reduction, on the other. Going forward, Lagos should prioritize the creation of a foundation for shared mobility, by optimising its impact on social equity and economic growth. Later, once an infrastructure has been established, the city can improve the environmental impact of shared mobility.

## METHODOLOGY AND OVERVIEW OF CITY ARCHETYPES

### CITIES CAN BE CATEGORISED IN DISTINCT ARCHETYPES BASED ON FOUR CRITERIA

Mobility patterns vary significantly among cities around the globe, so that shared mobility has different levels of impact in the three dimensions discussed in this report: economic, social, and environmental. Cities have been divided into four archetypes to assess the impact on each dimension and determine the optimal utilization of shared mobility in different types of cities. The city archetypes are defined according to infrastructure, modal mix, government support for transport, and economic development (see Appendix). This allows for a comprehensive, yet mutually exclusive coverage of different city characteristics and reflects the most important infrastructure trends in city development. The four archetypes are, briefly, as follows:

- **Active-Mobility City:** Most points of interest are accessible via strong public transport networks, micromobility, or active mobility such as walking and biking. Examples: Berlin and Amsterdam.
- **Mixed-Mobility City:** These cities have strong public transport networks, but people still rely on traditional rather than shared mobility because of gaps in first- and last-mile transport and slower transit systems. Examples: New York City and London.
- **Car-Dependent City:** These cities often sprawl over wide areas, and inhabitants largely rely on private cars for their long commutes because of mediocre public transport networks. Examples: Chicago and Los Angeles, where more than 70% of commutes are carried out in private vehicles.
- **Emerging City:** These cities are typically located in developing countries with weak public transport networks. Government investment in infrastructure and support for shared mobility are relatively low. Examples: Lagos and Lima.



Based on its unique features and current situation, each archetype has a different path forward to realize shared mobility's full potential in terms of environmental, economic, and social impacts.



## STATUS QUO ASSESSMENT OF CITY ARCHETYPES

### ACTIVE MOBILITY CITY

This city is characterised by a highly developed public transport network and strong government support for mobility. Examples are Amsterdam and Copenhagen.

- **Infrastructure:** Active cities have well-developed public transport systems that enable seamless end-to-end mobility. They offer good average commuting speeds and convenient access to transit stations, thereby reducing walking distances. These cities also have superior road quality, well-maintained thoroughfares, and abundant dedicated cycling lanes.
- **Modal split:** The cities have a strong focus on active mobility, with a significant share of walking and biking in the modal mix. Private vehicle usage is low compared to other archetypes, and public transport plays a significant role in meeting travel demand.
- **Government support:** The governments and local authorities of active cities are strongly committed to creating sustainable urban environments. This is evident through targeted investments, initiatives, and incentives to promote shared mobility and install EV infrastructure.
- **Economics:** The high purchasing power and level of car ownership in this archetype reflect these cities' prosperity.
- **Impact of shared mobility:** Shared mobility has become an integral part of mobility in active-mobility cities. End-to-end multimodal planning is an important success factor in the positive impact from shared mobility.
  - **Economic impact:** Well-established shared-mobility services make it easier for people to travel to work and contribute to job creation. They enable more-efficient matching of labour supply and demand throughout a city.
  - **Social impact:** Cities and shared-mobility providers are working together to better connect residential neighbourhoods to city centres, thus improving access to jobs, increasing equity, and easing commutes.
  - **Environmental impact:** The impact on emissions is high, as micromobility is commonly used to optimize end-to-end travel and replace car usage. EV infrastructure is being developed, incentivizing shared-mobility providers to increase their offerings. The continuous development of bike lanes and road quality further incentivizes citizens to use micromobility.

## MIXED CITY

This city is characterised by generally strong public transport networks and people who tend to rely on traditional transport rather than shared mobility. Examples are London and Paris.

- **Infrastructure:** Mixed cities benefit from a robust public transport system. But they lack seamless end-to-end mobility solutions, leading to gaps in first- or last-mile connectivity. Compared to active mobility cities, waiting times for transit in mixed cities are longer, and transit speeds are lower. Walking distances to reach public transport can also be high. The quality of roads and bike lanes is typically average to high.
- **Modal split:** Active mobility represents a moderate share of travel compared to other city archetypes, and there is a moderate share of walking and biking. However, the utilisation of private vehicles is more prevalent than in active mobility cities, primarily because public transport is less convenient and accessible.
- **Government support:** Mixed cities have not fully utilized the potential of comprehensive, multimodal shared-mobility options. Although some transport investments and initiatives are in place, the full potential remains untapped. There is a risk of suboptimal mode substitution, such as e-scooters primarily replacing public transport, which can hinder the overall impact.
- **Economics:** Purchasing power and the level of car ownership are considered high, reflecting a degree of prosperity.
- **Impact of shared mobility:**
  - **Environmental impact:** The public transit infrastructure is well developed, but its accessibility and efficiency fall short in certain areas. Micromobility can fill these gaps effectively — if citizens are incentivized to use a combination of public transport and shared mobility, instead of using their own cars or directly substituting public transit for micromobility.
  - **Economic impact:** Ride-hailing closes gaps in transport networks and increases connectivity, thus enabling citizens to travel longer distances. By connecting them to workplaces that were previously out of reach, ride-hailing thus helps to create jobs.
  - **Social impact:** Ride-hailing and micromobility can connect suburban and underprivileged districts to cities by bridging the first and last miles to and from public transport options.



## CAR-DEPENDENT CITY

In a car-dependent city, people tend to rely on their own cars as the main means of transport because of long average commuting distances, a lack of cheap, efficient alternatives, and/or a mediocre public transport network. Examples are Los Angeles and Dublin.

- **Infrastructure:** Car-dependent cities rely heavily on private vehicles, as their public transport systems are less developed — particularly in terms of last-mile connectivity and connections to commuter suburbs. While rail networks tend to be relatively well-established, people in these cities need on average to walk for a long time to access public transport compared to active and mixed cities. The overall transport speed is moderate to low. In addition, the average distance travelled is high, because the cities tend to sprawl over wide areas (Los Angeles, for example).
- **Modal split:** The most significant characteristic of car-dependent cities is the dominance of car usage, though this does not necessarily indicate that road quality is high. The prevalence of active mobility is moderate to low. These cities have a lower share of active mobility compared to other archetypes, and the share of walking and biking is moderate.
- **Government support:** Investments in public transit infrastructure are not optimised or strategically targeted, hindering progress towards sustainable transport and multimodal mobility. Furthermore, car-dependent cities tend to lag behind in the development of micromobility systems. The rollout of EV charging infrastructure is also slow. Despite ongoing investments and selected initiatives, shared mobility is met with controversy, and its full potential remains unrealized.
- **Economics:** Purchasing power is considered mostly medium level. The level of car ownership is high, reflecting a high dependence on cars but not necessarily wealthy residents.
- **Impact of shared mobility:**
  - **Environmental impact:** Due to the long distances travelled, ride-hailing is a more common choice than micromobility. It can help to reduce congestion and local air pollution if employed efficiently within a multimodal system. To bridge the deficiencies of public transport in city centres, micromobility solutions can substitute for private vehicle usage to a greater extent than in other city archetypes, yielding a positive impact on sustainability.
  - **Economic impact:** The high demand for car-based mobility makes ride-hailing jobs popular. People who don't own a car may benefit from ride-hailing as an equitable alternative that provides end-to-end travel where public transport is not available. Ride-hailing thus increases the potential radius people can travel and thereby their job opportunities.
  - **Social impact:** Ride-hailing effectively connects individuals who lack personal vehicles, do not feel safe using public transport at night, or do not live near transport hubs.

## EMERGING CITY

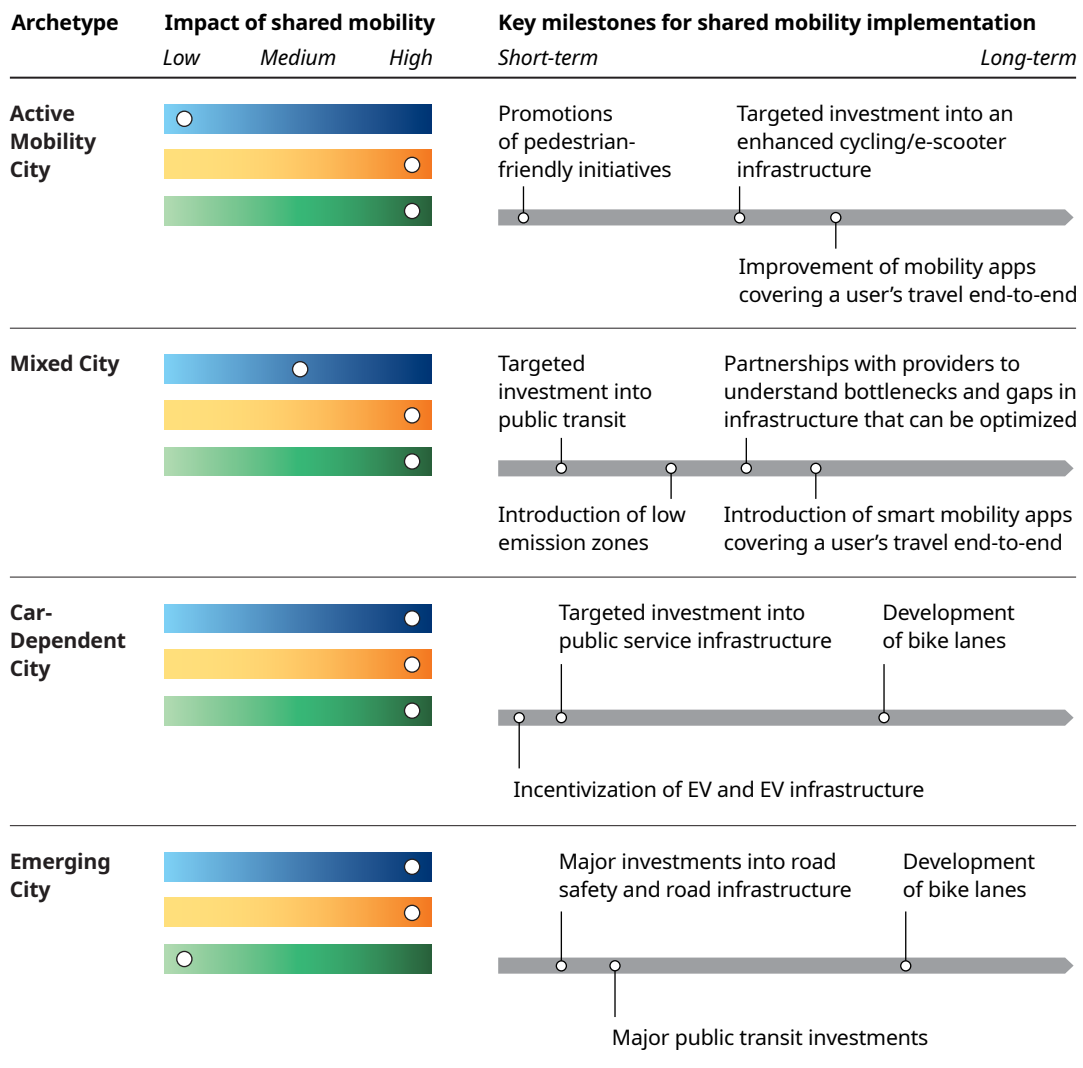
This city is characterised by an insufficient and inefficient public transport network, neglect of transport infrastructure, and a high dependency on active mobility such as walking or biking. Examples are Lagos and Nairobi.

- **Infrastructure:** In emerging cities, public transit networks are characterised by major deficiencies or are non-existent. In addition to a lack of developed rail networks, the speed of available public transit is low. The overall quality of road infrastructure is low and does not include bike lanes.
- **Mode of transportation:** Emerging cities have high levels of active mobility, primarily due to their lack of efficient transport options. The share of walking surpasses the share of biking by a considerable margin.
- **Government support:** Emerging cities are characterised by decades of underinvestment in public transport systems and road infrastructure. There is still a low allocation of funds to EV charging infrastructure and connected and autonomous vehicle (CAV) technologies.
- **Economics:** Residents of emerging cities tend to have low purchasing power and low rates of car ownership.
- **Impact of shared mobility:**
  - **Environmental impact:** Ride-hailing cars might add to the congestion of streets that are already overcrowded due to a lack of infrastructure. On the other hand, shared vehicles are usually newer than the average car, so they typically generate lower emissions. They can thus reduce the overall carbon footprint for mobility if they are substitutes for older, privately owned cars. However, poor road quality and overcrowded streets can cause high rates of accidents, and the resulting sense of danger limits opportunities for micromobility and other greener modes that can have a positive environmental impact. Since walking and biking are widespread and have the lowest CO<sub>2</sub> footprints among travel modes, the introduction of shared-mobility services will likely lead to an increase in emissions. Even if shared mobility in emerging cities was widely electrified — which is unlikely, considering the state of EV charging infrastructure — scope 3 emissions would still increase.
  - **Economic impact:** The potential economic impact of shared mobility in emerging cities with limited infrastructure is high, as it would significantly increase the accessibility, efficiency, and availability of personal mobility. Shared mobility could therefore help to match the supply and demand of labour, indirectly boosting job creation.
  - **Social impact:** Ride-hailing can reduce waiting times and enhance social and economic accessibility, as outlined in Section 3.2 of this report. It provides a safer alternative to public transport in emerging cities, particularly for women travelling at night.

# THE ROAD FORWARD: THE OPTIMIZATION OF SHARED MOBILITY

Each archetype has a different path forward to realize shared mobility's full environmental, economic, and social potential. These paths can be optimized through collective efforts by cities and shared-mobility providers.

**Exhibit 1: Impact of shared mobility for city archetypes**



■ Economic ■ Social ■ Environmental

Source: Oliver Wyman analysis

## OPTIMIZING THE ECONOMIC IMPACT OF SHARED MOBILITY

### Regulators:

- Invest in road safety and infrastructure, so that shared-mobility services can be rolled out in a safe manner. Connect urban districts better to increase commuting options — especially in mixed and emerging cities.
- Establish or strengthen collaboration with shared-mobility providers to improve accessibility through last-mile optimization. This will enable citizens to accept jobs in areas that were previously out of reach. Local businesses in areas not connected to public transport will be able to achieve higher revenues — especially in mixed cities.
- Invest in public transit infrastructure to establish a fully multimodal system that maximizes indirect economic impacts, for instance reducing traffic congestion and air pollution — especially in mixed and emerging cities.

### Shared-mobility providers:

- Make shared-mobility income opportunities more attractive, by offering additional benefits, if desired, tailored to the needs of specific groups and regions — especially in active mobility and mixed cities.
- Implement safety measures for people — especially women — working in ride-hailing to increase the quality of their jobs (see Chapter 2).

## OPTIMIZING THE SOCIAL IMPACT OF SHARED MOBILITY:

### Regulators:

- Leverage data-sharing between shared-mobility firms and cities to identify gaps in connectivity, areas of frequent e-scooter accidents, and public transport bottlenecks — especially in mixed cities.
- Target investments in public transit to increase connectivity in ways that close gaps with shared mobility offerings — especially in mixed cities.
- Collaborate with shared-mobility providers to better connect suburban and less-affluent areas to public transport — especially in emerging and car-dependent cities.
- Tailor the regulation of shared-mobility services to allow fair competition and efficient prices and so foster affordable mobility — especially in active mobility and mixed cities.
- Tailor the regulation of shared-mobility services to enable ride-hailing firms to offer safer (in terms of both actual and perceived safety) modes of transport, in particular for women and at night — and especially in emerging and car-dependent cities.

**Shared-mobility providers:**

- Expand service offerings to smaller cities and suburban areas to improve connectivity and accessibility to mobility — especially in mixed cities.
- Tailor mobility apps' functionalities to address consumers' end-to-end mobility needs — especially in active mobility and mixed cities.
- Make shared-mobility services more accessible for unserved groups, such as the elderly and people with disabilities — especially in active mobility and mixed cities.
- Continue implementation of measures to increase passenger and pedestrian safety in the context of shared mobility services — especially in active mobility and mixed cities.

## **OPTIMIZING THE ENVIRONMENTAL IMPACT OF SHARED MOBILITY**

**Regulators:**

- Invest in public transit to develop a fully multimodal mobility system, and encourage a modal shift towards more-sustainable transport and reduced car usage — especially in emerging and car-dependent cities.
- Invest in infrastructure and tailor regulations to enable safe, efficient use of shared-mobility offerings — especially in active mobility, mixed, and car-dependent cities. Examples include low-emission zones, a rollout of EV charging stations, dedicated lanes for bikes and micromobility, and parking spaces favouring electric vehicles.
- Allow privileged access and discounts for shared-mobility vehicles into city centres and congestion-charge zones to make private cars even more unattractive and unaffordable.
- Incentivize EV adoption — especially in active mobility, mixed, and car-dependent cities.
- Encourage the adoption of shared mobility through dedicated incentives and schemes such as emissions-based taxation. This can be done on a broad scale, using both state and national regulation.
- Understand the interplay between state, regional, and nationwide schemes. This is important in order to realize the full potential of regulation to maximize the environmental impact of shared mobility.

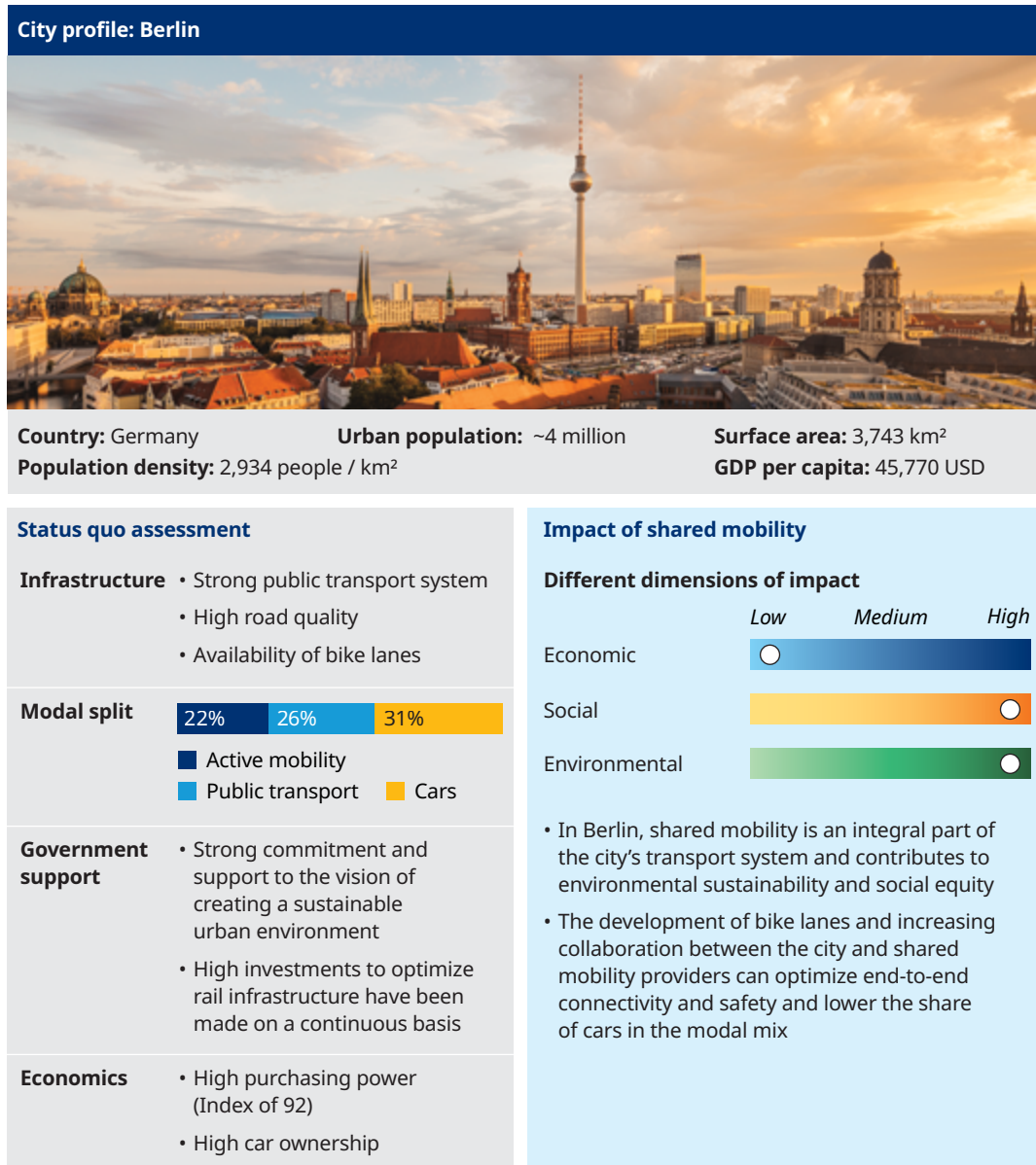
**Shared-mobility providers:**

- Actively adopt and incentivize EVs in ride-hailing and car-sharing fleets, and promote modes that are already fully electrified such as e-scooters and e-bikes. Plug-in hybrids are frequently used for ride-hailing services in some markets, but a focus on battery EVs will help to maximize the positive effects — especially in active mobility, mixed, and car-dependent cities.
- Tailor the functionalities of mobility apps to address consumers' end-to-end needs — especially in active mobility and mixed cities.



# DEEP-DIVE: BERLIN, AN ACTIVE MOBILITY CITY

Exhibit 2: City profile of Berlin, an active mobility city



Source: Oliver Wyman Urban Mobility Readiness Index (2022), Oliver Wyman analysis

The metro-area population of Berlin in 2023 was 3,574,000, a 0.08% increase from 2022, which is spread over an area of 891,82 square kilometres. The metro-area population of Berlin in 2022 was 3,571,000, which was a 0.11% increase from 2021. According to the current senate report on population forecasts, around 3.963 million people will live in the German capital in 2040. This contrasts with an average population decrease of 0,1% in German cities.<sup>142</sup> Berlin is also the largest city in Germany by far, more than twice the size of the second — Hamburg — with 1.8 million inhabitants. The capital is widely recognized as a pioneer in shared mobility, boasting one of the largest micromobility fleets in Europe. The city is home to numerous car-sharing providers, and the Berlin public transit authority's app, Jelbi, seamlessly integrates all available services into an end-to-end experience.

## **BERLIN'S INFRASTRUCTURE IS CHARACTERISED BY A STRONG PUBLIC TRANSPORT SYSTEM AND HIGH ROAD QUALITY**

Measured by transit commute speed, average walking time to public transport, and the density of public transit stations, Berlin performs above both the global and European city averages, according to the latest Urban Mobility Readiness Index from Oliver Wyman.<sup>143</sup> Berlin's infrastructure benefits from a well-established and comprehensive transport and rail network, with 10 subway lines connecting all districts of the city. The density of transport stations is high and ensures accessibility and connectivity. The average walking time to a public transport station is 7.7 minutes. That compares favourably with the mixed cities London, at 11.2 minutes, and Moscow, at 13.1 minutes.<sup>144</sup> Berlin also leads in road safety among 60 cities globally and records comparatively few traffic fatalities.<sup>145</sup> In addition, the standard maximum speed limit has been reduced from 50 kph to 30 kph in certain residential and mixed-use areas.<sup>146</sup> Berlin has also built protected bike lanes, green markings to indicate space for cyclists, cycle superhighways, and bike-parking facilities. It is planning to expand its current offering of bicycle facilities.<sup>147</sup>

## **BERLIN'S MODAL MIX IS DISTRIBUTED ALMOST EQUALLY BETWEEN CARS, PUBLIC TRANSPORT, AND ACTIVE MOBILITY**

Berlin's modal split indicates a relatively high proportion of journeys conducted on foot or by bicycle (21.5%). The usage of private vehicles remains high (31%), compared to other large European cities. There is a notable presence of cars on Berlin's streets, and the average driver spends a total of 71 hours in traffic jams each year.<sup>148</sup> The high share of car usage, despite Berlin's status as an active mobility city, reflects the country's car culture, which stems from the economic importance of automotive manufacturing.<sup>149</sup> To increase the share of public transport usage, Berlin's public transport provider, BVG, is considering expanding the city's S-Bahn (urban and suburban) and U-Bahn (metro) rail networks, with the aim of doubling their current sizes by 2050.<sup>150</sup> Cycling has also become popular, with a modal split of 12%, following investments in infrastructure. Berlin embraces multimodality through its U-Bahn and S-Bahn train networks and trams. These are accessible via an integrated app that provides journey planning and payment for all types of transport, including cars and e-scooters. To further facilitate active mobility, some streets, including Friedrichstraße, are being considered for conversion into bicycle and pedestrian zones in 2023.<sup>151</sup>

## **THE CONTINUOUS DEVELOPMENT AND IMPROVEMENT OF INFRASTRUCTURE IS PART OF THE CITY'S CORE STRATEGY**

Local authorities in Berlin demonstrate a strong commitment to the vision of creating an environmentally sustainable urban environment. This commitment is reflected in their targeted investments in transport, which are planned to amount to €19 billion from 2020 to 2035, above the average European investment of 1.6% of GDP in the transport sector.<sup>152</sup>

## **HIGH PURCHASING POWER AND CAR OWNERSHIP EXEMPLIFY BERLIN'S WELL-OFF ECONOMIC ENVIRONMENT**

Berlin residents' purchasing power is high. In an index of cities' relative purchasing power based on average net salary, Berlin scored 92, ranking 63 out of 246 cities globally.<sup>153</sup> Car ownership has decreased slightly in recent years but remains relatively high at around 50%. This can be attributed to Berlin's prosperity compared to other areas, as well as the cultural norm of owning a car in a country where the automotive industry is a crucial part of the economy. EV penetration in Berlin's existing car fleet is 2.01%, which is slightly below the German average of 2.08%.

## SHARED MOBILITY HAS A HIGH IMPACT ON ENVIRONMENTAL SUSTAINABILITY AND SOCIAL EQUITY IN BERLIN

With a wide range of firms offering services in Berlin, shared mobility has become an integral part of the city's mobility landscape. The dominant ride-hailing firms are Uber and Bolt, while shared micromobility is mainly provided by Bolt, Tier, and Lime. Helped by Berlin's highly developed infrastructure, an efficient ecosystem has been created, allowing optimization of shared mobility services to further improve their impact on environmental sustainability and social equity. The city has learned lessons from its bike-sharing wave of 2018, when Chinese-based services entered the city aggressively. They made a large numbers of bikes available, greatly exceeding demand and leading to blocked sidewalks and public uproar. To a lesser extent, some e-scooter sharing-service providers have had negative feedback after not actively managing their fleets in terms of scooter placement, maintenance, and driver behaviour.

In Berlin, the economic impact of shared mobility is lower than in other city archetypes. Ride-hailing and micromobility services have increased the share of jobs in the mobility sector. They have led to the creation of an estimated 16,000 ride-hailing income opportunities and additional jobs in the shared mobility industry, including direct jobs with providers.<sup>154</sup> Ride-hailing drivers are able to earn 37% more than the minimum wage in Germany.<sup>155</sup> However, Berlin already offers a multitude of jobs in different sectors, so the incremental contribution to the overall labour market is limited.

Shared mobility offerings in Berlin increase overall connectivity in the city and reduce last-mile travel gaps, thereby increasing social equity:

- Partnerships between shared-mobility providers and the mayors of city districts aim to identify and tackle the accessibility challenges experienced in different districts. For example, in June 2022, Bolt partnered with Martin Hikel, District Mayor of Neukölln, to provide an additional 400 e-scooters to enable last-mile connectivity between public transport stations and five business parks.<sup>156</sup>
- On average, a ride-hailing trip in Berlin costs €14.4 for 7 km. That is expensive compared to a public transport trip, which costs €3.2 for a ride that lasts up to two hours.<sup>157, 158</sup>
- Frequent news reports of accidents involving micromobility have raised public concern over pedestrians' safety. To address these concerns, the Berlin senate has imposed tighter rules and regulations, including the obligation for an operator to obtain a special permit — "Sondernutzungserlaubnis" — and to display the operator's contact information in case an e-scooter obstructs the sidewalk. Upon notification, the operator must relocate the scooter within four hours.<sup>159</sup>

The positive environmental impact of shared mobility is high. Thanks to improved last-mile connectivity through e-scooters, people in Berlin are better connected to public transport and have become less reliant on cars. Given that the city's infrastructure is already highly developed, future investments specifically targeting the development of EV and biking infrastructure could decrease pollution levels. Initiatives have been launched to advocate for increased use of shared mobility and partnerships between public transport operators and shared-mobility providers. One recent example is the cooperation between BVG and Vianova to gather and analyse e-scooter and car-sharing data. Insights from these data will be used to enhance the integration of public transport and shared mobility, improving connectivity and accessibility for commuters and residents.<sup>160</sup>

## **SHARED MOBILITY IS AN IMPORTANT LEVER TO FURTHER INCREASE BERLIN'S ENVIRONMENTAL SUSTAINABILITY AND SOCIAL EQUITY**

By optimizing shared mobility, Berlin can further improve its environmental sustainability goals in future. Initiatives can include investment in bike lanes and incentives for ride-hailing and car-sharing fleets to adopt EVs, such as emission-free zones and parking reserved for EVs. Social equity can be improved by strengthened cooperation between stakeholders — shared mobility providers, cities, and even academics — to identify additional mobility, accessibility, and connectivity opportunities and to make services more affordable, safer, and more accessible. Dedicated parking slots for e-scooters and e-bikes can be set up in locations where they are most needed, and riders can be incentivized to park vehicles in these places, increasing safety and availability.

Berlin has a highly developed public transport system, and mobility and shared mobility have been receiving attention and financial support from the city government over a long period of time. That means the actions proposed could be implemented rapidly by both the city and shared-mobility providers and that they could show an impact immediately. Berlin should regularly assess the impact and effectiveness of shared-mobility initiatives through data analysis, feedback from users, and surveys. It can then refine strategies, address challenges, and identify opportunities for adjustment and improvement.



# DEEP-DIVE: LAGOS, AN EMERGING CITY

Exhibit 3: City profile of Lagos, an Emerging City



Source: Oliver Wyman Urban Mobility Readiness Index (2022), Oliver Wyman analysis.

The current population of Lagos in 2022 is estimated at around 15.5 million people, and it could grow by 84% to 28.2 million in 2050.<sup>161</sup> An estimated 8 million people go to work via public transport each day on the 9,100 roads in Nigeria's largest city.<sup>162</sup>

## **MOBILITY IN LAGOS IS CHARACTERIZED BY INFORMAL MODES OF TRANSPORT AND HIGH CONGESTION**

As in other emerging market cities, public transit in Lagos consists mainly of buses and informal modes of transport.<sup>163</sup> According to Oliver Wyman's latest Urban Mobility Readiness Index, the city is severely lagging behind the global average in terms of the efficiency of its mobility systems.<sup>164</sup> In 2021, the value of Nigeria's infrastructure was about 35% of the country's GDP, which is low: In larger economies, this value is typically around 70% of GDP.<sup>165</sup> However, measured by transit commute speed, average walking time to public transport, and public transit station density, Lagos performs better than other African cities.<sup>166</sup>

On average, Lagos residents spend 30 hours a week in traffic, one of the highest figures in the world.<sup>167</sup> In comparison, Johannesburg residents only suffer about 61 hours of delay per year.<sup>168</sup> The city's road infrastructure is characterised by poor quality, leading to significant congestion. Moreover, the traffic-related fatality rate in Lagos is high, at 28 deaths per 100,000 people, compared to the global average of 17.<sup>169</sup>

The city's rail infrastructure is considered "largely inefficient, expensive, untimely, non-inclusive, and unsustainable," with no train service that serves the masses.<sup>170</sup> Furthermore, Lagos's mobility systems have a low level of preparedness to cope with potential crises such as natural disasters, in part because infrastructure development has not kept up with the city's fast population growth.<sup>171</sup> Lagos is currently building a 35-kilometre rail system with seven lines developed through a public-private partnership. Investment commitments are significant: They amount to \$6.68 billion.<sup>172</sup> The project, known as the Lagos Rail Mass Transit System, is sponsored by the Lagos state government and is being undertaken by China Civil Engineering Construction Corporation as part of China's Belt and Road Initiative. The first line began to carry passengers in January 2023. Once the system is completed, the trains are expected to carry more than 500,000 passengers a day.<sup>173</sup>

## **BUSES AND WALKING ARE THE MOST COMMON MODES**

Due to the current lack of a developed train system and residents' low purchasing power, almost 50% of daily passenger trips are made in yellow minibuses called "danfos," which are an integral part of the city's transport system.<sup>174</sup> Car ownership remains low but has significantly increased in recent years. There is a severe lack of adequate cycling infrastructure, and female cyclists report frequent sexual harassment.<sup>170</sup> As a result, cycling is seen as a high-risk activity, and its share in Lagos's active mobility mix is only 1%. Walking makes up 40% of the modal split.

## **THE GOVERNMENT HAS ONLY RECENTLY STARTED TO INVEST IN MOBILITY INFRASTRUCTURE**

Local authorities are aware of the current concerns over mobility and transport and have recently started to act. They have imposed bans on selected modes, invested in road and rail infrastructure, and reached out to private firms (both local and international) to form strategic and financial partnerships. To address overcrowding on roads and safety concerns, Lagos banned motorcycle taxis (called okadas) and three-wheeled commercial taxis from most of the city.<sup>175</sup> In 2023, the Lagos Metropolitan Area Transport Authority launched a sustainability transport initiative to foster a carbon-free ecosystem in Lagos State, and two electric buses and charging stations are in pilot phase.<sup>176</sup> With a score of 11.3 on a global index, purchasing power in Lagos is considered low, and it ranked 546 out of 552 cities.<sup>177</sup> Car ownership is also low but has increased significantly in recent years.<sup>178</sup> Car ownership in Nigeria is primarily influenced by GDP, per capita income, the fuel price, literacy level, and the stock of public transport vehicles.<sup>179</sup>

## **THE IMPACT OF SHARED MOBILITY ON ECONOMIC GROWTH AND SOCIAL EQUITY IS HIGH**

Due to Lagos's growing demand for mobility and currently inefficient infrastructure, shared mobility — as a flexible, on-demand service — has the potential to contribute positively to the city's economic growth. For instance, there are more than 50 million ride-hailing trips in Lagos per year. These provide jobs for drivers and connect more districts to the city, enabling people to commute for work.<sup>180</sup> It is estimated that 40,000 drivers are currently working in Lagos, and many would not have a job otherwise.<sup>181</sup> For most, driving is their primary occupation and main source of income.<sup>182</sup> Ride-hailing platforms enable broader outreach and effective matching, which result in increased earnings.

However, working hours are often long, and labour standards absent. A survey of drivers in Nigeria indicates that 22% work between 40 and 49 hours a week, and 31% more than 50 hours. Moreover, the high number of drivers on ride-hailing platforms pushes down service fees, gradually reducing drivers' real wages.<sup>183</sup>

Social contributions could include ride-hailing's potential to increase safety in Lagos by offering a reliable, monitored service that decreases waiting times, especially at night. (Another contribution to safety could come from digitizing danfo services, which would enable passengers to track their journeys in real time.) According to a study of students in Lagos, only 5% generally feel safe walking to or waiting at public transit stations at night. About one-third (31%) of the students have never felt safe at night, and about one-fifth (21%) have rarely felt safe.<sup>184, 185</sup> Nigerian newspapers warn residents to be mindful of unlicensed ride-hailing operators, as they pose significant security threats. (Drivers can turn out to be different to the ones shown in the ride-hailing app, or they can say inappropriate things).<sup>186, 187</sup>

To improve rider safety in Nigeria, riders would prefer to be able to share a car's location and would like the app to contain a recording function and a SOS button.

Ride-hailing is still not affordable for many low-income households in Lagos, and fares increased 200% after the federal government's decision to remove fuel subsidies.<sup>188</sup> The average trip in Lagos costs €3.9 for 7 km. In contrast, an intercity bus trip comes to about €1.6.<sup>189</sup> This means ride-hailing could primarily benefit the segment of society that is already privileged, further widening the gap between different income classes. The minimum wage in Lagos is N62,000 per month (€140), and 50% of employees in Lagos earn N299,000 (about €670) or less.<sup>190</sup> A recent analysis showed that Nigerian workers spend up to 79% of their income on transport,<sup>191</sup> highlighting that a large proportion of the population in developing countries often spend a disproportionate amount of their income and time on travel to and from work.

The benefits of shared mobility to the environment in Lagos are less evident than the positive economic and social impacts. While additional rides increase economic activity and connectedness, the substitution of net-zero modes such as walking and biking for shared mobility is likely to increase congestion and CO<sub>2</sub> emissions. Some 67% of drivers in Nigeria use their own vehicles,<sup>192</sup> and most of these are more than 10 years old and hence often not up to current emissions standards. Therefore, the introduction of new ride-hailing and car-sharing fleets can help drive down vehicle-based mobility emissions. As stated in Section 4, electrification targets set by shared mobility operators could reduce emissions from transport by up to 256,000 t CO<sub>2</sub>e in Lagos alone. Cycling makes up only 1% of the current modal split. Neither the infrastructural nor cultural foundations are currently present, so the adoption of biking and e-scooters — and its positive impact on the environment — is unlikely to come about soon.

## **LAGOS'S PATH FORWARD INVOLVES BUILDING OUT PUBLIC-TRANSPORT AND ROAD INFRASTRUCTURE, WHILE PROMOTING SHARED MOBILITY**

The growth of shared mobility in Lagos currently implies a trade-off between, on the one hand, the goals of economic growth and social equity, and on the other, environmental sustainability. The city needs to focus on building out its public transport infrastructure, so that people can choose mass transit instead of motorised mobility. Targeted investments in road infrastructure can enhance safe driving and improve ride-hailing services.

In the short term, economic growth and social equity can be further improved by developing shared-mobility options and the infrastructure they require. The city should incentivize individuals and organisations to adopt shared mobility through reduced parking fees for shared vehicles, tax benefits, and grants for companies that invest in electrified shared-mobility infrastructure. It would also help if the city established regulations to promote shared mobility and address any legal or safety concerns. One effort that shows the priority placed on ride-hailing is the state government's rollout of 1,000 ride-hailing cars as part of a new initiative, "Lagos Ride," in collaboration with a Chinese car manufacturer.

Existing services like the danfos — whose routes and alternative routes can now be viewed, after Google started its flagship programme in 2017 — could be further digitized by private mobility operators. This would allow passengers to track their journeys in real time and thus enhance the efficiency of the mobility system. Dedicated pickup and drop-off points could be connected to the wider mobility offering, making the overall transport system more efficient.

To improve long-term environmental sustainability, Lagos should regularly assess the impact and effectiveness of shared-mobility initiatives through data analysis and user feedback. It could launch campaigns to raise awareness of the benefits of shared mobility, including reduced traffic congestion. As road infrastructure is developed, bike-sharing could gain relevance, potentially filling the gap left by the ban of commercial motorcycling. Bike-sharing could replace several kinds of journey: ride-hailing trips, short-distance rides in private cars, and — especially — motorcycle trips. Apps like AWA, a bike-sharing initiative, are trying to change people's negative perception of biking. It is addressing women's safety concerns and seeking collaboration with the Lagos State government.

Less-developed countries do not have to follow the same (environmentally damaging) development paths as US and European cities. They can leapfrog to future visions for cities that focus on environmental and equitable living. New, electrified mobility services can play an important role in the acceleration of these countries' development.



**Exhibit 4: Median monthly wage level for various occupations in Kenya**  
 In Kenyan Shillings, 2022

Skill	Median monthly earnings by occupation (values in Shillings)	
Level 4	Ride-hailing full-time drivers (rented vehicle)	50,000
	Computing professionals	45,000
	Accountants	43,660
	Health professionals	39,000
Level 3	Business and public middle level personnel	30,000
	Secondary/Technical institute teachers	25,000
	Numerical clerks	30,000
Level 2	Material recording and transport clerks	26,000
	<b>Drivers</b>	<b>25,000</b>
	Secretaries, stenographers and typists	25,000
	Business service agents	25,000
	Information clerks	25,000
	General office clerks	25,000
	Cashiers, tellers and related clerks	22,000
	Primary education teachers	20,000
	Protective service workers	19,250
	Cooks	15,000
	House stewards and housekeepers	20,000
Level 1	Shop assistants	16,800
	Waiters	12,000
	Ride-hailing full-time drivers (own vehicle)	40,000
	Ride-hailing full-time drivers (rented vehicle)	20,500

Note: Ride-hailing full-time driver income is based on internal Bolt estimates assuming that full-time work involves 200 online hours per month (10 online hours for 20 days per month); earnings are reported on a net basis, after deducting vehicle ownership costs (rent, maintenance, insurance, car wash, fuel and income taxes) from gross driver earnings.

Source: Bolt, Kenya Labour Body Report

**Exhibit 5: Median monthly wage level for various occupations in Nigeria**  
 In Nigerian Naira, 2022

Skill	Average earnings per month by occupation (values in Naira)	
Level 4	Computing professionals	314,000
	Health professionals	260,200
	Accountants	257,700
	Personnel and occupational professionals	225,000
Level 3	Secondary/Technical institute teachers	170,900
Level 2	Primary education teachers	162,800
	Information clerks	137,200
	Secretaries, stenographers and typists	136,000
	Material recording and transport clerks	175,000
	General office clerks	149,000
	<b>Drivers</b>	<b>154,100</b>
	Cashiers, tellers and related clerks	121,400
	Protective service workers	105,600
	Cooks	138,000
Level 1	House stewards and housekeepers	128,200
	Building construction labourer	157,800
	Shop assistants	111,500
	Waiters	128,900
	Ride-hailing full-time drivers (own vehicle)	244,300
	Ride-hailing full-time drivers (rented vehicle)	129,700

Note: Ride-hailing full-time driver income is based on internal Bolt estimates assuming that full-time work involves 200 online hours per month (10 online hours for 20 days per month); earnings are reported on a net basis, after deducting vehicle ownership costs (rent, maintenance, insurance, car wash, fuel and income taxes) from gross driver earnings.

Source: Bolt, Paylab Nigeria

### Exhibit 6: Median monthly wage level for various occupations in South Africa

In South African Rand, 2022

Skill	Average earnings per month by occupation (values in Rand)	
Level 4	Accountants	32,700
	Computing professionals	30,700
	Personnel and occupational professionals	23,600
	Health professionals	21,700
Level 3	Secondary/Technical institute teachers	31,500
Level 2	Primary education teachers	20,900
	Business service agents	21,400
	Information clerks	15,100
	Secretaries, stenographers and typists	15,000
	Material recording and transport clerks	12,800
	General office clerks	12,300
	<b>Drivers</b>	<b>9,000</b>
	Cashiers, tellers and related clerks	6,600
	Protective service workers	6,900
	Cooks	6,500
Level 1	Shop assistants	8,400
	House stewards and housekeepers	6,900
	Building construction labourer	7,400
	Waiters	7,600
	Ride-hailing full-time drivers (own vehicle)	12,600
	Ride-hailing full-time drivers (rented vehicle)	7,000

Note: Ride-hailing full-time driver income is based on internal Bolt estimates assuming that full-time work involves 200 online hours per month (10 online hours for 20 days per month); earnings are reported on net basis, after deducting vehicle ownership costs (rent, maintenance, insurance, car wash, fuel and income taxes from gross driver earnings).

Source: Bolt, mywage.co.za

**Exhibit 7: Skill level definition by occupation**

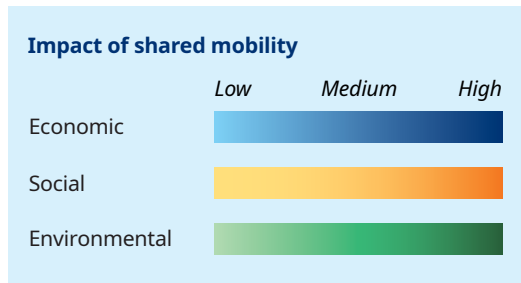
<b>Skill</b>	<b>Occupation</b>	<b>Definition</b>
<b>Level 4</b> Involves complex problem solving, decision making and creativity	Managers	Executives, senior officials and legislators, commercial managers, production and specialized services managers etc.
	Professionals	Engineers, healthcare professionals, professors and teachers, business professionals, IT professionals, legal/social/cultural professionals
<b>Level 3</b> Involves complex technical and practical tasks requiring high literacy, numeracy and interpersonal skills	Technical and associate professionals	Lab technicians, legal secretaries, commercial sales representatives, computer technicians etc.
<b>Level 2</b> Usually requires ability to read information, make written records, and perform basic calculations, as well as manual dexterity	Clerical support workers	Keyboard clerks, customer services, accounting clerks
	Services and sales workers	Personal service workers, sales assistants, personal care workers, protective services workers (police officers)
	Skilled agricultural, forestry and fishery workers	Farmers, animal producers, fishers, hunters and gatherers
	Craft and related trade workers	Electricians, construction workers, carpenters, stonemasons, mechanics, painters, metal workers, handicraft workers
	<b>Plant and machine operators, and assemblers</b>	<b>Plant and machine operators, assemblers, motor vehicle drivers</b>
<b>Level 1</b> Involves simple and routine physical or manual tasks and usually physical strength and endurance	Elementary occupations	Cleaners and helpers, labourers, kitchen assistants, couriers, freight handlers
	Armed forces occupations	Includes roles across skill levels 1, 2 and 4

Source: Based on International Labour Office (ILO)

### Exhibit 8: Archetype Methodology

**Name of archetype**

Distinct archetypes have been developed to account for infrastructure, mobility behaviour, and macro-economic as well as micro-economic differences between major cities.



**Infrastructure**

**Public transport networks:** Include length of walk to PT, train waiting time etc

**Road quality:** World Economic Forum data

**Biking infrastructure:** Km biking lanes as share of total km roads

**Modal split**

**Car usage:** Measured as % of total mobility

**Active mobility:** Walking and cycling measured as % of total mobility

**Public transport:** Measured as % of total mobility

**Government support**

**Spend on transport:** Measured as % of GDP

**SM initiatives/ incentives:** # and volume (in \$) of initiatives

**Economics**

**Purchasing power:** Index of rel. purchasing power in a city based on avg net salary

**Car ownership:** Measured as % of total households owning a car in the city

Source: Oliver Wyman analysis

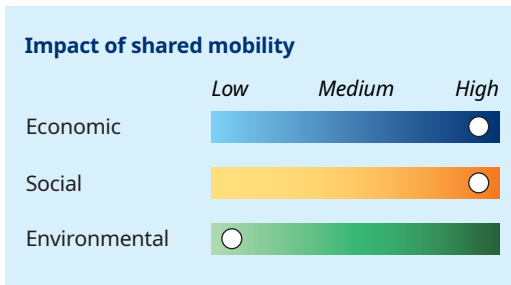


**Exhibit 9: The Active Mobility City is characterized by outstanding infrastructure and high levels of active mobility contributing to environmental sustainability and social equity**

**Active Mobility City**

Majority of points of interest accessible via strong public transport networks, micromobility or active mobility

e.g. Berlin, Amsterdam



Infrastructure	Low	Medium	High
Public transport quality			●
Road quality			●
Biking lanes			●
<b>Modal split</b>			
Car usage	●	●	
Active mobility			●
Public transport		●	
<b>Government support</b>			
Spend on transport			●
SM initiatives/incentives			●
<b>Economics</b>			
Purchasing power		●	
Car ownership			●

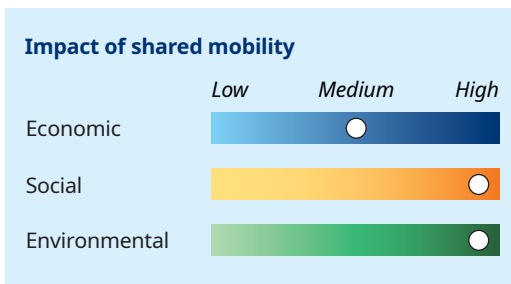
Source: Oliver Wyman analysis

**Exhibit 10: A Mixed City has highly developed infrastructure and a relatively equal distributed modal split contributing to environmental sustainability and social equity**

**Mixed City**

Cities with generally strong public transport networks but where people still have a tendency to rely on traditional rather than shared mobility means of transport

e.g. New York, London, Dublin



Infrastructure	Low	Medium	High
Public transport quality		●	●
Road quality			●
Biking lanes		●	
<b>Modal split</b>			
Car usage		●	
Active mobility		●	
Public transport		●	
<b>Government support</b>			
Spend on transport		●	
SM initiatives/incentives			●
<b>Economics</b>			
Purchasing power		●	●
Car ownership		●	●

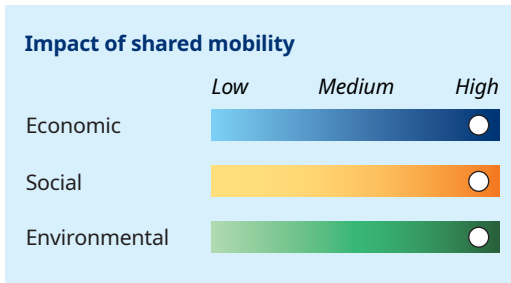
Source: Oliver Wyman analysis

**Exhibit 11: The Car-Dependent City has a high share of car usage and ownership, and shared mobility contributes to environmental sustainability and social equity**

**Car-Dependent City**

Cities that require people to rely on their cars as a main means of transport because of commutes and a mediocre public transport network

e.g. Chicago, Moscow



	Low	Medium	High
<b>Infrastructure</b>			
Public transport quality		●	
Road quality			●
Biking lanes	●		
<b>Modal split</b>			
Car usage			●
Active mobility	●	●	
Public transport	●	●	
<b>Government support</b>			
Spend on transport			●
SM initiatives/incentives		●	
<b>Economics</b>			
Purchasing power		●	
Car ownership			●

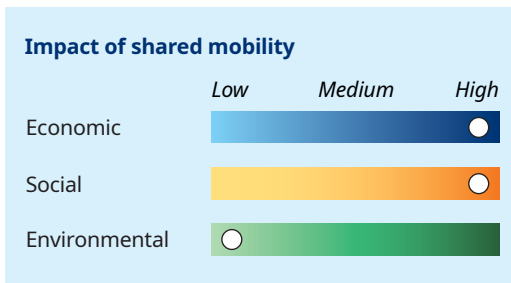
Source: Oliver Wyman analysis

**Exhibit 12: Emerging Cities are characterized by underdeveloped transport infrastructure, in which shared mobility is contributing to economic growth and social equity**

**Emerging City**

Cities normally located in developing countries with weak public transport networks and low government support

e.g. Lagos, Lima



	Low	Medium	High
<b>Infrastructure</b>			
Public transport quality	●		
Road quality	●		
Biking lanes	●		
<b>Modal split</b>			
Car usage		●	
Active mobility			●
Public transport		●	
<b>Government support</b>			
Spend on transport	●	●	
SM initiatives/incentives	●		
<b>Economics</b>			
Purchasing power	●		
Car ownership	●		

Source: Oliver Wyman analysis

## ENDNOTES

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Bolt is a leading shared mobility app in Europe and Africa offering ride-hailing, micromobility rental, car-sharing, and restaurant and grocery delivery services. The company was founded in 2013 in Tallinn, Estonia, and operates in over 45 countries and 500 cities across EMEA.

The company aims to accelerate the transition towards light electric vehicles such as scooters and e-bikes and shared mobility options like ride-hailing and car-sharing, to help transform urban areas into sustainable, people-friendly spaces.

This independent report uses Bolt's private and public source data to analyse the economic, social and environment impact of shared mobility. It also provides new proprietary data on some of the key issues affecting the sector including affordability and safety, ride hailing driver earnings and shared mobility's environmental impact.

Bolt and Oliver Wyman intend to update the findings on an annual basis if found to be of benefit to stakeholders in the city planning and transport sectors.

Oliver Wyman is a global leader in management consulting. With offices in more than 70 cities across 30 countries, Oliver Wyman combines deep industry knowledge with specialized expertise in strategy, operations, risk management, and organization transformation. The firm has more than 6,000 professionals around the world who work with clients to optimize their business, improve their operations and risk profile, and accelerate their organizational performance to seize the most attractive opportunities.

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